17th CLMPST
BUENOS AIRES 2023

INTERNATIONAL CONGRESS OF LOGIC METHODOLOGY AND PHILOSOPHY OF SCIENCE

MONDAY, JULY 24TH

9:30 – 11:00	OPENING CEREMONY

11:00 – 11:30	COFFEE BREAK

11:30 – 13:00	PLENARY SPEAKER: HELEN LONGINO

AUDITORIUM 1

PLENARY SPEAKER

Helen Longino
(Clarence Irving Lewis Professor of Philosophy, Emerita, Stanford University)

Science, values, and "development": How images of science matter

Abstract: While the status of traditional cognitive values is highly contested within philosophy, those values remain associated with and inform an image of science and scientific knowledge outside of philosophy. This talk relies on several case studies to explore the impact of this association in the arena of economic development and modernization.

13:00 – 14:30	LUNCH

14:30 – 15:30	INVITED SPEAKER: CATARINA DUTILH NOVAES

AUDITORIUM 1

INVITED SPEAKER
Catarina Dutilh Novaes (Vrije Universiteit Amsterdam)

The dialogical roots of deduction

Chair: Alejandro Solares-Rojas (University of Milan)

Topic: A.4 Historical Aspects of Logic

Abstract: In my book *The Dialogical Roots of Deduction* (CUP, 2020), I've argued that logic and deduction have dialogical roots in different senses: philosophical, historical, cognitive, and in mathematical practices. In this talk, I will present the main results of the historical chapters of the book (Chapters 5, 6 and 7). These chapters retrace the dialogical origins of logic and deduction in ancient Greece and the development of syllogistic by Aristotle; they include brief presentations of two other classical traditions in logic, namely the Indian and the Chinese traditions, and the medieval reception of Aristotelian logic both in the Latin and in the Arabic traditions. Finally, I discuss how the dialogical roots of deduction were by and large forgotten since the early modern period, culminating with Kant and the emergence of mathematical logic in the 19th century.

15:30 – 16:30	INVITED SPEAKER: PAOLO MANCOSU

AUDITORIUM 1

INVITED SPEAKER
Paolo Mancosu (University of Berkeley)

Totality, regularity, and cardinality in probability theory

Chair: Javier Legris (University of Buenos Aires / CONICET)

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: A probability space is given by a triple (Ω, $\mathfrak{F}$, P) where Ω is a set called the sample space, $\mathfrak{F}$ is a σ-algebra of subsets of Ω, and P is a probability function from $\mathfrak{F}$ to the interval [0, 1]. The standard Kolmogorovian approach to probability theory on infinite sample spaces is neither regular nor complete. Totality, expressed set-theoretically, is the request that every subset of the sample space Ω is measurable, i.e. has a probability value. Regularity, expressed set-theoretically, is the request that only the empty set gets probability 0. Mathematical and philosophical interest in non-Kolmogorovian

approaches to probability theory in the last decade has been motivated by the possibility to satisfy totality and regularity in non-Archimedean contexts (Wenmackers and Horsten 2013, Benci, Horsten, Wenmackers 2018). Much of the mathematical discussion has been focused on the cardinalities of the sample space, the algebra of events, and the range (Hájek 2011, Pruss 2013, Hofweber 2014). In this talk I will present some new results characterizing the relation between completeness and regularity in a variety of probabilistic settings and I will give necessary and sufficient conditions relating regularity and the cardinalities of the sample space, the algebra of events, and the range of the probability function, thereby improving on the results hitherto available in the literature. This is joint work with Guillaume Massas (Group in Logic, UC Berkeley).

Bibliography
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14:30 - 16:30

AUDITORIUM 2

(DLMPST-ISC)
Special Symposium DLMPST-ISC: Assessment of Research and Knowledge

Chairs: Batthyány, Karina; Löwe, Benedik

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: The question of assessment of research and knowledge is central to the utilisation of scientific research in society and an indispensable part of the lives and careers of scientists. When presented with individual results provided by scientific research, we need to assess whether they are correct, relevant, and adequately interpreted; when presented with proposals for future research, we need to assess their merits, likelihood of success, and adequate methodology; when presented with the research portfolio of an individual researcher who applies for a grant or academic position, we need to assess its relative strength within the field of applicants.

As a consequence, the general question of what our methods and criteria to assess research and knowledge is pivotal to science as a societal endeavour. It is also a deeply philosophical question, as it requires us to unearth the underlying norms used in our judgments, make them precise in order to enable us to communicate and justify our decisions, unravel various dimensions of assessment and aggregate them into decision procedures. The studies of rational decision making, philosophy of science and technology, and science policy meet in a fundamentally meaningful way to understand what we do, what we can do, and what we ought to do when assessing research and knowledge.

This special symposium, convened by the International Science Council (ISC) and the Division for Logic, Methodology and Philosophy of Science and Technology (DLMPST) aims to highlight the

philosophical and societal issues involved from a variety of different angles. In organising this symposium, the ISC and DLMPST involved the Consejo Latinoamericano de Ciencias Sociales (CLACSO) to include their expert knowledge in the discussions.

Speakers:
1) Karina Bathyány: Challenges of knowledge as a common good and research assessment in Latin America and the Caribbean: the FOLEC-CLACSO initiative
2) Cecilia Hidalgo: Assessing interdisciplinary studies in SSH
3) Fenrong Liu Assessment of logic research in China
4) Uskalli Mäki: Basic' and 'applied': Issues of impact and assessment
5) Eleonora Cresto: Knowledge and the assessment of statistical evidence in the legal realm
6) Kevin Zollman: The tension between research assessment and supporting cognitive diversity

14:30 – 15:00
Karina Batthyány (CLACSO - ISC Govering Board) - Challenges of knowledge as a common good and research assessment in Latin America and the Caribbean: The FOLEC-CLACSO initiative.

15:00 – 15:30
Cecilia Hidalgo (Universidad de Buenos Aires) - Assessing interdisciplinary studies in SSH

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: The presentation aims to contribute to the discussion of how assessment of interdisciplinary studies is defined in research and knowledge evaluation processes in Latin America. To re-signify collaborative practices in the region, a heuristic framework is built that comprehends the 'situated' and relational dimensions of research and knowledge production. This situated aspect is relevant for conducting more context-sensitive academic evaluation processes in Latin America, thus contributing to the ethical-political dimension on how research is defined, embodied, and enacted in specific contexts.

15:30 – 16:00
Fenrong Liu (Tsinghua University) - Assessment of logic research in China

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: I will present an overview of the current state of assessing logic research in China, emphasizing its merits and exploring potential areas for improvement. Specifically, I will examine the interdisciplinary nature of logic within the broader research landscape in China, encompassing philosophy, mathematics, linguistics, and computer science. Additionally, I will endeavor to make comparisons whenever possible in order to highlight distinctive features and approaches.

16:00 – 16:30
Uskali Mäki (University of Helsinki) – 'Basic' and 'applied': Issues of impact and assessment

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: As analytical categories, the notions of basic and applied research are inescapably ambiguous, but their rhetorical functions as policy categories are quite obvious. They are typically invoked at the interface between science and the rest of society, involving issues of impact and assessment. I will unveil some of those ambiguities as well as the (often quite shaky) presuppositions underlying those rhetorical functions."

Symposium continues in AUDITORIUM 2, 17:00 – 18:00

ROOM 01

(JUST)
Symposium: Justificaton, Creativity, and Discoverability in Science - Académie Internationale de Philosophie des Sciences

Chair: Heinzmann, Gerhard

Topic: B.1 Methodology

Abstract: This symposium is the outcome of discussions within the framework of the International Academy of the Philosophy of Science (Brussels). It investigates the interplay between ontological commitments, rigorous analysis and human creativity that leads to the discovery of the new in the sciences. According to a Kantian perspective, discoveries are in most cases an accomplishment of reflective judgement, which is not bound to theories and rules, but rather a case of ingenious achievement, which is essentially different from the usual methodology of the sciences. But what can be the indicators of success? Does ontologically committing to successful theories tends to make scientists skeptical of proposals at odds with mainstream ontological commitments, and does the non-ontological commitment to theories lead scientists to be systematically more open to radical theoretical novelty? Is inductive reasoning more effective than abduction for justifying some scientific beliefs about entities that cannot be immediately observed? What about creativity in data-intensive discovery? Can fallible judgements from the process of inquiry be eliminated there?

How should the relationship between evidence and creativity to be conceptualized in mathematics and logic? Could Peirce's ampliative reasoning be used in today's logical programs? Regarding especially the relationship between finite and infinite: Can predicativity provide a criterion for this, and how does the occidental standard conception relate in this respect to oriental conceptions, such as the bouddhist tradition of the Japanese school of Kegon? Finally, can we consider human creativity from an "eco-cognitive" perspective?

These questions will be addressed in the lectures by well-known specialists in the philosophy of science from Belgium, Croatia, France, Great Britain, Italy and the United States. It provides a significant overview of current research on the methodology of scientific discovery and justification, with examples from several disciplines and cultural areas.

1) Jure Zovko: The Role of Judgment in Scientific Discovery
2) Alberto Cordero: Ontological Commitment and Creativity
3) Michel Ghins: Justifying scientific beliefs: an anti-pragmatist and anti-naturalist perspective

4) Sabina Leonelli: Creative investigation in data-intensive discovery
5) Gerhard Heinzmann: Evidence, Creativity and Discoverability in Mathematics: the Example of Predicativity
6) Andrew Arana: Intuition and creativity: the Japanese perspectives of Kitaro Nishida and Gaisi Takeuti.
7) Lorenzo Magnani: Discoverability - The Urgent Need for and Ecology of Human Creativity
8) Atocha Aliseda: The Place of Logic in Creative Reason

14:30 – 15:00

Jure Zovko (University of Zadar) - The role of judgment in scientific discovery.

Topic: B.1 Methodology

Abstract: Kant saw in the reflective power of judgement a "heuristic principle", i.e. the ability to "investigate the particular laws of nature" (AA V, 411.). One of the most important characteristics of science since the 17th century has obviously been the expansion of knowledge and the discovery of new dimensions. In Kant's view, the heuristic segment of judgement consists in the reflective search for adequate explanatory models through experimental research. Discoveries of new knowledge are among the most important achievements of reflective judgement. Cognitive achievements that lead to the discovery of the new in the sciences are in most cases an accomplishment of reflective judgement, which is not bound to theories and rules, but rather a case of ingenious achievement, which is essentially different from the usual methodology of the sciences. Without the activity of reflective judgement, our scientific procedure remains a mere mechanical subsuming (Cf. Kant, AA V, 417.). This paper explores the heuristic dimension of judgement for scientific research.

15:00 – 15:30

Alberto Cordero (CUNY Graduate Center & Queens College CUNY (City University of New York)) - Ontological commitment and scientific creativity.

Topic: B.1 Methodology

Abstract: Most scientific realists take novel empirical success and scientific fecundity as indicators that some of the theoretical content deployed is approximately true. Critics disagree. According to an influential anti-realist argument, the suggested indicators of success are misleading and intellectually impoverishing. The argument, proposed in multiple guises by Kyle Stanford (2015, 2021), claims that scientific realist approaches systematically encompass a “conservative” interpretation of scientific success that proves intellectually pernicious in the long run. The reasoning rests on two premises. The first holds that ontologically committing to successful theories tends to make scientists skeptical of proposals at odds with mainstream ontological commitments. To defenders of this premise, one unfortunate consequence is unfair opposition to having such proposals sufficiently explored in science. The second premise holds that, by contrast, not ontologically committing to theories makes scientists systematically more open-minded to radical theoretical novelty, ultimately more creative, their beliefs more modest but better justified. My presentation will discuss the noted argument and suggest that the case it raises against ontological commitment is misguided and, in any case, unsound. However, the argument provides an opportunity to clarify connections between ontological commitment and the pursuit of creativity and justification in science.

I will concentrate on the case of ontic theories in quantum mechanics that started in the 1950s with the explicit aim of looking for alternatives to the then-dominant Copenhagen Interpretation.

These are developments committed to the idea that the quantum state represents a physical aspect of reality. The intellectual efforts behind the approaches may be regarded as "conservative" in their determination to take the quantum state ontically. However, especially from the 1990s on, the resulting ontic proposals have articulated radical alternative categories of understanding in physics. They have done this while improving the quality of theoretical justification—especially intra-theoretically, advancing the integration of descriptive domains across initially incompatible disciplines (notably, classical and quantum physics), opening the scientific mind beyond what was imagined possible.

References

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15:30 – 16:00

Michel Ghins (Université Catholique de Louvain) - Induction to justify, abduction to discover.

Topic: B.1 Methodology

Abstract: In this paper, while remaining faithful to a version of moderate empiricism, I defend an epistemological approach which is neither pragmatist nor naturalist. Such approach, which focuses on the products of scientific activity, namely theories, aims at assessing the better reasons to believe, or not, in some scientific claims. This approach is normative, not descriptive, and thus genuinely philosophical.
Within this framework, I argue that inductive reasoning is more convincing than abduction to justify scientific beliefs about entities that cannot be immediately observed provided they are empirically detected, that is, indirectly observed by means of instruments the reliability of which has been inductively assessed. On the other hand, I will vindicate the merits of explanationist strategies to discover new, unknown entities, provided they are empirically detectable.

16:00 – 16:30

Gerhard Heinzmann (University of Lorraine) - Evidence, creativity and discoverability in mathematics: The example of predicativity.

Topic: B.1 Methodology

Abstract: Predicativity is a central concept in mathematics, which illustrates the unresolved tension between evidence, creativity and discoverability in mathematics.

The foundational problem that was occupying Bertrand Russell and Henri Poincaré in the wake of the discovery of the famous Russell paradox was trying to answer the question as to which

propositional functions define in a non-circular way, i. e. predicatively, sets. However, the discussion about an explicit characterization of a predicative definition and of what constitutes a vicious circle lasted about more than 50 years and is not definitively ended.

The creativity of the search centered on an effort to show as much classical mathematics as possible to be predicative.

In a first section, I discuss the predicative definability of Russell and Poincaré to Weyl, Wang and Lorenzen. In a second section, I ask the question if complete induction would possess an irreducible impredicative character even if is not treated as an explicit definition but as an inductive definition. Using examples from Hilbert/Bernays and Lorenzen, I show that in the first case imagination or thought experiment transcending operative abilities would be a necessary tool to consider induction as evident; for Lorenzen, impredicativity can be avoided in favor of a purely operational justification with operative imagination, but at the price of a heterogeneous conception of predicativity. Regarding predicativity, the demarcation line between evident and suspect reasoning remains vague.

References

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Symposium continues in the same room, 17:00 -18:00

ROOM 02

14:30 – 15:00

Ashton Sperry (Ronin Institute) - Reinforcement learning and cooperation in the Centipede Game

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: This paper develops a dynamic-learning model of cooperation in the Centipede Game based on reinforcement learning and the literature on k-armed bandits. The Centipede Game models the tension of a dynamic relationship in which there are growing rewards from sequential exchanges but increasing temptation for individuals to capitalize on those rewards at the expense of others.

The Centipede Game has a unique solution given an iterated elimination of weakly dominated actions: a Nash equilibrium in which each player capitalizes at the first opportunity. A Nash equilibrium is a profile of strategies, one for each player, so no one has the incentive to switch one's strategy unilaterally. However, (at least partial) cooperation gives a greater joint payoff than the Nash equilibrium strategy. Hence, game theorists wish to explain how players might develop and sustain cooperation for a greater joint payoff than rationally prescribed.

This paper shows that cooperation in the Centipede Game stems from individuals learning each other's behavioral patterns through repeated interaction. For instance, individuals explore different actions through repeated interaction and study their opponents' responses. Individuals then settle on actions that attempt to exploit their opponents' actions. Those individuals who settle on exploitable actions settle on unstable behavioral patterns. Otherwise, individuals that settle on actions that are not exploitable settle on stable behavioral patterns. This paper shows that cooperation is not exploitable through repeated interaction in the Centipede Game and is a stable behavioral pattern.

This paper's dynamic-learning model transforms the Centipede Game into a new k-armed bandit called a 'strategic bandit'. A strategic bandit transforms a repeated game based on a behavioral rule into a k-armed bandit. For a traditional k-armed bandit, an individual repeatedly chooses from a k number of actions, each of which has a fixed probability and payoff assignment, which the individual does not know. The individual's goal is to use a decision policy to learn enough information about his decision situation to estimate the probability and payoff assignments. However, each action's probability and payoff assignment changes over time for a strategic bandit according to a transition rule. The individual's goal is to learn those changes in the probability and payoff assignments—that is, to learn the transition rule. The result is a dynamic-learning model in which individuals learn the strategic bandit's behavioral patterns from complete ignorance—the basis of learning cooperation in the Centipede Game.

Selected References

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15:00 – 15:30

Michał Tomasz Godziszewski (University of Warsaw), Leszek Wronski (Jagiellonian University) - The brier score and elimination counterexamples

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: In the accuracy-first epistemology program, the usual thing used to assess the accuracy of the degrees of belief is to use scoring rules - functions that measure the quality of a probability-estimate for a given event, with lower scores signifying probabilities that are closer to the event's status (1 if it occurs, 0 otherwise). Which of the rules should we choose? D. Fallis and P. Lewis (2016)) argue that the Brier Score, at least in the partition version, is not a good tool for measuring the value of an agent's belief function. The reason is that conditionalization is supposedly always of epistemic benefit to the agent, yet there are cases in which, according to the Brier Score, the inaccuracy of a belief function increases after conditionalization cases like this shall be called 'elimination counterexamples'. Both the logarithmic and spherical measures are immune to elimination counterexamples. So, should we care? Is this really so bad? Is this the fault of the Brier score? Is the situation similar in the context of Boolean algebras instead of partitions? As L. Wroński suggested (2017), a natural thing to do in an inaccuracy-first framework is to point out that conditionalization minimizes expected inaccuracy. In all examples the following is true: there is a different world w such that, were that world the actual one, the inaccuracy would decrease. A real flaw of the Brier score would be the following: if it allowed situations in which after conditionalization the inaccuracy increased whatever the actual world was. For the case of partitions, we know this cannot happen, and so we have proven "sanity check'' theorem for conditionalization coupled with the Brier Score: There are no probabilistic mass vectors *p* and *q* such that *q* is obtained from *p* via conditionalization and *B(p) < B(q),* regardless of the choice of the actual world *w*. What is more, as worked out during private communication with B. Fitelson, D. Fallis and P. Lewis, we can give necessary and sufficient conditions for the Brier score rising over partitions. During the talk I wish to prove the results, put it in the appropriate philosophical context and discuss the arguments that use the elimination counterexamples in the debates on scoring rules.

15:30 – 16:00

Matthew Coates (University of California, Irvine) - Modelling the effects of hiding dissent in journal publications

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: With a rise in “bad” (epistemically detrimental) dissent in science, for example climate change denialism, there have been discussions amongst social epistemologists about such dissent and how this dissent should be dealt with by scientific communities. Examples of these discussions include Biddle and Leuchsner (2015), de Melo-Martín and Intemann (2018), and Miller (2021). One method that has been proposed to deal with epistemically detrimental dissent is by hiding it, for example by hindering it during the peer review process and not publishing it in journals. However, the effectiveness of such a strategy has been questioned, for example by de Melo-Martín and Intemann (2014, 2018). Amongst other reasons, they claim that there is no characterization of epistemically detrimental dissent which reliably identifies dissent as epistemically detrimental and is able to exclude all legitimate scientific dissent. This means that legitimate dissent may also be hidden when dissent is hidden. Using network models, following the methods developed by Zollman (2009, 2010), I simulate the effect that scientists hiding dissenting evidence without such a reliable characterization has on the beliefs of scientific communities. My model finds evidence against the use of hiding dissent by journals if no reliable characterization of epistemically detrimental dissent is available in many situations. When dissent is hidden, the scientific community will come to the correct consensus less often than when dissent is not hidden, albeit it will come to the correct consensus faster. However, the model also finds that if scientists are sufficiently far along the path to reaching consensus before they start hiding dissent, it no longer matters that a reliable characterization of epistemically

detrimental dissent is not available. At that point hiding dissent becomes as successful as not hiding dissent, whilst also coming to the correct consensus more quickly. This suggests that scientists hiding epistemically detrimental dissenting evidence may be justified in certain cases. Additionally, I show that these results are robust under other modelling assumptions and other modelling frameworks.

References

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16:00 – 16:30

Javier Castro Albano (Universidad de Buenos Aires - Universidad Nacional de Rosario) - The logic of science in post-Kuhnian historicist philosophy of science.

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: In the first half of the 20th century, the Logic of Science, an activity that includes the logical regimentation of scientific languages, the axiomatization of scientific theories, and the study of logical properties and relations between scientific theories, became a central component of some of the major research projects in the philosophy of science, including (some versions of) logical empiricism and Karl Popper’s critical rationalism. For these projects, rational choice between scientific theories depends crucially on the logical structure of theories. The logic of science played an epistemological role in those proyects, since its main objective was considered to be the explicitation of that logical structure. The publication in 1962 of Thomas Kuhn's The Structure of Scientific Revolutions boosted a historicist turn in the philosophy of science, in the context of which the idea that rational choice between scientific theories is a far more complex problem than Popper and the logical empiricists had believed became firmly established. Exactly how scientific rationality is to be understood in the context of post-Kuhnian historicism is an extremely controversial issue, but the general consensus among historicists is that the logic of science does not have much to contribute to that understanding.

Against that general consensus, I will argue that “old fashioned” logic of science, including regimentation, axiomatization and the study of logical properties and relations between scientific theories, can make an important contribution to the understanding of scientific rationality in the context of post-Kuhnian historicism. I am not going to deny that the epistemological role that Popper and (some of) the logical empiricists assigned to the logic of science is incompatible with the historicist conception of science. What I will claim is that in addition to this epistemological role, “old fashioned” logic of science has also played another role in the philosophy of science of the first decades of the 20th century, a hermeneutic role, which has nothing to do with the search for the a-historical logical structure of scientific knowledge, and that post-Kuhnian historicism is fully compatible with it. My objective will be to bring to light that hermeneutic role of the logic of science that has been eclipsed by the centrality that the epistemological role has assumed in contemporary philosophy of science

and to show its relevance for the historicist understanding of the processes that drives rational choice of scientific theories and scientific change.

ROOM 03

14:30 – 15:00

Martina Zirattu (University of Turin) - Gappy Sentences and Preservation of Propositionality

Topic: A.2 Philosophical Logic

Abstract: Some sentences are clearly true or false, while assigning a truth value to other sentences is not that straightforward. This last case includes, for instance, sentences with non-denoting terms, paradoxical sentences, sentences with vague predicates etc. According to some theorists, these sentences should be valued as neither true nor false, considering their truth value as "gappy". Hence, they adopt a third truth value which can be assigned in the problematic cases.

However, a more fine grained perspective on gappy sentences sheds light on an important aspect, as pointed out in Martínez-Fernández and Martí (2021). In fact, their lack of a determinate truth value may depend on different semantic characteristics. Either they are not true or false but still express a full propositional content, hence could be true or false, or they can't even be true or false because, despite being sensical, they do not express a proposition. Hence, Martínez-Fernández and Martí (2021) argue that not only one but two more truth values could be adopted when dealing with natural language semantics. A four valued semantics seems then to be a good tool to capture the different semantic status of gappy sentences. They obtain this new semantics through the addition of a fourth contaminant/infectious truth value (for non-propositional sentences) to the Strong Kleene semantic tables (where the three truth values are assigned to propositions that are true, false or neither true nor false).

In this work, different consequence relations defined on the semantics by Martínez-Fernández and Martí (2021) are studied. In particular, a new logic which preserves the propositional truth values is introduced and characterized as validating all and only the inferences which respect the Right Variable Inclusion constraint (RVI).

The main idea here is that the non-propositional truth value can be used to characterize preservation of propositionality in inferences. This is interesting not only by itself but especially if combined with logics that preserve exact truth or non-falsity. The results in this work show that the kind of logics obtained following this idea (and, of course, accepting non-propositionality as being contaminant), have strong variable sharing properties. These features are usually seen as characterizing at a formal level the connection of meaning existing between the premises and conclusions of an argument, namely how one is relevant with respect to the other. Moreover, here RVI has been shown to coincide not only with this relevantist concern but also, within this semantic framework, with the preservation of propositionality, possibly making it even more appealing.

References

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15:00 – 15:30

Perceval Pillon (Université Paris 1 Panthéon Sorbonne - IHPST) - Philosophical goals and formal means of deontic logic

Topic: A.2 Philosophical Logic

Abstract: Deontic logic is a branch of formal logic aiming to give a formal account of a set of notions revolving notably around obligation and normative reasoning. Branching from the pioneer proposal in the form of a modal logic by von Wright (von Wright 51), deontic logic has been studied by a large range of formal systems of different natures (Hilpinen, R., & McNamarra, P. 2013). It grew to address more and more philosophical questions (Hansen, J., Pigozzi, G., & Torre, L. van der. 2007).

The aim of this paper is to study deontic logic from the perspective of a critical theory of formalization. The main issue will be to question the (philosophical) goals, the (formal) means of this enterprise and their related successes. We want to identify philosophical goals for the formalization of the set of notions defining deontic logic and, once those goals are identified, we want to study the adequation between them and the formal tool used. By formal tools we mean here the choice of formal solutions chosen in order to formalize the aimed notion. Taking obligation as an example, one can choose to formalize it by a deontic modal operator or to define it by a formula within an alethic modal logic (a la Anderson for example). The bottom line of our study is to answer the questions "why and how one formalizes such notions?". Our proposal will rely on two main philosophical tools to carry out the analysis: the Carnapian notion of formal explication (Carnap, R. 1950) and the literature on the theory of formalization (Dutilh Novaes, C. 2012).Given the large scope of the question, we will focus on significant examples of formal propositions : systems of modal deontic logic and in and out logic.

Our communication will first briefly explain the historical development of the field of deontic logic in order to contextualize the examples. Then we will present the criteria used to analyze the formal systems and the reasons why they seem relevant to us. The last and main part of the talk will analyze the selected systems, by applying the criteria defined earlier to them, having in mind the philosophical or practical goals they are supposed to achieve.

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15:30 – 16:00

Pawel Pawlowski (Ghent University) - Quasi-extensional semantics for modality

Topic: A.2 Philosophical Logic

Abstract: Non-deterministic or quasi-extensional semantics (NDS) were independently developed by Ivlev and Rescher and formally defined by Avron. This semantics is a generalization of the usual matrix approach to many-valued logic. In NDS, the interpretation of a connective does not uniquely determine the value of a compound formula. Instead, it assigns the compound formula a non-empty set of values.

In our talk, we will focus on a non-deterministic approach to modality. This approach involves defining a direct NDS for a modal logic without the rule of necessitation (NEC), and then strengthening these semantics by restricting the set of admissible valuations according to the procedure of m-th level valuation. The resulting logic is the closure of the starting logic under NEC.

We will study a 8-valued framework constructed in 2016, where the values not only indicate whether a formula is true, but also whether it is possible and necessary. We will prove what modal logics can be described in this framework by changing the interpretation of modalities and implication. We will also discuss the relationship between these semantics and possible world semantics, and address some open problems related to the height of the hierarchy of level valuations.

16:00 – 16:30

Cezar Mortari (Universidade Federal de Santa Catarina) - Valuation semantics for some classical and strict modal logics.

Topic: A.2 Philosophical Logic

Abstract: This work discusses the application, to several systems of classical and strict modal logic, of the valuation semantics technique proposed by A. M. Loparić for the basic normal modal logic K (see [1]). We review results already obtained and, building on previous work, present some new results about classical and strict modal logics.

A valuation for a logic L is a function from the set F(L) of all formulas of L to the set {1,0} of truth-values satisfying certain conditions (which vary depending on L). For classical propositional logic PL, for example, a valuation v is a function from F(PL) to the set {1,0} such that v(¬A) = 1 iff v(A) = 0; v(A ∧ B) = 1 iff v(A) = 1 and v(B) = 1; and so on.

Valuation semantics were presented for many logics; among them we have, for instance, da Costa's paraconsistent logics Cn and Cω, the modal logic K, some temporal and modal-temporal logics, usual normal logics, Johansson's minimal logic and intuitionistic logic.

Valuations for PL can be easily defined because classical operators are truth-functional (and the same goes for other truth-functional many-valued logics). For modal logics, however, we need to add conditions specifying how to deal with modal operators; which conditions precisely will depend on the logic in question. In general, for normal modal logics we would need something like the following:

* for any valuation v, if v(□A) = 0 then there is a valuation v' such that v'(A) = 0 and, for every formula □B such that v(□B) = 1, v'(B) = 1;and then we would add a clause dealing with the case in which v(□A) = 1. But evidently we cannot use this, on pain of circularity, to define a valuation. So we will need first to define certain functions and then define valuations in terms of them. This can be done in different ways: (i) directly in terms of valuations for PL (for instance, for some logics in which modal inference rules are restricted to tautologies), or (ii) we can use the modal degree of formulas, or (iii) we can use finite sequences of formulas closed under subformulas, as Loparić originally did for K. We will illustrate this for some logics, and point out how to modify the definitions to handle other systems.

For modal logics, valuation semantics allow us to dispense with the machinery of possible worlds and accessibility relations. Another advantage of the method of valuations is that usually we obtain a decision method for the logic question based on valuation tables.

We finish by mentioning some open problems regarding valuation semantics.

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ROOM 04

14:30 – 15:00

Laura Garcia (Posgrado en Filosofía de la Ciencia, UNAM) - Let's change the interpretation of autistic symptoms

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: For decades, Autism Spectrum Disorder (ASD) was defined as a triad of deficits in social interaction and communication, as well as by the presence of restricted and repetitive behaviors and interests (APA 2013). Although more is known in recent years about its neurological bases, little is still known about the development and mental functioning of an autistic person. It has recently been suggested that ASD leads to significant differences at a sensory and motor level, which affects the way in which the person behaves and expresses herself, since activities such as communicating, socializing and participating in interactions require a neurological system that coordinates, synchronizes and regulates sensory and movement information (Donnellan, Hill & Leary 2013). While it is recognized that autism is a disorder that reflects certain differences in an individual's neurology, these differences are not part of the core features of ASD.

My paper consists of explaining why it is convenient to opt for an interpretation of ASD from a neurological perspective, in which sensory and movement differences can be included, routes in which progress has currently been made. First, I will detail what the interpretation of ASD symptoms consists of, which has been overstated since the 1980s. Then, I will describe recent neurobiological findings on ASD (Gepner & Feron 2009), which suggest sensory and motor differences in autistic people, a situation that contributes to their different behavior, from a neurotypical point of view. Finally, I will argue that despite being in progress, this literature is important evidence and, furthermore, finds support in first-person reports from autistic people, unlike the overstated interpretation of ASD. All of this will help me explain why it is convenient to explore a change of perspective in the study of autism, namely, a neurological perspective based on autistic symptoms that can account for the abilities and disabilities in terms of movement and sensory differences of autistic individuals. These would help to understand in a more extensive way the behavior, as well as the difficulties that autistic people face.

Given the inconclusive evidence on ASD, the calls to help understand how its different aspects affect the lives of autistic people, as well as its relevance to Cognitive Sciences regarding the understanding of the human mind, Philosophy cannot ignore this pending issue. On the contrary, as it is a recent line of research on autism, Philosophy would continue to contribute to conceptual analysis, while helping to elucidate the explanatory and interdisciplinary bases that ASD demands.

15:00 – 15:30

Glescikelly Herminia Ferreira (Programa de Pós-Graduação em Filosofia, Universidade Federal de Pernambuco) - Four basic methodologies in the scientific research of lucid dreaming.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: Lucid dreaming (LD) is a type of dream in which subjects become aware of their oneiric state and may even have the possibility of controlling the dream and communicating with the external world. As a special state of consciousness and a type of dream, it has caught the attention of many

scientists and philosophers in the exploration of consciousness. The investigation of LD is important for clarifying the nature of consciousness and self-awareness, since it is a complex level of consciousness which can be monitored with imaging techniques, biochemical analyses and phenomenological introspection. Reports of LD appear since the beginning of the history of philosophy, and nowadays philosophers such as Jennifer Windt, who compares dreams with other states of consciousness, and Antti Revonsuo, who considers dreams as the most important path for the study of consciousness, have been interested in LD and dreaming in general, working together with neuroscientists, psychologists, and researchers from other fields. In this talk I will explore four methodologies used in dreaming and LD research, commenting on what can be inferred for the understanding of consciousness. The first classic methodology is introspection and self-observation, involving a dream diary. One may mention the studies in LD by the French sinologist Hervey de Saint-Denys (1867) and by the English psychologist Mary Arnold-Forster (1921), who explored self-suggestion before sleeping, which today is part of the standard techniques for inducing LD, and took lucid dreams as rehearsals of behavior. Reference should also be made to Frederik van Eeden, the first person to use the term “lucid dream” in its present meaning (1913) and who presented his views in academia, based on his diary of around 350 lucid dreams. The second methodology to be mentioned is polysomnography (PSG) and real time communication from dreamer to scientist. This new era began in the 1970’s, when neuroscientists started investigating LD in laboratory using PSG, the standard technique used for sleep investigation, which includes electroencephalography, electrooculography, and electromyography. Keith Hearne, a psychologist from Liverpool, and physiologist Stephen LaBerge, from Stanford, independently applied this technique for LD research in their laboratories and showed that LD is a measurable experience, with the sleeping subject being able to communicate, with the movement of the eyes, at the moment of the LD experience. The third methodology in the present list are the brain imaging techniques, which have been so important for neuroscience since the 1980’s. Functional magnetic resonance imaging (fMRI) has been used for showing the brain areas that are activated during LD, in comparison with non-lucid REM (rapid-eye movement) sleep (as in Dresler et al., 2012). Such areas are those associated with higher-order cognitive capacities, such as volition, memory, and self-awareness. The fourth method to be described refers to work by Kokoly et al. (2021), that describes two-way communication in real-time between dreamer and researcher, using sensorial stimulation and PSG. The use of external stimulation to interfere with dreams was pioneered by the French physician Alfred Maury, as reported in 1865.

15:30 – 16:00

Marina Trakas (CONICET - Lab Sueño y Memoria, ITBA), Ryan Daley (Gordon College) - Memory biases.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: In this presentation, I discuss different aspects of a kind of bias that has been quite ignored at least in the philosophical literature: memory biases. Memory biases can be broadly defined as biases that directly affect the memory system. I argue first, that memory biases deserve to be distinguished from other biases generally recognized in the literature, such as attentional biases, given that they are specific enough to not be reduced to other kinds of biases. Memory biases present specific mechanisms, and affect memory processes in at least two ways: (a) by interfering in memory consolidation processes, that is, in the enhancement and integration of the newly encoded memory into the network of preexisting long-term memories, and (b) by interfering in the retrieval of the memory.

Secondly, I argue that internally, as a kind, memory biases are not a unitary phenomenon and present different subkinds. Not only can they be produced by different mechanisms, but they also

present at least two heterogeneous forms. Memory biases can affect the conscious act of remembering information: (a) information about the rememberers themselves when, for example, depression biases the affective tone of memories, leading to the retrieval of more unpleasant past experiences; (b) information about someone else's actions, character, etc, when, for example, stereotypes influence memory. Biases in the conscious act of remembering itself are probably the most common form of memory bias. In other cases, memory biases take another form, and this happens when they directly affect perception. This happens, for example, when trauma leads to the consolidation of an overgeneralized fear trace that spreads beyond the original context of fear and leads to perceiving people, items and contexts that differ from the original ones as dangerous. This has as a corollary that some biases that influence perception should be understood as being in fact mnemonic in nature.

Thirdly, I argue that although memory biases do not necessarily entail, in each instance, epistemic and/or practical harms, it is false that memory biases can only be harmful when they directly influence actions and decision processes. If this is probably always the case for biases that affect memories about other people, for example, when the contributions of someone are misremembered due to the influence of a stereotype, the influence of the biased memory in actions and decision processes is not necessary to harm rememberers themselves. The simple fact of bringing a biased memory to consciousness can significantly harm the person who remembers, by negatively affecting their mental health, such as it happens in mood-congruent memory bias related to depression, but also by inducing self-deception and other kinds of distortions related to self-knowledge.

Finally, I consider a general way in which memory biases that affect the conscious act of remembering information can be reduced or at least controlled. I argue that rememberers have the duty to exert epistemic vigilance, that is, to perform--according to the circumstances--certain metacognitive actions (mental and/or non-mental) in order to control and monitor their memories and attribute to them the right credence.

16:00 – 16:30

Zak Kopeikin (University of Colorado Boulder), Ted Shear (University of Colorado Boulder) - Philosophy (of Science) of Psychedelics

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: We approach the recent scientific research into the classic serotonergic hallucinogens, commonly referred to as psychedelics, from the perspective of philosophy of science. While the modern scientific study of psychedelics began in the mid-twentieth century, a combination of social and political circumstances led to a period of dormancy in work on the topic with the passage of the Controlled Substances Act of 1970. In recent years, changing political circumstances and decades of advocacy work have led the legal restrictions previously inhibiting this research to be lifted. As a result, much of the serious scientific work on psychedelics is relatively new and rapidly developing [5]. These promising initial results have also attracted the interest of philosophers. Most of that work has focused on the consequences of this work for epistemology and philosophy of mind [2], but the topic has yet to attract attention in philosophy of science. As we will argue, the science of psychedelics provides an attractive object of study for empirically-informed philosophy of science. To demonstrate, we examine recent work on psychedelic therapies to treat chronic pain and other psychiatric conditions.

Taking phantom limb pain as a starting point, recent approaches to neuropathic pain treatment reconceptualize chronic pain as a brain problem that can be treated with mindfulness techniques exploiting neuroplasticity. This has led to the investigation of psychedelic therapies as treatment for various forms of chronic pain, such as phantom-limb pain [3] and cluster headaches [4]. On the other hand, it has been observed that even a single psychedelic experience can increase

mindfulness-related capacities that are correlated with therapeutic effects, such as reductions in psychiatric symptoms. Additionally, a robust correlation has been established between clinical benefits and modulations to the Salience Network, a network in the brain that is also implicated in the chronic pain research [1].

A thorough examination of this research provides a case study for how philosophy of science can contribute to psychedelic research. For instance:

1. We argue that the accumulated research places significant pressure on the current paradigm of treating physical suffering and mental suffering as distinct kinds and pushes us towards a paradigm shift in the science of suffering.
2. We argue that societal concerns, such as the opioid epidemic and mental health crisis, provide reason for searching for different kinds of explanations, such as approaches that aim to predict, explain, and control the phenomenological properties of conscious experiences (rather than, e.g., reductivist explanations). However, these efforts are complicated by the heterogeneous (and sometimes conflicting) types of inductive risk that arise for different therapeutic applications.

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ROOM 05

(KUHN3)
Symposium: Kuhnian Studies. Where are we and where do we go?

Chair: Giri, Leandro

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: Since the publication of The Structure of Scientific Revolutions, Thomas Kuhn has become one of the most quoted and discussed authors in contemporary thought. His influence radiated among social scientists, professional philosophers, and natural scientists. The purpose of this symposium is to take stock of the recent developments of studies on Kuhn's work and draw some lines on the future of this academic field.

The specialized scholarship on Kuhn has developed in different directions. The symposium aims to open a space for discussion on the current state of Kuhn's studies, as well as its potential for future development. We intend to discuss the main orientations in the study of Kuhn's work and the main problems, obstacles, and challenges facing current research. It is also of interest to discuss the relationships and connections between the critical research tendencies of Kuhn's work and those more reconstructive or exegetical views. We understand that holding a symposium like this contributes not only to the dissemination of research on Kuhn but also to the community of specialists having adequate self-consciousness of the potentialities, limitations, and challenges currently presented by the study of Kuhnian philosophy.

Speakers:
1) Paul Hoyningen-Huene: Where are we going after Kuhn's The Plurality of Worlds?
2) Maria Caamaño: Normal Science and Puzzles about Theory Application
3) Yafeng Shan: How not to be afraid of incommensurability
4) Vincenzo Politi: The Kuhnian account of the scientific community: autonomy and value-ladenness
5) Pío García and Andrés Ilcic: Revising Kuhn's expectations on thought experiments
6) Pablo Melogno: Kuhnian Studies: What is Working and What is Not
7) Jouni-Matti Kuukkanen: Thomas Kuhn and Knowing How: A New Conception of Scientific Progress"

15:00 – 15:30

Paul Hoyningen-Huene (Leibniz Universität Hannover) - Where are we going after Kuhn's The Plurality of Worlds?

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: The final appearance of Kuhns unfinished book The Plurality of Worlds marks a rupture in Kuhn studies. Finally, we have access to the development of Kuhn's thought within his last two decades, if only in unfinished form. Some of his thoughts, developed from the early 1980s on, could be glance from his unpublished, but widely circulated lectures from the 1980s. Kuhn had abstracted these lectures from his book manuscript. With respect to this manuscript, I suggest that the following questions should be treated.

First, Kuhn wrote in Structure about Structure that "this work remains an essay rather than the full-scale book my subject will ultimately demand." (p. viii) To the best of my knowledge, he never came back to this statement. Is Plurality this book? In other words, is the subject matter of Plurality the same as Structure's? Or is there a shift that goes beyond a mere shift in emphasis? Or does Kuhn simply further develop his views that became more and more language based from the 1970s on, away from the stronger emphasis on perception in Structure?

Second, the most important but poorly understood novelty of Structure was the introduction of incommensurability. In my view, there are not different kinds of incommensurability, for instance "semantic" and "axiological" incommensurability. Instead, these are aspects of one single package called incommensurability, as Kuhn explicitly claims in Structure (pp. 148-150). This unity has been eclipsed by Kuhn's work after Structure because he described there what was formerly called "paradigm change" as "lexical change". In other words, the semantic aspect of incommensurability became so dominant that the axiological aspect of incommensurability appeared to be a different subject matter. At any rate, what is the state of incommensurability in Plurality in comparison to Structure? Of course, there was a further development of incommensurability, but has the "spirit" of incommensurability changed? This presupposes to determine this "spirit" of incommensurability, and I suggest that can be done by looking at the function(s) that incommensurability has in Kuhn's theory. Has the function of incommensurability changed in Plurality, or has Kuhn treated the very same subject from 1962 onwards despite a highly increased degree of sophistication?

Third, it is well-known that there are three main lines of interpretation of Kuhn's work, the naturalistic (Bird), the Wittgensteinian (Sharrock and Read; Kindi), and the Neo-Kantian (Hoyningen-Huene). Usually, these interpretations are seen as competitors. Whether this is true is, however, not clear. It could be that Kuhn's work combines these aspects into one, possibly coherent position. Be that as it may, one should pursue the question of the overall interpretation of Kuhn's work in the light of Plurality. Given Kuhn's thought style, one should at least try to find a view of Kuhn's late work in which these different aspects are united.

15:30 – 16:00

María Caamaño (Universidad de Valladolid) - Normal Science and Puzzles about Theory Application

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: Kuhn's emphasis on the puzzle-solving practices characteristic of normal science, where nature needs to be "forced" in order to yield the appropriate puzzle-solutions (Kuhn 1962/1979, chapters III-V), was confronted by those Popperian-minded philosophers who perceived in this account a serious threat to the conception of science as a rational, empirically grounded enterprise. The puzzle-solving form of inquiry, as described by Kuhn, challenged long-held ideas about evidence, facts, data and the empirical basis of a theory in general. According to the Kuhnian picture, the accumulation of puzzle-solutions involves a myriad of factors including theoretical interests, pragmatic judgements on confirmatory usefulness, new technological designs and refinements for purposes of confirmation, favored modeling heuristics, similarity with existing successful applications of a theory… Overall, this array of factors undermines the traditional view that facts and data are neutral with respect to theory, providing unambiguous, stable pieces of information about the world.

Uncovering the complexity involved in the empirical application of a theory has been an important merit of Kuhn's characterization of normal science. Yet this merit was overshadowed, not only by the strong attention aroused by the incommensurability thesis, but also by the much greater emphasis usually placed on idealization and theoretical approximation in contrast to that on empirical approximation and concretization. My goal here is to identify some important insights provided by Kuhn's puzzle-solving approach to theory application, an approach linked to some previous ideas in "The function of measurement in modern physical science" 1961), which are often ignored in the literature. His claim that "(…) our most prevalent notions both about the function of measurement and about he source of its special efficacy are derived largely from myth" (Kuhn 1961, 161) anticipated some important issues that only more recently have begun to be addressed.

I suggest two venues for future philosophical inquiry, both connected to different aspects of puzzle-solving in theory application. One is the elucidation of the requirements for empirical approximation, where the "mopping up operations" underscored by Kuhn (1961, 168, 1962/1970 chapter III) are analyzed in the light of some current contributions on data production and use (Humphreys 2013, Leonelli 2015, 2019, Antoniou 2021). The other one is the clarification of the senses in which empirical information may or may not be neutral with respect to theory. Even if there has been an important progress in understanding how evidence may depend on theoretical assumptions, several sides of this issue are still quite controversial and open to elucidation. After examining the Kuhnian account of scientists' struggle to bring facts into conformity with a theory, I draw some implications for current debates on path-dependence, experimenter regress, and theory-ladden experimentation (Collins 1985, 2016, Schindler 2013, Franklin (2015).

16:00 – 16:30

Yafeng Shan (University of Kent) - How not to be afraid of incommensurability.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: In *The Structure of Scientific Revolutions*, Thomas Kuhn made two novel and important contributions: the introduction of exemplar as a unit of analysis in the philosophical examination of scientific development and the proposal of an paradigm-based account of incommensurability (Shan

2020b). However, neither the notion of exemplar nor the incommensurability thesis was well received among philosophers of science. In particular, Kuhn's incommensurability thesis was highly controversial. It seems to many that incommensurability entails relativism in science, irrationality of science, incomparability of scientific paradigms, and discommunication between scientific communities. Thus, philosophers tend to dismiss the notion of incommensurability and its role in the development and practice of science and are even afraid of talking of incommensurability. This paper develops a new account of the incommensurability thesis based on the notion of exemplary practice (Shan 2020a; 2020b). The key idea is that incommensurability is a relation between two exemplary practices in the sense they in their ways of problem-defining and problem-solving. Such an account well captures the three aspects of Kuhn's incommensurability thesis (i.e. methodological, semantic, and cognitive). I illustrate this account of the incommensurability thesis by a historical case, the Mendelian-Biometrician controversy. I show how Mendelians and Biometricians differed in their exemplary practices: the Mendelian exemplary practice and Galtonian exemplary practice. Moreover, I argue that the incommensurability of exemplary practices promotes pluralism in science, encourages communication between different scientific communities, and contributes to scientific progress. Accordingly, I argue that the existence of incommensurable exemplary practices is an indicator of healthy scientific practice. I conclude that the exemplar-based account of the incommensurability provides a fuller account of scientific development than Kuhn's late taxonomic account.

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Symposium continues in the same room, 17:00 – 18:00

ROOM 06

(INFER)
Symposium: What are Inferences? Some Reflections In-Between Logic, Language, and Cognition

Charis: Aguilera, Mariela; Visokolskis, Sandra

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: The classical view of inference states that inferences are conscious logical transitions over propositionally structured beliefs. According to this view, inferences are transitions that belong to the personal level in that they are operations for which the agent can be held responsible (Boghossian, 2014; Broome, 2013; Valaris, 2017). This view conceives inferences as operations over beliefs, that is, over propositional attitudes that aim at truth. Given that these operations are rule-governed transitions that obey some kind of logic (Boghossian, 2014; Broome, 2013), this view maintains that only propositionally structured belief can participate in inferences. As long as it is generally assumed

that only linguistic representations possess a structure sensitive to logical rules, this view argues that inferences involve transitions between representations with a linguistic format.

Although this view can be traced back to Frege, Sellars, Davidson, and McDowell, it has been recently defended in a strong version by Boghossian and Broome. This strong version has generated an intense debate during the last ten years. The goal of this symposium is to challenge the classical view of inferences based on recent criticism. Particularly, we want to challenge the reflective, logical, propositional, rule-following account to inferences.

In contrast, the contributions to this symposium will extend the focus of analysis to inferences that are: (i) non-deductive, such as abduction, induction, and analogy; (ii) non-conscious, which might involve intuitions, insights, or sub-personal processes; (iii) non-propositional, including models, affects, and representations with different formats, such as diagrammatic, iconic, cartographic.

Speakers:
1) Mariela Aguilera: The Dynamic Nature of (Cartographic) Inference
2) Wade Munroe: Why Can't We Just Believe What We Want? Inference, Metacognition, and Executive Control
3) Sanja Sreckovic: Inference over Affective Representations
4) Joan Sebastián Mejía-Rendón: I Feel I'm Inferring: The Phenomenological Experience of Inference
5) Nora Alejandrina Schwartz: Scientific Modelling and Distributed Representations
6) Diego Letzen: A Social, Dialogue-Based Account of Inference
7) Felipe Morales: What Achilles Should Have Asked the Tortoise
8) Gabriela Fulugonio: Implicit Inference Rules in the Begriffsschrift
9) Davide Rizza: Inference in the Context of Enquiry
10) Matías Osta-Vélez: Inference and the Structure of Mental Representation
11) Sandra Visokolskis: Are Associations Some Kind of Inferences? The Case for Creative Inferences

14:30 – 15:00
Mariela Aguilera (IDH - UNC - CONICET) - The dynamic nature of (cartographic) inference.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: It has been widely argued that maps have the recourses to play inferential roles (Casati and Varzi, 1999(Camp, 2007, 2018; Casati & Varzi, 1999; Rescorla, 2009). However, sometimes it is unclear what kind of inferences are sustained by maps, what those inferences look like, and how they differentiate from inferences with sentences. Besides, some of these theorists often accept an apparently incompatible view of maps that sustains that the information that should be inferred from the map is already represented on the map: "what would be an active inference from premises to a conclusion in a predicate calculus comes along as a "free ride" in maps and diagrammatic systems" (Camp, 2018, p. 39. See Shimojima, 1996). But, if the information can be read from the map, it is unclear whether maps effectively play inferential roles.

In this paper, I want to face this objection against inferences with maps. I argue that it mischaracterizes how we reason with maps, and what is more important, it mischaracterizes the nature of inferential processes. Remarkably, the objection against inferences with maps relies on a syllogistic view of inferences centered on the epistemic relation of warranting from premise to conclusion in the context of proof and justification. Under this view of inferences, maps, images, and sentences are evaluated in terms of their component structure, hence, as static representations. But, although inferences can be reconstructed as arguments, they shouldn't be identified with them (Harman, 2005). To proceed with my argument, I will focus on maps employed in dynamic processes

of reasoning, particularly on mental activities with maps. As the analysis will show, maps can participate in inferential processes by doing things with them.

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15:00 – 15:30

Wade Munroe (Department of Philosophy and the Weinberg Institute for Cognitive Science, University of Michigan) - Why Can't We Just Believe What We Want? Inference, Metacognition, and Cognitive Control

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: Consider a puzzling feature about mental life. There are certain mental states that we can form as a direct result of our intending to do so. For instance, on a whim, we can imagine that we are 10 feet tall. However, belief isn't like this. We can't just, in virtue of intending it, occurrently believe that we are 10 feet tall. Even if someone were to sweeten the deal and offer us one million dollars to believe that we possessed a giant's stature, we couldn't, thereby, get ourselves to believe the proposition (despite strongly desiring to earn the reward). What explains the discrepancy in control we possess over imagining and believing?

Although much philosophical ink has been spilt attempting to explain this control discrepancy, it's gone relatively unnoticed that the discrepancy is analogous to other, similar discrepancies in control. For instance, although we can imaginatively simulate playing billiards with David Hume in 1733, we can't, just by intending to do so, make it seem as if we are remembering the event. As I argue, there is a common explanation for the discrepancy in control we possess over imagining as compared to believing and remembering: metacognitive monitoring processes tag certain states as either imaginings, believings, or rememberings, where this tagging process happens automatically and outside of conscious awareness and determines how the states function. Although we can combine various memory traces and concepts to generate a representation of an arbitrary event or state of affairs, we don't have control over the metacognitive monitoring procedures that tag the representation as either an imagining, believing, or remembering.

In the paper, I begin by explaining the disparity in control we possess over imagination and episodic memory (the memory of an event). Using work in cognitive psychology, I argue that metacognitive monitoring processes track myriad features of event representations and their process of generation in determining whether the representations are memories or mere imaginative simulations of counterfactual scenarios. One of the features used in metacognitive monitoring is processing fluency, or the cognitive ease with which a representation is tokened. As compared to episodic memory, generating an imaginative simulation of a novel event typically requires more cognitive effort. The imaginer must rely on brain regions that subserve cognitive flexibility and the inhibition of automatically activated associations to generate the imaginative simulation. We clearly

don't have control over the cognitive resources required to generate a given event representation. Thus, although we can generate a simulation of an event at will, try as we might, we can't make the simulation seem like a memory just by intending to do so. I then argue that similar metacognitive processes use processing fluency to distinguish between beliefs and imaginings. Thus, the same type of explanation applies to the disparity in control we possess over imagination and belief. In closing, I argue that the two most prominent philosophical accounts of the disparity in control we possess over imagination and belief fall victim to the same objection, an objection that my account avoids.

15:30 – 16:00

Sanja Sreckovic (Faculty of Philosophy, Belgrade University) - Inference over Affective Representations

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: Can we make rational inferences over affects, such that affects play the role thought to be reserved only for propositions? Contrary to the mainstream view on reasoning (e.g., Broome, 2013; Boghossian, 2014), I argue that the elements of reasoning are not exclusively propositions. Rather, linguistically expressible propositions are just one type of representations whose structure makes them suitable for participating in inferences. First, I introduce a distinct type of representations that I call 'affective representations' (AR). I demonstrate that ARs satisfy the basic requirements for representation, and that they possess structural – proposition-like – properties that make them suitable for participating in inferences. Then I show that there is explanatory gain of postulating ARs, especially in the context of non-linguistic cognition.

I argue that affects represent in virtue of their phenomenal character, meaning that the felt experience of an affect is itself the vehicle of representation. In other words, the felt experience is what does the work of representing an object as 'being in a particular way'. Affects in general are characterized by valence – positive vs. negative (they feel 'good' or 'bad'). They are also characterized by degree – they are felt at a particular degree of strength. In virtue of these two dimensions of phenomenal character, affects have the format of directional psychophysical magnitudes, and have the potential to represent entities in the environment in a distinct way. I describe their format as having three components: object of representation (o), valence (V) predicated to the object, with a particular degree (D), in the form D(V(o)). In this way, affects involve the act of predication of properties to objects, which is often believed to be characteristic only of linguistically expressible propositions. I show that these characteristics are also what makes affects suitable to participate in mental transitions that are rationally evaluable.

After presenting my analysis, I provide independent support for postulating ARs based on their usefulness in accounting for some intelligent behaviors observed in non-human animals, for example in studies on transitive inference (TI). We can plausibly apply ARs to explain animal behaviors in the TI studies as a result of representing objects as attractive or aversive, and by representing one object as more attractive or aversive than another object, thereby representing relations between the objects ('more attractive than') that are transitive in nature. I show that transitive inference over affective representations is a mechanism that plausibly explains the animals' rational behaviors in the study, which the alternative accounts struggle to explain. Affective representations can easily be integrated into the recent proposals of the pluralistic approach to mental representation and inference, such that reveal that representations with different formats e.g., visuospatial imagery (Munroe, 2021), or cartographic representations (Aguilera, 2021), can participate in different kinds of inferences.

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16:00 – 16:30

Joan Sebastián Mejía Rendón (IDH, UNC-CONICET) - I feel I'm inferring: the Phenomenological Experience of Inference

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: The notion of inference has been widely discussed in the last decades. According to the classical literature, inferences are rule-based transitions of thoughts (Boghossian, 2014; Valaris, 2017; Broome; 2013). However, the metacognitive and phenomenological aspects of inferences have been overlooked. Why explain inferences from a metacognitive perspective? How does subjective experience influence inferential processes? What role do these feelings play in inferences? Inference occurs in a broad range of cognitive processing where metacognition is involved. Metacognition plays a crucial role in guiding the inferential process because they prompt certain types of epistemic feelings that trigger mental action. These kinds of feelings are subjective conscious experiences with positive or negative valence, that is, something that is felt or perceived by the individual with a certain intensity (Arango-Muñoz, 2014; Proust, 2015). This paper applies the three metacognitive stages to inference processing: self-prediction, intermediate assessment, and post-evaluation (Goupil & Proust, 2023). I characterize each stage with a different type of epistemic feeling: the feeling of inferential ability assesses our competence to generate new inferences or solve reasoning problems through inferential processes (self-prediction) (Cf. Chudnoff, forthcoming). The feeling of reliability monitors the performance of inference and determines whether it is on track to reach the desired goal, allowing for adjustments to the cognitive strategy if necessary (intermediate assessment) (de Sousa, 2009). The feeling of confidence, rightness, and endorsement evaluates the result of the reasoning episode when the individual accepts the conclusion of a reasoning episode as true (Thompson et al., 2011) (post-evaluation). The previous attempts to characterize the phenomenal aspect of the inferential process allow us to better understand other dimensions of mental transitions that have been overlooked in classical literature. As a final suggestion, I argue that it is crucial to analyze inferential processing from a metacognitive perspective because inferences do not occur isolated from the cognitive, mental, and epistemic feelings underpinning it.

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Symposium continues in the same room, 17:00 – 18:00

Saha

ROOM 07

15:00 – 15:30

Álvaro Mozota Frauca (Universitat Autònoma de Barcelona) - Time is order

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: In this paper I argue that the fundamental aspect of our notion of time is that it defines an order relation, be it a total order relation between configurations of the world or just a partial order relation between events. This position is in contrast with a relationalist view popular in the quantum gravity literature, according to which it is just correlations between physical quantities which capture every aspect of temporality, at least according to general relativity. I will argue that the view of time as defining an order relation is perfectly compatible with general relativity, while the relationalist view has to face some challenges. This debate is important from the perspective of the metaphysics of space and time and also for the development and understanding of theories of quantum gravity.

I will start by reviewing the two roles time plays in classical physics: it defines an absolute order relation between configurations of a system and it has a metric aspect, i.e., it defines a duration. While one can present some skeptical arguments about the metric aspect of time or argue that it is relational in some conventional sense, I will argue that the ordering role is indispensable. For this, I will introduce some simple models and I will show how the order between configurations is an indispensable part of the model that cannot be captured by some correlations between observables.

Then, I will move to the case of general relativity. I will argue that the temporal structure is much more complex in this theory, but that we can identify the same two roles of time. First, general relativity defines a proper time, which is the time an ideal clock would measure if it followed a certain trajectory in spacetime. As in the case of classical physics this metric aspect can receive some skeptical arguments or be argued to be relational as at the end of the day we use physical clocks for `measuring' this aspect of time. Second, in general relativity we also find an order relation, the causal structure of the theory. It is more complicated than in the case of classical mechanics as in this case the order is a partial order, but it is still an essential part of a general relativistic model. I will argue that, similarly to the case of classical mechanics, correlations between observables may fail to capture this order relation, and hence that the relational views of time can be challenged on these grounds.

Finally, I will briefly comment on how this position affects some approaches to quantum gravity. First, I will argue that the relationalist positions claiming that the problem of time of some approaches to quantum gravity can be overcome can be challenged in the light of what I argue in this paper. And second, I will argue that if spacetime functionalism is the way to make sense of spacetimeless approaches to quantum gravity, it is precisely temporal order the essential function of spacetime to be recovered by functional analysis.

15:30 – 16:00

João Luís Cordovil (CFCUL) - Towards an emergentist approach to the measurement problem of quantum mechanics

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: The measurement problem is a long-standing problem regarding Quantum Mechanics (QM) or, at least, its interpretation. Roughly speaking, the measurement problem arises from the opposition between the deterministic and linear evolution described by the first axioms of QM and the indeterministic and nonlinear modification portrayed by QM's last axiom – the so-called "collapse postulate" or "projecting postulate". We can find several ways of formulating the measurement problem in the literature. For instance, according to Ladyman and Ross (2007: 180-181), following Maudlin (1995: 7), the measurement problem can be presented as a trilemma:

1. All measurements have unique outcomes
2. The quantum mechanical description of reality is complete
3. The only time evolution for quantum systems is in accordance with the Schrödinger equation

The problem is that QM often attributes to quantum objects superpositions with respect to the properties that we can measure. We do not seem to observe the superposition of macroscopic objects like measurement devices contradicting (1), and so we have a problem if we continue to assume that the particle and the apparatus really don't have definitive states in accordance with (2), and that the time evolution is always in accordance with (3). (2007, p. 180-181)

Another way of putting the measurement problem is: "If quantum theory is meant to be (in principle) a universal theory, it should be applicable, in principle, to all physical systems, including systems as large and complicated as our experimental apparatus". (Myrvold, 2018)

However, this leads to the following:

"a state in which the reading variable and the system variable are entangled with each other. The eigenstate-eigenvalue link, applied to a state like this, does not yield a definite result for the instrument reading." (Myrvold, 2018)

So, if we consider that QM is a universal theory; if we consider that a property of being "quantum" is in a superposition state; and if we consider that a property of being "classic" is in a well-defined state, then the measurement problem, in general, can be stated as follows: how, as a result of a measurement, does a system in "quantum superposition" transforms into a system in a well-defined state?

However, while the measurement problem has been a central problem in the philosophy of physics for decades, the relation between the measurement problem and the concept of emergence has received very little attention. That is, despite the multiplicity of solutions and formulations of the measurement problem, all seem to assume that QM is a universal theory; all seem to assume that classical entities or properties are metaphysically reducible (or identical, in some cases) to quantum entities or properties. Nevertheless, do we need to accept this micro-reductionist assumption? Maybe we can question it, and maybe it is this assumption that makes the measurement problem problematic.

This paper aims to i) analyze this micro-reductionist assumption (the universality of QM) and its consequences to the formulation of the measurement problem of QM; ii) explore the possibility of an emergentist account of classical-quantum relationship, its feasibility and advantage.

16:00 – 16:30

Daniel Heredia (UNIVERSIDAD DE SEVILLA/CFCUL) - Roger Penrose and the applicability of mathematics in physics

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: It is well known that Roger Penrose, despite the fact that his background is strictly scientific, enters into debates of great philosophical depth and that he also does so by contributing enriching ideas. In this work we will see how this thinker faces the problem of the applicability of mathematics in physics. Penrose focuses this debate on the specific topic of complex numbers and the importance that these have within quantum mechanics. In addition to this, we will be able to see how his position is situated within this debate on a more general level through very recent studies on the applicability of mathematics.

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ROOM 10

14:30 – 15:00

Shuhei Shimamura (Nihon University) - A Dual Sequent Calculus with a Special Operator for Expressing Anti-Sequents

Topic: A.2 Philosophical Logic

Abstract: I present a dual sequent calculus that deals with positive and anti sequents and is also equipped with a new operator for expressing anti-sequents. This system is motivated by two interrelated philosophical projects. One is Semantic Inferentialism, according to which the meanings of linguistic expressions are (at least partly) explained in terms of their inferential roles. To fully specify such roles, as Rosenblatt (2021) rightly emphasizes using the bilateralist terminology, one needs to specify not only which use of a given sentence is "out of bound" (prohibited) but also which use of it is "in bound" (permitted). A dual sequent calculus is a natural tool to accomplish this task. The other motivation comes from Logical Expressivism (e.g., Brandom 2018), according to which the distinctive role of logical operators is to express---codify within the object language---inferential rules governing the use of non-logical expressions. Several systems have been proposed for operators expressing various features of positive sequents, but few for an operator expressing features of anti-sequents. The current system offers one.

So far, one of the most well-studied and well-behaved expressivist logical systems is Kaplan's (2018) NM-MS. NM-MS is supraclassical in that it has all the classically valid theorems along with some materially good ones. All its operational rules are invertible so that the following logical expressivist result holds, where Γ and Θ are schemas for multisets of formulae:

For any Γ, Θ: Γ ⊢ Θ iff ⊢ &Γ→∨Θ,

Here, the positive sequent on the left-hand side of the biconditional is expressed by the logically complex formula on the right-hand side. My dual system, which I call NMT ("T" for tilde), is obtained by conservatively extending NM-MS with a set of operational rules for anti-sequents and for the newly introduced one-place sentential operator (~).

NMT is not only coherent (i.e., for any Γ, Θ: it is never the case that both Γ ⊢ Θ and Γ ⊬ Θ) but also complete (i.e., for any Γ, Θ: either Γ ⊢ Θ or Γ ⊬ Θ). NMT extends the expressive capacity of NM-MS so that it can express negations of sequents:

For any Γ, Θ: (it is not the case that Γ ⊢ Θ) iff Γ ⊬ Θ iff ⊢ ~(&Γ&¬∨Θ).

Furthermore, it can also express meta inferences between sequents:

For any Γ, Θ: (if Γ ⊢ Θ, then Δ ⊢ Λ) iff ⊢ ~((&Γ&¬∨Θ)∨~(¬&Δ∨∨Λ)),

where "if" and "then" read as a material implication at the meta level. This is a potential advantage of NMT over Rosenblatt's dual system H. I also plan to indicate how this result can further be extended to an arbitrary higher level of metainferences.

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15:00 – 15:30

Sheila Miller Edwards (University of New Mexico-Taos), Rohit Parikh (City University of New York) - Vagueness Works: A Social Software Account of Vagueness

Topic: A.2 Philosophical Logic

Abstract: Vagueness works: we are able to use vague predicates to understand and reason about the world and to transmit meaningful, actionable information. The communication, cooperation, and deceit that reasoning allows are proof enough that we do indeed reason with them. But how?

A philosophy most able to interface with other disciplines is one at least consistent with––perhaps even interested in––empirical data, ordinary use of language, and the behavior results of that use. Building on earlier work of Parikh (1994), we explore a theory of reasoning, knowledge creation, and communication about vagueness that takes effective behavior as the paradigmatic illustration of knowledge rather than justified, true belief.

We suggest that the logic of reasoning about vague predicates is not uniform across all cases and implicitly uses a notion of distance between exemplars of concepts. Our personal notions of how to evaluate borderline cases do not always coincide, however (see, for example, Parikh (1991)). Existing attempts to impose a single logic on all reasoning with vague predicates tend to result in conclusions that range from unhelpful to unpalatable (e.g., there is a precise number of grains of sand that constitutes a heap––we just don't know what it is (Williamson, 1994); the world does not exist (Unger, 1979)).

It seems plausible that the inability of any one existing account to provide a satisfying and useful description of vagueness is because such reasoning is in fact dictated by internal algorithms that require different logics in different circumstances. We appeal to exemplars of vague predicates and often recognize would-be contradictions of classical logic such as “Boston is large and not large” (Sauerland) to contain information. In this paper we *discuss* these internal algorithms––a form of social software––and how they are used to communicate and to obscure communication; the logics we use under different circumstances; and give an account of how we avoid the Sorites paradox.

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15:30 – 16:00

Liying Zhang (Institute of Philosophy, Chinese Academy of Sciences) - Reasoning with Ceteris Paribus Laws

Topic: A.2 Philosophical Logic

Abstract: As a Latin phrase, the literally meaning of Ceteris paribus is “other things being equal”, nowadays Ceteris paribus was also used to express “other things being normal”. In the field of science,

to deal with disturbing factors and leave room for exceptions, ceteris paribus clause was introduced in laws or generalizations, such as Ceteris paribus, an increase of demand leads to an increase of prices; Ceteris paribus, planets have elliptical orbits etc.

However, the concept of ceteris paribus laws let to a debate in philosophy of science. Some scholars, such as Schiffer (1991) and Earman etc. (2002), argue that special science has no real law; on the other hand, most scholars support a weaker conclusion: although there is no strict law in special science, but special scientific laws should be come down to ceteris paribus laws. Although the debate is still going on, many explanation theories of ceteris paribus laws are developed in recently year. Such as Completer approaches (Fodor(1991), Pietroski & Rey(1995)), Dispositional Accounts(Cartwright(1989)), Invariance & Stability Theories (Lange(2000, 2002), Woodward & Hitchcock(2003)), Normality Theories (Schurz(2001), Spohn(2002))etc. How to achieve a balance between non-valid, or trivial true of ceteris paribus laws is a challenge in this field.

As a logician, I think that ceteris paribus condition was introduced to express the natural law or law-like results, is meaningful. The development of science has always been a process of updating the argumentation conclusion, and the characteristic of science is that it is falsifiable. So, try to explore how the process of scientific inquiry tolerates exceptions is challenging and profound. As for the debate on ceteris paribus laws, we could express these different viewpoints by giving different logic systems instead a yes or no judgement.

In this paper, under the viewpoint of ceteris paribus laws can be taken as a special kind of generic sentences, a more adequate explanation for ceteris paribus laws will be given. Firstly, an adjusted double normal semantics will be defined (Y. Mao and B. Zhou(2003), L. Zhang(2013, 2015)), under this semantics, ceteris paribus laws can (1) express laws, (2) tolerate exceptions, (3) be intensional (accept the absence of positive examples); and the explanation should (4) avoid circular definition. (1), (2), (4) can cover the dilemma of ceteris paribus laws, (3) is something “new” and is a feature should be considered. After that, in this paper, three Logic systemss will be given to capture different limiting strength ceteris paribus conditions, among them, Lcp1 as a basic logic which leaves rooms for universals, Lcp2 tries to capture locally identical qualification (correspond to semi-degenerated frame), Lcp3 tries to capture more specific and flexible restrictions (correspond to the frame with subject-monotonic and inclusion selection conditions). Based on these logic systems, the priority orders on premise set will be given to characterize the non-montonic reasoning with Ceteris Paribus Laws.

16:00 – 16:30

Francisco Díaz Montilla (Universidad de Panamá) - Monotonicity and defeasibility. The case of law

Topic: A.2 Philosophical Logic

Abstract: When reasoning, we often overlook that we do not always have all the necessary information to improve the situation, so we make inferences that could be criticized.

According to the property of monotonicity of classical logic, if T is a set of statements and P is one statement, then: if T ⊢ P, then T ∪ N ⊢ P, for any number N of statements. What does it exactly mean in legal contexts?

A way to view the norm is in terms of the material conditional. The antecedent refers to a legal or juridical condition while the consequent refers to a legal consequence. A norm, therefore, is hypothetical. A legal situation normally involves a norm, a fact, and -from both- a legal sanction. The norm and the fact are the premises, and the sanction is the conclusion.

Let’s consider the following example: Whoever causes the death of another will be punished with imprisonment of ten to twenty years, and Darth Vader causes the death of Obi-Wan Kenobi. We

can infer by E-(x) and modus ponens that: Darth Vader will be punished with imprisonment from ten to twenty years. But what would happen if -for example- the evidence against Darth Vader has been obtained illegally, or if Darth Vader were not imputable, or if there was some justifiable cause? According to the property of monotonicity, it seems that nothing. They play no role in the inference. Being d: Darth Vader, o: Obi-Wan Kenobi, Cxy: x causes the death of x, Px: x is punished, Ix: x is imputable, we get:

1. (x) (Cxy → Px) premise
2. Cdo premise
3. ¬Id premise
4. Cdy → Pd E-(x), 1
5. Cdo → Pd I=, 4
6. Pd M.P., 5, 2

Note that premise 3 has not been used in the derivation. Does this mean that the judge is not compelled to consider premise 3 as part of his reasoning for the imposition of the punishment? If it were the case, then it would be difficult to reconcile the decision with justice; therefore, an approach to legal reasoning that distances itself from the monotonicity principle is needed.

So, in this presentation, we will argue that (i) legal reasoning does not satisfy monotonicity and (ii) it is defeasible. It means that the relationship between the rule (R), the fact (F), and the conclusion (C) must be reformulated, considering possible exceptional situations (E). So, instead of (R ^ F) → C; we would have to consider: (R ^ F ^ E) → C; supposing that (R ^ F ^ E), then C cannot be inferred, and then, the judge could not apply the sanction established in the norm. In this way, the existing gap between the premises involved and the conclusion of the argument is fixed.

ROOM 11

14 :30 – 15 :00

Ignacio Ojea (Ludwig Maximilians University) - The Technological Disruption of Epistemic Authorities

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: Social media has been blamed for the increasing distrust in the sciences [1]. More generally, the sometimes difficult interactions between scientific and democratic practices [2] have been disrupted by this new technology [3]. This paper argues that in order to properly understand and find guidance in dealing with these issues, a broader philosophy of technology with historical perspective is needed. This is done here by building analogies with writing and the printing press.

Information technologies reduce the cost for the creation, reproduction, and dissemination of information. This makes them democratizing technologies, since more individuals have expressive power and access to data; but they also transform the way the public repository of knowledge is organized. They change what research questions count as significant, how expertise certifications are obtained, what is worth storing and what making publicly available, how information gate-keeping is justified, etc. In doing so, they challenge the status quo of epistemic authorities.

Consider an analogy between social media and Gutenberg's printing press. Both are democratizing information technologies that emerged in the context of an expanding capitalism, with a technically oriented bourgeoisie - industrial artisans and software engineer entrepreneurs. Both of them also rely on informational properties, like the compositionality of Indo-European languages and the encoding of different sources of information (linguistic, graphical, auditory, etc.) as digital. Most saliently, the press was instrumental to the scientific revolution and the Protestant Reformation,

breaking the centrality of the Catholic Church. It also helped the formation of European national, tribal, and religious identities that led to multiple wars [4]. Social media has been widely associated with an increase in political polarization, misinformation, and the spread of conspiratorial thinking [5]. It is telling that the notorious Malleus Maleficarum ('Hammer of Witches') was one of the most printed books after Gutenberg's invention. Democratizing information can lead to mass hysteria and the persecution of heterodox views and practices; new ideas will encounter resistance from entrenched institutions.

These historical analogies serve two purposes. First, to lay out a more general and trans-historical perspective to some of the problems we face today, since the tensions between the hierarchies of expertise in the sciences, democratic values of equality, and technological disruptions are long dated. Second, to provide some tentative guidance on how to navigate the present issues. One of the upshots of early modern European wars was the emergence of contractualism as a political theory, which emphasized the need of finding a common ground, and that led to the emergence of modern democracies and the public system of knowledge that we now call Science.

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15:00 – 15:30

Benedicto Acosta Díaz (Universidad de Salamanca) - What kind of experts are patent examiners?

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: Expertise is one of the key issues in recent philosophical reflection, especially in epistemology and political philosophy. Most philosophers concerned with the issue tend to understand expertise by referring to three conditions, which are not necessarily exclusive. Expertise is said to be a) a skill, b) a type of knowledge, c) a form of social recognition (Goldman 2018). The aim of my paper is to discuss these conditions in the wake of a scientific and technical institution that seems to have been forgotten by the literature: patent systems. To do so, I make use of information gathered from in-depth interviews with twelve Spanish patent examiners.

In my study I try to show how patent examiners, when confronted with inventions that are mostly novel, have difficulties in understanding what exactly those technologies or artifacts they evaluate consist of. This difficulty seems to be particularly noticeable in the case of chemistry or pharmacy (as suggested by Gupta et al., 2010). I start from a twofold hypothesis: if, on the one hand, the examiners accurately understand the invention they are evaluating then there is a likelihood that it is already part of the state of the art, and therefore not novel; if, on the other hand, examiners are not able to understand all the details or mechanisms of the invention, the likelihood that it is original is higher, but the ability to discern the veracity or the industrial application is diminished. These difficulties may be increased by the fact that such inventions are not replicated or reproduced at the patent office, but are simply evaluated from documents and, at best, from drawings.

Precisely for all these reasons I discuss the possibility that patent examiners are incapable of knowing many aspects of the inventions and unable even to detect their novelty, and that their nature is rather administrative or bureaucratic, an idea that emerges from the account of some interviewees. However, in my study I reject this interpretation, by arguing that the expertise of the patent examiner

may consist, fundamentally, in some kind of ability to read patent documents, to detect which parts claimed as novel are actually novel, and not so much in an exhaustive knowledge of the performance or mechanisms of the inventions they evaluate. This conclusion is supported both by the information gathered in the interviews and by the existing literature on patent filling strategies (cf. Arinas 2017; Gupta et al., 2010).

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15:30 – 16:00

Lisa Roux (Université de Pau et des Pays de l'Adour) - To the i-society and beyond? How data shape our world.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: Artificial Intelligence experiences burgeoning developments and benefits from many public and private investments. The economic and socio-technical stakes are huge, since it is deemed to foster progress by both increasing GDP growth (Mou, 2019) and developing valuable innovations in every area and space of our lives. All our world became more and more smart: smart traffic systems, smart environment, smart hospitals, smart agriculture, etc. (Farooq, 2015). The long term consequences of this technological policy on the human cognition, the moral and esthetic values, the relationships between individuals, the individuals and their surrounding world and themselves, the human and the machine, etc. remain unknown.

In political speeches, the idea that the development of AI should be promoted, even accelerated, because it is the future and the only way to stay competitive (Direction Générale des Entreprises, 2022), especially among the AI giants (i.e. United-States and China), is very widespread. Yet, in the liberal model and an increasingly globalized marketplace, the only way to stay competitive is to stay loose, ready to fill the gap and exploit any opening. This willingness to compete with countries such as China on AI market can be worrying, since the direction being taken by China with regards to AI development may appear unethical and economy-driven (Roberts et al., 2021). These speeches advocate for moving forward but, in the context of multiple, abundant, and uncontrolled initiatives, the destination is very uncertain. The belief that AI is a substantial part of the human progress remains very strong. Its development is hardly put into question, since this socio-technical progress is often regarded highly desirable (Ganascia, 2017), if not unavoidable (LeCun, 2017 ; Villani, 2018). Medias mainly report industrial discourses at the expanse of the reflections about the potential impacts of AI on our society (Brennen, 2018).

More and more papers investigate these impacts. For example, they note the individualization of health issues and the greater responsibility of individuals for what their data show (Lupton, 2013), the increased subjection of individuals to certain forms of self-monitoring (Calvignac 2021), and the systematic surveillance (Lyon, 2018).

Understanding how they transform our relationship to our environment and ourselves appear crucial, in order to point out the direction where we want to go in the technological field. The choice of the direction is closely related to the society we want to build. This work studies precise practical cases in order to comprehend what form of society is taking shape through the current AI development, focusing on the social and ethical impacts of the world datafication. For that purpose, I

examine the perception of the world promoted by several applications of AI, used by individuals to facilitate the monitoring of their everyday life (e.g. physical activity, health care, beauty care, sleep). They will be systematically examined in order to precisely identify the values they convey, the perception of the world (self, others, direct environment) they promote, the behaviors they foster, the cognitive mechanisms they tend to inhibit or, on the contrary, stimulate.

16:00 – 16:30

Brandon Long (Bowling Green State University) - How Does Publicly Engaged and Democratically Implemented Gene Drive Create Public Trust and Protect Social Values?

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: Gene drive is a technology that has the capability to stabilize or destabilize the environment. Therefore, the stakeholders of this technology are anyone who partakes in the natural environment. Widespread use of this technology will require considerable public trust in science and government, trust that largely does not exist, especially in the United States. Exposing the public to risk by implementing gene drive without their input or consent is not only undemocratic, it could harm institutional trust further. While engaging the public in deliberation may not significantly change the risk assessments the science community makes, tradeoffs between risks and rewards are values-based, and should engage all stakeholders and protect their social values. Therefore, gene drive implementations must be publicly engaged and democratically implemented. As this is commonly agreed upon in the literature, the present paper will demonstrate what mechanisms underlying public engagement and democratic implementation foster trust with the public and protect social values. The paper also incorporates relevant issues in the trust and public engagement literature that has implications for the ways a publicly engaged and democratically implemented gene drive should proceed to foster trust and protect values in a publicly justifiable way.

ROOM 12

(LOG-N)
Symposium: Logic, Norms, and Reasoning

Chair: Tajer, Diego

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Logic has traditionally held a special relationship with reasoning. For long, the received view of logic wanted it to be a model of correct reasoning. Logic was, in other terms, normative for reasoning: we reason correctly, when we reason logically; or so the received view goes.

Yet, in the twentieth-century, the emergence of cognitive science as a distinct (cluster of) scientific discipline(s), on the one hand, and the explosion of non-classical logics, on the other, have shed doubts on a straightforward, normative relationship between logic and reasoning. The most widely accepted psychological theories, in fact, do not conceptualize reasoning as a logical process. Logical norms for reasoning clash with our non-logical mental processes; simply stated, logical norms would be an “ought” without a “can”. Moreover, the enormity of different logical systems available

has led to a sort of “embarrassment of riches”: even granting that logic is normative for reasoning, it remains to explain which logical system enjoys such normative role.

In recent years, philosophers of logic have sought to explicate the normative relationship between logic and reasoning by proposing complex, fine-grained accounts of logic and its norms. In this symposium, we will present several, different ways of understanding the normative role that logic exerts on reasoning. Specifically, our symposium will include talks by philosophers approaching this topic from different backgrounds, thereby offering a discussion of logical normativity that relates it with recent discussions in philosophy of logic, epistemology, and cognitive science.

Some talks will discuss how the normativity of logic deals with epistemic concepts such as doubt or information, and how synchronic norms of logical coherence are related to dynamic norms of reasoning. Another important issue will be whether logical normativity is compatible with contemporary findings of cognitive science, which describe a bounded and often illogical agent. Also some contemporary issues in philosophy of logic will be explored, such as the compatibility between logical pluralism and logical normativity. Finally, we will go back to a classic question: whether logic is descriptive or normative. As such, this symposium will present the audience with a diverse survey of contemporary approaches to the normativity of logic.

Speakers:
1) Erik Stei: Innocuous Plurality, Irrelevant Logics: Revisiting the Collapse of Logical Pluralism
2) Alessandra Marra & Matteo De Benedetto: Sound and Feasible Reasoning: A bounded rationality approach to the normativity of logic
3) Bruno Jacinto: Information, Credences and Epistemic Normativity
4) Diego Tajer: Negative Reasoning and Logical Rules
5) Matteo De Benedetto and Matias Osta-Vélez: The normative dimension of logical modeling
6) Natalia Buácar: Logic, inference tickets, and forking paths

14:30 – 15:00

Erik Stei (Utrecht University) - Innocuous Plurality, Irrelevant Logics: Revisiting the Collapse of Logical Pluralism.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Logical pluralists claim that there is more than one correct logic; logical monists insist that there is exactly one. Many philosophers have argued that pluralism is incompatible with certain ways in which logic can be said to be normative. The basic thought is, roughly, as follows: suppose that logic is normative in the sense that you make a mistake if you accept the premises of a valid argument but reject its conclusion. Suppose, further, that logic L1 and logic L2 are both correct and that the argument from Γ to ϕ is valid in L1 but invalid in L2. By normativity and L1, you make a mistake if you accept all sentences in Γ and reject ϕ. L2, on the other hand, is silent on the matter. After all, the argument is not valid-in-L2. On the current assumptions, L2 is normatively irrelevant. When it comes to the normative constraints imposed by logics, pluralism about L1 and L2 is indistinguishable from monism about L1. While this "collapse problem" (Caret 2017) was originally raised against Beall & Restall's (2006) version of logical pluralism (see Priest 2006, Read 2006), a generalized version threatens a broad family of pluralist positions (Stei 2020).

Recently, logical pluralists have responded to this challenge in various ways. It has been suggested that i) logic is not normative (Russell 2020), that ii) the normative irrelevance of L2 can be avoided by taking into account pro tanto reasons arising from invalidities (Blake-Turner 2022), or that iii) different logics may come with different normative constraints (Tajer 2022). In the talk, I will assess those responses. I argue that if they manage to avoid the collapse of logical pluralism at all, they do

so by trivializing the notion of plurality to such an extend that monists about logical consequence can happily endorse it. My argument relies on a distinction between conciliatory and revisionist readings of logical pluralism, where only the latter is incompatible with the monist assumption that an argument is either deductively valid or invalid, period. I suggest that the collapse argument, properly understood, is directed at revisionist logical pluralism. The claim I want to defend is that, as things stand, there is no convincing response to this challenge: revisionist pluralism collapses.

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15:00 – 15:30

Alessandra Marra (MCMP LMU Munich), Matteo De Benedetto (Ruhr-Universität Bochum) - Sound and Feasible Reasoning. A Bounded-Rationality Approach to the Normativity of Logic.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Recent years have witnessed a revival of interest in the normative role that logic plays for everyday reasoning: Do logical principles and rules give rise to norms of good reasoning? Answering this question, one is pushed towards opposite intuitions. On the one hand, it appears that there is a direct, normative connection between logic and reasoning. Logical principles and rules give rise to norms for our reasoning, to the effect that our beliefs ought to obey logical principles and rules. Let us call this the direct normativity intuition. On the other hand, in real situations, it may be beyond one's cognitive capacities to draw a certain logical conclusion or to detect a logical inconsistency. The normative demands of logic are largely unfeasible for us and, thus, do not reflect what we actually ought to do or believe. Let us call this the unfeasibility intuition.

Much of the recent literature on the normativity of logic has sought to solve the tension between the direct normativity intuition and the unfeasibility intuition by abandoning the former. In the wake of the seminal MacFarlane (2004), the standard response has been two faceted: firstly, it abandoned the direct normativity intuition; secondly, it attempted to capture the normative connection between reasoning and logic by virtue of normative principles that are epistemically-relativized and weakened to account for the problematic cases that support the unfeasibility intuition (MacFarlane 2004; Field 2009; Steinberger 2019).

We are skeptical that the standard response appropriately captures the normative connection between logic and reasoning. By abandoning the direct normativity intuition, the standard response falls short on offering a satisfactory account of the normative import that logic itself exerts on reasoning and its relations with the other factors that constrain an agent's reasoning. The approach that we will develop in this paper is conceived explicitly as alternative to the standard response.

At the heart of our proposal is the embedding of logical normativity into a broader theory of bounded rationality that understands reasoning as constrained by multiple independent normative

factors, logical and non-logical ones. In this picture, logic is only one among the many normative factors that jointly determine which inferences an agent actually ought to make. Other normative factors emerge from contextual cognitive and environmental features, such as the complexity of the task, the time available to the agent, and the attention required to her. Starting from this, alternative perspective, we understand logic as issuing only prima facie oughts, that is, defeasible obligations that can be contextually defeated by other non-logical prima facie oughts. This defeasible normativity of logic allows us to save both intuitions we started from. In our account, in fact, logic itself gives obligations on what we have to believe, as the direct normativity intuition requires, but these obligations do not necessarily determine what an agent ought to do all things considered, as highlighted by the unfeasibility intuition.

15:30 – 16:00

Bruno Jacinto (University of Lisbon) - Information, Credences and Epistemic Normativity

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: According to the information-theoretic account of belief and knowledge (Stampe 1977, Dretske 1981, Stalnaker 1984, Millikan 1989) (i) an agent A believes that p only if it is in a belief state that carries the information that p, and (ii) A knows that p only if A believes that p and conditions are optimal.

Arguably, if belief and knowledge are to be understood in terms of information-carrying, the same is true of credence and evidential probability. Yet, hardly any information-theoretic account of them is present in the literature (Tang (2014) discusses a view different from the one to be proposed here, finding it wanting). The present paper's first aim is to fill this gap by proposing an information-theoretic account of credences based on a generalization of Dretske's conception of information-carrying.

Dretskian information-carrying is defined as follows: a state S of an information system I D-carries the information that p if and only if the objective conditional probability that p given that I is in state S and conditions are optimal is 1. For instance, a scale's internal state of displaying '8g' D-carries the information that the objects on top of it weigh 8+/-0.5g just in case the conditional probability of this being so given that it displays '8g', its batteries are working, etc., is 1.

Dretskian information-carrying is naturally generalized to the following graded notion. S carries the information that p to degree d if and only if the objective conditional probability that p given that I is in state S and conditions are optimal is d. For instance, a scale's state of displaying '8g' carries the information that the objects on top of it weigh 8˘ 0.1g to degree 0.5 just in case the conditional probability of things being so given that the scale displays '8g', its batteries are working, etc., is 0.5.

According to my proposed information-theoretic account of credence and evidential probability: (i) A has a credence of d that p only if A is in a belief state that carries the information that p to degree d; and (ii) A has an evidential probability of d that p only if conditions are optimal and A has a credence of d that p.

The information-theoretic account naturally suggests the following conception of epistemic obligation: it is epistemically obligatory that p for an agent A just in case p is true under all optimal conditions. The paper's second aim is to present, on the basis of the information-theoretic account, a possible worlds' model of the interaction between belief, knowledge, credence, evidential probability and epistemic normativity, and to extract some of its consequences. As will be shown, the model predicts the truth of epistemic norms such as the truth and knowledge norms of belief, the enkratic principle and rational reflection, and of some widely discussed MacFarlanian (2004) bridge principles, such as Wo+.

16:00 – 16: 30

Diego Tajer (Instituto de Investigaciones Filosóficas, SADAF, CONICET) - Negative reasoning and logical rules

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: In his book Rationality through reasoning (2013), John Broome develops a theory of reasoning rules. According to him, reasoning consists in adopting a new attitude on the basis of previous attitudes; e.g., one can adopt "q" on the basis of believing "p" and "if p then q". However, he opposes the possibility of removing beliefs via reasoning. The problem, says Broome, is that removing beliefs requires "reasoning to an absence", and we cannot do that; we can only go from an attitude to another one.

In a recent paper, Dietrich, Staras and Sugden (2019) develop a logical system which is supposed to capture the Broomean rules of reasoning. Unsurprisingly, their system achieves some kind of logical closure, by following the proposed rules of reasoning until no more steps can be applied. But it does not satisfy any consistency requirement, for the rules are only forwards-directed, and one may obtain new sentences which are inconsistent with previous beliefs. Moreover, because of the Broomean assumptions, one cannot remove problematic beliefs or inconsistencies via reasoning. Even though this theory is correct as a reconstruction of Broomean reasoning, I will claim that it is not a good theory of reasoning in general.

In this talk, I will propose an extended logical theory of reasoning, which includes different kinds of reasoning steps. I will explain why removing beliefs via reasoning is realistic (following some ideas in Drucker 2022), and then develop a formal reconstruction of these "backward" rules. The theory involves a detailed analysis of reasoning as a step-by-step application of forward and backward logical rules. In this sense, the theory is different from the standard Belief Revision theory, where contracting or revising beliefs is possible, but not based on logical rules. Also, in standard Belief Revision, the output of a contraction or a revision is always a consistent set. In my theory, consistency can be achieved, but often in the long run.

In the final part of the talk, I will explain how this theory of reasoning can reach consistency and some degree of logical closure, under realistic conditions. However, I will show that legitimate reasoning steps can also lead to vicious phenomena such as inconsistencies or mental loops. In other words, permissible reasoning does not guarantee a logically stable output, but it can always reach one.

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Symposium continues in the same room, 17:00 – 18:00

ROOM 13

(NCM)

Symposium: Non-Classical Mathematics

Topic: A.1 Mathematical Logic

Chair: Ferguson, Thomas

Abstract: The 20th century has witnessed several attempts to build (parts of) mathematics on grounds other than those provided by classical logic. The original intuitionist and constructivist renderings of set theory, arithmetic, analysis, etc. were later accompanied by those based on relevant, paraconsistent, contraction-free, modal, and other non-classical logical frameworks. The subject studying such theories can be called non-classical mathematics and formally understood as a study of (any part of) mathematics that is, or can in principle be, formalized in some logic other than classical logic. A broader description of related topics (e.g. past symposia and collections) can be found at the NCM website (http://www2.cs.cas.cz/~ncm/whatncm.php).

The aims of this symposium on non-classical mathematics are to bring together new research on philosophical and logical aspects of such systems of non-classical mathematics. The scope of the call for papers is quite broad, including philosophical or formal research on:

* alternative mathematical theories (e.g. restricted theories of arithmetic or alternative class theories)
* mathematics formulated on non-classical deductive bases (e.g. intuitionistic, relevant, or fuzzy logics)
* analyses and solutions to set-theoretical paradoxes

Speakers:

1) Luis Estrada-Gonzalez and Alejandro Estrada-Girón: On the explanatory power of Lawvere's Schema
2) John Slaney: Relevant arithmetic with cancellation
3) Vilem Novak: Formalisation and mathematics of AST via fuzzy type theory
4) Maria Beatrice Buonaguidi: HBST (HYPE Basic Set Theory): a hyperintensional approach to alternative foundations of mathematics
5) Thomas Ferguson: Griss on executability and induction
6) Arnon Avron: Predicativity as Invariance: Going Beyond \Gamma_0
7) Edson Bezerra and Eduardo Barrio: The Logic of a Universal Language: Truth and Validity
8) Laurent Dubois: Trans-Referential Modelization Of Russell Paradox
9) Matteo de Ceglie: Integrating models of non-classical set theories in the V-logic multiverse
10) Fernando Cano: A trinitarian approach to paraconsistent computability theory

15:00 – 15:30

Alejandro Estrada-Girón (National Autonomous University of Mexico), Luis Estrada-González (Institute for Philosophical Research, National Autonomous University of Mexico (UNAM)) - On the explanatory power of Lawvere's Schema

Topic: A.1 Mathematical Logic

Abstract: In his recent Paradoxes and Inconsistent Mathematics, Zach Weber claims that Lawvere's Schema, due to its abstractness, lacks explanatory power about both the source and the prospects of giving a unified solution to the paradoxes. For example, according to Weber, from Lawvere's Schema we cannot tell the difference between a paradoxical phenomenon from a recursive phenomenon, since both of them fit into the schema.

In this paper, we show that, given that every category is a model of a certain typed higher-order language, the schema gives enough information about the source of the paradoxes: they are all the principles needed for the proof of the Cantor-Lawvere Theorem. Moreover, that there is a unified theory of the paradoxes, such as that embodied in Lawvere's Schema, does not entail that there is a uniform solution for them. Yet the number of maneuvers available according to Lawvere's Schema is so well organized and small enough to be in the vicinity of "same paradox, same solution".

15:30 – 16:00

John Slaney (Australian National University) - Relevant Number Theory with Cancellation.

Topic: A.1 Mathematical Logic

Abstract: The arithmetic R-sharp is obtained by postulating standard axioms for Peano arithmetic on a basis of the relevant logic R rather than classical logic. The resulting theory has some interesting features, including models in which the domain of numbers is finite. It does, however, face at least two serious difficulties. Firstly, Friedman and Meyer [1] established that R-sharp is not closed under the rule gamma of material detachment. Gamma is required for the theory to capture all of classical Peano arithmetic in the classical vocabulary. Hence, as an arithmetic, it is seriously incomplete. Secondly [2] there is no way to extend R-sharp conservatively to cover rational number theory without violating intuitively reasonable requirements.

In this paper, we consider strengthening R-sharp to obtain a more satisfactory arithmetic. The weakness of R-sharp lies in the axiom saying that zero is not a successor: in a paraconsistent logic like R, merely stipulating that something is not the case does little to prevent it from being the case anyway, as models may contain contradictions without much penalty. The present proposal is an extended theory, R-natural, with an additional axiom saying that if zero is a successor, then 0=1. This is equivalent to supporting the inference of cancellation (dividing both sides of an equation by a positive constant). R-natural disallows the finite models in the integers modulo n except for the extreme and rather uninteresting case n=1, in which of course there is only one number and all equations are true.

The one-number model still suffices for a finitary proof of absolute consistency, but the loss of the other finite models destroys the easy finitary proof of reliability in the sense that no false equations are provable. It remains an open question whether reliability can be proved in some other way without appeal to non-finitary means. We show that more conventional models, on which 0 really is not a successor, may be based on any propositional structure for R satisying a simple condition, and exhibit an infinite propositional structure satisfying the condition in question.

The Friedman-Meyer proof that gamma fails for R-sharp is blocked by the additional axiom, so it does not apply to R-natural. The admissibility of gamma for R-natural is accordingly another open question.

Most importantly, R-natural supports rational number theory in the same way as classical arithmetic. That is, it can be incorporated by means of the usual definitions, making it essentially part of the natural number theory. The additional axiom is equivalent on these definitions to the postulate that the relation of equality between rationals is transitive, just like the analogous relation between naturals. This allows the smooth extension of relevant arithmetic to a very standard account of reasoning with rational numbers.

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16:00 – 16:30
Thomas Ferguson (Czech Academy of Sciences) - Griss on executability and induction

Topic: A.1 Mathematical Logic

Abstract: The philosopher and mathematician G.F.C. Griss is known for promoting a very restrictive variety of intuitionistic mathematics in which negation is rejected. But Griss's critique is tailored to Brouwer-style intuitionistic negation rather than negation in general. Recent work has investigated applying bilateral techniques from D. Nelson's constructive logic to add a negation to Griss' theories that cohere with Griss's philosophical aims. This leads to an interpretation of Griss's mathematics as involving executability rather than positivity as its primary focus. In this talk, I will discuss problems that arise in the formulation of executable arithmetic in the setting of this reinterpretation of Griss, in particular, the problem of providing a sufficient account of arithmetical induction. I will draw parallels between this setting and earlier work on arithmetic in connexive logics in order to provide an account of executable induction that is consonant with Griss's philosophy of mathematics.

Symposium continues in the same room, 17:00 – 18:00

16:30 – 17:00 COFFEE BREAK

17:00 - 18:00 INVITED SPEAKER: YASUO DEGUCHI

AUDITORIUM 1

INVITED SPEAKER
Yasuo Deguchi (Department of Philosophy, Kyoto University)

From WE turn to an Alternative Relationship between Humans and Artificial Persons

Chair: Tuomas Vesterinen (University of Helsinki)

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: This talk firstly overviews the WE turn, as I call it, that is, the shift from an individual 'I' to a multi-agent system 'WE' of subject, agent, or unit of action, self, life, wellbeing, responsibility, rights, goodness, and freedom. For instance, the WE turn of freedom is the shift from freedom as the autonomy of I to freedom as the softening of WE, that is freedom from the hardness of We, i.e., jingoism against its outsiders and excessive peer pressure against its insiders.

Based on the WE turn, this talk envisions an alternative picture of the ideal relationship between humans and artificial persons, that is, artifacts that function as if they have personalities,

such as special sorts of robots and AIs. Due to today's standard criterion, the relationship is good if and only if it respects and doesn't violate the freedom as the autonomy of a human individual or I (e.g., Verbeek 2011). The standard models include the master-slave model, according to which an artificial person, as a slave, must unilaterally serve the interests of its master, a human (Bryson 2010, Navon 2021). In contrast, this talk proposes the softening criterion which claims that the relationship is good if and only if it contributes to soften a WE to which humans and artificial persons belong. Also, the alternative co-adventurers model is mentioned, which takes them as equal members of a WE who jointly take risks in their collective actions, and therefore doesn't set up any unilateral serving/served relationship among them.

References

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17:00 - 18:00

AUDITORIUM 2

(DLMPST-ISC) From previous time slot, same room.
Special Symposium DLMPST-ISC: Assessment of Research and Knowledge

Eleonora Cresto (SADAF-CONICET) - Knowledge and the assessment of statistical evidence in the legal realm

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Predictions of human behavior on the basis of statistical evidence seem inevitable, and are routinely used for decision making, also at the government level. I aim to contribute to the debate of how logicians and formal epistemologists can play a role at the time of designing and assessing decision procedures that are deemed suitable for the kind of society we wish to have. I will focus on the use of algorithms in the legal realm. I suggest a secondary criterion for algorithmic fairness, which I dub *conditional fairness*, in the context of the recent discussion on biases and impossibility results for predictive algorithms.

Kevin Zollman (Carnegie Mellon University) - The tension between research assessment and supporting cognitive diversity

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

ROOM 01

(JUST) From previous time slot, same room.
Symposium: JUSTIFICATION, CREATIVITY, AND DISCOVERABILITY IN SCIENCE—Académie Internationale de Philosophie des Sciences

17:00 – 17:30
Andrew Arana (Université de Lorraine) - Intuition and creativity: the Japanese perspectives of Kitaro Nishida and Gaisi Takeuti

Topic: B.1 Methodology

Abstract: The role of intuition in mathematics and its creative activity has been frequently stressed, e.g. by Kant and Poincaré. The conception of intuition used by these Western thinkers can be contrasted by that found in Japanese philosophy emerging from the Kyoto School of the early twentieth century. While in the Western tradition intuition is seen chiefly as receptive and, in this way, passive, in the thought of the Kyoto School we find instead what Kitaro Nishida called active intuition. In an active intuition, not only is the object of intuition received by the subject, but the subject is itself reflected in the object so intuited. Nishida illustrates this kind of intuition by reference to the process of artistic creation, wherein the artist creates her artwork and is in the same way transformed herself by her creation. While Nishida contrasted logical knowledge and mathematical knowledge in terms of the role of intuition, it was the mathematician Gaisi Takeuti, a proof theorist who worked with Gödel at Princeton and was professor at the University of Illinois, Urbana-Champaign, who developed more fully an account of mathematical knowledge and creation by active intuition. In this talk we will describe Nishida's idea of active intuition and Takeuti's deployment of the notion in the philosophy of mathematics.

17:30 – 18:00
Atocha Aliseda (UNAM and UNED) - The Place of Logic in Creative Reason

Topic: B.1 Methodology

Abstract: “It is true that the different elements of the hypothesis were in our minds before; but it is the idea of putting together what we had never before dreamed of putting together which flashes the new suggestion before our contemplation” (CP, 5.181)

In this talk, I shall argue in favor of a general thesis according to which creativity and logic do not exclude each other. Creativity takes place in the process of invention, when an idea is first conceived, or a scientific hypothesis is discovered. However, as well known, there is no consensus as to what creativity amounts to. I depart from the characterization of a creative product in Computational Psychology, namely one which is novel (original, unexpected) and useful. Moreover, I presuppose there is some kind of automatic method for generating that new product, and in this respect, I rely on contemporary logical formulations of Peirce’s abduction and of the definition of machine in automata theory.

The analysis Peirce gives to ampliative reasoning, involves two challenges: on the hand to justify its very possibility and on the other hand, the development of its method, if any. A response to the former is found in Peirce's metaphysics; a response to the latter is concerned with an impressive research logical program nowadays, much of which is devoted to abductive logics, and the focus in this talk. I shall show through an illustration of automata, that even though it is possible to generate new items automatically and autonomously, their novelty is restricted to by the stipulated alphabet. This is the case from Peirce's abductive formulation all the way through automata theory. In terms of concept formation and of hypothesis discovery, this means new concepts and hypotheses are generated from previous ones (concepts, hypotheses); they are a product of their possible combination.

References

Aliseda, A. "Ignorance and Creativity: Woods on Third-way Reasoning", en D. Gabbay, L. Magnani, W. Park, (eds), *Natural Arguments: A Tribute for John Woods*, College Publications, Reino Unido, septiembre de 2019. ISBN 978-1-84890-302-9.

Aliseda, A. "The Place of Logic in Creative Reason", en John R. Shook, Sami Paavola (eds.), Abduction in Cognition and Action: *Logical Reasoning, Scientific Inquiry, and Social Practice*, pp. 149–160. SPRINGER, Studies in Applied Philosophy, Epistemology and Rational Ethics. ISBN 978-3-030-61772-1

ROOM 02

17:00 – 17:30

Kyley Ewing (Cape Breton Uiversity) - Free Will and Moral Responsibility in the B-theoretic Block

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: This paper argues against the possibility of any conception of free will capable of grounding responsibility in the block universe that we inhabit. Following theorists such as Double (2000), Smilansky (2002), and Pereboom (2001), I suggest that libertarian free will is an illusion. Unlike many of these other theorists, however, I propose that questions of free will and responsibility can be answered apart from any considerations related to determinism and indeterminism. Specifically, I aim to show that, whether or not determinism is true at the microscopic and macroscopic levels, the macroscopic world in which we reason and act is constrained by the ontology of time afforded by the block universe. It is this ontological structure of time that precludes both libertarianism and any type of compatibilism able to sustain our everyday, intuitive notion of responsibility.

My conclusion is that, given the block universe that we inhabit, we ought to believe and act as if free will and responsibility are not genuine features of the world. Nevertheless, I think that responsibility and punishment or deterrence can come apart to a certain extent. This means that there may still be justifiable repercussions for behavior that is harmful to others or destructive. An interesting line of inquiry that results from this conclusion concerns the psychological basis for the illusions of free will and responsibility. In the end, the best way to understand free will and responsibility in the block universe might be to draw an analogy between these two notions and the standard B-theoretic conception of the passage of time.

References

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ROOM 03

17:00 – 17:30

Tatiana Velásquez (Universidad Nacional de Colombia), David Rey (Universidad del Valle) - Collective readings of sentences with plural terms and anaphoric pronouns

Topic: A.2 Philosophical Logic

Abstract: This paper will be devoted to the analysis of anaphoric pronouns whose antecedents are plural terms. To see why such pronouns are interesting, let us consider the following sentence:
1.) If the students write a poem, they will win a prize.

This sentence has a collective reading. Suppose that the students in a classroom will win a certain poetry prize if they write a poem together, but none of them is capable of writing a good poem without the aid of her classmates. In this scenario, (1) is true if the predicate write a poem is interpreted collectively.

The collective reading of (1) poses a challenge to the "singularist" approach to plurality that was adopted by distinguished analytic philosophers such as Frege (1967) and Quine (1960). If we try to symbolize (1) using standard predicate logic, the best we can do is to provide a formula equivalent to (2).
For any x and any y, if x is a student of the class, y is a poem, and x writes y, then there is some z such that z is a prize and x wins z.
However, (2) is false in our scenario. It does not capture the collective reading of (1).

Oliver and Smiley (2013) propose a plural-logic theory that offers a non-singularist account of collective readings. Their theory relies on the notion of plural denotation, which is a relation that holds between a term and one or more objects. Like traditional denotation, plural denotation is a relation, but it is not a function. In other words, a term may denote various objects.

Oliver and Smiley characterize a formal language for plural logic equipped with predicate-logic quantifiers, plural variables, and a description operator. However, for the purposes of analyzing a sentence such as (1), we need a theoretical framework that can account for natural-language anaphora. Dynamic semantic theories offer a sophisticated account of singular anaphoric pronouns in intra-sentential and inter-sentential discourses (Kamp 2013 p.3). They use a base discourse that can be constantly fed and connected with new information.

The main goal of this paper will be to provide a reformulation of Discourse Representation Theory (DRT) that incorporates the notion of plural reference. We will suggest that plural terms can be treated in DRT as expressions that introduce plural discourse referents that stand in a relation of plural reference with external entities. Once we take this step, the plural anaphoric pronoun of (1) can be accounted for using the same resources that standard DRT applies to singular anaphoric pronouns. With the incorporation of plural reference into DRT, we will get an accurate logical representation of the plural use in natural languages and by doing that we will also be able to reject the singularist approaches.

References
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17:30 – 18:00

Andrés Rubio Krohne (University of the Andes), David Rey Sampedro (University of Valle) - Proper names and belief attributions

Topic: A.2 Philosophical Logic

Abstract: In this talk we propose a theory about the role that proper names play in belief reports and we argue that it solves a trilemma that affects other theories. The talk will have four parts.

We begin by describing the trilemma. Suppose a speaker S utters a belief report R of the form "B believes that N is such-and-such" (e.g. "John believes that Mary is tall"), where B is a believer and "N" is a proper name. We argue that it is hard to simultaneously account for the following three facts about R:

Opacity: In some circumstances, the truth-value of R is not preserved if "N" is substituted for a correferential name (cf. Frege 1892).

Inter-linguistic attribution: R can be true even if B doesn't speak English— and, therefore, B would not use "N" to describe her own belief.

Informational instability: R can be true even if S and B attribute different properties to the referent of "N".

Secondly, we consider some theories about the role of proper names in belief attributions and we argue they fail to simultaneously account for the three facts. Specifically, 'reference-centered' theories (Cresswell 1985) do not explain Opacity, 'form-centered' theories (Larson and Ludlow 1993) do not explain Inter-linguistic attribution, and 'sense-centered' theories (Frege 1892) do not explain Informational instability.

Thirdly, we propose a solution. We claim that, in some cases, belief attributions convey information about the ways in which the believer represents the objects of her belief. In such cases, a sentence like (1) has the truth-condition given in (1'):

(1) Louis believes that Superman flies.

(1') There is a mental file x in Louis' mind such that (i) Louis believes of Superman that he flies by representing Superman through x and (ii) x stands in an appropriate equivalence relation to name "Superman".

We clarify our use of the concept of mental file (adapted from Recanati 2012), explain what it means to represent something through a given mental file, analyze the concept of equivalence relation through the notion of causal chain (Kripke 1980), and we explain in which cases this analysis does not hold.

Fourthly, we argue that our proposal accounts for the three facts mentioned above: conditions (i)-(ii) can be met in cases in which S and B speak different languages or attribute different properties to the referent of "N", and, moreover, condition (i) may fail when "N" is substituted for a correferential name. Finally, we apply our theory to other problematic cases, like Kripke's (1979) famous Paderewski example.

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ROOM 04

17:00 – 17:30

Jorge L. Garcia (Inner Mongolia University), Xiao Yu Wang (IMU) - From Aesthetics to Anthropology: Ideal Beauty in Camper's (1722-1789) Theory of Race

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: The problem of finding objective criteria for the characterization of racial difference has often been confused with the questionable task of providing scientific grounds for racism. One important case in point is the misconception of supposing that Petrus Camper's (1722-1789) theory of the facial line demonstrates the superiority of the Caucasian racial type. In this paper, we argue that the invention of the facial line does not obey Euro-centric aesthetic bias. On the contrary, Camper's original account of the racial difference is best understood from a pluralistic stance which is neutral with respect to any claim of racial superiority. This can be seen from the representational function of the facial line in relation to its aesthetic underpinnings. This relation is captured by Camper's assumption according to which if a representation faithfully captures certain aesthetic properties of its target, then it also represents objective physical properties thereof. To unpack how this principle underlies the construction of the theory of the facial line, we analyze the influence of Johan Joachim Winckelmann's (1717-1768) conception of Ideal Beauty on Camper's craniological studies. On the one hand, Winckelmann's schema situates classical Greek statuary at the highest level of sensual depuration in the depiction of the human form. On the other hand, Winckelmann proposed a duality of modes of ideal beauty that fits neatly with Camper's approach to the problem of racial variation. These features of correctness, neutrality, and duality of the Ideal Beauty guided the discovery of the facial line as the logical space for the anthropometric characterization of human variation. The upshot of Camper's is the representation of racial variation as an order, not a hierarchy, in the logical space of the facial angle.

17:30 – 18:00

Tomasz Żuradzki (Jagiellonian University in Kraków) - Embryo-like structures, value-loaded metaphysics of science, and regulation of biomedical research.

Topic: C.4 Philosophy of the Biomedical and Health Sciences
Abstract: Philosophical discussions on non-epistemic values in science usually focus on the role of values in inspiring scientific questions, affecting scientific methodologies, and setting the level of evidence needed for drawing conclusions. On the examples of human embryos and embryo-like structures, we analyze the role of non-epistemic values in classificatory practices in biomedicine. In particular, we focus on cases when regulatory mechanisms limit research, either in the forms of direct bans (e.g., some cases of human embryo research) or indirect incentives (e.g., bans on public funding or patenting some procedures regarding human embryos and embryo-like structures). Thus, we challenge all these philosophical theories of classification and kinds that do not accommodate the role for non-epistemic values.

We will discuss the 14-day rule stating that in vitro research on human embryos and some embryo-like structures is permissible, but only until two weeks after fertilization or creation. One may interpret this rule as assuming that purely value-free biological facts about human embryos (e.g., individuation, i.e., the fact that embryos can no longer twin, or the first appearance of the primitive streak around this time, which is a precondition for the capacity to feel pain) ground the moral or legal status of organisms. Such a "metaphysics-first" approach tries to settle the metaphysical question of what a human embryo is – what is its essence or definition – and from there derive normative conclusions about, e.g., regulations on research.

In this paper, we argue that this view is mistaken because, in particular, in the case of research-oriented biological classifications, there is no value-free (or interest-free) metaphysics of science. Our approach first takes into consideration the interplay between epistemic and non-epistemic values in real cases of biological classifications, and then draws conclusions about metaphysics, i.e., the how human embryos or "synthetic human entities with embryo-like features" may be classified to suit a given value framework.

For example, human parthenogenetic stem cells are excluded from the patenting prohibition of procedures based on hESC by the European Biopatent Directive, because such stem cells have been defined differently than human embryos or other types of stem cells: the parthenogenetic ones do not have 'the capacity' to develop into a (born) human being, i.e. totipotency. However, the capacities of some of such embryo-like structures may be measured after realization of these capacities in controlled environments. Since their capacity is context-dependent, there is no such thing as a value-neutral environment in which we can judge the embryo's or stem cells' 'genuine' intrinsic potential. Thus, any forward-looking definition of embryos or embryo-like structures is grounded in specific normative evaluation on what counts as 'normal environment'.

We conclude with a few remarks on the role of philosophers of science and bioethicists in the realm of science policy and we argue that major normative and regulatory issues in biomedical research would benefit from the tighter integration of these two disciplines.

ROOM 05

(KUHN3) From previous time slot, same room.
Symposium: Kuhnian Studies. Where are we and where do we go?

17:00 – 17:30
Vincenzo Politi (Universitat Autonoma de Barcelona) - The Kuhnian account of the scientific community: between autonomy and value-ladenness

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: Now that there is a growing consensus in considering the social constructionists' (mis)appropriation of Kuhn's philosophy as an unintended consequence of his focus on the scientific community, a new worry is emerging among philosophers: namely, that his view is actually too internalist.

Kuhn argued that scientific progress is the result of the (relative) isolation of the scientific community from the rest of society. For Douglas (2009), this view contributed to the popularity of the so-called 'Value Free Ideal' (VFI) among philosophers of science. Although it recognizes that so-called non-epistemic values (e.g., moral and political judgments) mayplay some 'external' role in science (e.g., in the agenda-setting stage), for VFI the 'internal' stages of scientific research must be driven only

by purely epistemic values. VFI has been contested by several scholars, who have also developed a new 'co-production' ideal, for which science is deeply embedded in society, engaged with a plurality of social actors, and aligned to societal needs.

Reisch (2019) argues that Kuhn was far from promoting social disengagement, and that he made some of his claims in an attempt to avoid personal and professional troubles while navigating difficult political times. While Reisch develops his argument on the basis of Kuhn's biography, in this talk I aim at rejecting the interpretation of Kuhn as a supporter of VFI on a strictly philosophical ground. In other words, I will not talk about 'Kuhn-as-a-person', but I will rather discuss what conclusions we can draw from the 'Kuhnian philosophy'.

The relation between Kuhn's insular image of the scientific community and VFI is not straightforward, for at least two reasons. First, Kuhn does not claim that scientists ought to avoid every socially important problem, but only those that are not reducible to a tractable form. Rather than a defence of VFI, therefore, Kuhn's claims can be read as the recognition of the limits of science. Second, the 'isolation' of the scientific community does not imply its value-freeness. Although Kuhn did not explore this line of inquiry, it is possible to conceive the scientific community that he regarded as insulated from the rest of society as being nevertheless internally driven by non-epistemic values.

In the last part of the talk, I will explain why this 'neo-Kuhnian' account of a relatively autonomous and yet internally value-laden scientific community is epistemically and morally preferable to the 'co-producing' and 'open' models of science promoted by several philosophers and policy makers. I will defend such a claim on two grounds. First, I will argue that the very idea of science contributing to society requires the lines between 'science' and 'society' not to be too blurred. Second, I will argue that, in the same way in which freedom is one of the necessary conditions of responsibility, the scientific community ought to preserve part of its autonomy in order to be properly socially responsible.

References

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17:30 – 18:00

Pío García (Universidad Nacional de Córdoba (UNC)), Andrés A. Ilcic (Universidad Nacional de Córdoba (UNC)) - Anomaly Creation Machines: Revisiting Kuhn's Expectations on Thought Experiments.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: In 1964, two years after the release of The Structure of Scientific Revolutions, Thomas Kuhn published a paper about thought experiments [TEs] (later reprinted in [1, ch. 10]) that can be interpreted in different directions. For instance, James Brown paradigmatically interprets Kuhn's account in terms of the conceptual framework of The Structure, insofar as a TE "helps us to see the old data in a new way—re-conceptualized" [2, p. 111]; he therefore takes learning about our own conceptual apparatus as the main objective of Kuhn's proposal [2, p. 113].

Broadly speaking, most philosophical accounts of TEs either underline an empiricist perspective [3], while others rely on a more Platonic (or at least rationalist) attitude [4]. This implies that the crucial question "what can we learn from a thought experiment?" can be answered in at least two different ways, usually mutually exclusive: we can either learn something about the world or we can learn something about our concepts or ideas. This is the starting point of Kuhn's analysis of TEs. Kuhn considers them as a "potent tool for increasing man's understanding of nature" [1, p. 240]. With this statement, we take Kuhn to be, in some sense, following a Machian tradition.

In this talk, we explore some consequences of interpreting Kuhn's account of TEs in line with a more Machian tradition of likening them to physical experiments, yet aware of the theory-ladeness of observation and other cognitive contributions. In this sense, we read Kuhn as holding that there is more than a merely logical or conceptual-semantic issue when learning from TEs. In epistemic terms, the result of a TE is more than merely solving a "confusion" or eliminating a "contradiction." TEs cannot deal with self-contradictions, since these cannot hold in any possible world; there are simply no such experiences to which our familiar concepts can be applied. Therefore, for Kuhn, if there is any sense of "confusion" that can be at play in empirical TEs it must be one where some experiences are familiar insofar as they naturally fit our previous concepts and experiences. For a fruitful TE, there must be some possible experiences that challenge those concepts. The crux of the issue now becomes a decision to be made about the way to challenge a previous concept, for it might be dealt with by confronting it only with a new concept, or rather with a novel context of experiences that we might now judge as significant due to the TE.

References

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[3] John Norton, "Why Thought Experiments Do Not Transcend Empiricism", in *Contemporary debates in the philosophy of science*, Blackwell Malden, pp. 44–66.
[4] James Robert Brown, "Why thought experiments transcend empiricism", in *Contemporary debates in the philosophy of science*, Blackwell Malden, pp. 23–43.

ROOM 06

(INFER) From previous time slot, same room.
Symposium: What are Inferences? Some Reflections In-Between Logic, Language, and Cognition

17:00 – 17:30
Nora Alejandrina Schwartz (Facultad de Ciencias Económicas - Universidad de Buenos Aires) - Scientific Modelling and Distributed Representations

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: Some thinkers have thematized the involvement of material resources in scientific reasoning from the "new" cognitive studies of science. Such studies constitute a naturalized epistemology that do research on scientific tasks without putting aside the environment within which they take place. (Kitcher, Ph., 1992; Rouse, J., 2007). They based the research on the "environmental" perspectives of the contemporary cognitive science. These ones encompass views and investigation projects that include the embodied mind, the embedded mind, the extended mind (Gallagher, S., 2008) and distributed cognition. The environmental cognitive studies of science have analyzed scientific practices integrating their many dimensions. Most notably, they have examined modelling and other heuristic reasoning, attending to the devices that are part of the material scientific culture. In particular, Nancy Nersessian examined the role of material representations in scientific modelling –considered as a genuine kind of reasoning- grounded in distributed cognition. She took a notion of

reasoning from the Philip Johnson-Laird´s semantic conception of reasoning (Johnson-Laird, P., Girotto, V., & Legrenzi, P., 1998). It is a loose concept, as it includes not only algorithmic inferential procedures, but heuristic ones (Nersessian, N., 2008; y 1992b).

Nersessian thought that external representations, together with analogy and thought experiment, are technics employed in building and using mental models. She refers to those heuristic procedures in many publications (cf., for example, Nersessian, N., 1999). Distributed cognition understands problem solving and reasoning as processes that emerge from the activity of functional systems. These ones have representational components – individuals and representations codified in different material media- that coordinate each other in carrying on any task (Perry, M., 2003).

In great measure, Nersessian´s analysis of external representations as a kind of modelling focused on visual representations. Specifically, she employed the research on diagrams (Nersessian, N., 2008). However, She also referred to physical models, i.e., to models of three dimensions (Nerssesian, N., 2002), and to in silico models (cf., for example, Nersessian, N. 2012). In these works, Nersessian took advantage from the category of system of distributed representations, which comes from the aformentioned environmental perspective of the contemporary cognitive science. Now then, Nersessian took on the category of distributed representations system in a critical way. Especially, Nersessian together with Lisa Osbeck pointed out that Edwin Hutchins did not offer a conception of the representation nature compatible with the idea of distributed cognition through a system integrated by "inner" and "external" representational media (these ones understood in a broad sense). In other words, Nersessian et al. noticed that Hutchins did not pose a concept of representation different from the view of the traditional cognitive science nor from the connectionist perspectives. Furthermore, they point out that Hutchins did not put forward a concept of representation able to distinguish different kinds of media within the cognitive system (Nersessian N., & Osbeck, L., 2006; Nersessian N., & Osbeck, L., 2014). This paper aims to analize and put in context the just mentioned Nersessian´s observations.

17:30 – 18:00

Diego Letzen (Universidad Nacional de Córdoba) - A Social, Dialogue-based Account of Inference

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: In the study of logic and reasoning, the notion of inference plays a central role. Inferences where the truth of the premises guarantees the truth of the conclusion are known as deductive inferences and deduction is conceived as a powerful reasoning tool, allowing for the derivation or justification of conclusions not only in everyday life but in various areas of intellectual inquiry such as philosophy or mathematics. The study of deductive inference has been a central theme in philosophy since ancient times. However, it wasn't until the mid-19th century that the study of deductive inference became a major area of focus in mathematics and logic, due to the advancement of symbolic logic and the study of formal systems. The field has since evolved to encompass other forms of inference, particularly with the advent of artificial intelligence.

In this context, models for inference representation, particularly those corresponding to defeasible reasoning, have gained importance. These models are more suitable for representing ordinary reasoning and allow for the conclusion drawn from certain premises to change in the presence of new information (non-monotonic inference models). The AGM theory of belief change (Alchourrón et al., 1985) formally considers such cases, where the agent must accept or reject the incorporation of a belief, potentially triggering an adjustment to their belief state. Both the deductive view of inference and these models share the idea that inference is an individual, almost private, mental activity at a personal level. This contrasts with recent research on the development of reasoning and also with the analysis of inference from antiquity, especially from Aristotle, which sees

it as having a strong social-dialogical character. In his approach, inference is viewed from a dialogical context, where reasoning is seen as inscribed. As some authors have recently pointed out, the dominant approach to reasoning since the modern era seems to have forgotten the dialogical roots of argumentation and reserved its treatment to informal theories of argumentation. Faced with this situation, some of them (Dutilh Novaes, 2015, 2021; Rahman et al., 2018) have adopted or proposed a dialogical approach to consider and represent phenomena related to deductive and other kinds of reasoning. The common idea is that inferences can be considered as linked to an implicit interlocutor (Sundholm, 1997; Rahman 2018). This concept allows us to explain the process of internalization (Peregrin, 2014) of the social dimension under consideration, and offers a way to understand some kinds of inferences in general and belief change from a perspective that includes the central role of external interactions as components of this kind of processes.

This paper proposes to rethink these authors' observations by applying a dialogical framework to model the dynamics of belief. To this end, we adopt the dialogical framework of Martin-Löf's Constructive Type Theory and seek a reconstruction of the theory of belief dynamics that allows us to consider the interactive elements of meaning and belief acquisition. This will allow us to discuss alternative aspects of inference that go beyond the classical view.

ROOM 07

17:00 – 17:30

Pablo Acuña (Pontifical Catholic University of Chile) - Von Neumann, gleason, kochen-specker: revisiting three theorems and hidden variables

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: It is a widely held view that John von Neumann's so called "impossibility proof" is an uninteresting result that does not accomplish its alleged goal of establishing the absolute impossibility of hidden variables in quantum mechanics. This widespread belief is rooted in John Bell's criticism of the theorem, which targets a crucial premise in the proof. On the other hand, it is also a widely held view that the Kochen-Specker theorem imposes a contextuality constraint on the ontology of beables in hidden variables theories. That is, it is generally believed that this theorem enforces that in hidden variable theories the value of (some) beables depends essentially on the context of measurement.

In this talk I challenge both these "official" views. In the first part, I show that, although it is true that it does not prove the absolute impossibility of hidden variables, von Neumann's theorem does establish that hidden variables theories with deterministic states cannot be Hilbert space theories. I argue that Bell missed this because he misunderstood the scope and goals of von Neumann's proof, which I will explain in detail. I also show that if we consider the precise logical structure of the theorem, along with the original conceptual goal that von Neumann had in mind when he introduced it, von Neumann's result is quite analogue to Gleason's celebrated theorem. Just like Gleason's, von Neumann's theorem is a derivation of the quantum mechanical trace rule from basic principles of probability theory and basic properties of Hilbert space. Furthermore, the same restriction that von Neumann's result imposes on hidden variables theories can be derived from Gleason's.

In the second part of the talk, I show that in the usual interpretation of the Kochen-Specker theorem—according to which it imposes a contextuality constraint on the ontology of beables in

hidden variables theories—it is assumed that those theories are theories in Hilbert space, so that beables are represented by Hermitian operators. However, since theories like that are banned by von Neumann's and Gleason's theorems, the usual interpretation of the Kochen-Specker theorem cannot be right. I show that if we consider the precise meaning of von Neumann's and Gleason's proofs, the relevance that the Kochen-Specker has for hidden variables theories is much weaker that it is usually thought. I illustrate the conclusions of the talk with the case of Bohmian mechanics.

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17:30 – 18:00

Adán Sus (University of Valladolid) - Earman's symmetries principles and the Problem of Spacetime

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Earman(1989) states two symmetry principles, understood as conditions of adequacy between dynamics and spacetime structures in a theory of motion, that amount to prescribing the extensional equivalence of dynamical and spacetime symmetries. Much in recent debates about symmetries in physics is related to the discussion about the validity, limitation or refutation, and eventual justification of Earman's principles. In this talk, I intend to tackle directly the question of their justification with the aim of providing an improved version of a principle that relates spacetime symmetries and dynamical symmetries.

In order to do so, I make contact with two different discussions in the context of spacetime theories. The first one is the so-called Problem of Space as addressed by authors like Riemann, Helmholtz, Poincaré, Lie and Weyl. One can argue that the main motivation behind these different proposals has to do with stating the conditions from which spatial geometry (in the original pre-relativistic context) and spatiotemporal local chrono-geometry (in Weyl's version of the problem) can be derived. A dimension of this discussion, that proves extremely fruitful for the formulation of a symmetry principle, is that it hints to an explicit connection between spacetime geometry and certain conditions (like free mobility in the original formulation) that can be interpreted dynamically. I propose and discuss a general formulation of these results (a Helmholtz-Lie-Weyl theorem) and extract from it a promising perspective for the characterization of spacetime symmetries.

On the other hand, we have the discussions about the physical and empirical significance of different symmetry transformations. There is a natural approach to this problem, developed mainly by David Wallace, that makes such a significance dependent on questions about how the symmetry transformations of a given subsystem extend to transformations that include the environment (other subsystems) that interacts with it, together with the explicit consideration of how the symmetries

affect the physical process of measuring. I endorse this approach and put it to work to provide an interpretation of dynamical symmetries, dependent on the characterization of the workings of the measuring procedures implicit in the theory, that allows to establish the link between dynamical and spacetime symmetries.

The result of combining appropriately these two discussions is the formulation of an improved symmetry principle, together with a framework in which to discuss its foundations and understand better its limitations.

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ROOM 10

17:00 – 17:30

Stef Frijters (KU Leuven) - Aristotelian Diagrams for many-valued logics

Topic: A.2 Philosophical Logic

Abstract: The square of opposition and other, more complex, Aristotelian diagrams have been used to graphically represent logical relations since at least the early middle ages. Recently there has been a notable surge in the study of these diagrams as objects of independent interest, often under the name `logical geometry'. Most, though certainly not all, of the field of logical geometry has however only been concerned with diagrams based on classical logics. In this talk I will focus on the logical geometry of non-classical, specifically many-valued, logics.

The relations expressed by Aristotelian diagrams are usually defined in terms of truth values. For example, two formulas are said to be contrary to each other iff they cannot both be true, but can both be false. Instead, I propose a slight generalization of these definitions in terms of designated values. I say that two formulas p and q are:

Contradictory* iff p and q cannot both have a designated value and cannot both have an undesignated value.

Contrary* iff p and q cannot both have a designated value, but can both have an undesignated value.

Subcontrary* iff p and q cannot both have an undesignated value, but can both have a designated value in Subalternation* iff whenever p has a designated value, then q also has a designated value, but it is not the case that whenever q has a designated value, then p must also have a designated value.

This is a proper generalization, i.e. any pair of formulas of a classical logic is in one of the *-relations iff they are in the corresponding `normal' relation. However, the new definition also allows us to study the logical geometry of many-valued logic. This is what I will do in this talk.

Take for example the set {p /\ q, p \/ q, ~p /\ ~q, ~p \/ ~q}. It is well-known that in classical logic this gives us a square of opposition. If instead we draw the Aristotelian diagram for the same formulas in Kleene's three-valued `strong logic of indeterminacy' (using the * definition), then we get a square of opposition where the subcontrariety relation is missing. In contrast, if we draw the diagram for Priest's three-valued `logic of paradox', then the contrariety relation is missing. This shows that there is both a discontinuity and a continuity between the Aristotelian geometry of classical and many-valued logic. The discontinuity is illustrated by the fact that the two new diagrams were impossible to draw in classical logic (i.e. there is no set of four formulas such that they give an Aristotelian isomorphic diagram in classical logic). The continuity lies in the logic-sensitivity of the new diagrams: in the classical case, changing underlying logics gives different diagrams. This example shows that the same holds for many-valued logics.

17:30 – 18:00

Jose Verissimo Teixeira Mata (house of Representatives) - The List of Frege and Aristotle

Topic: A.2 Philosophical Logic

Abstract: I will discuss the position of Aristotle concerning the relationship between logic and mathematics, and what his biology has made for this relationship. Frege (Logik in der Mathematik) gave us names in his list,which have worked in the relationship of mathematics and logic: Plato, Descartes, Leibnitz and Newton, but he didn't say anything about Aristotle and we can prove that he knew some important Aristotle's texts and very well(De Interpretatione, for example), but it is evident that he didn'nt know the totality of Aristotle's works and including something very important in logic and mathematics.

Lukasiewics corrected partially that kind of position, but only "en passant" (Aristotle's Syllogistic). The aim of this paper is to show how much Aristotle has to do with mathematics and how much his biology is important for that discipline and for logic in his philosophical view.

If no one has doubt about the relationship between Plato and Mathematics, I will try to show that biology for Aristotle is not a negation of mathematics, but only a way to overcome Plato's theory and philosophy. In Aristotle epistemology, biology is the right way to get reality and to speak about world, how it is, including when we speak about mathematical objects (here, In some directions, we can see: Frege only thinks he is completely free of aristotelic logic, neverless he has almost always dressed or taken the platonic colours). As always, the word "almost" is here too, and we can show some completely aristotelic texts from Frege...

One of the Aristotle's main aims, when he took the biological paradigm, was to deny the Plato's logic and philosophy, but not the mathematics. We can say more: this is not enough. In fact, he has tried to reconstruct all knowledge from another standpoint. This new standpoint has very important consequences for mathematics and mathematical development.

What Aristotle took from biology in logic, he put in his universal foundation of logic(second substance-gender, species; first substance – individual), objekt and Begriff(concept) in Frege's theory.

We can say that the new standpoint became real and operative in logic when Aristotle appears for us in Categories and De Interpretatione. And we can say that Aristotle in someway or, to be more precisely, in someways, has worked all his life in his categorical project.

We can put some questions in this context, for example:

1) how Aristotle's foundation of logic has implications for mathematical and logic objects?

2) What is the nature of possibility?

3) Is the necessary possible or not? How many answers we can give for that question?
4) Which place has the language philosophy in Aristotle's thought?
5) Which places the real contradiction has in Aristotle's thought?
To touch these questions accurately is the aim of my exposition for concluding that Aristotle could be placed in Frege's list by right and, in all these questions, remains modernal in foundation of logic and mathematics.

ROOM 12

(LOG-N) From previous time slot, same room.
Symposium: Logic, Norms, and Reasoning

17:00 – 17:30
Matteo De Benedetto (Ruhr-Universität Bochum), Matias Osta-Velez (HHU Duesseldorf, Udelar Montevideo) - The Normative Dimension of Logical Modeling.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: The traditional view of the nature of logic wants it to be a model of correct reasoning. Yet, it remains largely unclear the exact way in which logic and reasoning are related. In particular, it isn't easy to specify the exact relata of logical entities and the specific kind of connection that logic establishes between such relata and logical entities. In this talk, we will address this problem by developing a new perspective on the modeling nature of logic.

Our proposal will be centered around the idea that logic is a normative model of reasoning, and, as such, its modeling nature closely resembles our best social sciences models. We will develop our approach as an extension of the so-called logic-as-a-model conception of logical consequence (e.g. Shapiro 1998; Sagi 2014; Glanzberg 2021). According to this view, model-theoretic logical consequence is a good mathematical model of the intuitive concept of logical consequence that we use in everyday reasoning. From this perspective, logic is a good model of reasoning because its elements (i.e. formal languages, logical truth, model-theoretic structures, etc.) represent adequately entities involved in reasoning tasks (i.e. natural language, declarative truth, possible situations, etc.) and because model-theoretic logical consequence preserves certain central aspects of the intuitive concept of logical consequence (e.g. Tarski's formality and necessity conditions, cf. Sagi 2014). Despite the progresses made by the logic-as-a-model conception of logical consequence in understanding the relation between logic and reasoning, the notion of model used in this literature is overly simplistic, leaving unexplained the exact modeling nature of logic and the representational mechanisms involved. This is the gap that our approach will fill.

In order to better understand the modeling nature of logic, we will rely on the existing literature, in philosophy of science, on the nature of scientific models and scientific representation (e.g. van Fraassen 2008; Frigg and Nguyen 2020). Building on the distinction between descriptive and normative models in science, we will argue that logic is a normative model of reasoning that involves an idealized descriptive component. As such, we will show that, contrary to what proponents of the logic-as-a-model approach usually assume (Shapiro, 1998; Glanzberg, 2021), the relation that connects logic and reasoning is not so much analogous to the one connecting models in natural sciences to their phenomenon, but it closely resembles instead the relation between normative models in social sciences and their objects (cf. Beck and Jahn 2021). From this perspective, we will argue that the goodness of logic as a model of reasoning can be assessed by looking at whether it

provides successful normative guidance to agents in a wide range of inferential activities. We will prove the fruitfulness of this new
account of logic-as-a-normative-model by applying it to three different discussions in the philosophy of logic that are connected to the modeling nature of logic: the debate on Tarski's minimal conditions for logical consequence, the debate on the normativity of logic for reasoning, and the alleged opposition between pragmatic-inferential views of logical consequence and model-theoretic ones.

17:30 – 18:00

Natalia Buacar (UBA - IIF SADAF) - Logic, inference tickets and forking paths.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: After the well-known dispute around psychologism in logic, resolved in favor of the antipsychologism defended by Frege, one of the beliefs that prevailed was that logic was not descriptive but normative. This seemed the only way to account for logical error, something apparently desirable. In fact, the idea that logic is normative has been recurrent throughout the history of logic and its philosophy. The general idea is that logic provides norms for thinking or reasoning. This assumption was critically discussed by Hilbert Harman (1986). According to him, logic does not set rules about what we should or should not believe; therefore, it is not normative. In response to this, John MacFarlane (2004) inaugurated a tradition where the aim is to restore that link between logic and rules for reasoning through the specification of "bridge principles." To accomplish that, it became crucial to specify a more precise sense of normativity.

I will address the debate around the normativity of logic presupposing a distinction between two senses of normativity: prescriptive and evaluative. This distinction has been widely thematized in moral philosophy and discussed by von Wright (1963) for the case of logic. From this perspective there are two ways in which a statement or a rule can be normative, one prescriptive, the other evaluative. While the former impose, prescribe, direct or govern certain actions or attitudes, the latter introduces criteria for (in)correctness. The way in which normativity has been understood and criticized through the literature on the subject has mainly centered on the prescriptive sense.

In this talk, I will defend that logic is normative in an evaluative sense. According to this, logical theories do not tell us how we should act or infer, but only how it is correct to do so if we are pursuing certain ends. The discussion about ends is a broader discussion that occurs in the field of theories of rationality. Even so, logical theories allow us to evaluate our argumentative practice as correct or incorrect, it offers criteria to carry out that evaluation and, moreover, credentials to support inferences. To explore and clarify my proposal, I draw two analogies. The first one in terms of inference tickets, taking Ryle's (1950) proposal as a starting point. The second one appeals to hiking trail maps to try to capture the idea that logic gives us guidelines and safety guarantees when moving inferentially from one statement to another. These analogies will also help to contextualize the problem of the normativity of logic within a more vast entanglement of central philosophical problems about logic.

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ROOM 13

(NCM) From previous time slot, same room.
Symposium: Non-Classical Mathematics

17:00 – 17:30
Edson Bezerra (SADAF/FONCyT), Eduardo Barrio (IIF-SADAF-CONICET & University of Buenos Aires) - The logics of a Universal Language.

Topic: A.1 Mathematical Logic

Abstract: Semantic paradoxes pose a real threat to logics that attempt to be capable of expressing their own semantic concepts. Particularly, Curry paradoxes seem to show that many non-classical solutions to these paradoxes must change our intuitive concepts of truth or validity or impose limits on certain inferences that are intuitively valid. In this way, the logic of a universal language would have serious problems. In this talk, we explore a different solution that tries to avoid both limitations as much as possible. Thus, we argue that it is possible to capture the naive concepts of truth and validity without losing any of the valid inferences of classical logic. This approach is called Buenos Aires-plan. We present the logic of truth and validity, STTVω based on the hierarchy of non-transitive logics STω is capable of blocking these problematic results while it keeps the deductive power of classical logic as most as possible, figuring out an adequate semantic theory. Unfortunately, such a good solution comes with a price. The logic of a universal language cannot be closed under its logical principles. We also argue that the local characterization of validity shows how to make inferences using the logic STω.

17:30 – 18:00
Fernando Cano-Jorge (University of Otago and Universidad Panamericana) - A paraconsistent approach to computational trinitarianism

Topic: A.1 Mathematical Logic

Abstract: Computational trinitarianism or trilogy [4] is the mathematical insight that there are three different manifestations of the same phenomenon of computing occurrying at the foundations of mathematics: in logic as Gentzen proof systems, in computability theory as functional programming languages like typed lambda calculus, and in category theory as Cartesian or monoidal categories of mathematical objects and their transformations. One of the possible implications of this view is that if there are several different kinds of logics that are strong enough to support mathematical theories (e.g. at least those about basic arithmetic and recursion), then there are several different kinds of theories of computability, which could in turn have their own different limitations and capabilities, a view that converges with [6]. This correspondence has been studied for the cases of classical —even modal— logic, intuitionistic logic and linear logic, reaching models of computation of the Boolean, constructive and quantum varieties, respectively.

In the last decades we have learned of paraconsistent logical systems meeting the above mentioned strength requirement, allowing the development of inconsistent mathematics; however, computational trinitarianism is yet to be explored in the case of such paraconsistent logics. In this talk

I will set out a trinitarian route to follow. First, we will look at the general strategy followed by trinitarians to exploit the correspondence between Gentzen systems, categories and typed lambda calculi. Then, since there are different families of paraconsistent logics, we will discuss the philosophical motivations one may have to study such correspondence when it comes to specific paraconsistent logics. We will begin by looking at Priest's LPQ and then we will argue that other paraconsistent logics give rise to richer, more interesting theories of computability. In particular, we suggest this is the case for the affine system SubDLQ from [7] and [2], which is an extension of the combinatorial logic BCK (see [3, §2.3.2]); and also for relevant systems from [1] like RQ and Routley's DKQ from [5].

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TUESDAY, JULY 25TH

9:30 – 10.30	INVITED SPEAKER: ERICH GRÄDEL

AUDITORIUM 1

INVITED SPEAKER
Erich Grädel (RWTH Aachen University)

Semiring Semantics for First-Order Logic and Beyond

Chair: María Gabriela Fulugonio (University of Buenos Aires)

Topic: A.3 Computational Logic and Applications of Logic

Abstract: Semiring semantics relies on the idea to evaluate logical statements not just by true or false, but by values in some commutative semiring. In this context, the standard semantics re-appears as the special case when the Boolean semiring is used. Valuations in other semirings provide additional information, beyond the truth or falsity of a statement, such as costs, confidence scores, access levels, or the number of successful evaluation strategies. Further, semirings of polynomials or formal power series permit us to track which atomic facts are used (and how often) to establish the truth of a sentence in a given structure.

Semiring semantics originated in the provenance analysis for (positive) database query languages, but in the last years it has been systematically extended to many logical systems, including first-order logic, modal logic, and fixed-point logic. This raises the question to what extent the standard results and techniques of classical logic (and specifically finite model theory) extend to semiring semantics, and how such extensions depend on the choice of the underlying semiring.

09:00 - 10:30

AUDITORIUM 2

(FE)
Special Symposium: What's New in Formal Epistemology?

Chair: Fitelson, Branden

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: The symposium puts together cutting edge work in current formal epistemology, from six broad thematic areas: Deference and chance, Evidence, Normative Uncertainty, Imprecises Credences, Randomness, and Permissivism

Speakers:
1) KEVIN DORST & BEN LEVINSTEIN: What's New in Deference & Chance?
2) ANNA-MARIA ASUNTA EDER & PETER BROESSEL: What's New in Evidence?
3) CHAD LEE-STRONACH & PAMELA ROBINSON: What's New in Normative Uncertainty?
4) GIACOMO MOLINARI & JASON KONEK: What's New in Imprecise Credence?
5) FRANCESCA ZAFFORA BLANDO & SIMON HUTTEGER: What's New in Randomness?
6) MIKE TITELBAUM & KENNY EASWARAN: What's New in Permissivism?

9:30 – 10:00
Kevin Dorst (MIT) - What's New in Deference & Chance? I.

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: Consider deferring to an 'expert' probability function, such as the opinions of a rational person or the objective chances. If that expert's probabilities are introspective—the expert knows what the expert-opinions are—then all plausible deference principles agree. But often the expert probabilities are not introspective: when evidence is ambiguous, the rational person might not know

that they're rational; if the world is Humean, the objective chances might not settle what the objective chances are. In such contexts, there are a variety of natural deference principles of varying strengths. We'll review recent work that characterizes these differing principles in general and shows how they impose demanding constraints on the possible expert-opinions. To illustrate, we'll turn to Humean theories of chances, revealing a serious tension between chances being (1) simple and learnable, and (2) worthy of deference.

10:00 – 10:30

Ben Levinstein (University of Illinois at Urbana-Champaign) - What's New in Deference & Chance? II.

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: Consider deferring to an 'expert' probability function, such as the opinions of a rational person or the objective chances. If that expert's probabilities are introspective—the expert knows what the expert-opinions are—then all plausible deference principles agree. But often the expert probabilities are not introspective: when evidence is ambiguous, the rational person might not know that they're rational; if the world is Humean, the objective chances might not settle what the objective chances are. In such contexts, there are a variety of natural deference principles of varying strengths. We'll review recent work that characterizes these differing principles in general and shows how they impose demanding constraints on the possible expert-opinions. To illustrate, we'll turn to Humean theories of chances, revealing a serious tension between chances being (1) simple and learnable, and (2) worthy of deference.

Symposium continues in AUDITORIUM 2, next time slot.

ROOM 01

(JC-HCRRP)

Symposium: Hasok Chang's Realism for Realistic People Symposium

Chair: Jamie Shaw

Topic: B.1 Methodology

Abstract: Hasok Chang's Realism for Realistic People offers the most mature version of his brand of pragmatist realism to date. Herein, Chang developed and applies his views to classic topics including inquiry, truth, and correspondence. The goal of this symposium is to bring together four scholars to critically discuss the more prominent themes of Chang's positions.

One of the central aspirations of Realism for Realistic People is to offer a pragmatist perspective on the realism debate. Specifically, Chang claims to rehabilitate and update elements of pragmatism that can be found in the works of C.S. Peirce, John Dewey, and C.I. Lewis. Given the rich history of pragmatism and the diversity of opinions within the movement, there is ample room to dig

back into history and situate Chang's pragmatism within this paradigm. More specifically, multiple of our talks will revisit developments in historical accounts of pragmatism – from Dewey to van Fraassen – showing how there are still lessons to be learned for Chang's pragmatism. Of course, pragmatism never died out as a philosophical program and there are many variations of pragmatism on the market. This symposium will, therefore, not only include historical forays but critical and comparative assessments of Chang's pragmatism against other contemporary accounts.

A second central position outlined and defended in Chang's most recent book is realism. Chang offers a rethinking of realism as a kind activism, what he calls 'activist realism', which changes realism from an explanatory thesis about the success of science to a normative position that attempts to stimulate inquiry. In our symposium, we will include discussions of Chang's activist realism and its implications for scientific ontology and understanding.

Finally, Chang claims that the ultimate and proximate aims of scientific inquiry is operational coherence where various intellectual and material entities are harmonious with one another. This symposium will offer conceptual engagements with Chang's notion of operation coherence to further probe its nature. Moreover, given the proximity of operational coherence to what other philosophers have called 'understanding', comparative assessments between operational coherence and conventional accounts of scientific understanding are bound to reveal hidden assumptions in both.

This symposium hopes to not only critically engage Chang's positive position but to see what implications it might have for other fields of inquiry. In this spirit, this symposium also includes a talk dedicated to assessing the implications Chang's activist realism and pragmatism might have for our understanding of the nature of the History and Philosophy of Science as an intellectual endeavor. This attempt to generalize Chang's account might further illuminate the scope and applicability of Chang's philosophy of science.

9:00 – 9:30

Bruno Borge (UBA-CONICET) – Activist Realism, Naturalistic Metaphysics, and Ontological Pluralism.

Topic: B.1 Methodology

Abstract: Hasonk Chang's latest book develops a novel form of scientific realism: activist realism. It aims to reshape realist commitments orienting them toward scientific practice. Activist realism collides with most of the core commitments of traditional versions of scientific realism. Additionally, the central notions of reality, knowledge, and truth (among others) acquire in this context a specific (and new) meaning guided by the adoption of pragmatism. More precisely, they are reconceptualized in terms of operational coherence, a notion introduced to designate the aim-oriented coordination of actions towards the (regular) achievement of its aim(s). It consists in doing "what makes sense to do in specific situations of purposive action" (Chang 2022: 40). Although the details are complicated, activist realism is a form of pragmatic realism that combines a pragmatic/internalist understanding of reality and knowledge with a positive attitude regarding the epistemology of science. Like other internalists views of scientific knowledge, activist realism includes the rejection of what is usually called 'metaphysical realism' or 'God's Eye point of view realism'. Still, this approach is not committed to the abolition of metaphysics. On the contrary, the activist realist advocates for "a modest and piecemeal practice of naturalistic metaphysics" that allows "our knowledge of ontology to emerge from well-established practice" (2022: 130). Naturalistic metaphysics so conceived includes what Chakravartty (2017) calls scientific ontology, that is, the task of determining which ontological commitments our best science licenses.

The combination of pragmatism with naturalistic metaphysics leads to a form of practice-based ontological pluralism, according to which we accept as real, in the pragmatic sense, entities

that are pragmatically necessary for carrying out coherent epistemic activities. According to Chang (2022:149), this ontological pluralism is very similar to the 'pluralism about packaging' that Chakravartty adopts regarding natural kinds (2017: 190).

In this talk, I argue that the naturalistic metaphysics and its associated scientific ontology advocated by Chang require a modest or weak form of metaphysical realism (precisely, the one present in Chakravartty's pluralism). The alternative is that ontological pluralism collapses into a radical form of epistemic relativism. To this end, I critically discuss the notions of mind-control and mind-framing, as they appear in the articulation of Chang's pragmatic metaphysics. Additionally, I analyze this problematic aspect of activist realism in light of objections previously raised against Putnam's and van Fraassen's internalist views.

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9:30 – 10:00

Matthew J. Brown (Southern Illinois University), Milx Bria-Massaro (The University of Texas at Dallas) – Pragmatist Reflections on Chang's Realistic Realism.

Topic: B.1 Methodology

Abstract: In *Realism for Realistic People*, Hasok Chang proposes a *new* pragmatist philosophy of science that grounds concepts of "truth" and "reality" in "operational coherence." While rejecting correspondence-based realism, Chang argues that his operationalist and coherentist accounts of truth and reality make them into ideals achievable in scientific practice. We assess Chang's account by comparing it to the most thoroughly-developed among the *old* pragmatist philosophies of science: John Dewey's theory of inquiry. We find significant resonance between Chang's account of "operational coherence" and Dewey's central concept of "functional fitness." However we find some significant distance between Dewey and Chang when it comes to his discussion of the concepts of mind-independence, mind-control, and mind-framing. This is unfortunate for Chang, as it means that he ends up having to deal with what we call "the framework predicament," a problem that Dewey carefully worked to avoid in his version of pragmatism. This puts Chang closer to conceptual relativists and neopragmatists like Goodman, Putnam, and Rorty than to classical pragmatists like Dewey. However, Chang already has the start of a way out of the framework predicament in his account of "operational coherence." A minor Dewey-inspired tune-up allows Chang to escape the framework predicament and articulate a more successful pragmatic realism.

10:00 – 10:30

Dubian Cañas (Institute for Philosophical Research, National Autonomous University of Mexico) – Realistic Mirror: HPS as Coherent Active Knowledge.

Topic: B.1 Methodology

Abstract: I aim to explore the heuristic power of Chang's pragmatist philosophy (Chang 2022) to account for enquiry in history and philosophy of science (HPS). I suggest that the conceptual framework it provides —grounded in notions of active knowledge and operational coherence— can

justifiably be used to understand and guide the practice of HPS itself. Specifically, I want to argue for the following points:

(1) HPS constitutes a plurality of systems of practice, the constituent epistemic activities of which are operationally coherent. These activities are individuated by the unitary inherent goal that each approach in the field (i.e., philosophical, historical, and sociological) aims to achieve. As long as such activities can be coordinated according to system-level aims, HPS can fulfil operational coherence and hence hold a positive epistemic standing.

(2) The concept of truth-by-operational-coherence leads not only to reject an unrealistic picture of science, but also to abandon an unrealistic view of HPS. This view wrongly assumes that there is a necessary connection between the philosophy of science and the unrealistic picture of scientific knowledge.

(3) The relevant claim of activist realism is the rejection of epistemic absolutism underwriting standard scientific realism. The central consequence of adopting a realistic vision of HPS is to refuse the assumption that the philosophy of science entails epistemic absolutism. This assumption frames the apparent conflict between the philosophy of science and other studies of science (e.g., Riesch 2014).

(4) The alleged fundamental disagreement of the philosophy of science with the history of science and the sociology of knowledge results from accepting an unrealistic view of HPS. In a realistic mirror, however, such intractable conflict is illusory. HPS features both tolerant and interactive forms of pluralism, allowing science scholars to reach a consensus on some shared epistemic achievements by a process of aim-oriented adjustment.

(5) One of these achievements is the challenge to epistemic absolutism by both Chang's and sociological-oriented scholars' works in HPS (e.g., Kusch 2021). This example illustrates how epistemic activities from different fields can constitute coherent systems of practice interacting with one another. This pragmatist rendering of HPS sensibly makes sense to the fact that apparent irreconcilable approaches to science can be coordinated, and that research agendas in the study of science regarding further epistemic achievements should sensibly promote such coordination.

Putting forward (1)-(5), I seek to show how Chang's pragmatist philosophy can be used for the production, evaluation, and improvement of HPS. More specifically, how it actually offers "useful framing devices for other historians, too, as well as sociologists, anthropologists and others who make empirical studies of science" (Chang 2022, pp. 8-9).

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ROOM 02

(ECON)

Symposium: Values and Uncertainty in Economics. Philosophical and Methodological Reflections

Chairs: Jardon Urrieta, Juan Jose; Legris, Javier

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: This symposium aims at being a contribution to the main theme of the CLMPST 2023, Science and Values in an Uncertain World, as this theme is approached in the Philosophy and Methodology of Economics with an Iberoamerican perspective. The symposium is sponsored by the Iberoamerican Society for the Methodology of Economics (SIAME).

The economic environments in which humans live and interact are plagued by uncertainties, originated by different sources. However, economic theory has often neglected uncertainty. Values are linked to economics in different ways, to economic theory, to applied economics and to economic policies. In standard economic theory the agent prefers between values or ends. Each agent defines a utility function that is subjective and exogenous to the theory.

Now, when an economic theory is applied, values are not an exogenous variable. Applied science and technology consist of finding the set of laws by which a desirable end is produced. It is necessary to justify the desirability of the end. Different aspects of these problems will be discussed in the talks constituting the symposium.

Interesting methodological approaches to both problems on uncertainty and values in Economics are offered by current trends like Behavioral Economics and Evolutionary Economics. The first provides theory-based and analogy-based models of reasoning in decision under uncertainty. The second can be applied to cases in meso-economics, based on an ontology that encloses by far the rules and agreements that shape institutions. Moreover, empirical methods of causal inference have been successfully applied by many economists. However, some limitations show that these methods have been overestimated. As far as values are related to ethics, a promising approach arises from analyzing the relevance of the relation between ethics and economic knowledge under Charles S. Pierce's Pragmatism, linked to a realism-based Philosophy of Economics. These are the topics to be discussed by the speakers at the symposium. The individual talks are the following:

1) EDUARDO SCARANO: Applied economics and values
2) RICARDO CRESPO & FERNANDO TOHMÉ: Economics in an Uncertain World
3) JUAN JOSÉ JARDÓN URRIETA: The meso-economic level in the analysis of evolutionary economics
4) LUIS MIRELES-FLORES: Some problems with the empirical turn in economics
5) MARÍA ALEJANDRA MADI: Ethics and Scientific Knowledge in a Pragmatist Philosophy of Economics

9:30 – 10:00

Eduardo Rubén Scarano (Instituto Interdisciplinario de Economía Política) - Applied economics and values.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: There are two main ways in which values are linked to economics, the first to economic theory, the second to applied economics. Our objective is to expose the different components and types of argumentations that appear in the second.

In standard economic theory the agent prefers between values or ends -defines a utility function. Although these functions are subjective, they depend on each agent, however, as Hayek noted, the structure of the evaluations is common to any subject. The values are exogenous to the theory, it is not your task to explain them but how, with the available means, to maximize the utility function. In philosophical terms, it is a purely instrumental reason (Horkheimer).

The second link occurs when economic theory is applied to achieve certain ends. It is related to the Senior-Mill-Cairnes tradition and to the one who formulated it most completely and precisely,

J. S. Mill. Applied science or technology consists of finding the set of laws by which a desirable end is produced. It is necessary to justify the desirability of the end, therefore, it is no longer an exogenous variable. By justifying it, a discussion about ends that exceeds instrumental reason is introduced. Including the ends and their justification implies several consequences. The values are not necessarily economic, so applied economics is broader than theory, it includes the discussion of other extra-economic values, for example, in economic policies (Timbergen) or in currency stabilization; in affirmative policies such as the design of markets to allocate places in schools (Roth).

The scientific method is insufficient to settle or estimate alternatives; applied science becomes more complex by introducing foundations on broader cognitive bases that include common or expert knowledge (changing agent expectations; obtaining social license for a project).

The justification of values includes knowledge but also other classes of components that exceed the scientific framework: ethical -which sector is privileged or postponed-, political -social acceptance of a plan-, persuasive -acceptance of an objective.

It is important to consider applied economics in this broad way, not only because of its philosophical interest, but also because it affects the way in which we should train specialists, professionals capable of interdisciplinary action, aware that they will have to choose between values and the action of other mechanisms that are not purely economic to achieve an end.

These consequences show that they affect not only the conception of applied economics but more broadly, applied science itself. Without connection to science we find technique, not technology (Bunge), however, the latter is linked to non-scientific components that are part of technology and its validation is a necessary perspective that is often called a reverse approach to technology. In economics there have been recent explorations in this direction such as economic engineering (Roth) or economic plumbing (Duflo).

10:00 - 10:30

Ricardo Crespo (Universidad Austral and CONICET), Fernando Tohmé (Universidad Nacional del Sur and CONICET) - Economics in an Uncertain World.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: The environments in which humans live and interact are plagued by uncertainties. Their sources are manifold. Perhaps the main cause is the fact that “each person is a world”. Another relevant cause is that the future is inherently contingent, and consequently unknown and hardly predictable. Even worse, forecasts can be falsified by humans aware of them. These characteristics make extremely difficult to make inductive inferences other than for frequently repeated events.

Despite these aspects are well-known, economic theory has often neglected uncertainty, trying to reduce it to probabilistically tractable risk. In the first half of the XXth century, uncertainty was considered by authors like Frank Knight and John Maynard Keynes (and much later by George Shackle) as a non-measurable phenomenon. These authors suggested alternative ways of addressing the presence of uncertain events in economic affairs.

In this paper we examine how these ideas evolved in the last century. We start by analyzing in some detail the ways in which Knight, Keynes and Shackle addressed the problem of making rational choices under uncertainty, showing the similarities of their views with some aspects of the logical process of abduction.

Knight, Keynes, and Shackle share a common view according to which humans analyse current situations in the light of past facts, qualitatively appraising different scenarios. While they use a mixture of abductive, inductive, and deductive procedures, abduction plays the most relevant role.

The revolution in economic theory brought by the ideas of John von Neumann with Oskar Morgenstern, in particular the representation of rationality as the maximization of expected utility,

called for a probabilistic treatment of uncertainties. Despite the early critiques of Maurice Allais and other continental economists, these ideas became enriched by the development of the subjective expected utility theory of Leonard Savage and the version promoted by de Finetti (1937), based on the idea of implicit probabilities exhibited by the betting odds of economic agents.

Interestingly, starting in the 1970s with the experiments on decision-making of Amos Tversky and Daniel Kahneman (1971) and a renewed interest in the results of Daniel Ellsberg (1961), economists realized that economic agents in real-world situations may not be able to manage correctly the assignment of probabilities to uncertain events.

The development of Behavioral Economics, intending to incorporate all the aforementioned effects into economic models, led to a large body of alternative models. A particularly interesting development is Itzhak Gilboa, Stefania Minardi and Larry Samuelson's (2020) generalized theory-based and analogy-based model of reasoning in decision under uncertainty. In this framework agents have to choose among different world views, each one corresponding to a "theory" about an uncertain situation. The similarity with certain aspects of abduction is evident, showing that the literature of the last hundred years has come close to full circle back to the original ideas of Knight and Keynes.

Symposium continues in the same room, next time slot.

ROOM 03

9:30 – 10:00

Wagner Sanz (Faculdade de Filosofia, UFGO, Campus Samambaia, Goiânia, GO, Brasil), Petrucio Viana (Instituto de Matemática e Estatística, UFF, Niterói, RJ, Brasil) - Euclidean Machines and Its Objects.

Topic: A.2 Philosophical Logic

Abstract: Propositions in Euclidean Geometry are either problems or theorems. Faced with a problem, one is asked to construct some figure; with a theorem, asked to justify some statement about the figures. In the history of the subject, sometimes one, sometimes the other received greater prominence. In the nineteenth century, Hilbert scored a point in favor of theorems when, in his Foundations of Geometry, gave the first thoroughly rigorous axiomatic-theorematic presentation.

Interestingly, there are not so many attempts at an exclusively problematic approach, that is, based on problems and not on theorems. It is not difficult at all to interpret theorems as a special kind of problem: problems in which discourse has an important role. But, apart from introducing a certain artificiality in some instances, this is not the general case for all problems.

We intend to fill the gap pointed by introducing and developing the concept of an Euclidean machine. Essentially, the idea is to treat geometric construction problems similar to the way arithmetic problems are treated with Turing machines. So we have elements similar to those of a Turing machine, i.e. tape, fundamental symbols, fundamental operations, step-by-step execution, etc. And we solve a problem by writing fundamental symbols on the tape and manipulating them step-by-step through the fundamental operations, until we reach the desired construction. In this way, we can approximate the resolution of a problem with the calculation of the geometric analogue of a Turing-computable function. But we must warn the reader that the concept of a problem is slippery. If solutions are equated to functions, then the axiom of choice seems to be bad news, even for constructivists once it is proved in Intuitionistic Type Theory.

In this talk we will address the question: What are Euclidean machines and which role do diagrams play in regard to them? We also present some examples of how Euclid's problems can be treated and analyzed through Euclid's Machines. We end the talk with a series of questions about the philosophical, mathematical and practical aspects of Euclidean machines.

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10:00 – 10:30

Thomas Piecha (University of Tübingen), Wagner Sanz (UFG - Universidade Federal de Goiás) -
Constructive Semantics and Mathematical Proofs.

Topic: A.2 Philosophical Logic

Abstract: In constructive semantics the meaning of statements is specified in terms of the notions of proof and construction. In particular, the meaning of the logical constants occurring in logically complex statements is explained by determining how statements of a given logical form can be asserted, proved or constructed from other statements. One such meaning explanation is the Brouwer-Heyting-Kolmogorov interpretation (cf. [2]), which can be seen as the prototype of constructive semantics. In later developments of constructive semantics by Prawitz, Dummett, Schroeder-Heister and the authors, constructions of atomic statements, that is, statements that do not contain logical constants, become crucial (cf. [1], [3]-[6]).

There are, on the other hand, proof systems for intuitionistic logic, which are taken to represent the constructive content of mathematical proofs or to delineate exactly what is a constructive mathematical proof (cf. [6]). It could be shown (cf. [2, 4, 5]), however, that in constructive semantics more statements can be justified than are provable in intuitionistic logic. This raises the following questions: Is our understanding of the meaning of the logical constants as explained by the standard constructive semantics correct? Which elements are essential in the concept of construction? What is the relation between constructions and assertions?

In this talk, we will address these questions by discussing the use of constructions in mathematical proofs, taking Euclidean geometry as an example.

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ROOM 04

9:00 – 9:30

Artur Koterski (ZLiMN, WFiS, UMCS) - Bilikiewicz's "Die Embryolgie" as a forgotten contribution to the sociology of scientific knowledge.

Topic: B.6 Historical Aspects in the Philosophy of Science
Abstract: The (re)discovery of Ludwik Fleck's book in 1979 made it sufficiently clear that some ideas and insights commonly linked with T. S. Kuhn's Structure had been formulated already in the 30s. And there is more to uncover: In the autumn of 1930, Tadeusz Bilikiewicz (1901–1980), a junior assistant in the Department of History and Philosophy of Medicine at the Jagiellonian University (Cracow, Poland), completed a volume on a rather poorly developed part of the history of medicine, namely the beginnings of modern embryology. While his Die Embryologie im Zeitalter des Barock und des Rokoko was reviewed positively over two dozen times in several languages in Europe and USA, today it remains virtually unknown. Bilikiewicz himself is remembered for his post-war oeuvre, i.e., as a psychologist and a psychiatrist, and, quite rarely, for his polemical exchange with Fleck started by the latter over Bilikiewicz's sociology of science (1939).

In his book Bilikiewicz presented and discussed the history of embryology from William Harvey to Caspar Wolff, and explained the shape that it took by environmental conditioning. Following historiographies of Heinrich Wöfflin, Karl Joël, and particularly Henry Sigerist, Bilikiewicz attempted to provide reconstruction of the intellectual ideals, or 'the spirit of the time,' of the Baroque and of the Rococo. The Zeitgeist is followed in every domain of culture in a given era, including science. It determines scientific objectives and the range of problems to be addressed by scientists, defines the methods by which their solutions can be obtained, and influences both the choice of empirical data and their interpretation. With the concept of the spirit of the time Bilikiewicz sought to explain as rational some perplexing decisions made in the République des Lettres, primarily the rejection of the theory of epigenesis and the adoption of preformationism and the concept of preexistence, as well as the emergence of vitalism from mechanicism.

The Zeitgeist is set of patterns and in this sense it is a paradigm — and it does resemble Kuhnian paradigm in many ways. Thus, the aim of this paper is twofold. It is to indicate the similarities between the Zeitgeist and the paradigm as well as the limitations of such a comparison. It is also to attract the interest of philosophers of science to this forgotten contribution to the sociology of science.

9:30 – 10:00

Zeyad El Nabolsy (Cornell University) - Baconianism as an Anti-Racist Philosophy of Science in the Mid-Nineteenth Century.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: Some scholars have argued that Francis Bacon's philosophy of science was in some fundamental sense deeply tied to the trans-Atlantic colonial projects launched in the fifteenth and sixteenth centuries (Scalercio 2018). Moreover, the period during which race science came into its own in Britain, i.e., the mid-nineteenth century, was also a period characterized by a revival of interest in Francis Bacon. This period witnessed the publication of the Spedding-Ellis-Heath edition of The Works of Francis Bacon in seven volumes from 1857 to 1859. Practicing Victorian scientists also generally tended to think of themselves as engaging in an empiricist inductivist Baconian form of inquiry (Van Riper 1993; Verburgt 2021). This also holds true for influential race scientists such as James Hunt, a key figure in the founding of The Anthropological Society of London, as well as Carl Vogt (primarily active in Germany but influential in British circles). James Hunt (1863) presents his claims about the anatomically grounded inferiority of Africans as a product of a Baconian form of inquiry. Vogt (1864) also makes claims about the inductivist Baconian nature of his anatomical inquiry into the differences between white Europeans and Africans. One might be tempted to think that there was some form of elective affinity between Baconian philosophy of science and race science. However, in this paper I attempt to show that such a claim would be too simplistic. Turning, to the writings of the Victorian Sierra Leonian natural philosopher, James Africanus Beale Horton, especially his West African Countries and Peoples (1868), I show how Horton sought to demonstrate that if one takes Bacon's philosophy of science seriously, one will be led to the conclusion that insofar as race scientists such as Hunt and Vogt engaged in "anticipations of nature" (to use Bacon's expression), their research programs were not an instance of science properly so-called. I thus show how Baconianism also came to be used as an anti-racist philosophy of science in the mid nineteenth century. To this extent, I argue that accounts that reduce Baconian philosophy of science to an ancillary of colonialism, imperialism, and race science are too simplistic, both historically and conceptually.

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10:00 – 10:30

Frank Hernández (Central European University) - Scientific progress and epistemic normativity: a functional-externalist and perspectivalist account.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: What distinguishes the concept 'progress' from other diachronic concepts, such as 'change', is that in addition to being a descriptive concept it also has some kind of normative significance. In the context of scientific practice, this means that the change from theory ϕ to theory ψ is progressive if and only if this change carries with it some normative force, such that the proposition 'the change from ϕ to ψ is good (or some other qualification of this sort)' is true whenever it is the case that the

change is progressive. I understand this proposition to mean something like: a change in theoretical acceptance is good if it leads to scientific success, where scientific success includes explanatory and predictive success.

Most of the literature on progress in the context of scientific theories has thus far attempted to define 'progress' in terms of the aims of science focusing on one of four alternatives: increase in a) approximation to the truth (Niiniluoto 1980, 2011, 2014, 2017), b) knowledge (Bird 2007), c) puzzle-solving capacity (Kuhn 1970, Laudan 1977), or d) understanding (Dellsén 2018). The first two accounts are mostly used by realists to defend the view that our most successful scientific theories are progressive because they literally describe the way unobservable reality is, whether they do it fully or just approximately.

In my opinion, Ikka Niiniluoto's verisimilitudinarian account, which links the success of our most successful theories to the empirical evidence via Bayesian updating, has significant advantages. Nonetheless, because of some significant limitations, I think his account would fare better if instead of assuming that the value of verisimilitude corresponds to the value of truthlikeness (i.e. how close a theory is to the truth), even if only minimally, it focused on the way that verisimilitude is defined. That is, shift the focus from the first-order semantic variable connecting verisimilitude to truthlikeness to a second-order variable that shows how rational it is to increase our verisimilitude based on the available evidence.

I plan to defend what I call a functional-externalist account of scientific progress. This account explains scientific progress as 'how well science serves the function of minimizing the need for miracles (in response to Putnam's (1975) no-miracles argument) in the acceptance of a theory'. I will also argue that this account is compatible with scientific perspectivalism (Massimi 2022) because different theories arising from different scientific perspectives can result in an equal (or very similar) value of the variable expressing the amount of miracles needed for a theory to be successful, and thus rational to accept. In such cases, the change from ϕ to ψ is not progressive unless new evidence leads us to update the value of this variable accordingly. Otherwise, if two or more theories continue to share an equal (or very similar) value, this might indicate their complementariness, rather than inconsistency. Thus, I conclude that the most rational position to take in such cases is that of ‚open-mindedness', insofar as the evidence permits it.

ROOM 05

(IASCUD-AL)
Symposium: Artificial Languages in the History of Science and Mathematics

Chair: Muntersbjorn, Madeline

Topic: C.6 Philosophy of Computing and Computation

Abstract: Artificial intelligence (AI) driven by successes in machine learning now permeates virtually all areas of our daily lives to make or at least influence decisions. In areas that impact human life (such as agriculture, climate, forestry, and health), ethical and legal aspects such as transparency, fairness, and trust in such decisions are receiving increasing attention. As a result, hundreds of ethical frameworks have been published by organizations such as government agencies, large corporations, and academic institutions. Adopting these principles is widely seen as one of the best ways to ensure that AI does not cause unintended harm and is used safely and responsibly. However, due to the complexity of AI, it remains a challenge to implement ethical and legal frameworks for AI in practice.

This Symposium wants to offer a space for presenting and discussing recent research on theories, tools, metrics, standards, and best practices for implementing technical, ethical, and legal frameworks for the safe and responsible use of AI.

This Symposium aims to discuss original theoretical and practical research on designing, developing, presenting, testing, and evaluating approaches for AI framework implementations supporting trust in AI, including cutting-edge theories, foundations, actionable tools, and impactful case studies of AI ethical framework implementations, supported by advanced AI techniques and interdisciplinary research–in particular, social science, law, and cognitive science.

On one hand, the goal is to foster interdisciplinary and transdisciplinary approaches and stimulate cross-domain integration of diverse disciplines. The approaches aim at making AI ethical principles operable in applications.

On the other hand, the symposium seeks to share experiences and delineate actions for promoting good practices for developing AI systems. We aim to look again at old and new questions about ethics & AI and re-examine some running practices.

Speakers:
1) Karine Chemla: What can the history of numbers teach us about artificial languages
2) Peeter Müürsepp: Leibniz's Universal Language, the Three Strategies
3) Madeline Muntersbjorn; Feature Talk and the Algebra Project
4) Vitaly Pronskikh: Pidgin and Creole Simulation Codes in High-Energy Physics
5) Shereen Chang: Artificial languages in animal language studies
6) Polina Petrukhina: Between science and fiction: on the status of universal languages for interstellar messaging

9:00 – 9:30
Karine Chemla (CNRS) - What can the history of numbers teach us about artificial languages?

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: As is illustrated by several major contributions to the topic, notably Geneviève Guitel's Histoire Comparée des Numérations Ecrites,(*) the history of numerical signs has been written under the—often tacit—assumption that the primary function of these signs was to write a spoken language. I argue that this does not hold true of all numerical signs, thus introducing a distinction between different types of numeration. This remark will lead me to show that some systems of numeration—not all—share many features with what we usually call algebraic symbolisms. They both circulate in the same way across linguistic borders. The handling of both types of inscription testifies to a great amount of similarity, notably in relation to the spatial dimensions of the notation. The two types of inscription relate to spoken language in a quite specific and yet similar way. In this talk, in addition to providing arguments supporting these theses, I will discuss how the history of some numerical signs can help us approach some features of artificial languages.

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(*) Guitel, Geneviève. 1975. Histoire comparée des numérations écrites. Paris: Flammarion.

9:30 – 10:00
Peeter Müürsepp (Tallinn University of Technology) - Leibniz's Universal Language, the Three Strategies.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: Leibniz held the idea that progress in any area of knowledge depends on the symbolism in usage. This idea was the basis for his efforts on working out a universal language. He viewed the universal language not just as a mirror of mind but also as an instrument of reason. The universal language should have enabled to make logical deductions remaining neutral of any cultural influences of natural languages. Leibniz did not originate the search for a universal language. The idea was put into the air in the beginning of the XVII century already. Most of the progress was made by Leibniz however. Leibniz explained that the universal language can be explained by missionaries, the true religion, which is in complete agreement with reason, and apostasy will no more be feared in the future than would an apostasy of men from the arithmetic or geometry which they have once learned. For Leibniz, the task of the universal language would be to guide the thinker out of the labyrinth of opposite views and information.

In more concrete terms, in the first model of the universal language Leibniz replaced ideas with indivisible numbers and concepts with combinations of these. Leibniz also developed the system where consonants were replaced with numbers from 1 to 9 and vocals with 1, 10, 100, etc. Leibniz commented that once characteristics for most concepts have been set up, the human race will have a new kind of instrument which will increase the power of the mind much more than optical lenses strengthen the eyes. This approach was not published before the 20th century. If it was then symbolic logic might have been born a couple of centuries earlier than it did.

Leibniz later abandoned his model based on numbers and developed another one based on natural language, namely Latin. The idea was to strip Latin off from all unnecessary, like gender, and only the constituent characters would remain. In the end, Leibniz understood that natural language is still too rich and overpowers the capacity of memory.

After becoming disappointed about his first two attempts to develop a universal language, Leibniz based his project on logic. He tried to conceive rules by which the calculation of thoughts can be achieved. Leibniz adopted the following basic ideas:

1) all concepts can be reduced into simple concepts much the same way as in mathematical division
2) all complicated concepts can be formed by arranging the simple concepts
3) there is only a small amount of simple concepts, but they form the basis of all concepts
4) simple concepts are represented by simple signs or terms, complicated concepts are represented by complicated signs or terms. The complicated signs are definitions of the complicated concepts.
5) reasoning is based on analysis of the relations between simple concepts.

Concrete examples will be given in the talk.

10:00 – 10:30

Madeline Muntersbjorn (University of Toledo) - Feature Talk and the Algebra Project.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: Robert P. Moses (1935-2021) was an activist and educator who taught mathematics and studied philosophy. Moses is renowned for his efforts to organize volunteers from around the country who came to Mississippi to help black Americans register to vote in the 1960s. Moses is less widely known as a mathematics education reformer, whose philosophy of mathematics shaped the Algebra Project, a curricular approach designed to teach algebra to adolescents. The first objective of this talk is to promote a broader understanding of Moses's legacy as both a pedagogue and philosopher of mathematics. Two events coincided in 1982 that led to formation the Algebra Project. Moses' eldest started eighth grade at a public school that did not offer algebra to eighth graders. At the same time, Moses won a MacArthur Fellowship to honor his achievements in the Civil Rights era. This "genius

award" gave him the freedom to devote himself to teaching middle school algebra at his daughter's school. Moses not only taught algebra from 1982-1987, but also began to promote the idea that access to algebra was the key to math literacy and, thereby, full citizenship in the 21st C. The Algebra Project, Inc. was formally launched in 1990 and has been an active agent of education reform ever since, growing from a handful of students in one school in Cambridge, Massachusetts, to thousands of students in hundreds of schools across the US. The second objective of this talk is to highlight "feature talk" as part of Algebra Project pedagogy. Algebra Project pedagogy is based on a five-step curricular process that starts with individual representations of shared experiences and ends with formal representations of the mathematical features of those experiences. This five-step process makes the conceptual transition from ordinary language—people talk—to regimented discourse—feature talk—a precursor to the translation of feature talk into mathematical notation. Feature talk is an artificial language that acts as an intermediary between informal natural languages and formal symbolisms. In Radical Equations, Moses (2001) credits Quine with the observation that this "'regimented discourse' is the conceptual language that underlies all the various symbolic representations you find in the sciences and mathematics" (p. 97). Feature talk artificially constrains people talk by imposing precise boundaries on terms, often leading to more prolix articulations. Symbols introduced at the end of the curricular process are not translations of naturally spoken languages; instead, symbolic notations are translations of constrained artificial languages that highlight conceptual features of the mathematical problem space at hand. This talk concludes with the Road Coloring Problem as an illustration of how the Algebra Project learning progression helps students develop not only implicit intuitions into what kinds of things functions are, but also explicit means of representing functions using various systems of formal notation including arrow diagrams, ordered pairs, plotted points, and matrices.

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ROOM 06

9:00 – 9:30

Pier Luigi Pireddu (Universidade de Lisboa) - On the organism-environment relationship: an ecological discussion through the phenomenon of station-movement.

Topic: C.3 Philosophy of the Biological Sciences

Abstract: Ecology is a relatively recent science, whose years of systematization date back to the late 19th century. The intent of this talk is to propose a discussion of the scientific-historical development of the discipline of ecology, using the phenomenon of biological field research stations – the so-called stations-movement, as conceptualized by De Bont (2015) – as a key to understanding it. The purpose, according to Kingsland (2011) and Kohler (2002), is to clarify how the development of ecology as a scientific discipline is deeply linked to a tradition of field research, going into the merits of biological stations that arose in aquatic systems. Field stations of all kinds, as Kofoid (1898) already pointed out, have arisen with the same goal of creating a closer link between researchers and nature. Thus, it is an in-nature work, leading to a more complete and articulate understanding of the dynamics between organisms and the environment. This organism-environment relationship, which is itself a research object, emerges through the stations-movement in a decisive way, representing the conceptual essence of contemporary ecology. Therefore, the paper will elucidate how scientific approaches and

theories depend on the space in which research is carried out. When considering aquatic ecological disciplines (as marine biology and limnology), the distinction between biotic and abiotic factors loses its meaning (Kingsland, 2011; McIntosh, 1985), as suggested by the pioneering works of S. Forbes (1887). The tendency to distinguish between abiotic and biotic was considered almost as a commonplace in terrestrial ecological disciplines (as in plant ecology). Differently, an ecosystem perspective may be more fitting in order to show the influence of landscape on research approaches. Therefore, landscapes such as lakes, rivers, and coral reefs given their isolated nature, well-defined boundaries and a certain internal stability, were propaedeutic for the systematization of theoretical perspectives related to the ecosystem concept. It is thus possible to establish that field research stations offered a new way of approaching nature, highlighting new lines of research that defined the core of ecology, as well as new scientific practices and theories.

Therefore, without going into the details of specific case studies, the main objective of this proposal is to argue in favour of the importance that biological research stations have had in the development of ecology as a scientific discipline.

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9:30 – 10:00

Catalina Sierra (iB3-UBA), Julián Maxwell (IFIBYNE-UBA/CONICET), Nicolás Flaibani (IEGEBA-UBA/CONICET), Constanza Sanchez de la Vega (Instituto del Cálculo-UBA/CONICET), Alejandra Ventura (IFIBYNE-UBA/CONICET), Nicolás José Lavagnino (Grupo de Filosofía de la Biología-FFyL/FCEyN-UBA; CONICET), Matías Blaustein (iB3-UBA; CONICET) - Fine-tuning of cancer incidence across species: rethinking cancer from an evolutionary and ecological perspective.

Topic: C.3 Philosophy of the Biological Sciences

Abstract: Cancer is associated with the accumulation of mutations throughout the life of a multicellular organism. Therefore, the probability of developing cancer increases as an individual gets older. Since cancer negatively impacts survival of individuals, classic evolutionary explanations have had to account for the prevalence of cancer across the tree of life. Cancer-promoting gene variants have been traditionally associated with either negative or neutral fitness value. In the first case, these variants are proposed to be related to other phenotypic traits on which positive selection operates (antagonistic pleiotropy). Alternatively, they are conceived as neutral traits since cancer tends to occur after reproduction. However, some mammals present molecular mechanisms that confer strong or even full resistance to developing tumors, confirming that multicellularity can evolve without cancer as an inevitable by-product. On the other hand, the existence of other mammalian species with high incidence of malignant tumors suggests that cancer may also be acting as a phenoptosis

mechanism (programmed organism death) on less reproductive adults. In fact, ecological systems can experience counterintuitive increases in population size (what is known as the hydra paradox) or stability, when a subpopulation exhibits higher mortality rates.

Here, we present the hypothesis that cancer mortality rates across the tree of life might have been fine-tuned by evolution. A high incidence of cancer could have a neutral, negative or even positive adaptive value, depending on the evolutionary history, environment and context of each species. By using public databases on cancer-related mortality of adult zoo mammals (110.148 individuals, 191 species), we show that species with higher intraspecific competence (solitary animals, large litter size) display higher cancer mortality rates; while species with cooperative and caring habits (group living, small litter size) have lower cancer mortality rates. We validated these results by using two paradigmatic external groups of wild animals with either high tumor incidence or strong resistance to cancer. Finally, we demonstrate by mathematical modeling that higher mortality rates in older less reproductive individuals can lead to an increase in the population size in a context of intraspecific competition (hydra effect). On the contrary, in a context of cooperation, population size increases as mortality rates of older and less reproductive individuals decrease. Our results approach the phenomenon of cancer from a multidimensional perspective and are compatible with a co-evolution of cancer incidence and other physiological, ecological, and behavioral aspects across the tree of life. Should this be the case, cancer incidence could be then considered as an exaptation, a trait that has been co-opted for distinct functions over the evolution course of multicellular organisms.

10:00 – 10:30

Martín Eduardo De Boeck (UNT) - PaJaMa experiments and the concept of genetic program.

Topic: C.3 Philosophy of the Biological Sciences

Abstract: In the following lines the role of metaphors in the process of scientific theory construction will be addressed, taking as an example the notion of "genetic program". It will be outlined that their role is not only a cognitive one, since they usually maintain some connection with social and cultural factors beyond scientific domain. Thus, through scientific metaphors the ways of interactions between social and cultural spheres and scientific practice and discourse stand out (Bono 1990). So, the notion of "genetic program" will allow to conceive the genome as an editable text, permitting adds or removals, and thus it will legitimize an emergent form of biopower (Kay 2000).

For this, it will be analyzed the importance of "PaJaMa" experiments (Pardee, Jacob & Monod, 1959) in the progressive admission of terms coming from the theory of information and cybernetics in molecular biology's discourse, perspective labeled by Monod "Enzymatic Cybernetics" (Gayon 2015). It will be outlined that operon model (Jacob & Monod 1961a, 1961b) represents and explicit attempt to combat influential neolamarckian tendencies among french biologists at that time (Loison 2013). In this sense, it stands out the adoption of "teleonomy" to replace "teleology" (Jacob & Monod 1961c).

In addition, this model adopted a simple representation that conceive the gen as a linear segment inside the cromosome, also conceived linearly, and also included Crick's hypothesis for a "messenger" molecule that carry and transfer the information contained in the DNA molecule. Secondly, the distinction between structural and regulatory genes introduces a hierarchy in the organization of genetic information that combine two central notions for molecular biology: information and control (Rheinberger 2006; Peluffo 2015).

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ROOM 07

9:00 – 9:30

Mason Majszak (Universität Bern), Lorenzo Sartori (London School of Economics) - Managing Values in Climate Modelling using Structured Expert Judgement.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Parker and Winsberg (2018) have suggested that, in climate science, non-epistemic values can problematically affect scientific investigation and the evaluation of evidence. They argue that given the complexity of climate phenomena, the entirety of our background knowledge cannot be taken into consideration, thus we must rely on idealised simulation models to provide a subset of the background information to define, select, and interpret evidence. Given that a models' idealisations and abstractions often depend on non-epistemic values, this value-ladenness also ends up affecting how we identify and evaluate new evidence. Therefore, even by collecting new evidence we risk retaining the same original implicit biases entrenched within our models or even reinforcing them. One promising response has been put forward by Jebeile and Crucifix (2021), who argue for increased pluralism of values by including experts from different social/geographic backgrounds into scientific practice. We continue this focus on experts but, following Thompson et al. (2016), we orient the discussion to the structured elicitation protocols (SEPs) that one could employ to integrate diverse expert judgments. We argue that the use of SEPs, paired with radical pluralism, can provide an answer to Parker and Winsberg's pessimism.

First, these protocols can explicitly highlight the use of specific social values within the production of the elicited judgement as the subjective elements of the individual expert come to the forefront in the design of a given protocol (O'Hagan 2019). This will help identify which social values already exist within the domain, and which may be problematic. Additionally, SEPs have been shown to actively enhance or remove certain values, in a way managing the values used in the production of the aggregated expert judgement (Lam and Majszak 2022). We build on this, showing how it can be done within both the elicitation structure of the protocol as well as in the aggregation procedure. We will thus highlight key procedural techniques for managing problematic biases caused by values in

climate science. Different protocols can then be seen to answer to different issues, which in turn tame different types of biases. Ultimately, the group of experts within a SEP can perform a meta-evaluation of the relevant information required to produce a specific judgement. While this may not call for the use of the entire set of background information, it will at the very least be larger than the subset that Parker and Winsberg argue is attained when models are exclusively used as this subset.

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9:30 – 10:00

Matthias Dörries (University of Strasbourg) - Usable knowledge, thin description, and climate change.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: In recent years, promoters of climate engineering (here understood as the deliberate modification of the earth's climate by technological means) have increasingly included socio-political approaches in their strategic portfolio, hoping to overcome opposition to new technologies (see especially the promotion of solar geoengineering by the professor for Applied Physics and Public Policy David Keith at Harvard University). This instrumentalization of the social sciences recognizes the maturity and relevance of socio-political studies, but it also signals overconfidence in their instrumental usefulness. How can the social and human sciences assert themselves beyond a subservient role as lubricant for technology implantation?

I address this question by mobilizing and merging two concepts of distinct provenance: thin description and usable knowledge. The latter has been widely discussed in recent issues of Climatic Change (Deborah R. Coen, Adam Sobel (eds.), 2021-2022). I understand here the term usable science here as distinct from useful science or useful knowledge. It promises to strengthen the autonomy and relevance of the social sciences, as it allows a shift of focus from mission orientation towards the conditions that must be met to build knowledge that serves communities. Usable knowledge means furthering the skills for community building and drawing on this knowledge in a way that brings people together and encourages action. It sets the stage for bottom-up work on environmental problems, favoring generative step-by-step processes of knowledge and action building while at the same time recognizing the importance of plurality of inputs and approaches.

Thin description (John L. Jackson (2013)) is meant to be both complement and critique of thick description. In contrast to the latter, thin description does not claim to be on top of things and have a better understanding of the matter than the actors themselves but is located rather in the midst of them, encouraging engagement. Already in 1973, Clifford Geertz had already warned anthropologists to stay focused on "existential dilemmas" and not to get lost in "some empyrean realm of de-emotionalized forms." Jackson stresses the limits of written texts, "sanitized versions, stripped of

emotions." Thin description does not mean shallow description, but rather a deliberate selection for a narrative that engages people and keeps them engaged by presenting matters deliberately in a way so that they can be further developed and thought about.

Both concepts invite working towards a radical change of how research is done, how it presents its results, and how it develops over time. Both propose "an approach from the perspective of vulnerability and dependence," (Ruha Benjamin, Race after technology, 2019), one that considers research as both "care for data and its analysis, and care for people and their relationships." (Coen, 2021). They put into question the current strong focus on a single medium, the polished academic text, inviting to think about different media and esthetic forms, like film. They opt for an open-ended, inclusive, bottom-up approach driven by well-chosen narratives that build, strengthen, engage communities, confronted with the current environmental challenges.

10:00 – 10:30

Rawad El Skaf (Politecnico di Milano) - Climate Science's Scenario Framework.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: The adequacy of purely quantitative approaches is forcibly questioned in scientific fields that are complex, interdisciplinary, deal with "deep" uncertainties, are politically and socially relevant. This is most notable in the climate sciences where researchers have progressively developed hybrid forms of inquiries that includes both quantitative and qualitative elements. Narratives such as scenarios, pathways and storylines have been introduced and developed and are – to a greater or lesser extent – relied upon by the IPCC's latest report (2021). There are two important examples of hybrid approaches in climate science. The most notable one is the "scenario framework" (the other is the storyline approach to the detection and attribution science, Lloyd and Oreskes 2018). This paper is programmatic and aims at drawing philosopher's attention to climate science's scenario framework.

The scenario framework project started in 2010 (Moss et al. 2010, Van Vuuren et al. 2013) and was developed, in parallel, by all three major climate science research communities. Briefly, earth climate modelers developed the Radiative Forcing Pathways (RCPs), while research communities who study integrated assessment modelling as well as impacts, adaptation, and vulnerability developed the Socio-Economic Pathways (SSPs). The scenario framework combines both in a matrix architecture:

1. In the rows are the RCPs: These are four alternative characterizations of plausible futures of the climate. They include emissions and concentrations of the full suite of greenhouse gases.

2. In the columns are the SSPs: These are five alternative characterizations of plausible societal futures. Because of the many uncertainties involved in socioeconomic change over many decades, qualitative and quantitative elements are necessary to represent factors that could influence long-term developments. Quantitative components provide common assumptions for quantifiable elements such as population or economic growth while qualitative narratives describe the evolution of aspects of society that are difficult to quantify such as the quality of institutions, political stability, environmental awareness.

Both SSPs and RCPs are incomplete by design. Each SSP tells a story about a plausible societal future in which no climate change impacts occur, nor climate policy responses implemented. Each RCP tells a story about a plausible climate future without societal change. They are completed when combined and applied in individual studies, a cell in the matrix, in which multiple "scenarios" can be defined.

From a philosophy of science perspective, the main question concerns the novelty of this scenario framework. More to the point, does it call for a new (i)ontology – what, exactly, are scenarios/pathways –, (ii)semantics – what do scenarios/pathways refer to or represent – and (iii)epistemology – what can we learn from scenarios/pathways and is this new insight justified. Put differently, the scenario framework and, more generally, the use of narratives in (climate) science, calls for a similar philosophical attention given to models, thought experiments and computer simulations in the sciences several decades now. Or maybe not; one could argue that there is nothing new under the sun and the extensive philosophical literatures on these latter tools already have the resources needed to address the former.

ROOM 08

14:30 – 15:00

Juan Saharrea (Universidad Católica de Córdoba-Unidad Asociada al CONICET), Claudio Viale (Universidad Católica de Córdoba-Unidad Asociada al CONICET) - The Status of Logic in Dewey´s Educational Theory.

Topic: B.7 Educational Aspects of Philosophy of Science

Abstract: Dewey's ties with logic (formally understood) were problematic. In Logic. A Theory of Inquiry (1938) he offers a peculiar way of understanding the nature and the study of logic. There, he does not appeal to any symbolic language neither practically discuss the viability of formal languages. This role that Dewey gave to formal logic, still posits relevant objections outside as well as inside of pragmatist tradition. Hence, if we consider the field of philosophy of logic, Dewey´s approach still has to face serious objections in order to account for its conception of logic. It should be said that many scholars have defended that, if we consider Dewey´s insistence on the nature and function of the qualitative, Dewey´s project of relating the study of logical forms to the nature of inquiry results appealing (Pappas 2022). There is, however, a not so famous ties with formal logic that relates to a Dewey's educational book: How we Think (1910). There, Dewey´s understanding of logic comes up less controversial. Actually, it emerges as one conception which is aligned with certain intuitions of common sense. Precisely, in this paper we will try to point out the formulation of logic in Dewey's educational theory. Our approach is fundamentally a conceptual one, but we will offer a necessary historical overview why we will focus on How We Think (since, it is barely taking into account, even among the few who address the relationship between logic and education —Vannatta 2014).

We attempt to defend that some tensions among naturalist and normative aspects are eased, within Dewey´s approach to logic through Educational Theory. To develop our hypotheses, on the one hand, we will introduce how Dewey considers that "formal logic" impact on his conception of learning understood as "Reflective Thought" (MW 6). In this part, we will address his thesis that every stage of development has its own logic (his naturalist commitment). On the other hand, we will suggest that in the case of educational context, Dewey appeals to the idea of formal logic in order to organize the curricula at the final stages of learning process. So viewed, we highlight an interesting Dewey´s defense of the normativity of logic (in a strictly evaluative sense) in his Educational Theory.

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15:00 – 15:30

Ana Claudia Couló (Universidad de Buenos Aires - IIF SADAF CONICET) - Science, values and science teacher education.

Topic: B.7 Educational Aspects of Philosophy of Science

Abstract: Teaching and learning science in high school can be envisaged, among other things, as part of science communication. Science communication has come to be accepted as an important feature of the interaction between the scientific community and the general public, with impact on democratic governance. The recent (and ongoing) CoVid19 pandemic has provided multiple examples of both successful and frustrated instances of government, public and scientific community interaction. Often, communication hindrances are attributed to public (and government) lack of scientific literacy. Consequently, enhancing high school science teaching, and improving preservice and in service teachers’ professional development could play an important role in overcoming those hindrances.

Science education from an HPS (History and Philosophy of Science) perspective has long been discussing and developing theoretical frameworks, curriculum questions and pedagogical/didactical proposals for science teaching that is informed by the history, the philosophy and the sociology of science (Matthews, 2015). Within this context, there has been discussions on which would be the relevant philosophical problems to be considered. Among them can be found axiological issues related to the role of values in science.

Science as a human endeavor entails dilemmatic situations that cannot be resolved appealing exclusively to empirical reasons. Science related decision making implies a wide rationality, that involves norms, values, duties, responsibilities, value preferences. Although the value-free ideal for scientific rationality has prevailed throughout the best part of the 20th century, that ideal has come under discussion. H. Putnam posited that there is no clear demarcation between facts and values; feminist epistemologies (e.g., Longino, 1990) put forward different arguments against the received view of objectivity; and even as early as 1965 C. Hempel acknowledged a place for non epistemic values when inductive risk was at stake.

In Science, Policy and the Value Free Ideal, H. Douglas articulates an ideal for science that rejects the value free stance, and argues for ethical and social values in scientific reasoning. In Science Communication: beyond the deficit model, she links that new ideal for science with science education so that its central aim should be for the public to understand the nature of scientific reasoning and practice, and especially the role that values play in them. In this paper I aim at a critical consideration of her arguments, especially from the point of view of philosophy contribution to science teacher’s professional development.

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15:30 – 16:00

Rocío Dalio (CIT-UNVM), Sandra Visokolskis (FFyh-UNC/UNVM) - Interthematic Fluency as a Philosophical-Educational Category: A Proposal in Terms of Creativity.

Topic: B.7 Educational Aspects of Philosophy of Science

Abstract: The goal of this paper is to introduce a new category of analysis that allows interpreting teaching and learning processes of science at the primary level of formal education as creative; focused on producing a path from a problem to a solution, based on interthematic similarities. This category, which we call interthematic fluency, is defined, a priori, as any transfer of knowledge, practices, tools and methodological strategies between disciplines or between subjects of the same discipline centered on the figure of the primary level teacher; taking into account that the disciplinary areas do not need to constitute spaces of a scientific nature. Interthematic fluency is built based on philosophical postulates that are related, at first, to the notion of interdiscipline, then to transdiscipline, and finally to fluidity. Taking into account the historical construction of the philosophy of science, we can say that, in the creation of interdisciplinary knowledge, specialists in a certain field share efforts with experts from others, each contributing the concepts and methods of their discipline to understand a certain field.

On the other hand, transdiscipline implies a holistic vision of reality, that is, it is characterized by, in addition to using concepts and methods from different disciplines, forging concepts and methods that did not exist previously and that are not identified with any particular discipline. This is where the attempt to build the category of interthematic fluency comes from, since it is no longer a question of various specialists around a problem, but of a single specialist in various topics. This specialist is the primary level teacher who develops creative learning situations centered on analogy, metaphor, multimodality, narrative and dialogism. The interthematic fluidity that the teacher creates allows the approach of unfamiliar and complex objects to primary level students who are still restricted in a concrete operational stage of thought, linked to experience and contact with the known. And this category can do it creatively.

We propose, in this paper, to introduce this category of Interthematic fluency, based on several theoretical philosophical contributions, which will be critically discussed, in order to assess how much they have timely meant in their context of application. This will allow inferring typical properties of the proposed category. In this sense, the following cases will be analyzed, from the approach of the Transductive Theory of Creativity (Visokolskis 2021): (1) Plato, with the search for a unification of disciplines (Plato, Euthyphro, II). (2) Aristotle, questioning monisms of the Parmenidean Eleatic style (Aristotle, Physics, I), assuming that the world admits a complexity of genres, where the latter define the frontiers of science, based on his classical notion of metabasis (Aristotle, Post. An.). And (3) another historical milestone that contributes to the rejection of this category, through the notion of "category error" that Gilbert Ryle proposed in his work The Concept of the Mental, from 1949. Although there are

many other cases where the existence of this category could be interpreted in philosophy, even current ones, these proposed cases have a notable incidence in others.

ROOM 09

9:30 – 10:00

Malena Leon (Instituto de Humanidades (CONICET-UNC) - Understanding intentions appropriately to tackle the problem of algorithmic creativity.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: Many artificial intelligence algorithms are currently dazzling with their ability to produce original and valuable results. A debate is thus opened regarding whether these algorithms are creative (Coeckelberg, 2017; Kind, 2022). Creative products in addition to being new, are good: they have value, they are relevant, or they work (Kaufman and Glăveanu, 2019). However, some also consider that creative products must be the result of intentional agency (Gaut, 2003, 2010; Davies, 2009). I will call this approach to creativity intentionalist. As Kind (2022) and Stokes and Paul (2021) point out, if an intentionalist stance on creativity is maintained, artificial intelligence algorithms cannot be considered creative.

One of the chief exponents of the intentionalist approach is Barry Gaut (2003, 2010), who has argued that without adding such a requirement, we should consider more results creative than appropriate. Indeed, the problem of over-attribution is a challenge to an anti-intentionalist approach to creativity.

Now, the intentionalist position depends on a traditional conception of the human mind and more generally of intentionality (in its specific technical meaning). According to this conception of intentionality, it is possible to distinguish clearly and distinctly the intentionality exhibited by human minds from that exhibited by other phenomena. In contrast, from a perspective of intentionality such as that of Daniel Dennett (1987), according to which all intentionality is derivative and relative to the observer, this is not possible. Such a view of intentionality is a good first step in maintaining an anti-intentionalist stance on creativity. Dennett (2004) himself has argued that computational algorithms can be creative, but beyond stating his position in a paper, he has not argued his position.

I will argue for an anti-intentionalist view of creativity, which allows us to consider the products of computational algorithms as genuinely creative. I will try to show that if it is argued that in addition to paying attention to creative products, attention is paid to how they interact as environments and processes, it is possible to overcome the problem of over-attribution.

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10:00 – 10:30

Lorenzo Boccafogli (Universidad de Costa Rica) - Syntax as a hybrid object in the minimalist program: a categorial approach.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: Until today the applications of Category Theory in linguistics, also relatively to the minimalist program, consisted mainly of categorial grammars, computational analysis, and NLP. The resurgence of interest in Lambek’s work was due to Montague (and someway to Lewis) during a period of relative dissatisfaction with the syntax-primacy-principle, and developed side-by-side with Lakoff’s proposals; the recent results of similar projects, whose pivotal element remains the interpretation Functor Φ: Syn→Sem, retain semanticist tendencies, with the primacy of actual use and typological analysis over formal grammar.

Constituting an exception among a few others, Song (2019, 2020) interprets categorially the basic Chomskian elements of combinatorial operations (merge, in minimalism) and the general syntactic system-grounding rules. Adopting Wiltshcko’s universal spine hypothesis to include different layers of abstraction, he categorizes the basic elements in terms of mergemes, fundamental units dependent on granularity levels. In this model, the mainstream category-theoretic formalizations of language constitute the last abstraction-layer, where the multi-level typological organization disappears, leaving just some general combinability features.

I propose a complementary CT-account of the syntax-semantics relation: dual interpretations can indeed be provided at any level of analysis before the institution of full propositional semantics.

The main idea is to adapt some results of CT-application in the philosophy of science: the syntactic and the semantic interpretations of scientific theories, considered opposite, proved complementary in the 2-category of scientific theories, where the objects are theories and the arrows are translations between them (the Stone duality theorem: 1 - maps each propositional theory to the topological space of its models; 2 - shows that the most interesting relations between models correspond to syntactic relations between theories: logical semantics is dual to logical syntax). I argue that a similar metatheory is possible also in linguistics, linking opposite approaches to language(s) instead of opposite interpretations of theories. My contribution proceeds as follows:

- I identify two different semantic approaches: a core level (Narrow FL) and a full-propositional one (Broad FL). This template is well-founded in both linguistics and cognitive literature (not last in Chomsky).
- I show that in this model many changes of lexical categories during computation result possible in principle.
- I introduce the category of syntactic generativeness SgCat, showing its logic-philosophical compatibility with spine-based and mergeme-based approaches.
- I formally prove the Morita equivalence between these approaches and SgCat, defined as a coherent category. I demonstrate the hybrid nature of SgCat.
- I show that this procedure is consistent with the presupposition of a “protologic”, syntactically and semantically defined, at the level of combinatorial operations.

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ROOM 10

(SULOMET)
Symposium: Substructural Logic and Metainferences

Chairs: Barrio, Eduardo; Pailos, Federico

Topic: A.2 Philosophical Logic

Abstract: The concept of substructural logic was originally introduced in relation to limitations of Gentzen's structural rules of Contraction, Weakening and Exchange. Recent years have witnessed the development of substructural logics also challenging the Tarskian properties of Reflexivity and Transitivity of logical consequence. The main proposal of this Symposium is to analyze two topics connected to such structural properties.

On the one hand, standard ways of defining the notion of logical consequence in classical logic naturally induce substructural logics when admitting more than two truth values; on the other hand, these substructural logics give rise to hierarchies of metainferences that can be used to approximate classical logic at different levels.

Speakers:
1) Eduardo Barrio: Hyper Mixed Consequences
2) Bruno Da Ré: Hierarchies of dual Logics
3) Bogdan, Dicher: Two heterodox interpretations of Substructurality
4) Agustina, Borzi & Camillo, Fiore: Conjoining, Disjoining, and Bunching Formulae in Weak Kleene Logics
5) Pablo Cobreros: Metainferences in Strong Kleene
6) Peter Verdee: Core Logic as a substructural logic: sequent calculus and closure frames
7) Jitka Kadlečíková and Thomas Ferguson: The Ethical Case Against Cut and Its Resolution
8) Damian Szmuc: Canonical, co-canonical, and combined sequent rules for classical logic
9) Eliana Franceschini: Metainferential Negation
10) Federico Pailos: Non-exhaustive and non-exclusive structural solutions to the Validity Paradox
11) Camillo Fiore & Joaquín Toranzo: The Heretic Family Grows: Model Theory
12) Joaquín Toranzo: & Camillo Fiore: The Heretic Family Grows: Proof Theory

9:30 – 10:00
Eduardo Barrio (IIF-SADAF-CONICET & University of Buenos Aires) - Hyper Mixed Consequences.

Topic: A.2 Philosophical Logic

Abstract: Standard ways of defining the notion of logical consequence in classical logic naturally induce substructural logics when admitting more than two truth values. In particular, logics ST and TS induce potential failures of transitivity and reflexivity respectively. The focus is on the mode in which nontransitive and nonreflexive logics arise from the adoption of a generalization of the classical definition of logical consequence in terms of mixed standards. Mixed logical consequence is defined using distinct standards for premises and for conclusions. For example, the definition of consequence in terms of the entailment of non-falsity from truth corresponds to ST logic. In this talk, I am going to present a generalization of this idea: the hype mixed consequence. This proposal takes very seriously the definition of logic as a sequence of standards that can vary along the different metainferential levels. Although in the most well-known cases, it is usually assumed that there is a determining relationship from the inferential standards to the metainferential standards (LP is the external logic of ST), the notion of hype mixed consequence avoids such an assumption, adopting total freedom in the exploration. of standards. I propose to explore the philosophical consequences of adopting strong metafreedom and its potential applications.

10:00 – 10-30

Bruno Da Re (IIF-SADAF-CONICET and University of Buenos Aires) - Hierarchies of dual logics.

Topic: A.2 Philosophical Logic

Abstract: Barrio, Pailos and Szmuc (2020) have defined a hierarchy based on the logics ST and TS and have shown some collapsing results regarding classical logic. Later, Da Ré et al. (2020) introduced a notion of duality for metainferences of level 1 and proved that the locally valid metainferences of the logic ST and TS are dual. The aim of this talk is to extend the notion of duality to metainferences of levels higher than 1, apply this new definition to the hierarchies of logics designed by Barrio, Pailos and Szmuc (2020) and, finally, discuss the relation between these results with the notion of metainferential paraconsistency, as defined in Da Ré, Rubin and Teijeiro (2022), and in Barrio, Pailos and Szmuc (2018).

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Symposium continues in the same room, next time slot.

ROOM 11

(HAPOC)

Symposium: Understanding and defining algorithms: from fundamental issues to new challenges

Chairs: Naibo, Alberto; Papayannopoulos, Philippos

Topic: C.6 Philosophy of Computing and Computation

Abstract: What is an "algorithm"? This term appears increasingly often in contemporary scientific and popular discourse (and even in public debates). Thus, one might reasonably think that it is a well-defined term, or, at least, one that is sufficiently understood. But a closer look into the literature indicates that there is far from a consensus about what this term exactly means and what its fundamental properties are. As a telling example, in a relevant Wikipedia entry ("Algorithm characterizations"), we find a list of more than 15 different delineations of the concept. What is more, the great majority of textbooks dedicated to algorithmic methods in computer science and mathematics very rarely define or even attempt a rigorous characterization of this central notion. Nevertheless, three notable exceptions should be mentioned: two attempts to define algorithms in computer science (by Y. Moschovakis and Y. Gurevich) and one attempt to define algorithms in mathematics (by Blum, Shub, Smale and Cucker). Indeed, these proposals have all been influential and inspired a series of subsequent works. But even this does not change our predicament with respect to our understanding of this notion. For in fact the underlying assumptions of the foregoing approaches differ so much that not only is it difficult to directly reconcile them, but it also seems unlikely that a common ground between them could be found, one that could form the basis for a consensus on how "algorithms" ought to be better understood.

The purpose of this symposium is to examine the complexities of "algorithm" as a scientific notion and bring to the surface inherent reasons for its being so challenging to define in a universally accepted way. We aim to look again at old and new questions about this concept and re-examine its conceptual foundations in the light of new advancements in computer science and mathematics. It is in this sense that we aim to (re)assess its relation to other concepts in the same ballpark, such as "programs", "proofs", "information", "construction", "reasoning", and others.

Speakers:
1) Ksenia Tatarchenko: Algorithm in Culture: Reinterpreting Algorithmic Rationality
2) Thomas Seiller: A Geometric Theory of Algorithms
3) Nachum Dershowitz: Graph-Based Operational Semantics
4) Gregory Chaitin: Defining "Algorithm" in Algorithmic Information Theory
5) Santiago Figueira: Algorithms as a Language of Thought

9:30 – 10:00
Ksenia Tatarchenko (Singapore Management University), Anya Yermakova (University of St. Louis) - Algorithm in Culture: Reinterpreting Algorithmic Rationality.

Topic: C.6 Philosophy of Computing and Computation

Abstract: This paper traces one national tradition of engaging with algorithmic culture to offer a reinterpretation of the notion of Cold War algorithmic rationality. By looking at the interaction between mathematical logic, mechanized reasoning, and, later, computing in the Russian Imperial and Soviet contexts, our aim here is to offer a history of the algorithm as a mathematical object bridging the inner and outer worlds. We describe this humanistic vision that shaped a very specific understanding of the algorithm as a mathematical notion that cannot be defined within other

standard notions of mathematics. For instance, in the words of logicians Vladimir Uspensky and A. L. Semenov: "the algorithms themselves are objects of a very special kind and have property non-typical for mathematical objects—the semantic property ‘to have a meaning.’" (V. A. Uspenskii and A. L. Semenov, "What Are the Gains of the Theory of Algorithms," 1981) We unfold the deep roots of this vision as embodied in scientific intelligentsia. First, we examine continuities between the turn-of-the-twentieth-century discussions of "poznaniye"—an epistemic orientation towards the process of knowledge acquisition—and the postwar rise of the Soviet school of mathematical logic. Establishing this connection allows us to explain, the role of the algorithm in disciplinary dynamics between mathematical logic and cybernetics and a characteristic understanding of programming, not as a narrow skill, but as a matter of consciousness.

10:00 – 10:30

Thomas Seiller (CNRS) - A geometric theory of algorithms

Topic: C.6 Philosophy of Computing and Computation

Abstract: The presentation will introduce a new formalisation of the notion of algorithm. The approach is based on a clear and precise distinction between three notions from computer science that are frequently wrongly coalesced, namely that of computation, programs, and algorithms.

Computation denotes here the physical process of computation, whether it is e.g. mechanical, electronic, quantum. A computation takes place each time a computer program is run. It is bound to a physical theory; it is also deterministic by nature. Computations are naturally formalised as dynamical systems [1]. A program is then bound to a model of computation which abstracts the physical devices on which computations are performed. Models of computations are formalised as monoid actions describing how each instruction acts on the space of possible configurations of a machine. A program then describes a family of possible computations based on these specific instructions. A program is formally defined as a graphing: a generalisation of dynamical systems that still possesses a finite description as a generalised graph.

Those formalisations of models of computation and programs appeared in recent work on semantics [2,3,4] and complexity [5,6].

The notion of algorithm is an eluding one, though any computer scientist or mathematician understands it. Algorithm are not bound to a model of computation, neither to small perturbations in their implementations as programs; algorithms are therefore objects obtained by operating an abstraction on programs. The only proposed formalisation, namely defining algorithms as equivalence classes of programs, was shown to fail [7].

To bypass this issue, and other shortcomings, I propose to exploit the formalisation of programs as graphings to define algorithms as specifications. More precisely: algorithms can be defined as finite labelled graphs, together with a specification of the labels. This combines two kinds of information:

1. procedural information about how the different parts of the algorithm are organised together; formally this is captured by the labelled graph (i.e. not taking into account the specification of labels). That a given program implements (the syntactic structure of) a given algorithm will then be witnessed by some notion of graph homomorphism.

2. intensional information about the operations performed on each edge, formalised as a specification for each label. Beyond satisfying the above requirement of implementing its syntactic structure, a program implementing an algorithm should also interpret labelled edges by a program realising this specification.

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Symposium continues in the same room, next time slot.

ROOM 12

(MMK)
Symposium: Mathematics, Modality and Knowledge Symposium

Chairs: Melisa Vivanco and Otávio Bueno

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: The Mathematics, Modality and Knowledge Symposium aims to bring together various philosophers who embrace diverse views and methodologies to build a network of people working in the field, and create a collaborative space to promote philosophical research on the exact sciences.

Some of the topics to be explored in this symposium extend and update traditional issues, such as those related to the foundations of mathematics, but with a distinctive twist. For example, the role of quantum mechanics in motivating revisions in the foundations of set theory, so that quantum theory can be formulated as intended, will be discussed. Also addressed are cognitive tensions generated by the use of formal and informal languages in mathematics. Metaphysical issues about mathematics, including those concerning modality, will also be examined. In particular, papers on the intuitive essence of numbers, the notion of grounding in mathematics, and the relation between mathematics and modality will be presented and discussed throughout the symposium.

Much of the discussions will focus on methodological issues that have significant metaphysical and epistemic consequences. Some will explore problems related to mathematical proof. This includes analyses of the verb “to prove” as an achievement verb, in the context of mathematical practice as well as the development of a dialogical account of proof in mathematics. Moreover, the dichotomy between normativism and descriptivism in philosophy of mathematics will also be considered, whether in the context of paraconsistent mathematics or in the act of logic selection when implementing mathematical work. To conclude, logic is integrated into the analysis through abstraction, computational reasoning and game theory.

The exchange of ideas from diverse approaches to the philosophy of mathematics is promising in multiple ways. The analysis of modality and of mathematics—including the study of their respective methodologies—overlaps in philosophically relevant ways. Significant epistemic challenges also arise from the study of these topics. The Mathematics, Modality and Knowledge Symposium's purpose is to address and develop further a selected portion of them.

Speakers:
1) Décio Krauze: Quantum Set Theories
2) Jody Azzouni: Mathematics: informal and formal languages
3) Melisa Vivanco: Mathematical Grounding
4) Mario Gomez-Torrente: Identifying the Numbers through their Essence
5) Otávio Bueno, Mathematics' Modal Content
6) Catarina Dutilh Novaes, A Dialogical Account of Proofs in Mathematical Practice
7) Curtis Miller, Mathematical Discourse and the Semantic Analysis of Achievement Verbs
8) Katrina Torsoe, Normativity in the Act of Logic Selection
9) Jonas Becker, Paraconsistent Mathematics, Descriptive and the Normative
10) Nikolaj Jang Lee Linding, Pedersen & Matteo Zicchetti, Non-evidentialism About Mathematical Foundations: Moore, Mathematics and Transmission Failures
11) Pawel Stacewicz & Paula Quinon, Analog Computation--Continuous vs. Empirical
12) Fenrong Liu, How do Players Reason in the Cops and Robber Game?
13) Giuseppe Rosolini, Abstracting Logic

9:00 – 9:30

Décio Krause (Federal University of Rio de Janeiro) - Remarks on the Application of Mathematics to Reality.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Some people suggest that mathematics (and logic) can be applied directly to reality. So, when we say that two men plus two men form four men, we apply the arithmetical rule '2+2=4'. I diverge by suggesting that mathematics (and logic) apply to our representations of parcels of reality so they relate to reality only indirectly. For instance, when we say that a man plus a man makes two men, we make several suppositions such as that the men are distinct and that we can sum them. But there is no operation 'addition of men'; we add numbers. So, we need to represent the men in a mathematical structure (usually a set) in order to be able to use the standard mathematical tools for counting, say by means of a bijection with a certain cardinal number. The most pressing problem is to go back to 'reality', that is, to justify the association of outcomes (for instance, 'four') and link such a value to men. As Patrick Suppes (1998) said, "We cannot literally take a number in our hands and 'apply' it to a physical object." This point will be explored in this talk.

Essentially, the 'road back to reality' is similar to what the old logic positivists called "correspondence rules" (Carnap 1966), but taken in the reverse direction: from mathematical models to empirical reality (Bueno and Colyvan 2011). In the case of the physical sciences, to which I shall refer here, we need to formulate mathematical structures that are compatible with a parcel of reality we are interested in, which are idealizations. Physical laws, as suggested by many such as Nancy Cartwright (1983), apply to these representations, idealized objects described through 'models'. This brings up another problem I shall address here: where these structures are built. Usually (in the cases considered here), they are set-theoretical structures, built in a standard set theory such as ZFC. But we might face problems when we assume a metaphysical position regarding quantum objects seeing them as en- tities devoid of identity conditions (French and Krause 2006). In this case,

metamathematics becomes relevant and must be considered. The quantum case is used to illustrate this point.

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9:30 – 10:00

Jody Azzouni (Tufts University) - Mathematics: informal and formal languages.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: That mathematics takes place in the vernacular, and that it's nevertheless understood via formalization and the models for such, creates cognitive tensions. I explore some of these insofar as they arise in our understanding, for example, of alternative mathematics (e.g. geometries that obey the parallel postulate and geometries that don't) and with respect to higher-order logics, and the like. Here are more details. Our experience of the vernacular (one that's largely innate) is of sentences with meanings that are fixed. That is, a sentence may hold or not hold in different situations, but it means the same thing and its truth value in those situations is a resultant of two vectors: its meaning and the particulars of the situation. So, the parallel postulate is understood to mean something, apart from the geometric situations it's applied to, and whether it's true or false of various geometric situations is a result of the interaction of its meaning with the particulars of the situation (e.g., what straight lines are like on spheres, on flat planes, etc.). Skolem was already arguing that this is the wrong picture. Rather, the sentence (even a higher-order sentence) is a purely syntactic object that is given an interpretation by the model it holds (or doesn't hold) in. In contemporary logic, what sorts of interpretations a sentence—the syntactic object—may hold in are constrained by its syntactic properties but (I argue) that's insufficient to treat this syntactic object as having a "meaning" apart from the model that, in fact, gives it one. This is even true of higher-order logics, theories of which seem to exclude, on purely syntactic grounds, nonstandard models. Lest this second view of how syntactic objects are given meanings be seen as one that holds only of formal languages when they're artificially interpreted by standard model theories, be forewarned that this sort of view is held in contemporary languages in linguistics, although how the syntax of the vernacular is given interpretations (by context, by referential relations, by internal conceptual content) is wide-open and controversial. In short, our phenomenology (our experience) of natural language—sentences with intrinsic meanings—doesn't even match what linguistic science says is going on in the vernacular. In any case, I'll illustrate, with arguments from the pioneers of the logical discipline (Hilbert, Frege, Skolem, and the like) as well as contemporaries (Clarke-Doane) how the clash between the phenomenology of our experience of the vernacular and the realities of how syntactic expressions are given meaning causes philosophical errors of various sorts.

10:30 – 11:00

Melisa Vivanco (UNAM) - Mathematical Grounding

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: As some philosophers have argued, the philosophy of mathematics can become a microcosm of philosophy's more general and central questions—questions of epistemology, metaphysics, and the philosophy of language. Furthermore, the study of those parts of mathematics to which philosophers of mathematics most often attend (logic, set theory, arithmetic) seems designed to test the merits of extensive philosophical views about the existence of abstract entities or the tenability of a particular picture of human knowledge. In line with these ideas, I present the relation between a mathematical structure and its basis as a microcosmos from which to study metaphysical grounding. The analysis shows that the formal resources provided by mathematics help to decrease the ambiguity that appears to be inherent when introducing the concept of grounding throughout mainstream resources.

In mathematics, results are often pursued in such a way as to minimize the resources explicitly invoked to derive them and maximize the generality of those results. To this extent, the notion of a basis for a particular structure is recurrent in many areas of mathematical practice. A basis B for a space M, constituted by a set X, is characterized as a subset of X with two characteristic properties:
1) B generates X: Every element of X \ B can be decomposed into elements of B.
2) B is minimal: If b is an element of B, then it cannot be decomposed into other elements of B.

The methodological advantage of working with bases is that relevant properties can be easily determined for B and then inferred for all M. The core of my proposal is that such inference occurs by virtue of the relation between facts about M and facts about B. This relation is what I call Mathematical Grounding. As an illustration, consider the cases of a vector space V and a topological space τ. Linear properties can be derived from properties of a basis BV of V . Specific BV-facts ground linear-facts of V. Likewise, a specific topology on a space τ can be derived from properties of the open sets of a basis Bτ. Topological Bτ -facts ground topological τ -facts.

The aforementioned relation models the notion of grounding in metaphysics. The Grounding Mathematical Model (GMM) accounts for grounding as a constitutive relation of determination or explanation that cannot be causal or probabilistic. In this sense, the absence of causal relations in mathematics allows for a clearer picture to analyze the relevant relations for the relevant philosophical purposes.

Symposium continues in the same room, next time slot.

ROOM 13

9:00 – 9:30

Terblanche Delport (University of South Africa) - Synthetic Models of Infinitesimals.

Topic: A.1 Mathematical Logic

Abstract: The paper investigates the approach to a synthetic representation of infinitesimals. On an elementary level, infinitesimals can be defined as a number that is not zero but is smaller than any standard real number.

The attempt to find an applicable universe for the existence of infinitesimals, had a great effect on the mathematical area of logic and geometry. The geometric rationale of working with infinitesimals is that it allows us to conceive of the concept of a number and line in different ways.

Two possible ways to consider the real numbers are the Cantor-Dedekind hypothesis (CD) and the Intended Interpretation hypothesis (II) [1]. CD identifies the real number line as a line in space while II balances the interpretation of the natural numbers in its set-theoretic context as well as its intuitive approach as a counting number. Infinitesimal analysis enables us to transit [2] between these conceptualisations of infinitesimals.

There are several ways in which to approach the question of how to give infinitesimals a rigorous logical formulation. Two of the most well-known of these approaches are Abraham Robinson's treatment of infinitesimals in his Non-Standard Analysis (NSA) [3, 4], as well as Edward Nelson's Internal Set Theory (IST) [5, 6]. While NSA makes use of model theory to construct a model in which infinitesimals exists, IST axiomatises infinitesimals by adding to the axioms of ZFC.

While both Robinson and Nelson engages with DC and II approaches to real numbers, they do it from two differing perspectives. The two approaches to infinitesimal analysis mentioned can be seen as corresponding to an analytic and synthetic approach. Abraham Robinson approaches the formulation of infinitesimals by using already existing techniques in, amongst others, model theory. Edward Nelson, on the other hand, directly axiomatises the intuitive ideas of infinitesimal numbers and from there attempts to build his theory of infinitesimal analysis.

After discussing Robinson and Nelson's approaches to infinitesimals, we will consider the example, via the Banach-Tarski 'paradox', of amenable groups. While we can consider rich measure-theoretic structure via Robinson's construction of the Loeb-measure, Nelson's Radically Elementary Probability Theory (REPT) does not allow the same measure theoretic constructions [7]. Do we, however, need these measure-theoretic constructions? What do we sacrifice when approaching infinitesimals synthetically instead of analytically?

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9:30 – 10:00

Felipe S. Abrahão (University of Campinas), Itala M. L. D'Ottaviano (University of Campinas) - Semantic robustness to isomorphisms in partial dyadic structures.

Topic: A.1 Mathematical Logic

Abstract: Previous results have shown that isomorphisms do not preserve the algorithmic information content of finite dyadic (total) structures, such as finite graphs and multidimensional networks [2,1].

This distortion phenomenon has impacts on network complexity, coding theory, and data compression [2].

Partial structures generalizes the pertinence relation in the traditional concept of total structures in order to deal with pragmatic formalizations of (partial-)truths [4,3,5] so that traditional model-theoretic truth remains in turn retrievable in the asymptotic limit of infinite successive expansions of partial structures.

One central problem in the context of finite structures is whether or not isomorphisms are insufficient for determining the relational structure itself.

More specifically, the question is if there is a relational total structure whose atomic diagram cannot be generated (computed or encoded) from any of its relabelings (i.e., any member of its isomorphism group on the same domain) by an a priori given formal theory and/or truth-converging partial structure.

In this work we demonstrate that such an impossibility already occurs in case the partial structures are dyadic, albeit either the isomorphism or automorphism groups of graphs can always in turn be computed from encodings of their respective atomic diagrams and domains [6].

To this end, it suffices to demonstrate that dyadic structures are sufficiently complex to overcome algorithmic information distortions caused by isomorphic transformations, if the encoded atomic diagram is sufficiently incompressible.

In addition, our result implies a semantic incompleteness for computable (finite) structures. Formally, there is a sufficiently large partial structure that, although its expansions converge to the total structure, the atomic diagram of the total structure cannot be computably constructed from any isomorphic transformation of the partial structure.

Therefore, isomorphisms are not able in general to produce or carry formal knowledge sufficient for determining the structure itself.

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10:00 – 10:30

Alexander De Klerck (KULeuven), Leander Vignero (KULeuven), Lorenz Demey (KULeuven) - Categories of Aristotelian Diagrams.

Topic: A.1 Mathematical Logic

Abstract: Aristotelian diagrams have a rich history in philosophy and logic. The so-called square of opposition for Aristotle's syllogistics is undoubtedly the oldest and best-known example, but there exist many other, more complex types of Aristotelian diagrams as well (e.g., various types of hexagons and octagons of opposition [1]). Since the last decade, these diagrams are studied in a more systematic fashion, under the heading of logical geometry. The main aim of logical geometry is to create a complete mathematical framework for Aristotelian diagrams, allowing us to make precise statements about their properties. Although natural links between logical geometry and contemporary discrete mathematics have been found (e.g., combinatorics, Boolean algebra and order theory [1]), satisfying mathematical foundations have not yet been established. A particularly promising line of research in this respect was initiated by Vignero [2], who showed that Aristotelian diagrams can be studied using the tools of category theory. In particular, he defined a specific notion of morphism between diagrams, which he calls infomorphism.

The present paper fits within this research line of categorifying logical geometry. However, we will not be concerned with studying Vignero's category of Aristotelian diagrams in more detail, exploring further category-theoretical constructions, etc. Rather, our aim is to take a step back and reflect on the fundamental building blocks that are required for this categorification project. After all, a category is not just determined by its objects (in casu: Aristotelian diagrams), but also by the arrows between those objects. Vignero proposed one specific notion of morphism, but there exist others as well. So far it is not obvious whether one of these qualifies as the uniquely `correct' or canonical notion of morphism between Aristotelian diagrams. In this paper we will study various kinds of morphisms and their corresponding categories, while keeping two theoretical desiderata in mind. On the one hand, we want to obtain categories that are richly structured and well-behaved from a categorical point of view. On the other hand, we want to achieve a conservative generalization of previous work in logical geometry.

After comparing the different morphisms developed here on an elementary level of category theory, we come to the conclusion that a slightly more general version of Vignero's infomorphisms is the most promising candidate for a satisfying notion of morphism. For example, we show that the category created by these general infomorphisms is sufficiently general to enable discussing a wide array of mappings between diagrams. Also, we show that both initial and terminal objects exist in this category, and that the diagrams that are closed under negation form a reflective subcategory. An interesting direction of future research would therefore be to study this category on a deeper level of category theory.

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10:30 – 11:00	COFFEE BREAK

11:00 - 12:00	INVITED SPEAKER: ALFREDO MARCOS

AUDITORIUM 1

INVITED SPEAKER
Alfredo Marcos (Universidad de Valladolid)

The ontology of Artificial Intelligence and the Toy Story effect

Chair: Ambrosio Velasco-Gomez (Instituto de Investigaciones Filosóficas, Universidad Nacional Autónoma de México)

Topic: B5. Ethical, Social and Political Issues in the Philosophy of Science

Abstract: I'll address some ontological questions of artificial intelligence (AI). The most elementary is whether the AI exists. I will argue that AI does not exist; what does exist are AI systems. In other words, we must go from considering AI systems as technical systems with social consequences to considering them as technically implemented social systems. So, people are part of the AI systems, as designers, users... It is in these people that the intelligence resides: in AI systems the intelligent part is not artificial and the artificial part is not intelligent. It is not a rectifiable technical problem, but an ontological one. When we accept that intelligence can be found in a mere device, we succumb to what might be called the Toy Story effect. Toys do not play by themselves, machines do not have intelligence. Both playing and understanding require the concurrence of a human being.

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12:00 - 13:00 INVITED SPEAKER: DANIEL STEEL

AUDITORIUM 1

INVITED SPEAKER
Daniel Steel (University of British Columbia)

Mechanisms and the Moral Obligation for Action on Climate Change

Chair: Mathias Frisch (Leibniz Unversity Hannover)

Topic: B.1 Methodology

Abstract: Understanding the causal mechanisms involved in mitigating climate change is crucial for grasping how effective action is possible. Mitigation requires transitioning away from fossil fuels, and declines in prices of renewable energy technologies, like photovoltaic solar, demonstrate two important features of mechanisms through which this can happen. First, renewable energy supporting policies implemented by some governments can accelerate positive feedback loops that reduce the

costs of mitigation for others. I refer to such mechanisms as “mitigation cascades.” Second, mitigation cascades can result in renewables being cheaper than fossil fuels, at which point the cost of mitigation is negative. However, these two key features of mitigation mechanisms are incompatible with the idea that mitigation should be represented as a prisoner’s dilemma or an intergenerational conflict of interests. In a prisoner’s dilemma, cooperation is collectively beneficial but always individually costly, while an intergenerational conflict model suggests that mitigation is beneficial for future generations but costly for each current generation. By disregarding the possibility of mitigation cascades, both of these models assume that mitigation by some does not reduce mitigation costs for others and that at mitigation imposes net costs on decision makers at every point in time. As such, they fundamentally misconstrue the basis for a moral obligation to mitigate climate change and the ethical challenges that arise for accelerating the energy transition. To effectively respond to climate change, we must first understand the mechanisms that underlie the solutions.

11:00 - 13:00

AUDITORIUM 2

(FE) From previous time slot, same room.
Symposium: Special Symposium: What's New in Formal Epistemology? (FE)

11:00 -11:30
Anna-Maria Asunta Eder (TU Dresden - University of Cologne) - What's New in Evidence? I

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: There is widespread agreement that it is impossible to formulate an adequate account of suspension in terms of probabilistic credences (short: credence account of suspension). At least since Friedman's (2013) "Rational Agnosticism and Degrees of Belief," epistemologists have pointed out how credence accounts of suspension are problematic in various respects. This paper suggests such a credence account based on a theory of reasoning with higher-order evidence. We take Raleigh's (2019) belief account of suspension as our stating point. According to Raleigh, for suspending judgment concerning some proposition p, it does not suffice to merely not believe p and not disbelieve p (i.e., not believe non-p). He also does not assume any other attitude besides belief. Instead suspending judgement concerning proposition p requires the higher-order belief that the available evidence neither supports believing p nor disbelieving p. In line with this proposal, we suggest within a framework of probabilistic credences that, roughly, suspension requires higher-order evidence that one should have middling credences. We study the advantages and prospects of our proposal and how this higher-order approach can circumvent the problems pointed out by the various critics of credence accounts of suspension. We conclude with a defence against criticism of our account and a discussion of the account's possible limits.

11:30 – 12:00
Peter Broessel (Ruhr-University Bochum) - What's New in Evidence? II

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: There is widespread agreement that it is impossible to formulate an adequate account of suspension in terms of probabilistic credences (short: credence account of suspension). At least since Friedman's (2013) "Rational Agnosticism and Degrees of Belief," epistemologists have pointed out how credence accounts of suspension are problematic in various respects. This paper suggests such a credence account based on a theory of reasoning with higher-order evidence. We take Raleigh's (2019) belief account of suspension as our stating point. According to Raleigh, for suspending judgment concerning some proposition p, it does not suffice to merely not believe p and not disbelieve p (i.e., not believe non-p). He also does not assume any other attitude besides belief. Instead suspending judgement concerning proposition p requires the higher-order belief that the available evidence neither supports believing p nor disbelieving p. In line with this proposal, we suggest within a framework of probabilistic credences that, roughly, suspension requires higher-order evidence that one should have middling credences. We study the advantages and prospects of our proposal and how this higher-order approach can circumvent the problems pointed out by the various critics of credence accounts of suspension. We conclude with a defence against criticism of our account and a discussion of the account's possible limits.

12:00 – 12:30

Chad Lee-Stronach (Northeastern University) - What's New in Normative Uncertainty? I

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: In our view, the most exciting new research is being done on basic questions like the following: What exactly is normative uncertainty? What are the metaethical presuppositions of the problem specification? What are “normative theories”? What kinds of normative questions are we asking when we want to know what we ought to do under normative uncertainty? Answers to questions like these have the potential to resolve and dissolve some of the difficult puzzles and challenges for normative uncertaintists. They also make room for alternative formal models for representing, and potentially clarifying, the problem.

One such model, which we will discuss, is that of multi-objective decision-making, which frames the problem not in terms of competing “theories” but instead in terms of rankings of equivalent sets of properties that bear on choice. We offer this model in contrast to the approaches mentioned above, which treat theories as well-defined and monolithic. On the view we sketch, the problem of normative uncertainty is as much about the problem framing and procedure of choice as it is the definition of a decision rule that maximizes, say, “choice-worthiness”, understood as the property of maximizing some weighted average normative value.

Instead, we explore whether we can do without first-order normative theories in favor of normatively equivalent properties, whether the problem of intertheoretic comparisons is not so much one of ranking but of solving a quite different kind of information problem involving categorization, and whether we could use precisifications or ‘amplifications’ of theories to smooth an otherwise uncertain and impassable normative landscape.

12:30 – 13:00

Pamela Robinson (Australian National University) - What's New in Normative Uncertainty? II

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: In our view, the most exciting new research is being done on basic questions like the following: What exactly is normative uncertainty? What are the metaethical presuppositions of the

problem specification? What are “normative theories”? What kinds of normative questions are we asking when we want to know what we ought to do under normative uncertainty? Answers to questions like these have the potential to resolve and dissolve some of the difficult puzzles and challenges for normative uncertaintists. They also make room for alternative formal models for representing, and potentially clarifying, the problem.

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ROOM 01

(JC-HPSB)
Symposium: History and Philosophy of Structural Biology

Chair: Agnes Bolinska

Topic: B.1 Methodology

Abstract: Knowing the structures of proteins and other biomolecular systems has implications for our understanding of cellular processes, describing molecular evolution, and modulating cellular functions. Yet little philosophical attention has been devoted to the various experimental and theoretical methods used to produce models of these structures. This symposium will address the roles of experiment, data, theory, and representation—and the relationships between them—in our understanding of complex biomolecular structures through historical and philosophical lenses. Its aim is not only to develop a historical and philosophical understanding of the practice of structural biology, but also to extend lessons drawn from the cases each talk explores to other areas of science.

The first two talks in this symposium draw philosophical lessons from detailed historical case studies. Using cases from the large-scale history of protein science in the nineteenth and twentieth centuries, Dana Matthiessen (University of Pittsburgh) shows that model and experiment can be mutually constraining: which models can be constructed depends upon which experimental techniques are available, and vice versa. These cases show that attempting to understand scientific representation as a relation between a model and its target—abstracted away from a historical or practical context—is misguided. Jacob Neal (University of Western Ontario) explores the relationship between experimental techniques and conceptions of the nature of protein. He analyzes the slow transition from viewing proteins as static to regarding them as dynamic in the last century, identifying two factors that can account for it: (i) a preference for experimental over theoretical work and (ii) differences between the ways in which evidence for each view was typically evaluated.

The second two talks draw philosophical lessons from contemporary practice, situating this practice in historical context. Agnes Bolinska (University of South Carolina) examines how information of varying degrees of uncertainty can be used as inputs in a process called integrative structure modeling. She argues that understanding how models are constructed using this four-step, iterative process requires a reconceptualization of representation as nested; further, we ought to understand this process as one of epistemic iteration (Chang 2004), enabling the successive reduction of uncertainty through self-correction and enrichment. Finally, Sandra Mitchell (University of Pittsburgh) discusses how we should understand the achievements of AlphaFold2, an artificial intelligence algorithm for predicting protein structure from genomic and amino acid sequence data. She argues that the complexities of the inferential relationships instantiated by AlphaFold2 require a philosophical reexamination of the roles of theory and data in scientific practice and have implications for how we understand the logic of prediction in science.

Speakers:
1) Dana Matthiessen: Reciprocal Influence of Modeling and Experiment in the Large-Scale History of Protein Structure
2) Jacob Neal: Theory vs. Experiment: Explaining the Shift from the Static to Dynamic View of Proteins
3) Agnes Bolinska: Managing uncertainty: Nested representation and epistemic iteration in integrative structure modeling
4) Sandra Mitchell: Does AlphaFold2 solve the problem of protein structure prediction'?

11:00 – 11:30

Dana Matthiessen (University of Pittsburgh, History and Philosophy of Science) - Reciprocal Influence of Modeling and Experiment in the Large-Scale History of Protein Structure.

Topic: B.1 Methodology

Abstract: Much of the philosophy of science literature on modeling treats this subject in relative isolation from other aspects of scientific practice. This includes discussions of how models represent their target system. With some noteworthy exceptions (e.g., Knuuttila & Loettgers 2016; Boesch 2017), it is often assumed that practical and epistemic activities such as model construction or the process of establishing that a model accurately represents a target system are easily separable from ontic questions of representation per se. On this view, representation is a kind of relation between model and target that can be abstracted from historical or practical context; whether a model represents is merely a question of whether this relation obtains or not.

In this talk I present a case from the large-scale history of protein science that suggests a tighter link between representation and experiment. It shows how judgments of the adequacy of a model for a given representational use depend on the conception of a target phenomenon resulting from experiment. Over time, model and experiment are tuned to one another, demonstrating a reciprocal influence between (i) conceptual and structural models of a target phenomenon and (ii) the instrumentation and techniques for intervening on this phenomenon. Informative model-based reasoning about a target emerges from this dynamic relation.

The talk will cover, in outline, three phases of empirical inquiry into protein structure, with a focus on hemoglobin. These are: 19th century crystallographic chemistry, early 20th century biochemistry, and mid-20th century X-ray crystallography. For each phase, I will summarize how they engaged with their target and how techniques developed over time. In each case, the predominance of a particular empirical program enabled distinct ways of characterizing proteins. Some questions about the nature of proteins could be fruitfully investigated by these means, other questions were

unanswerable—if raised at all. These, then, constrained and incentivized particular ways of modeling the structure of proteins. The mutual refinement of target models and technique is thus seen to tend toward a form of generative entrenchment (Schank & Wimsatt 1986; Wimsatt 2013), where modeling features and related research problems come to depend on specific means of data production available to researchers, and where further developments reflect prior dependencies. While the implications of this dynamic for the history and philosophy of science have yet to be fully explored, I will note several patterns of interest.

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11:30 – 12:00

Jacob P. Neal (Western University) - Theory vs. Experiment: Explaining the Shift from the Static to Dynamic View of Proteins.

Topic: B.1 Methodology

Abstract: In the course of the last century, the scientific conception of the protein has undergone a dramatic shift from static to dynamic. For the first half of the twentieth century, the dominant view held that proteins were rigid, compact, and largely static molecules. This static view was supported by empirical results primarily from x-ray crystallography. An alternative dynamic view of proteins arose in the 1970s and 1980s largely from thermodynamic considerations. On this view, proteins in solution would undergo constant structural fluctuations because of thermal pummeling by solvent molecules. The dynamic view met with a slow reception by structural biologists, taking more than a quarter century to become widely accepted. In this talk, I seek to explain this slow reception. I identify two main reasons for it: (1) a general preference for experimental over theoretical work and (2) a specific way of evaluating evidence from different methods.

Most early proponents of the dynamic view were committed to it for largely theoretical reasons. Being trained in physics or chemistry, they were more receptive to theoretical arguments for protein dynamics than most of their colleagues (Brooks et al. 1988). In contrast, the static view was supported by experimental evidence, and the static structures resulting from x-ray crystallography fit within the reigning structure-function paradigm (Sarkar 2008). Although the early adopters found the theoretical arguments for the dynamic view compelling, the majority of structural biologists waited for the accumulation of empirical evidence for dynamics. Thus, the differential treatment of theoretical and experimental work by structural biologists partially explains the dynamic view's slow reception.

Alan Cooper, a scientist involved in this history, identified another reason for the dynamic view's slow reception, based upon the type of evidence involved. He claimed that empirical evidence for static structure was "direct" while most empirical evidence for protein dynamics was "indirect" (Cooper 1980, 1984). He offered the direct-indirect distinction as an epistemic basis for preferring the static view at that time. I argue that there is no easy way to rank the "directness" of the relevant

methods, nor is there a consistent epistemic justification for more "direct" methods (Parker 2017). I suggest an alternative way to classify relevant evidence via two dimensions: (1) discerning power and (2) inferential strength. A careful assessment of the empirical evidence for dynamics in the 1970s and 1980s using these two dimensions reveals a second, purely epistemic reason for the slow uptake of the dynamic view.

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12:00 – 12:30

Agnes Bolinska (University of South Carolina) - Managing uncertainty: Nested representation and epistemic iteration in integrative structure modeling.

Topic: B.1 Methodology

Abstract: Scientific models are often constructed from uncertain information. For instance, experimental data are prone to error and theoretical considerations can be ambiguous about what they indicate about a given target system. Consequently, there is a risk that uncertainties will be propagated, detracting from the overall accuracy or precision of models. Moreover, we cannot directly assess the extent to which the uncertainty in the information affects models constructed from it. Yet, in focusing on the relationship between models and their targets, discussions of the nature of scientific representation often overlook how uncertainty is managed throughout the process of model construction, and how it affects the representational relationship between models and their target systems.

In this paper, I examine integrative modeling in structural biology to argue that paying attention to how uncertainty is managed in the process of model construction yields a richer account of scientific representation. To construct models of complex biomolecular systems, an array of information from diverse theoretical and experimental sources is often required. Integrative modeling is a method for taking all such information into account to produce a model that is sufficiently accurate for answering biological questions of interest. It proceeds via four steps: (i) defining the model representation, which specifies the variables whose values will be determined by modeling; (ii) constructing a function for scoring alternative models with respect to how well they accommodate input information; (iii) searching a space of models for those that satisfy information sufficiently well; and analyzing those models for fit with information used and not used for model construction. These steps are iterated until a model adequate for answering biological questions is found (Sali 2021).

I argue that, to fully appreciate how models of biomolecular systems constructed via integrative structure modeling represent their target systems, we cannot just focus on the relationship between them and these systems. Instead, we ought to understand representation as nested: different pieces of information are represented in different ways in the process of model construction, which vary with respect to how well they account for uncertainty in information. Constructing a model that

is sufficiently accurate and detailed for answering biological questions is made possible by the iterative nature of integrative modeling, which serves to reduce the uncertainties inherent in the information. I describe this process as one of epistemic iteration, illustrating two modes in which it operates: self-refinement and enrichment (Chang 2004). Understanding representation in this way gives us a richer understanding of how models can serve as mediators between theory and the world (Morgan & Morrison 1999).

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12:30 – 13:00

Sandra Mitchell (University of Pittsburgh) - Does AlphaFold2 solve the "problem of protein structure prediction"?

Topic: B.1 Methodology

Abstract: AlphaFold2 is the most accurate of a growing number of artificial intelligent algorithms (including RosettaFold and ESMFold) generating protein structure predictions from genomic and amino acid sequence data and limited additional information. These advances in technology have been heralded as constituting "a gigantic leap" that "changes everything" (Callaway 2020) for protein structure prediction.

The capacity to predict protein structures from amino acid sequences alone was projected as far back as John Kendrew's 1963 Nobel lecture, though Kendrew conceded then that it would not happen soon. (Kendrew 1964). Indeed, until this past year, almost all protein structures have been determined experimentally, primarily by Xray Crystallography and NMR spectroscopy. The number of experimentally derived structures deposited in the Protein Data Bank (PDB) has increased dramatically from just 13 in 1976, with yearly increases of less than 200 through 1992, to a total of nearly 175,000 in 2023. In July 2022, AlphaFold2 made 200 million AI predicted protein structures available through its database.

Clearly something remarkable is happening to protein structure prediction. But does it change "everything"? In this talk I will examine what AlphaFold2 does, what it can do and what it cannot. Then we can articulate what changes it induces for scientific practice. In addition, I will explore the implications of the use of artificial intelligence algorithms like AlphaFold2 for our understanding of the logic of prediction in science more generally. New experimental instruments provide new sources of data, and new theories of scientific phenomena shape the inferences that can be drawn from that data. But AlphaFold2 provides neither new data, nor a new theory of protein structure. Instead, I will suggest, it exposes the complexities of inferential relationships between theory and data from which accurate predictions can be obtained. The success of AI requires a philosophical realignment of the roles and relationships of theory and data in understanding scientific practice.

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ROOM 02

(ECON) From previous time slot, same room.

Symposium: Values and Uncertainty in Economics. Philosophical and Methodological Reflections

Juan Jose Jardon Urrieta (Faculty of Economics. UMSNH) - The meso-economic level in the analysis of evolutionary economics.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: Interest in the study of the meso- within levels of economics can be directed towards the evolutionary and evolutionary view of meso-economics. This implies differentiating evolutionary meso-economics from meso-economic evolutionism. What this paper seeks to do, on the one hand, is to narrow down the analysis of meso-economics within modifications that look at the intrinsic and hence the links with the micro and the macro. On the other hand, it puts the meso-economic issue in the evolutionary context by emphasizing the stages. The result is a comparison of different stage fields for the meso-economic.

For the former, the focus is on the question of how to make space for the meso-economic in economic analysis, starting from conceiving a set of nested theories that accommodate the meso-space (Jardón, 2013) and also the consideration of other rationalities (Day, 2008). For the second, the analysis of the meso is based on the conception - generic and rules - following Foster (2005, 2007), Dopfer (2005), Dopfer and Potts (2008). The work transcends theories and models of economics mainly in industries that emerged from the 19th century and matured in the 20th century and entered a declining stage in the 20th century.

The contribution of this work is to clarify the methodological aspect of mesoeconomics, but highlighting the vision of evolutionary economics that in itself could be depending on an ontology that has not been systematized and that encloses by far the rules and agreements that shape the institutions.

Thus, first, this paper analyses nested theories as an essential part of how immediate problems have been solved and assesses their scope for bringing them into the grip of evolution. Second, it discusses the bimodality argument in evolutionary theories and the relationship with

nested theories. Thirdly, it discusses limitations of methodological consistency in both cases and possible ways out towards mixed methodological consistency.

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11:30 – 12:00

Luis Mireles-Flores (TINT, University of Helsinki) - Some problems with the empirical turn in economics.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: During the last three decades, economics has seen an increasing emphasis on the use of empirical methods of causal inference as the most suitable and reliable basis to answering policy related questions. This trend has been called “empirical turn” or “credibility turn” in economics (Angrist & Pischke 2010), because the scientific results obtained using these methods are said to be more reliable and “credible” than the traditional more abstract and theory-based reasoning in most mainstream economics of the late 20th century. The specific set of methods favoured by the proponents of the empirical turn are ‘design-based empirical methods’, which are methods that try to emulate the inferential properties of an ideal experimental design (Morgan & Winship 2007; Cohen & Easterly 2009; Banerjee & Duflo 2011; Angrist & Pischke 2015).

The proliferation of design-based techniques within economics is often defended as the best means to producing scientific research of high policy value (see Duflo 2017). Not surprisingly, the empirical methods of causal inference promoted by this empirical movement have rapidly grown in popularity both among researchers and policy makers, for it allows economists to present their research as highly policy relevant, and at the same time it allows policy makers to present their decisions as strongly grounded on science.

In this article, my aim is to contribute to the philosophical assessment of design-based empirical methods in economics, not only epistemologically, but from a normative perspective as well. I will expose and elaborate on three potentially harmful aspects of the empirical turn in economics, namely:

1). It has led researchers to focus only on one type of causal questions (based on one particular account of causation), at the expense of disregarding many other potentially (socially) relevant types of causal questions.

2). It has led researchers to focus on one small part, or more precisely, one single stage of the policy process, namely “impact evaluation”, at the expense of achieving a more comprehensive and useful understanding of the whole, quite intricate, process of policy making.

3). It has led researches (and users of scientific results) to overvalue the inferential import and reliability of the empirical results obtained.

I will show how these problems originate from rather subjective ontological, epistemological, and methodological a priori presuppositions, made by the empirical researchers, which turns out to be in tension with the claim of "objectivity" that has sometimes been provided as a justification for the whole new empirical approach.

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12:00 – 12:30

Maria Alejandra Madi (University of Campinas) - Ethics and Scientific Knowledge in a Pragmatist Philosophy of Economics.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: In The Postmodern Condition, Jean-François Lyotard argues that scientific knowledge has been commodified in Western culture since the late 20th century. As a result, modern science is tied to new political and economic power structures and disconnected from reality and social demands. In point of fact, the handling and results of the 2008 global financial crisis as well as the breakout of COVID-19 call into doubt the realism of economic theories and practices. Additionally, social challenges and inequalities have raised ethical concerns, which is further proof that values should matter in scientific endevours.

As a historical and evolutionary reflection on human experience, a philosophical approach to scientific economic knowledge should pose the following questions: How can Ethics and Epistemology be brought together? Is there an irreconcilable opposition between Theory and Practice, that is to say, between, theoretical and practical reason?

To respond to these inquiries, this paper addresses the relevance of the relation between Ethics and economic knowledge under Charles S. Pierce´s Pragmatism. In line with his thinking, our purpose is to examine how Epistemology and Ethics relate to one another into a realism-based Philosophy of Economics. Peirce's philosophy is about actual life, and he believed Theory and Practice are the two major tasks of mankind. Since theoretical and practical reason are intertwined, Ethics as a normative science is antecedent and supplies applied sciences, such as Economics, with action principles guided by an ideal of behavior that rejects particular ends. According to Pragmatist Ethics, scientists should pursue the Logical Good while being open-minded to a fallibilist standpoint in an uncertain and changing world.

The paper will develop our objective as follows. First, we present the relations between Epistemology and the normative sciences - Aesthetics, Ethics and Logic - within Peirce´s philosophy. Second, in the context of a Pragmatist approach to the Philosophy of Economics, the connection between Ethics and scientific knowledge is discussed. Moreover, we provide an overview of the principles that should govern this Pragmatist approach by considering the relations between Phenomenology, Ontology, Epistemology, and Ethics. Finally, we analyse the false opposition between Theory and Practice. In light of Peirce´s ideas, economic theory must be validated in practice in accordance with the principles of Logic and Ethics. The science of Economics should be driven by the pursuit of the Logical Good and the awareness of the inextricable link between Pragmatist Ethics

and genuine scientific knowledge. In this endeavour, it is advocated to reconceptualize the Economic Good as a Social Good. Reconciling Ethics and Economics on new grounds is a challenging task. Nonetheless, it is of the greatest social relevance.

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ROOM 03

11:00 – 11:30

Luis Urtubey (Universidad Nacional de Córdoba), Sebastián Ferrando (National University of Cordoba) – Justification Logic for reason-based preferences.

Topic: A.2 Philosophical Logic

Abstract: While there is some recent achievements on logical representations of the structure behind preferences[1][2], there is not much previous work on reasoning about this type of frameworks in modal logic.Particularly, in this contributed paper our concern will be that of reasoning about the framework developed in [3] in the setting of Justification Logics. Foregoing comparable results has been already accomplished [4], based on other formal representation model, though. When we reason about what we prefer we are interested not merely in what our preferences are, but also in the reason for which it is preferred. We suggest that the framework of Justification Logic [5],a.k.a. explicit modal logic, offers a formal setting in which we can represent reasoning about the reasons for which something is preferred. A key feature of Justification Logics is that terms can be of two types, variables and constants. Variables represent arbitrary reasons, while constants represent reasons for assumptions, and in particular for axioms. Constants represent specific “atomic” reasons, i.e. reasons which are simply accepted as justifying what they do. Concerning preferences, reasons for logical axioms can be taken to represent how logic-respecting one’s preferences are. For instance, for a constant c, c ☹ (A ∧ B) → A) might be read as c constitute a reason to prefer A on condition that A ∧ B is preferred. Von Wright [6] already examined how preferences are subject to logical principles.The systems of Justification Logic considered so far capture some basic behavior of any kind of justifications, but none of the systems are specifically for preferences. The minimal assumption made concerning reasons for preferring to distinguish them from reasons in general can be that of having some motivation, i.e., witnessing a set of the so-called ‘motivationally salient reasons’ [3][4].Theory can specify that the agent possesses a reason to prefer p whenever she prefers p and that she can access to this reason in a given state. Under this interpretation, the operator ‘!’ (check) of introspection in Justification Logic can make sense and corresponds to a form of ‘transparency’ concerning preferences. The corresponding version of modal Axiom-4 will express that fact. In this talk we will explore this interpretation as well as some problems concerning order relations associated with this axiom.

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11:30 – 12:00

Vitaliy Dolgorukov (HSE University), Elena Popova (HSE University) – Temporal Epistemic Logic for Awareness with Minimum Delay.

Topic: A.2 Philosophical Logic

Abstract: We present a temporal epistemic logic for awareness with minimum delay (TELAMD). We have two main goals: 1) construct the awareness logic with temporal relation, 2) consider the particular formal “trigger” for awareness, explaining why an agent becomes aware of something.
Logics of awareness appeared in the battle against the problem of logical omniscience in epistemic logic (Hintikka 1962). The problem is that agents know all logical tautologies and the epistemic system contains the epistemic closure under implication. An awareness approach solves the problem of logical omniscience by dividing knowledge into implicit and explicit. The last one is not closed under logical inference; therefore we can describe and model resource-bounded agents. This approach was proposed by (Levesque1984, Vardi 1986, Fagin 1988, van Benthem 2010). It is based on extending standard epistemic logic with awareness operator Aϕ (“be aware of ϕ”).

Minimum delay means that the agent needs minimum time to become aware of some fact. Thus, TELAMD describes semi-ideal agents, such as robots that do not make mistakes in reasoning, but spend some time on computation. TELAMD formalizes the deliberation in a constantly changing flow of information. The basic idea is that agents need time for deliberation to become aware of some facts. But, at the same time, the situation in the world may change, so the agent’s awareness should relate to the facts of the past.

Let us consider an example. According to NASA, it takes from 5 to 20 minutes to send radio signals between Mars and Earth (the particular time depends on the planets’ position). That is why it makes it difficult to control from Earth in real time, the robots that explore Mars. Let us consider an imaginary autonomous robot “Journey-16” that explores the position of the stars and planets from Mars and sends data to Earth. For example, “Journey-16” detected a comet and sent its coordinates to Earth. Given that the radio signal from Mars to Earth took 15 minutes, and scientists spent another 2 minutes decrypting the data, the received coordinates of the comet relate to the past, since, during these 17 minutes its position has changed.

We present a completeness result for TELAMD and prove that this logic is decidable.

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12:00 – 12:30

Sena Bozdag (Ludwig Maximilian University of Munich) – Two Approaches for Capturing Hyperintensional Content

Topic: A.2 Philosophical Logic

Abstract: Traditionally sets of possible world have been used to represent intensions of sentences, and modalities are understood as expressing properties of intensions of sentences. Some modalities are however create special contexts where entailment as strict preservation of truth needs to be redefined or supplemented to make more fine-grained distinctions between sentences with the same intensions possible. Modalities such as seeing and believing are examples of this sort, as they create hyperintensional contexts, that are sensitive to the sentential content of sentences.

The sentential content of truth-bearers is sometimes represented by explicitly enhancing the possible worlds-based intentional content with the notion of subject-matter, or by providing a different semantics and changing what determines a proposition. The examples for the former approach are world-partition semantics and topic-sensitive semantics. These suggest a two-fold evaluation of sentences: i) the truth-conditions determined by sets of worlds, ii) the aboutness conditions determined either by the partition (i.e. the subject-matter), or the topic assigned to the sentence. The latter approach can be obtain via state-based (or support-based) semantics. Here, both the truth-conditions and the aboutness conditions of sentences are determined by sets of states. It will be argued that the fine-grained content captured by the two accounts are not equivalent. This is manifest in different behaviour of the logical connectives, specifically the negation, under hyperintensional contexts.

The topics of comparison will be topic-transitivity of negation and the notion of semantical opposition. The possible worlds-based approaches yield a topic-transitive reading of negation since aboutness conditions are independent of the truth-conditions. Given a state-based semantics however, sentential content is determined by the support-conditions which include the truth-conditions of a sentence. Hence negation is no longer topic-transitive. In this case, sentential content follows closely the syntactic complexity of sentences, and reasoning agents seems to be susceptive to the syntactic complexity of the provided information.

Second, the meaning of semantical opposition, which is at the core of the meaning of negation, shifts when the propositions are determined by incomplete states. Classically, semantical opposition is interpreted based on the opposing notions of truth and falsity. However, the shift from truth-conditions to support-conditions means that truth and falsity should be taken as two primitive notions. Hence, we expect that some classically opposed sentences (eg. A and ¬A), are no longer strict oppositions. This will be exemplified with the suggestion that the epistemic context, i.e. the context in which an agent is reasoning, might be part of the sentential content of sentences.

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12:30 – 13:00

Chen Bo (Wuhan University) – Logical Exceptionalism and its Predicaments.

Topic: A.2 Philosophical Logic

Abstract: The term “anti-exceptionalism” has been first coined by Timothy Williamson in his book The Philosophy of Philosophy (2007), with the intention to describe his metaphilosophical position that philosophy is continuous with science and not to be taken as an exception to other sciences. He also used the same term in the exposition of his logico-philosophical standpoint, namely that logic is a theory about the most general characteristics of this world and not an exception to other sciences (cf. Williamson, 2007, 2013a, 2013b, 2017). Then, the controversy about logical exceptionalism and anti-exceptionalism became a hot issue in the field of philosophy of logic. In the recent few years, altogether 14 articles on the controversy were published in the renowned international journal Synthese. In 2019, the periodical Australasian Journal of Logic published a special issue (no. 7), which was comprised of 8 articles related to the topic. The controversy involves problems like the epistemological status of logic, the methodology of constructing logic, as well as
the criteria of evaluating and selecting logics. In the Sinophone academic circles, a prompt response to the debate was given in a special issue of the Universitas- Monthly Review of Philosophy and Culture (Zhexue yu wenhua 哲學與文化), which thus marked the entry of the Chinese academic community into the wider debate.

This article consists of three sections. In the first section I will discuss the main standpoints of logical exceptionalism, by expounding on it through four main claimsimitating Hjortland’s (2017) formulation. Logical exceptionalism claims that logic is exceptional with respect to all other sciences, including natural science, social science and humanities, because logical propositions say nothing about the world, and are true or false based on the meanings of logical constants; that logical truth is analytical, a prior and necessary, so it is not revisable; and that logical laws are normative for how to think correctly. In the second section I will discuss the evolution and development
of logical exceptionalism through the perspective of six representative philosophers, namely: Leibniz, Hume, Kant, Frege, Wittgenstein and Ayer. Among them the first three discussed traditional formal logic, the latter three discussed variants of modern logic, the nuclei of which consist of first-order logic. In the third section I shall further discuss the four predicaments faced by logical exceptionalism, namely: How do we
justify and validate logical laws? How do we account for mutually conflicting logics and how do we select from them? How do we explain the universal applicability of logical laws? And how do we account for the normativity of logic with regard to correct thinking? Finally, I will conclude that logical exceptionalism is founded upon several not yet carefully investigated and critically examined presuppositions, and thus troubled by numbers of insurmountable theoretical difficulties.

ROOM 04

(PM)
Symposium: Symposium in Memory of Pablo Melogno

Chair: Borge, Bruno

Pablo Melogno was Professor of Philosophy and History of Science at the Faculty of Information and Communication of the University of the Republic, Uruguay. As a researcher in the area he specialized in the work of Thomas Kuhn. His numerous publications projected him as one of the main international references in Kuhnian studies and one of the central figures of the philosophy of science in Latin America. At the time of his death he was President of the Latin American Association of Analytic Philosophy (ALFAn). He was also the main mentor of the Colloquium of Philosophy and History of Science of the Río de la Plata, and promoter of several academic initiatives that promoted the permanent integration of Latin American researchers.

This Symposium brings together friends and colleagues of Pablo Melogno to remember and celebrate his contributions to philosophy of science.

Speakers:
1) Paul Hoyningen-Huene: Pablo Melogno and Thomas Kuhn
2) Pío García & Andrés Ilcic: The Discovery-Justification Distinction: Comments on Melogno's Analysis of a Kuhnian Account"
3) Daian Flórez: Incommensurability as a philosophical bomb: Why the conversation with Pablo Melogno must go on"
4) Bruno Borge: Pablo Melogno on Varieties of Incommensurability and Scientific Practice"
5) Deivide Garcia da Silva Oliveira: Pablo Melogno's view on science education
6) Victoria Lavorerio: Rational Choice between Incommensurables
7) Angel Rivera-Novoa: Translation and incommensurability. Reply to Pablo Melogno
8) Hernán Miguel & Leandro Giri: Double prevention in the counterfactual theory of causation: Melogno versus Hall"

11:00 – 11:30
Paul Hoyningen-Huene (Leibniz Universität Hannover) - Pablo Melogno and Thomas Kuhn.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: There is no doubt that Pablo Melogno was the most important contributor to Kuhn Studies from South America. His contributions written in English reached world philosophy, his contributions in Spanish helped to remove the stereotypical and inappropriate images of Kuhn (that exist world-wide) in the Spanish speaking countries. In particular, Pablo took up a very important topic that was known in principle in the Kuhn literature but rarely treated extensively, namely the dependence of Kuhn's theory in The Structure of Scientific Revolutions on an underlying specific mode of historiography of science. For instance, he analyzed very carefully the development of Kuhn's historiographic stance in between Kuhn's Copernican Revolution and Structure, that is, in the decade preceding the publication of Structure ((Melogno & Courtoisie, 2019), (Melogno, 2022)). His avid interest in the not so obvious aspects of Kuhn's work and its development led him to Kuhn's not so well-known Thalheimer Lectures. He published them together with his friends and colleagues Hernán

Miguel and Leandro Giri (Melogno et al., 2017), and he analyzed them, both with respect to the historiography of Kuhn and the distinction between the context of discovery and the context of justification, in an article that appeared in the highly esteemed Journal HOPOS (Melogno, 2019). Thanks to Pablo, the Thalheimer Lectures are publicly now available at least in Spanish. Together with Leandro and Hernán, he edited an important volume on Kuhn, which resulted from an exciting conference held in 2018 in Buenos Aires (Giri et al., 2023). I am very glad that Pablo could finally see the publication of this book before his untimely death. There is much more that Pablo published, but in my talk I will address mostly those (English) publications that made Pablo known all over the world.

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11:30 – 12:00

Angel Rivera-Novoa (Universidad de Antioquia) - Translation and incommensurability. Reply to Pablo Melogno.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: "Melogno (2020) made a defense of Kuhn's (1983) local incommensurability. In this defense, Melogno brought out the assumptions behind the classical criticisms of incommensurability by authors such as Putnam (1981) or Davidson (1974). Incommensurability is questioned because it implies paradoxical results: portions of meaningful languages would not be recognizable as linguistic behaviors and there would be failures of communication between the representatives of the disputed theories. Following Kuhn, but going beyond him, Melogno distinguishes three linguistic levels between which there is no inferential relation: translation, interpretation and communication.

Translation is a semantic relation between languages, the success of which depends on their capacity to express the statements of each of them. Interpretation is the relationship between a speaker and a particular language. Unlike translation, which, according to Melogno, presupposes a symmetrical relationship, interpretation does not, since languages do not interpret speakers. Communication, on the other hand, is a relationship between speakers, characterized by the possibility of linguistic exchange. According to Melogno, the problem with the critics of incommensurability is that they confuse the processes of interpretation and translation and only then would the apparent paradoxical implications arise. Furthermore, contrary to Kuhn, Melogno argues that communication failures are not the result of translation failure. Melogno thus shows that a case can be made for local incommensurability, in terms of untranslatability, without leading to problems concerning interpretation or communication failure.

My aim in this presentation is twofold: I wish to show that even assuming that the distinction made by Melogno is correct, we could still maintain that untranslatability is impossible. Thus, one can

accept, with Melogno, that translation and interpretation are distinct phenomena, but if one succeeds in interpretation, one will also have to accept a success in translation. Secondly, and following an intuition of Melogno's, I point out that the debate is resting on an additional assumption, namely, that theoretical languages are analogous to natural languages. When one speaks of "theoretical language" one speaks, at most, of a vocabulary. But a language is much more than a vocabulary, for it contains a set of syntactic rules that guarantee its productivity and compositionality. I agree with Melogno that translation is a relation between languages. However, it would be misleading to speak of a failure or a success of translation between "theoretical languages" insofar as these do not constitute, strictly speaking, languages.

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12:00 – 12:30

Bruno Borge (UBA-CONICET) - Pablo Melogno on Varieties of Incommensurability and Scientific Practice.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: Several philosophers have noted that Kuhnian incommensurability between paradigms operates at three levels: methodological, perceptual, and semantic (Hoyningen-Huene 1993; Bird 2000; Hoyningen-Huene & Sankey 2001). The semantic dimension of incommensurability has received much attention from critics, commentators, and Kuhn himself throughout his work. As such, much of the discussion on incommensurability has focused on issues related to the change in meaning of theoretical and observational vocabulary, theories of reference, and the scope of semantic holism, among others. Perceptual incommensurability has also attracted some attention from critics (e.g. Tibbetts 1975, Diez 2012). Studies on the methodological aspects of incommensurability are less frequent (e.g. Sankey 2013).

Pablo Melogno is no exception. Over a series of papers (2014, 2020, 2021), Melogno develops a rich analysis of incommensurability focusing on semantic considerations. Among the many valuable theoretical tools that Melogno (2020) introduces, he distinguishes interpretation, translation, and communication to clarify aspects of semantic incommensurability. In addition, Melogno (2021) carries out a careful analysis of the notion of perceptual incommensurability, applied to the case of the chemical revolution.

Like many scholars of Kuhn, Melogno did not pay special attention to methodological incommensurability, which occupies a marginal place in Kuhn's own works. Nevertheless, his analyses of the semantic and perceptual aspects of incommensurability are directed toward scientific practice, linguistic practices in scientific contexts, and experimental practices. In this framework, the structure of scientific practices and the epistemic values that guide them play a crucial role. In this talk, I argue that we can find in Melogno's work the key to a reorientation of discussions about incommensurability toward scientific practice. In this context, analyses of the role of epistemic and methodological values take on renewed importance.

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12:30 – 13:00

Deivide Garcia da Silva Oliveira (Universidade Federal do Recôncavo da Bahia) - Pablo Melogno's view on science education.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: The philosopher and professor at the Universidad de la Republica de Uruguay, Pablo Melogno, had dedicated his life to studying philosophy and the history of science in general, but he was particularly interested in the study of Thomas Kuhn. Nevertheless, not only that, among his extensive research and topics of interest, he also developed his understanding of science education based on his refined interpretation and research on Kuhn. Thus, on the one side, his work has an internationally acknowledged understanding of Kuhn and carries a Kuhnian influence. On the other side, Melogno's work on science education also carries the originality and brightness of his viewpoint (Melogno, 2013a, 2013b, 2015). For instance, on this subject matter, he opposed R. Bailey (2006) and D.L. Rowbottom (2006), who sustained the idea that a Kuhnian education is dogmatic y indoctrinates the students due to their view of Kuhn's processes of scientific revolutions and periods of normal science (Melogno, 2013a). Against them, Melogno says that Kuhn, no more than others like Lakatos and Putnam, does not save the current paradigm of all criticisms. However, scientists also cannot criticize all scientific claims and theories all the time and all at once. Scientific education follows the rules of normal science, which means that while some scientific claims are not criticized, "that this does not mean that some of them are intrinsically irreversible" (Melogno, 2013a). In this sense, Pablo has continually debated and reintroduced Kuhn's view on science education from his sophisticated viewpoint, fed by a lifetime dedicated to studying Kuhn's work, bringing new approaches, and solving possible misunderstandings about his philosophy. Consequently, Melogno was not only walking in the steps of Kuhn but by reinterpreting, analyzing, and contributing to the philosophical community, making his own philosophy and leaving his marks on the sand.

(IASCUD-AL) Continues from same room, previous time slot
Symposium: Artificial Languages in the History of Science and Mathematics

11:00 – 11:30
Vitaly Pronskikh (Fermi National Accelerator Laboratory) - Pidgin and Creole Simulation Codes in High-Energy Physics.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: The fact that artificial sign systems, such as those used in mathematics and natural science, reveal some "generosity" in the sense that they can be quite universal and applicable to a wider range of entities than those for which they were originally intended, was emphasized by (Staal 2007). Sometimes such artificial languages may arise as a result of the development of natural languages when they are applied to scientific discourse (Chemla 2006). In high-energy physics (HEP), artificial languages often arise out of necessity to exchange scientific information and mediate communication between professional communities that use different sign systems (e.g., between theorists and experimentalists; Galison 1997). The emergence of such languages requires the creation of a special social and communicative space, so-called "trading zones," during the evolution of which interdisciplinary languages can move from the simplest form of
jargons and pidgins to more complex ones of creoles, which can serve as analogues of native languages for professionals (Gorman 2010). In the field of HEP, artificial languages play a special role: they can be associated with complex computer codes used to simulate the interactions of accelerated particles with other particles and atomic nuclei (Pronskikh 2022). The scope of application of such codes in accelerator experiments is truly immense: this includes radiation protection, the design of accelerators and detectors for experiments, and the prediction of the
effects being studied. It is not surprising that during their development, trading zones of complex configurations arise, in which these codes, akin to artificial languages, arise, evolve, and disappear. We examine two types of codes. For the first type we refer to codes such as FLUKA, MARS, and PHITS, which are pidgins between theoretical physics, experimental engineering, and engineering. They have been developed by certain scientific centers since the 1960s, coordinated according to the model of sole leadership, and supported by specialists who received training in classical fields of physics. Such codes can be understood by physicists of
most specializations without the need for translation. The second type is GEANT4, in which coordination is distributed. Such codes are arranged like creole: physicists learn to use it from the student's bench as the main language of studying the discipline. This report will discuss the reasons why, for such codes, their evolution from pidgin to creole is a necessary condition for their preservation.

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11:30 – 12:00

Shereen Chang (University of Guelph) - Artificial languages in animal language studies.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: When scientists conduct research on nonhuman animal language learning, they often train subjects on human-created artificial languages. These artificial languages often borrow elements from natural language but are modified in several ways. In this presentation, I consider the extent to which departures from natural language make it easier for nonhuman animals to acquire the artificial language.

First, I consider the research of Pepperberg et al., who trained grey parrots to vocalize and use a simplified system of words. Their artificial language shares various features with English, including vocabulary and medium. It is vocalized like regular spoken English, such that researchers could immerse subjects in an environment for learning it, not only in formal training sessions, but also informally around the lab. Using various training methods based on social context and interaction, parrot subjects were taught to communicate using word-like symbols. Pepperberg primarily used a Model/Rival training technique, where two human trainers used the target words and relevant props/objects while the subject observed and later participated. Her technique involved demonstrating to the parrot how words were used to refer, such that the subject learned to use a variety of words, not only for tangible objects but also for category concepts. I identify several ways in which the artificial language used by Pepperberg was simplified. First, researchers used a simplified grammar to exclude words that were unnecessary to the meaning of the sentence. Rather than asking “What is the shape of this?” they would ask “What shape?” Second, researchers shortened or substituted words to simplify vocalization and pronunciation. They used “hide” instead of “rawhide”, and “peg wood” instead of “clothespin”. Third, they streamlined the lexicon to match the conceptual space. For example, they reduced prefixes to their root, when using “three-corner, four-corner” instead of “triangle, square”. This streamlined lexical and conceptual space likely facilitated the parrot’s later acquisition of number concepts and numeral literacy.

Second, I consider the research of Herman et al., who trained bottle-nosed dolphins with two artificial languages: a language using arm gestures and an acoustic language using whistle-like sounds. Both artificial languages used referential symbols to denote objects, modifiers, and actions. Each language had its own set of grammatical rules for constructing sentences, which were sensitive to word order. For example, in the acoustic language taught to the dolphin Phoenix, a five-word sentence would take the form of {Modifier + Direct Object + Action + Modifier + Indirect Object}. The grammatical rules here were very consistent; the modifier precedes the object that is modified. Although much more structured than the language used by Pepperberg, these artificial languages were similarly simplified in excluding words that were unnecessary to the meaning of the sentence, e.g., prepositions and articles. However, I also consider differences in how the individual dolphin subjects were trained, due to different features of the two kinsd of artificial language used. Specifically, I consider the possibility that excessive formal consistency (in the acoustic language) hindered long-term retention.

12:00 – 12:30

Polina Petruhina (Lomonosov Moscow State University) - Between science and fiction: on the status of universal languages for interstellar messaging

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: The ideas of creating a language suitable for communication with extraterrestrial intelligence may sound like something out of science fiction. Yet the attempts to construct such a language have been made by recognized scientists, such as Hans Freudenthal [1] and Alexander Ollongren [3], who developed the first and the second versions of lincos (Lingua Cosma) respectively. The necessity of artificial language for communication with alien intelligent creatures has been discussed within interstellar message design projects of SETI (Searching for Extraterrestrial Intelligence) and METI (Messaging Extraterrestrial Intelligence) organizations [2]. However, while the participants of these discussions and the creators of interstellar communication languages are generally acknowledged as members of the scientific community, the status of this type of artificial language is unclear. Can lincos be considered as an object worthy of scientific attention? Should the development of such languages be called a scientific endeavor? This presentation will address these questions.

The major aim of this talk is to trace the history of interstellar message design from the perspective of its "scientificalization" (as a process of gaining respect and recognition as a scientific project and even a discipline, astrolingustics [3]) and the obstacles faced during this process. I examine the role of different understandings of communication and language in this process, as well as the role of the community as the corresponding "form of life" [4]. I will argue that the idea of universal language and inclusion or exclusion of philosophical and linguistic issues (e.g., the conceptions of N. Chomsky, W. V. Quine and L. Wittgenstein) has influenced the image of the interstellar design community: Can the discipline, elaborating on the problems of radical translation or the possibility of understanding alien "form of life", be considered truly scientific?

Two competing approaches to the format of interstellar communication can be distinguished. The first and most generally accepted one does not imply creating a special full-fledged artificial language or usage of any natural-like languages at all. SETI members have preferred to use images and symbols instead, pushing linguistics and philosophical issues out of their research field. However, some scientists are trying to revive the idea of artificial language design launching thematical workshops and symposia (such as Language in the Cosmos by METI). Here the problem of intellectual labor division and distribution arises: Is there is a place for linguists and even philosophers of language in the exploration of deep space? Perhaps the idea of an artificial universal language could be their ticket to this research community.

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4. Wittgenstein, L. (1953). Philosophical Investigations. Macmillan, New York.

ROOM 06

(NOMOS)
Symposium: Laws and Powers in the Metaphysics of Science

Chair: Psillos, Stathis

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: NoMoS "Laws and Powers in the Metaphysics of Science" focuses on a central issue in metaphysics of science; the source of natural necessity in the world. It examines a novel solution to this problem; namely a dualist model according to which both laws and causal powers ground natural necessity by playing discrete and indispensable roles in specifying the nomological structure of the world. NoMoS offers support and develops the central features of this model that stands in contrast to the dominant monistic views that take only governing laws or powers as the fundamental category. The talks will investigate the dualist model from a methodological, historical, conceptual and scientific perspective, complementing each other to offer a holistic understanding of the relationship between laws and powers.

The first talk 'Natural Necessity De-Ockhamised: a Leibnizian Account' develops the main thesis of the dualist model, i.e. that the sources of natural necessity are both laws and powers. It reviews various arguments against the monistic views, revisits the argument of a key precursor of dualism, viz., Leibniz, and updates it in order to argue that a relatively thin conception of powers is enough to ground the nomic relatability of worldly things.

The second talk 'Powerful qualities and the Dualist Model of Laws and Powers' examines the metaphysics of dualism, by investigating the nature of properties within the context of the dualist model. It defends a novel version of the Powerful Qualities View according to which properties are dispositional because they have the ultra-light power to be nomically governable, and categorical/qualitative because they need robust, governing laws to determine their nomic role.

The third talk 'Ceteris Paribus: The Role of Powers within a Web of Laws' focuses on the problem of ceteris paribus laws in the context of the dualist model. It critically discusses two recent attempts to deal with the problem of ceteris paribus laws by drawing on early modern views about laws, and examines the prospects of reconciling the web of laws metaphor with powers for solving the problem of ceteris paribus laws.

The fourth talk 'Laws and Powers in Descartes' examines the relationship between laws and powers in the thought of René Descartes, and defends a realist solution to what is known as the 'problem of force' in Cartesian physics, i.e. the problem of how to understand the ontological status of forces in Descartes's Principia. It shows that a dualist model of the metaphysics of Cartesian physics looks very promising.

The fifth talk "Laws and Powers in light of the wavefunction" examines whether a unified account of laws and powers can offer a better understanding of the wave-function in the context of nonrelativistic quantum mechanics.

The last talk "The periodic table as law(s) of nature" examines whether the periodic table represents laws of nature. It argues that the periodic table is a representation of multiple laws of nature. It supports this by showing how standard features of laws, apply to the law-like statements that are embedded in the table.

Speakers:
1) Stathis Psillos: Natural Necessity De-Ockhamised: a Leibnizian account
2) Vassilis Livanios: Powerful Qualities and the Dualist Model of Laws and Powers
3) Konstantina Antiochou: Ceteris Paribus: The role of powers within a web of laws
4) Stavros Ioannidis: Laws and Powers in Descartes
5) Maria Panagiotatou: Laws and powers in light of the wave function

11:30 – 12:00

Stathis Psillos (University of Athens) - Natural Necessity De-Ockhamised: a Leibnizian account.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: The main thesis of this paper is this: the sources of natural necessity are both laws and powers. This dualist model was first presented by Ioannidis, Livanios and Psillos (ILP) in a paper published in EJPS in 2021, and promises to overcome the problems faced by monistic accounts, i.e., accounts of natural necessity which posit either laws or powers. Monism has been the dominant approach view and it comes in two broad forms: one is based on laws, claiming that natural necessity is nomological necessity, while the other is based on causal powers, claiming that natural necessity is a function of the powers particulars have to act and be acted upon.

We can call the former view Lawful Powerlessness (LP) and the latter Powerful Lawlessness (PL). The two most prominent LP views are structuralism and primitivism, while of PL is dispositionalism.

The paper is structured as follows: There are four sections.

In section 1, some of the arguments against monistic views will be reviewed. Against PL it will be argued that an exclusively power-based ontology cannot account for laws of conservation and symmetry principles and that it cannot account for the quantitative-mathematical form of laws. Against LP, it will be argued that it cannot solve the 'governing problem', viz. the problem of how properties in general are nomically relatable. And more specifically: the problem of why specific properties (and not others) related by a nomic relation. It will be suggested that all of these problems are overcome if we adopt a dualist ontology, viz., laws and powers.

In section 2, we will revisit the argument of a key precursor of dualism, viz., Leibniz. He had an account of the metaphysics of science in which laws (holding with natural and not metaphysical necessity) are required for the intelligibility of the world and (active) powers are required for the laws to be 'executable' by worldly things. This argument is based on Leibniz God-governed universe; and yet it can be dissociated from this, along the following lines: laws follow from basic (primitive) symmetries that obtain in the universe but some conception of powers is needed to explain why and how things 'obey' laws.

In section 3, Leibniz's argument will be updated, along the lines just mentioned, explaining how a relatively thin conception of powers is enough to ground the nomic relatability of worldly things but that laws are also necessary to account for the overall structure of the world as well as for the existence of specific relations among worldly things. The new dualist approach will be briefly examined in the light of a well-known case, viz., Maxwell's laws.

Finally, in section 4, the key methodological problem of the apparent uneconomical (de-ockhamised) character of dualism will be addressed. It will be argued that the application of Ockham's razor in metaphysics should be taken to be a function of the explanatory power of the thesis to which it is supposed to apply relative to the problems that need to be explained.

12:00 – 12:30

Vassilis Livanios (University of Cyprus) - Powerful Qualities and the Dualist Model of Laws and Powers.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: The bulk of the literature concerning the governing role of laws has been concentrated on the Inference Problem, that is, the alleged incapability of second-order atomic nomic facts to determine the regularities in the behaviour of actual objects. Most recently (2021), Ioannidis, Livanios

and Psillos (ILP, for short) have argued that governing laws determine the behaviour of objects only through their properties and any adequate solution to the Inference Problem presupposes an answer to the following question: how nomic relations manage to determine the 'behaviour' of their properties-relata? The associated metaphysical problem is what ILP dub the Governing Problem. ILP propose a Dualist Model (DM) as a solution to the Governing Problem: relata-specific nomic relations and properties with thin powers are individually necessary but only jointly sufficient in order to have an adequate metaphysical explanation of the actual behaviour and dispositions of objects. DM, as ILP themselves acknowledge, needs further elaboration because it leaves some crucial questions unanswered. One of these questions concerns the grade of modal strength of nomically governed properties. In this talk I will take it for granted that the most plausible version of DM accords to properties the ultra-light power of nomic governability in general and, given that, I will focus on the question regarding the nature of properties that have the ultra-light power. I will first argue that the only extant metaphysical view about the nature of properties which is associated with dispositional/categorical debate and is compatible with the ultra-light-power version of DM is the Powerful Qualities View (PQV); that is, the view according to which properties are (in a sense depending on the particular version of PQV) both dispositional and categorical. Then, I will defend Powerful Categoricalism, a novel version of PQV according to which properties are dispositional because they have the ultra-light power to be nomically governable, and categorical/qualitative because they need metaphysically robust, governing laws to 'tell' them what to do. Finally, the question whether Powerful Categoricalism is compatible with the most popular version of PQV (i.e., the so-called Identity Theory) will be answered in the negative.

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12:30 – 13:00

Konstantina Antiochou (University of Athens) - Ceteris Paribus: The role of powers within a web of laws.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: The fact that the laws of fundamental physics (may) hold under ceteris paribus (CP) conditions raises a series of questions mainly regarding the meaning and testability of these laws. It questions the validity of scientific reasoning and at the same time it challenges a widely accepted view, according to which the generalizations in physical science differ from those of social sciences in two important aspects; (a) unlike the social sciences, the physical sciences do not tolerate exceptions, and therefore (b) the application field of the generalizations in physics can be more accurately characterized.

Philosophers of science have traditionally attempted to handle these problems either by specifying the content of CP-laws (Cartwright 1989) or by invoking their actual (and/or potential) functions in science (Lange 2002). More recently, Andreas Hüttemann (2021) argued for a dispositional account of CP-laws, which is largely based on his reading of Descartes, while in his (2022) Walter Ott claims that the moderns have an alternative response to the problem of CP- clauses, which is related to their view of laws as a web. While then both are inspired by the moderns, for Hüttemann both the semantic and the confirmational problem for CP- laws can be solved by assuming that law statements attribute special kinds of dispositional properties, whereas Ott argues that the laws function as a web to produce predictions or explanations and, therefore, any apparent exception to a law can be due to (and covered by) the others.

The aim of this paper is twofold. It first presents and critically discusses these two accounts, with the aim to see if and how they can be used to deal with the problem of CP-clauses, while in a second part it discusses the question of realism that arises within them and the possibility of reconciling the web metaphor with a true account of the physical world. It argues that in the web of laws approach, as it is conceived by Ott, a CP-law is nothing but a lazy law, to use the terminology of Earman and Roberts (1999), that is an abbreviation for a more complex law, which could make it explicit what conditions it presupposes. A philosophically interesting sense of CP could arises for realism and within a dualist model, as it is argued, that is a model which combines laws and powers. It remains to be seen if such a model offers a way out of the problems surrounding CP-laws too.

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ROOM 07

11:00 – 11:30

Daniel Shussett (Villanova University) - "Pollutants" and Boyd's Natural Kind Theory.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: This paper will examine if the term "pollutants" in environmental science literature and climate science literature (among other fields) constitutes a natural kind in accordance with Richard Boyd's (1999) theory of natural kinds and homeostatic property clusters. While "pollutants" in various disciplinary matrices appears prima facie to be both a paradigmatic natural kind and a Boydian natural kind, the terms included in "pollutants" are in fact better understood as members of other natural kinds. "Pollutants" is too varied a term, with too little consensus in its defining fields, to

constitute a Boydian natural kind. Thus, there is either a need to adjust Boyd's theory or a need to further clarify the boundaries of the term "pollutants" as is currently in use.

The argument will begin with a general introduction to "pollutants" and Boyd's natural kind theory. Following this, we will examine two case studies relating to the classification of pollutants. The first case study, focusing on work by Kelly and Fussell (2012) is about air pollution, specifically particulate matter (PM). The second case study, by Hartmann et. al. (2019), seeks to establish a categorization framework for microplastics. Using these two case studies, an argument will be made that "pollutants," as currently in use in environmental science literature, is not a Boydian natural kind term. First, Boydian natural kinds must be defined by properties that tend toward each other. Second, Boydian natural kinds must be epistemically useful for inductive inferences. Third, Boydian natural kinds must be consensus-based within their relevant disciplinary matrices. This paper is largely agnostic about the first stipulation, but rejects that "pollutants" does sufficient epistemic work for the second and third stipulations. Therefore, "pollutants" is not a Boydian natural kind term.

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11:30 – 12:00

Jorge Alberto Manero Orozco (UNAM's Institute for Philosophical Research) - The two problematic facets of implementing superselection rules.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: The mathematical reformulation of a physical theory initially formulated in a different mathematical language may have important implications. Considering that we are uncertain about which is the most appropriate reformulation, let us focus on two possible scenarios:

Firstly, the new formulation may be incapable of describing all physical states allowed by the old formulation, so that some external readjustments introduced by hand are needed. The form of these readjustments depends on the nature of the physical states that cannot be described by the new formulation: if they are empirically meaningful, auxiliary terms are incorporated into this formulation to make the theory empirically adequate; and if they are empirically meaningless, these states are forbidden to get rid of inconsistencies.

Secondly, the new formulation may introduce additional mathematical structure to describe all physical states allowed by the old formulation, irrespective of whether or not they are empirically meaningful.

When choosing between both scenarios, some prefer the first one because they think that, for sake of simplicity, additional structure should be avoided (e.g., North, 2009, JP, 106, 57-88), whereas others prefer the second one because, for sake of naturalness, the new formulation should not introduce external readjustments (e.g., Curiel, 2014, BJPS, 65, 269-321).

Interestingly, this situation is similar when physicists are uncertain about implementing superselection rules when reformulating their theories in terms of group theory (Weinberg, 1995, CUP). The first scenario happens when a theory is reformulated in terms of a group structure A that cannot consistently describe superpositions of states of certain observables. Since, according to the creators of A, these states are empirically meaningless, superselection rules are implemented to forbid them. The second scenario happens when the same theory is reformulated in terms of a group structure B that can consistently describe those superpositions. Since, according to the creators of B, these states are also empirically meaningless, they are described by surplus mathematical structure without implementing superspection rules. Thus, we have to decide between implementing superselection rules and forbid superpositions of states of certain observables or introducing surplus mathematical structure without implementing superselection rules.

In this talk, I will support the claim that the implementation of these rules involves heuristic and epistemological facets, the two of which give rise to undesirable philosophical consequences. Firstly, the heuristic facets of implementing superselection rules involve a constrain on theory development by virtue of the fact that superselection rules remove surplus structure that might be physically fruitful for further developments. Secondly, the corresponding epistemological facets involve a stronger form of underdetermination, as there is less underdetermination of the formulation by the theory when superselection rules are excluded and the formulation is modified.

Considering this argument, one may imply that the heuristic facets are problematic for antirealists, whereas the epistemological facets are for realists. I shall conclude that the implementation of superselection rules should be rejected and that, in certain circumstances, the formulation of a theory should be modified, irrespective of the position endorsed with respect to the realist-antirealist debate.

12:00 – 12:30

Diana Taschetto (University of São Paulo), Ricardo Correa da Silva (University of Erlangen-Nuremberg) - The Origin and Nature of the Quantization Rules.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Quantum descriptions of a physical system are generally constructed from their classical counterparts by a procedure called “quantization”. It is almost ubiquitously taken for granted in the literature that this was how quantum mechanics was in fact construed: Heisenberg, Born and Jordan “guessed” the commutation relations [p,q]= -iħ; Schrödinger, then, to attain equivalence with their theory, set p → -iħ ∂/∂x and q → Q, and the matter was clarified by Dirac, who noted the classical

analogy and therewith proposed the prescription: to quantize, replace functions f by an operator F so that Poisson brackets are mapped onto commutators: [F, G]= -iℏ{f,g}. That this prescription does not work is however a well-known fact in mathematical physics; many no-go theorems testify to Edward Nelson's famous remark, "first quantization is a mystery." The mystery, however, turns out to be due to historical oversight. In this talk, we shall demystify the nature of the quantization rules by tracing them back to their origin in Hamilton's action principle via Schrödinger's Wave Mechanics. We shall also give this story a special twist, by showing how the origin of the quantization rules is mathematically related to the measurement problem in the foundations of quantum mechanics.

12:30 – 13:00

Yichen Luo (University of Western Ontario), Niels Linnemann (University of Geneva), Christopher Smeenk (University of Western Ontario) - How on earth can we model black holes? A case study on modeling inaccessible systems in physics.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: The question of how physical theories are constructed is a fascinating one. But even once a theory is regarded as empirically adequate for certain models, one cannot but feel awe for how further models for that theory are set up, especially in regimes far away from empirical access, i.e. concerning systems that for all practical purposes are inaccessible. A particularly fascinating example of this lies in modeling black holes: how do we develop detailed models of objects that are not just galactically distant but also maximally opaque with respect to their interior?
The concrete question we would like to take up in this talk is how exactly one can use general relativity and its wider mathematical framework to analytically model black holes. Focusing on the classical-analytic modeling of black holes is a sensible beginning in an endeavour to understand black hole modeling more generally.

Concrete black hole models (e.g., the Schwarzschild solution) bring to the fore the distinct features of black holes including the central singularity and various horizons. As these models are derived under specific stationarity and symmetry assumptions, it was only thanks to Penrose and Hawking's singularity theorems that black hole spacetimes eventually got accepted as singular. In the first part of the talk, we show how the attempt to explicate what a singularity is beyond the context of the known solutions leads to a causal-topological take; we then argue how this causal-topological take in turn motivates theorems in the style of Hawking and Penrose. In particular, we work out that the concept of trapped surface plays a central role in fleshing out features familiar of concrete black hole models.

However, where do trapped surfaces come from, and under which circumstances do they form? More recent modeling work sets out to explain the dynamical formation of trapped surfaces (and thus ultimately of black holes too) as the result of physically-motivated initial states. Thereby, after its introduction as an auxiliary concept, the trapped surface gets a dynamical underpinning. How proposals for such initial states can be motivated via a mixture of physical intuition and bound manipulation techniques, is the focus of the second part of our talk.

This study on black hole modeling illustrates how theory construction in physics can proceed systematically thanks to the analysis and evolution of specific concepts (even in lack of empirical data): it is shown how it is the continuity between specific concepts which allows for the theoretical development of one out of the other rather than generic heuristics. Our work in a sense also addresses a concern by Curiel (2019), that it is hard to agree on a unique definition of a black hole. At least in the classical modeling, one should stress less that there is no single concept to agree on to call a `black hole' but rather that different fruitful specific concepts are available that are inter-connected and together constitute what we mean by black holes.

Reference
Erik Curiel. The many definitions of a black hole. Nature Astronomy, 3(1):27–34, 2019.

ROOM 09

11:00 – 11:30

Natalya Kozlova (Moscow Pedagogical State University) - Metaphorical correlation as a cognitive mechanism: on the problem of sense-making.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: Understanding the self as an existentially 'non-static' system (Foucault) bearing with it 'the world as an accepted sense' (Husserl) makes it possible to rethink the connection between language, thinking and perception and thus open up new avenues in the study of cognition in science. Here, a problem assuming a special prominence is attaining the obviousness and veracity (a primary cohesion of experience) by possessing which cognising agents construct a reality. As is known, a prominent focus of research spanning various approaches to understanding the link between language, thinking and sense-making is the theory of metaphor. The central question my presentation will raise is whether metaphorical correlation (MC) can be seen as a mechanism of thinking that a cognising agent uses to create and transform scientific ideas.

The MC mechanism is defined as a process by which some characteristics of an object (those selected by thinking) interact and some others are suppressed, with a chance at later actualisation. In this presentation, I will consider put forward arguments in support of point of view that MC is a cognitive mechanism which marks the starting point of knowledge. I will consider Gustav Gerber`s theory of figurative origin of language, Hermann von Helmholtz's definition of perception as 'unconscious inference' and Immanuel Kant's assertion about the 'logical tact' lying 'in the obscurity of the mind'. I will try to show how metaphorical correlation is able to act as a mechanism of a sui generis intuitive logic, which paves the way for linguistic reality. From this point of view, metaphorical correlation is a mechanism of abstraction and conceptualisation that determines the angles of science knowledge. Finally, I will examine how and why this understanding of the MC mechanism may be promising for analysing the development of language of science, as well as ontology.

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11:30 – 12:00

Alice Roberts (University of Cambridge) - Questioning the Nativist "Essence" of Psychological Essentialism.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: In a famous series of experiments, Kiel (1989) presented children with a description of a scenario where a raccoon undergoes a surgery that causes it to look indistinguishable from a skunk. A majority of the children agreed that despite these skunk-like changes, the animal is still a raccoon. This is often interpreted as evidence for psychological essentialism: the view in social psychology that human thinkers infer that there is an intrinsic, unobservable property responsible for category membership which is impermeable to environmental and other external factors.

Some theorists make the further claim that psychological essentialism is an innate feature of human cognition (Gelman and Hirschfeild 1999; Rakoczy and Cacchione 2014; Salomon and Cimpian 2014; for a summary see Neufield 2022). I will refer to this view as "the nativist claim". The nativist claim takes there to be an essence to essentialising – not only are there people who sometimes use essences to reason about the world, but rather, using these essences is an innate human cognitive feature.

In this paper, I will propose a new reason to be sceptical of the nativist claim. I will argue that examining the history of essentialism about three significant concepts - species, disease and race - gives more plausibility to essentialism being a contingent feature of human cognition. This is because there is historical evidence of significant and sustained non-essentialist formulations of these three concepts. Furthermore, the species, disease and race concepts fall under the purview of folk biology, where psychological essentialism is supposed to be at its strongest (Gelman 1999). Therefore, if the nativist claim is tenuous when applied to these folk-biological concepts, it is even more likely to be tenuous elsewhere. Previous critiques of the nativist claim have pointed to cross-cultural variation in psychological essentialism (Olivola and Machery, 2014), but a cross-historical critique has not been put forward yet.

I will suggest that this historical evidence better supports the claim that psychological essentialism is a historically contingent heuristic than the claim that it is an innate feature of human cognitive architecture. I will conclude by saying why the non-nativist view could be fruitful for researchers who study psychological essentialism to take more seriously.

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12:00 – 12:30

Alberto García-Hernández (Universidad Nacional Autónoma de México) - Self-Affirmation Theory and Structuralism: Motivating an Integrationist Approach to Social Injustice.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: How can we best combat persistent forms of social injustice? An answer to this question suggests that our primary focus in tackling injustice should be the implicit and explicit bias of

individuals [Blum 2002; Stanley 2015]. Some philosophers have criticized this view, arguing that systemic social ills derive not from individual attitudes but from underlying structural forces [Anderson 2010; Frye 1983; Dixon et al. 2012; Haslanger 2015, 2012; Táíwò 2017]. These critics are called structuralists. Structuralists endorse that social structures shape individual attitudes; unjust social structures promote discriminatory perceptions and thus create negative prejudices among individuals. Therefore, targeting personal psychologies without changing the social environment is an inefficient attempt at fighting injustices. In this paper, I challenge this assumption to incentivize the idea that both minds and social structures should be targeted equally in the fight against social injustice. Appealing to self-affirmation theory [Gilbert 2009; Mandelbaum 2019; Sherman & Cohen 2006; Steele 1988], I explain how we strive to defend the conceptions we have of ourselves. This means that we strive (typically not consciously) to defend the features we incorporate into our self-concept. I further explain that this affects how we respond to the evidence that threatens the doxastic or subdoxastic states that relate to our social identity: we attend to evidence that reinforces the beliefs we make regarding our social identity but ignore and resist contravening evidence. I argue that the structuralist's conception of the relation between mind and environment doesn't consider this tendency towards protecting one's self-conception. Given how we strive to protect cherished doxastic/subdoxastic states about our self-conception, the relation between minds and environment has a bidirectional character that the structuralist fails to capture: minds are not only shaped by the environment, but individuals and their psychologies can also shape the environment in which they exist. This suggests that a successful approach to fighting injustice has to acknowledge both, the individual psychologies, and the structures/institutions underlying persistent injustices.

12:30 – 13:00

Joan Camarena (University of Valencia) - Constraints and Invariants: from ecological psychology to biology and vice versa.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: One of the most important ontological commitments of ecological psychology is the idea of the mutualism of the organism and the environment: mutualism is not mere interaction or coupling between two separate systems, mutualism means that the organism and the environment co-define, co-regulate, co-determine and co-evolve mutually (Read &Szokolzky 2020). Now, how does this happen? My idea is that it happens thanks to the constraints and invariants. Thus, the main objective of this article is to offer a use of the notions of 'restriction' and 'invariant' that is broad and satisfactory enough because it can be applied both in biology and in cognitive sciences in light of the ontological and epistemology of organism-environment mutualism.

To achieve this goal, the outline of the article will be as follows. In the first place, it will be systematically exposed how the notion of organism-environment mutualism of ecological psychology is understood (Read &Szokolzky 2020) and how this ontological assumption makes it possible for the organism to directly perceive structured and specified ecological information in the environment, that is, ecological invariants (Reed and Jones 1982). Second, how the notion of 'constraint' has been specified since the work of Barwise and Perry (1983) and how this notion can be incorporated into the debate about whether one can speak of the existence of laws in biology (Andersen 2011) through the idea of understanding biological regularities as nomic constraints. Third, it will show how the notion of ecological invariant can be considered as a biological nomic constraint. Fourthly, it will show how invariants and constraints are accommodated within a process ontology (Nicholson & Dupré 2018) that confronts the explanatory model of the new mechanists in cognitive science (Piccinini 2020).

The advantages of offering an explanatory framework based on constraints and invariants both in biology and in cognitive sciences would be the following: first, the model based on structural

invariants of the environment could provide an answer to the problems that arise when talking about "biological laws". Secondly, the invariants would also respond to the problems that appear when we talk about "biological mechanisms". Thirdly, a constraints ontology that replaces the mechanistic one would offer a multiscale anti-reductionist explanatory model that overcomes the Component/Constitution separation created by the mechanists. And lastly, the notion of constraint better accommodates the processes in which the environment influences the organism and vice versa, in such a way that it would more strongly support the idea of mutualism.

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ROOM 10

(SULOMET) From previous time slot, same room.
Symposium: Substructural Logic and Metainferences

11:00 – 11:30
Bogdan Dicher (Universidade de Lisboa) - Two heterodox interpretations of substructurality.

Topic: A.2 Philosophical Logic

Abstract: The structural rules of Gentzen-style presentations of logics are generally interpreted as expressing properties of the consequence relation of those logics. Thus, e.g., a logic lacking Weakening in the antecedent is taken to have a non-monotonic consequence relation. A logic lacking Cut is taken to be non-transitive, etc. The same standard interpretation takes the structural rules to be prior to the logical constants. To the extent that the logical constants behave differently in structurally different logics this is to be explained as a consequence of the structural difference.

This orthodox stance has recently been challenged in two ways. [2] retains the notion that the structural rules stand for properties of the consequence relation, but challenges their conceptual priority. Indeed, he argues that the structural properties of a logic are grounded in properties of the logical constants:

It is common to think that premise combination (...) is different from and indeed prior to conjunction, in the sense that the logical properties of premise combination are constituted independently of those of conjunction and indeed help to constitute those of conjunction (. . .). [Q]uite to the contrary,(. . .), it is conjunction that is prior to premise combination (in fact, premise combination consists in a certain kind of conjunction). (s511)

In this paper I will first argue that Zardini's arguments in favour of this reocnceptualisation are unsuccessful.

However, this is not an argument in favour of the traditional interpretation. Drawing on the recent advancement of the study of metainferences, I will argue in favour of a different account of the substructural rules., starting from the view of consequence as metainferentially determined sketched in [1]. On this account, structural rules codify properties of the basic materials of reasoning: sentences, propositions, information-tokens, assertions/denials etc. For example, on this hypothesis, the structural rule of Contraction (which states, roughly, that the number of occurrences of the same premise does not matter) codifies the property that the basic materials of reasoning one is employing do not admit of different tokens of the same type. Such a property would indeed seem to be enjoyed by propositions, so that the structural rule of Contraction would be acceptable when reasoning with propositions (but not, say, when reasoning with information- tokens). Moreover, on this hypothesis, the basic materials of reasoning always occur already embedded in networks of inferential relations: while structural rules therefore codify properties pertaining to the configuration of those relations within a single network, logical consequence itself is a relation among different networks, and so it operates at a different level from that of structural rules.

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11:30 – 12:00

Agustina Borzi (IIF-SADAF-CONICET, Department of Philosophy (UBA)), Camillo Fiore (IIF-SADAF-CONICET, Department of Philosophy (UBA)) - Conjoining, Disjoining, and Bunching Formulae in Weak Kleene Logics.

Topic: A.2 Philosophical Logic

Abstract: In multiple-premise and multiple-conclusion settings, a metalinguistic comma ',' is used for bunching formulae together inside sequents. On most logical systems, the comma on the premise side matches the behavior of the object language conjunction, and on the conclusion side matches that of the disjunction.

This is not the case of Paraconsistent Weak Kleene (PWK) or paracomplete Weak Kleene (WK3) logics (WK logics for short) (Ciuni & Carrara 2016). These are three-valued systems in which the non-classical truth-value behaves in an "infectious" way, i.e. as an absorbing or zero element for all the operations (Kleene 1952).

The third value is designated in PWK, but not so in WK3. Simplification ($\phi \wedge \psi \Rightarrow \phi$) is not valid in PWK, whereas $\phi, \psi \Rightarrow \phi$ is. And dually, $\phi \Rightarrow \phi, \psi$ is valid in WK3 while addition ($\phi \Rightarrow \phi \vee \psi$) isn't. This fact shows that the metalinguistic comma alluded earlier doesn't behave as the expected binary associative connective featured in the language (Bonzio & Pra Baldi 2016). This suggests that there are two distinct ways of conjoining (disjoining) formulae in WK logics: one can either use conjunction (disjunction) or the comma to gather premises (conclusions) together in PWK (WK3), resulting in a different set of validities in each case.

The main objective of this talk is to restore the equivalence of the metalinguistic comma to that of the operations available in the language:

$\gamma 0, \ldots, \gamma n \Rightarrow \delta 0, \ldots, \delta m$ iff $\gamma 0 \wedge \ldots \wedge \gamma n \Rightarrow \delta 0 \vee \ldots \vee \delta m$

We present two different ways to accomplish that goal: first, we explore logics in which formulas are bunched together in accordance with the WK connectives, and secondly, we study

systems where it is made explicit (at the language level) the different ways of conjoining and disjoining available in WK logics.

In the first case, we define two logical systems, which we will call uPWK and uWK3 (for 'uniform WK logics'). These are proper subsystems of PWK and WK3 correspondingly, and both are substructural: Left Weakening fails in uPWK, as does Right Weakening in uWK3. In the second case, we define two extensions of PWK and WK3, which are the result of adding to the vocabulary new connectives (whose semantics are given by non-deterministic matrices) that mimic the structural behaviour of the comma. Since in this case the behaviour of the comma is 'internalized', we decided to name the resulting logics iPWK and iWK3.

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12:00 – 12:30

Pablo Cobreros (University of Navarra) - Metainferences in Strong Kleene.

Topic: A.2 Philosophical Logic

Abstract: The notion of metainference and of metainferential validity gained popularity in the discussion in Philosophical Logic in the last decade in connection to the study of Strong Kleene logics. There are, however, different ways in which we can understand these notions and it is still controversial which one, if any, is the right one.

In this talk we discuss and compare the (so-called) local and global notions of metainferential validity. The local notion won the dispute in practice: most philosophers working on metainferences, stick to the local notion. In the talk we argue that, contrary to the majority opinion, it is the global notion – once properly understood – the proper way to understand metainferential validity.

The discussion also shows how to adapt semantic tableaux, aka. analytic trees, in order to deal with local and global validity both at the inferential and metainferential level.

12:30 – 13:00

Peter Verdee (UCLouvain) - Core Logic as a substructural logic: sequent calculus and closure frames.

Topic: A.2 Philosophical Logic

Abstract: In the paper we present a way to see Tennant's intuitionistic relevant logic called Core Logic as a mainstream substructural logic, building on our previous work on non-transitive relevance. The logic is interesting because, while it is in some sense relevant, one could claim that it enables all intuitionistic inference, because its closure under Weakening results in full intuitionistic logic. It is natural to see this logic as missing some straightforward classical structural rules, given that its consequence relation is non-transitive and non-monotonic. However, surprisingly little work has been done to include it in or compare it to the well-studied family of substructural logics (which include

most of the other relevant logics on the market). My goal in this paper to do exactly that: present Core Logic as a full (albeit a bit awkward) member of the substructural logic family. The advantage is that we are able to better study this rather special logic with the general tools available in the literature and that we can expand it with a relevant object-language conditional that corresponds to the relevant consequence relation, thus transforming it into a full relevant logic in the more ordinary sense of the word.

We will show that a rather natural multiset-multiset sequent calculus can be defined for Core Logic, with Left and Right Contraction and Identity, but lacking the Cut rule, Mingle, and Left and Right Weakening. It may come as a surprise that an intuitionistic logic can be defined by means of a multiple-conclusion calculus (with contraction moreover) and we will explain that this does not lead to collapse into Classical (Core) Logic, because of the non-classical behaviour of the paracomplete negation and of the material conditional.

I will moreover show that an adequate (non-distributive) Closure Frame semantics (as presented by Restall in his introduction to substructural logic) can be given for this logic. This is rather unexpected given the fact that Distribution (of disjunction and conjunction) is valid in Core Logic. We will explain that this is a result of the asymmetric treatment of premises and conclusions and of disjunction and conjunction: disjunctions are intensional *qua premises* and extensional *qua conclusions* and conjunctions are intensional *qua conclusions* and extensional *qua premises*.

Finally I will say a few words on a philosophical interpretation of the difference in meaning of sentences depending on the inferential role they play (as premise or as conclusion), by adding to the traditional intuitionistic BHK-interpretation of seeing truth as *constructability* (fits well with conclusive inferential roles) a notion of truth as *being given/established* (fits well with hypothetical inferential roles.

Symposium continues in the same room, next time slot.

ROOM 11

(HAPOC) Continues from same room, previous time slot.

Symposium: Understanding and defining algorithms: from fundamental issues to new challenges

11:00 – 11:30

Gregory Chaitin (University of Buenos Aires) - Defining "Algorithm" in Algorithmic Information Theory.

Topic: C.6 Philosophy of Computing and Computation

Abstract: In order to be able to develop a theory of the information
content of algorithms, one has to face the question of which precise definition of algorithm one adopts, that is to say, of the programming language that is taken as the standard for measuring program size. We will briefly review the differing proposals that have been made and their advantages and disadvantages, starting with Leibniz and Hermann Weyl.

11:30 – 12:00

Santiago Figueira (Universidad de Buenos Aires & ICC UBA/CONICET Argentina) - Algorithms as a Language of Thought.

Topic: C.6 Philosophy of Computing and Computation

Abstract: In the last two decades, different techniques to reverse engineer the human brain have successfully inspired artificial intelligence algorithms. Recent advances in deep learning have achieved remarkable results in many domains such as visual object recognition, speech recognition and automated translation. However, although learning from sparse data is a common ability of the human mind, current machine learning techniques have not been able to mimic such ability with the same success.

Previous computational cognitive research has proposed the idea that the ubiquitous ability of the human to make predictions from sparse data can be represented by models of probabilistic inference over symbolically structured representation spaces. These proposals are revamping Jerry Fodor's hypothesis which states that thinking takes form in a sort of mental "Language of Thought" composed of a limited set of atomic symbols that can be combined to form more complex structures following combinatorial rules.

These combinatorial rules are realized as expressions of a formal grammar together with formal semantics. In the most general case, this ensemble formed by the grammar and the semantics can be understood as an 'algorithmic language', a given expression of the grammar as an 'algorithm', and the output of such an algorithm as a 'concept'. This clear distinction between a description language (the grammar) and the concept it describes (its semantics) leads to the notion of minimum description length or MDL, following the ideas of algorithmic complexity in the areas of logic and computability. The MDL of a given concept C is defined as the length of the shortest description of C. Namely, among all algorithms describing C, we take the length of the shortest one.

The MDL has shown to be a useful tool| when trying to measure the subjective complexity of a concept C —that is, the capacity of a human to learn or understand C. Of course, there is no universal algorithmic language: for each particular cognitive task one proposes and studies a reasonable algorithmic language. For Boolean valuations, propositional logic could be reasonable; for strings of symbols, perhaps a language that can compress repetitions or recognizable patterns would be suitable.

We do not claim that the human brain actually interprets an algorithmic language in the same manner a computer interprets a program, but we do believe that the subjective complexity is correlated to the MDL. Hence, ideas and concepts from algorithmic information theory have something to say in the distant area of human concept learning.

In this talk I will show recent results on the design and evaluation of different Language of Thought models to explain human learning from sparse data in various domains: binary linear sequences, geometric sequences, and logical concepts. In our models we assume that the Language of Thought acts as a programming language capable of generating programs to model concepts in the world, and we explain learning as a process of probabilistic inference over these programs or with a minimum length of description approach based on the notions of algorithmic complexity.

12 :00 – 12 :30

Philippos Papayannopoulos (Université Paris 1 Panthéon-Sorbonne, IHPST), Alberto Naibo (Université Paris 1 Panthéon-Sorbonne, IHPST) – Roundtable

Topic: C.6 Philosophy of Computing and Computation

Abstract: Roundtable of the symposium

ROOM 12

(MMK) Continues from same room, previous time slot.
Symposium: Mathematics, Modality and Knowledge Symposium

11:00 – 11:30
Mario Gomez-Torrente (Instituto de Investigaciones Filosoficas, UNAM) - Identifying the Numbers through their Essence.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: In earlier work I have argued that there are many indications that the natural numbers as ordinarily conceived are probably to be identified with the corresponding plural cardinality properties. Among those indications I have listed some intuitions about essential features of the numbers. In this talk I will seek to offer a tighter argument for the same conclusion, again from intuitive premises some of which describe aspects of the intuitive essence of numbers. One key premise is what we might call the idea of "intrinsicness": a bunch of individual objects has the number it has intrinsically, i.e. independently of the relations of the bunch or the individual objects in it to other objects. (This is manifested in dispositions to say things like "It's just not true that if Julius Caesar had not existed, the number of these stones would not have existed or would not have been the same".) Intrinsicness plausibly implies that the numbers cannot be individuals, and hence presumably that they must be properties. Another premise is what we might call "pluralitiness": numbers are numbers of pluralities, not of sets or concepts. (Manifested in dispositions to say things like "The number of coins in my pocket is not too large". Contrast e.g. with: "The number of the concept of coin in my pocket is not too large".) Pluralitiness together with intrinsicness plausibly imply that numbers must be plural properties. Another key premise is what we might call "essential possessability": the number n (noun) has as a part of its essence the property of being had by (being of) arbitrary pluralities of n (adjective) things, in the sense that it's part of what it is to be n to be had by arbitrary pluralities of n things. (By contrast, it's not part of what it is to be Zermelo-n to bear any relationship to arbitrary pluralities of n things. And it's not part of what it is to be the (structuralist) nth position in the omega-structure (viewed as the relation between a thing in the nth place in a progression and that progression) to bear any relationship to arbitrary pluralities of n things. Etc.) Essential possessability together with pluralitiness and intrinsicness plausibly imply that numbers must be plural cardinality properties. Furthermore, additional intuitive premises about de re attitudes toward numbers suggest that only non-descriptive or "pure" plural cardinality properties could be the numbers. I conclude that all these premises eliminate all relevant sorts of initially perceived indeterminacy and lead to an identification of the numbers with such properties. I will end with a brief consideration of the anti-nominalist and, especially, anti-structuralist implications of my argument. Against structuralism, it will be emphasized that the fact that a science (arithmetic, physics, psychology, etc.) does not contain statements about the ultimate nature of its subject matter does not imply that this subject matter must be purely structural.

11:30 – 12:00
Otavio Bueno (University of Miami) - Mathematics' Modal Content.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: On the surface, mathematical discourse and mathematical objects and structures may be thought as not being modal at all. Mathematical language is purely extensional, and the corresponding objects and structures, on the usual interpretation, are all abstract. How could mathematics possibly have any modal content?

In this paper, I argue that appearances are deceptive, and that modality is integral to the very content of mathematics. Modality emerges in different ways. First, as opposed to the standard model-theory approach, the very concept of logical consequence, crucial to mathematical practice, is modal in nature: in a valid argument, the conjunction of the premises and the negation of the conclusion is not possible. Second, theorems, being deductively derived from principles and assumptions regarding the relevant mathematical objects and structures, encode possibilities: what can or cannot obtain, given the principles, assumptions, and the underlying logic. Third, the fact that the mathematical content of a result changes substantially with a change in logic, as is clear when classical and constructive mathematics are compared, is the reflection of a modal variation: what is possible or not, given the logic under consideration. Finally, the application of mathematics crucially relies on the modal content of mathematics, highlighting the possibilities or impossibilities of certain empirical situations, properly interpreted. I will examine and defend each of these points, thus highlighting mathematics' integral modal content.

12:00 – 12:30

Catarina Dutilh Novaes (Vrije Universiteit Amsterdam) - A Dialogical Account of Proofs in Mathematical Practice.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: In The Dialogical Roots of Deduction (CUP, 2020), I presented a dialogical account of deductive reasoning, drawing on findings from philosophy, history, psychology and cognitive science, and mathematical practice. According to this account, deductive arguments can be viewed as corresponding to dialogues between two (fictive) characters, Prover and Skeptic. Prover seeks to prove that the conclusion follows deductively from the premises, while Skeptic examines each step in the argument critically to ensure that it is valid and sufficiently clear.

Prover begins by stating the conclusion to be proved, and then asks Skeptic to grant certain premises. Prover then proceeds to establish the conclusion in a step-wise way, by means of individually transparent inferential steps. Skeptic, in turn, has three main moves: he may come up with counterexamples (either global, related to the whole proof, or local, pertaining to specific inferential steps); he may ask for further clarifications about inferential steps that are not sufficiently evident; and he grants or denies premises for the dialogue to start. These dialogues are characterized by a certain amount of adversariality against a largely cooperative background. If both participants perform to the best of their abilities, then the common goal of producing a valid proof will be optimally achieved. The cooperative component is also illustrated by the fact that Prover seeks to assist Skeptic in truly understanding why the conclusion follows from the premises; by asking appropriate clarificatory questions, Skeptic may help Prover to formulate an explanatory proof.

It turns out that these two characters, Prover and Skeptic, are not only fictive: they can be viewed as embodied by real-life mathematicians. Indeed, the Prover-Skeptic dialogues offer a compelling description of actual practices of proof in mathematics, such as peer reviewing practices, the different levels of granularity in the presentation of proofs depending on the intended audience

(students, peer mathematicians etc.), and different forms of (adversarial) collaboration. In this talk, I present a dialogical account of proofs in mathematical practices following the Prover-Skeptic dialogues, including a detailed discussion of four case studies: the reception of Gödel's incompleteness results, Wiles' proof of Fermat's Last Theorem, a failed proof of the inconsistency of Peano Arithmetic by mathematician E. Nelson in 2011, and Mochizuki's (purported) proof of the ABC conjecture. These case studies exemplify the Prover-Skeptic interaction in real-life mathematics in different ways. Gödel's incompleteness results were surprising and initially were met with some skepticism; but because the proofs were presented in a very perspicuous way, all those who went through the details became immediately convinced. Wiles' proof of FLT and the purported proof of the inconsistency of PA are cases where mistakes were spotted by diligent Skeptics in the mathematical community. Finally, Mochizuki's purported proof of the ABC is an example of how the harmonious cooperation between Prover and Skeptics can sometimes break down: the proof remains impenetrable for the wide majority of the relevant experts.

12:30 – 13:00

Curtis Miller (University of Miami) - Mathematical Discourse and the Semantic Analysis of Achievement Verbs.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: The topic of this talk is on the semantic analysis of accomplishment verbs and mathematical discourse. Broadly speaking, the goal of offering a semantic analysis of verbs of accomplishment is to take sentences such as:
(1) Fred is proving a theorem.
and, in less controversial terms, state what the sentence says.

This talk argues that accomplishment verbs in mathematical discourse such as 'proving', present a unique difficulty for current views on accomplishment verbs. More specifically, this talk applies Ivan Mayerhofer's modal semantics and Zoltán Szabó's event-based semantics to ordinary sentences such as (1), in order to demonstrate that neither view offers a satisfactory analysis of verbs of accomplishment. The structure of this talk is as follows.

To begin, I outline the semantics offered by both Mayerhofer and Szabó while offering the general motivation behind their views. I then argue that when both views are applied to mathematical discourse, neither Szabó nor Mayerhofer can provide uncontroversial interpretations of sentences such as (1). The core issue is that both semantics, when applied to mathematical discourse, involve contentious assumptions regarding the metaphysical nature of mathematical objects and as such, fail in their intended goal to state sentences such as (1) in less controversial terms. Consequently, both accounts fail to provide an adequate semantic analysis of accomplishment verbs. In concluding, I argue that event-based semantics can be easily modified so to sidestep these issues whereas modal accounts are entirely unsalvageable.

Symposium continues in the same room, next time slot.

ROOM 13

(EAI)

Symposium: Ethics and Artificial Intelligence from fundamental issues to new challenges

Chairs: María Vanina Martínez and Diana Pérez

Topic: C.6 Philosophy of Computing and Computation

Abstract: Artificial intelligence (AI) driven by successes in machine learning now permeates virtually all areas of our daily lives to make or at least influence decisions. In areas that impact human life (such as agriculture, climate, forestry, and health), ethical and legal aspects such as transparency, fairness, and trust in such decisions are receiving increasing attention. As a result, hundreds of ethical frameworks have been published by organizations such as government agencies, large corporations, and academic institutions. Adopting these principles is widely seen as one of the best ways to ensure that AI does not cause unintended harm and is used safely and responsibly. However, due to the complexity of AI, it remains a challenge to implement ethical and legal frameworks for AI in practice. This Symposium wants to offer a space for presenting and discussing recent research on theories, tools, metrics, standards, and best practices for implementing technical, ethical, and legal frameworks for the safe and responsible use of AI.

This Symposium aims to discuss original theoretical and practical research on designing, developing, presenting, testing, and evaluating approaches for AI framework implementations supporting trust in AI, including cutting-edge theories, foundations, actionable tools, and impactful case studies of AI ethical framework implementations, supported by advanced AI techniques and interdisciplinary research–in particular, social science, law, and cognitive science.

On one hand, the goal is to foster interdisciplinary and transdisciplinary approaches and stimulate cross-domain integration of diverse disciplines. The approaches aim at making AI ethical principles operable in applications.

On the other hand, the symposium seeks to share experiences and delineate actions for promoting good practices for developing AI systems. We aim to look again at old and new questions about ethics & AI and re-examine some running practices.

11:00 – 11:30

Diana Pérez (IIF-SADAF/CONICET-UBA), Diego Lawler (IIF-SADAF/ CONICET), Tomás Balmaceda (UBA-IIF-SADAF/ CONICET), Karina Pedace (UBA-UNLAM-IIF-SADAF/CONICET) - Ethical concerns about AI systems: an innovative approach.

Topic: C.6 Philosophy of Computing and Computation

Abstract: The aim of this paper is to clarify the different dimensions in which AI systems can be ethically evaluated. Firstly, we will introduce a conceptual clarification about the notion of algorithm involved in these systems. We propose two ways of characterizing algorithms, which can be called “algorithm in the narrow sense” and “algorithm in the broad sense”. We argue that algorithms in the narrow sense are not subjects to ethical assessments, but algorithms in the broad sense actually are. Secondly, we identify, for the latter case, different spheres of activities that can be ethically evaluated: (1) human practices of designing, and (2) practices that comprise our interaction with AI systems once they are present in human societies.

Regarding (1), the distinction made about algorithms allows us to locate more adequately the ethical difficulties that these systems pose. In a narrow sense, an algorithm is a mathematical construct that is selected during the design of a system or technological artifact given its past effectiveness in solving tasks similar to those posed by similar problems than the one is now intended

to be solved. Examples of algorithms in the narrow sense are deep neural networks, Bayesian networks, Markov chains, the simple Perceptron model, etc.

In contrast, an algorithm in the broad sense is a tripartite technological system, comprising training data, a learning algorithm (the algorithm in the narrow sense), and a statistical model as its final output. This system is designed, assembled, and implemented for certain purposes, connected to the resolution of a previously formulated practical problem. The production of an algorithm in the broad sense passes through four key phases: (i) the characterization of both the problem to be solved and the solution sought; (ii) the design, formatting and edition of the data with which it is going to work; (iii) the selection of the algorithm in a narrow sense; and (iv) the training phase of the algorithm based on the available data, and the evaluation of the technological system until it is fine-tuned. Each of these phases could be the source of ethical concerns that the AI system shows once finished.

Regarding (2) we hold that, unlike what happens when we interact with other kind of artifacts designed by human beings, many AI systems are treated as "intentional systems" instead of being understood from the design stance (Dennett 1987). As long as we see AI systems as intelligent machines, we tend to understand what they do as if they were agents. We will argue that as long as we adopt a double stance while interacting and understanding these systems, additional ethical challenges -different from those generated by other artifacts- emerge.

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11:30 – 12:00

Fernando Schapachnik (Departamento de Computación, FCEyN, Universidad de Buenos Aires, Buenos Aires, Argentina) - AI: is time to think about labor.

Topic: C.6 Philosophy of Computing and Computation

Abstract: Advances in Artificial Intelligence do not cease to amaze us. In recent months, some applications have become public that have shown the capacity to generate digital artifacts that we believed were reserved exclusively for the creative capacity of human beings: digital art, music, computer programs, and all kinds of texts: contracts, poems, academic articles. A phrase quickly comes to mind: no one will keep its job. It would seem that no one is irreplaceable by a machine. Is it really so?

In this talk we will discuss the landscape that the advancement of AI presented for the world of labor until a few months ago, and the most recent changes. Under the premise of not renouncing the aspiration of a present and a future with jobs for everyone, we will also propose some axes to discuss so that this present and future can take place.

12:00 – 12:30

Nieves Montes (Artificial Intelligence Research Institute (IIIA-CSIC)) - Value Engineering for Autonomous Agents.

Topic: C.6 Philosophy of Computing and Computation

Abstract: "Value engineering" refers to the collection of design strategies, techniques and methods that can be leveraged to embed values into autonomous agents. Despite the substantial challenge, work on the engineering of values for autonomous software agents is incredibly timely, as modern

society evolves ever closer toward a massive multiagent system (MAS) inhabited by software agents with varying degrees of autonomy and their human users. If the interactions at the heart of this system are to respect the values that humans hold dear, it becomes mandatory to incorporate them during the development of autonomous software agents.

This talk presents an integrated approach to the problem of value engineering drawing upon literature in sociology, normative MAS, institutional analysis, game theory, psychology and the engineering of autonomous agents. Starting from Schwartz's Theory of Basic Human Values [Schwartz 1992], the notion of translating values in a particular context to motivational goals is adopted, where such goals act as proxies for the value in question and ground their semantics in the domain at hand.

We leverage Schwartz's theory to formulate a framework for the evaluation of value-aligned norms. In the MAS community, prescriptive norms are one of the most well-studied mechanisms to constraint or incentivize agent action and, subsequently, the outcomes that the system is able to achieve. When these final outcomes are respecting and abiding by a value (or set of values), we can state that the norms leading to them are aligned with respect to the value in question. Hence, by establishing a link of consequential nature between values and norms, we are able to formulate solutions for the optimization of norms with respect to the values that are considered relevant in an automated fashion.

However, one point that has often been overlooked in the autonomous agents literature is the profoundly social nature of values. According to Schwartz, values constitute a shared vocabulary to help humans articulate, cope and communicate their goals to others, in hopes of gaining their cooperation. Therefore, we argue for the role that Theory of Mind (the human cognitive ability to perceive and interpret others in terms of their mental states) should have in the design of value-abiding and socially-oriented autonomous agents. We propose a model of an autonomous agent that is not just capable of interpreting norms from their own perspective, but also from the perspective of others and in terms of their values. To achieve this functionality, agents are endowed with norm representation and interpretation capabilities, as well as with the ability to change their view of the world by that of a fellow agent. Essentially, this allows the building of empathetic agents who are better suited to operate in the massive MAS that our societies are heading towards.

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12:30 – 13:00

Vicent Costa (Artificial Intelligence Research Institute, CSIC (IIIA-CSIC)) - On integrating the humanities into XAI research and development.

Topic: C.6 Philosophy of Computing and Computation

Abstract: In this talk, we argue in favor of humanities integration into eXplainable Artificial Intelligence (XAI) research and development, present methodological proposals based on this integration, and discuss some of the current open problems in the XAI discipline for which integrating humanities becomes especially relevant.

First, we show that the constitutive relationship between artificial intelligence and the humanities, influencing each one and the other, is central to understanding and clarifying the theoretical framework of XAI, whose definitions and terminology still lack consensus [PMA21, HIM23] even the growing claiming of the discipline [WHE21, SPE22, MWF22]. In particular, we consider this relationship to study the foremost notion of explainability in XAI. Then, we discuss some of the

convergencies regarding their interests between XAI and humanities (related, among others, to ethical concerns and epistemic regards) and the importance of remarking on these common points for tackling some challenges of the discipline, especially those related to ethics, trust, and accountability. In this way, we also provide an example illustrating this. Finally, we focus on the open problem of standardizing procedures for evaluating explanations displayed by systems (e.g., [CBS22, FC21]), presenting and contextualizing it, and show how theories of explanation from humanities (mainly from philosophy) could help towards its solution (for instance, by picking up and elucidating traits of suitable explanations). We conclude the talk with final remarks and proposals for additional related future lines of research in XAI.

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[WHE21] T. Weber, H. Hußmann, M. Eiband (2021): Quantifying the Demand for Explainability. In: C. Ardito et al., Human-Computer Interaction – INTERACT 2021. Lecture Notes in Computer Science, Volume 12933, pp 652–661.

[HIM23] AKM B. Haque, A.K.M. N. Islam, P. Mikalef (2023): Explainable Artificial Intelligence (XAI) from a user perspective: A synthesis of prior literature and problematizing avenues for future research. Technological Forecasting and Social Change, Volume 186, Part A, 122120.

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[FC21] Z. Falomir, V. Costa (2021). On the Rationality of Explanations in Classification Algorithms. In: M. Villaret et al., Frontiers in Artificial Intelligence and Applications, Volume 339, pp 445–454.

Symposium continues in the same room, next time slot.

13:00 - 14:30 LUNCH

14:30 - 16:30

AUDITORIUM 2

(FE) Continues from the same room, previous time slot.

Special Symposium: What's New in Formal Epistemology?

14:30 – 15:00

Giacomo Molinari (University of Bristol) – What's New in Imprecise Credence? II

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: This talk will cover two new developments in imprecise Bayesianism: accuracy and the value of information. In the first half, we will introduce a new class of accuracy measures for imprecise credence. Imprecise credences are evaluable for what might be called 142eneralized type 1 and type 2 error. Generalised type 1 error is roughly a matter of the extent to which an imprecise credal state makes false judgments of desirability (i.e. recommends an action as better than the status quo when it is not). Generalised type 2 error is roughly a matter of the extent to which it fails to encode true judgments of desirability. Accuracy measures for imprecise credence are penalty functions that average these two types of error. We will show how to construct such accuracy measures and investigate their theoretical usefulness. In the second half, we will explore new results in the value of information. We like to think that rational agents value the evidence. This intuition can be captured by a well-known theorem, due to I.J. Good, which involves sequential decision-making. However, Good's theorem fails for agents with imprecise credences. This raises the worry that imprecise credences are not rationally admissible. We will argue that our intuition about the value of evidence is best captured in terms of deference, rather than sequential decision-making. Then we will introduce a deference principle for imprecise credences, and show that agents with imprecise credences value the evidence by deferring to it.

15:00 – 15:30

Jason Konek (University of Bristol) – What's New in Imprecise Credence? I

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: This talk will cover two new developments in imprecise Bayesianism: accuracy and the value of information. In the first half, we will introduce a new class of accuracy measures for imprecise credence. Imprecise credences are evaluable for what might be called 142eneralized type 1 and type 2 error. Generalised type 1 error is roughly a matter of the extent to which an imprecise credal state makes false judgments of desirability (i.e. recommends an action as better than the status quo when it is not). Generalised type 2 error is roughly a matter of the extent to which it fails to encode true judgments of desirability. Accuracy measures for imprecise credence are penalty functions that average these two types of error. We will show how to construct such accuracy measures and investigate their theoretical usefulness. In the second half, we will explore new results in the value of information. We like to think that rational agents value the evidence. This intuition can be captured by a well-known theorem, due to I.J. Good, which involves sequential decision-making. However, Good's theorem fails for agents with imprecise credences. This raises the worry that imprecise credences are not rationally admissible. We will argue that our intuition about the value of evidence is best captured in terms of deference, rather than sequential decision-making. Then we will introduce a deference principle for imprecise credences, and show that agents with imprecise credences value the evidence by deferring to it.

15:30 – 16:00

Francesca Zaffora Blando (Carnegie Mellon University) – What's New in Randomness? I

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: In this presentation, we pursue two goals. First, we develop a Bayesian perspective on algorithmic randomness: a branch of computability theory concerned with characterizing the notion

of a sequence displaying no effectively detectable patterns. Second, we argue that taking a Bayesian point of view on randomness leads to new insights for Bayesian epistemology—specifically, for two pillars of Bayesian epistemology: convergence to the truth and merging of opinions. In particular, adopting such a perspective reveals that, for computable Bayesian agents, the sequences of observations, or data streams, along which convergence to the truth and merging of opinions occur are uniformly characterizable in an informative way: they are the algorithmically random data streams.

16:00 – 16:30
Simon Huttegger (University of California, Irvine) – What's New in Randomness? II

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: In this presentation, we pursue two goals. First, we develop a Bayesian perspective on algorithmic randomness: a branch of computability theory concerned with characterizing the notion of a sequence displaying no effectively detectable patterns. Second, we argue that taking a Bayesian point of view on randomness leads to new insights for Bayesian epistemology—specifically, for two pillars of Bayesian epistemology: convergence to the truth and merging of opinions. In particular, adopting such a perspective reveals that, for computable Bayesian agents, the sequences of observations, or data streams, along which convergence to the truth and merging of opinions occur are uniformly characterizable in an informative way: they are the algorithmically random data streams.

ROOM 02

(BORA)
Symposium: Bounded Rationality: Polemics and Controversies

Chair: Alvarez, J. Francisco

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: In this four papers symposium we show some questions related with the broad field of bounded rationality. The consolidation of behavioral economics as an important trend in the main stream of economics can be seen as the result of a long series of conceptual debates and practical questions that seemed difficult to solve with the tools of neoclassical economics. A reading of these debates is proposed, from the perspective of bounded rationality, with specific attention to heuristics, biases, procedural rationality, the ecology of reasoning, informational limits, intentional maximization versus optimization. In general, based on the analysis of the act of choice and the difficulties faced by optimizing proposals, practical proposals such as nudges or other measures of social intervention are studied. Particular attention is paid to the history of controversies about the construction and adoption of human models that have tried to overcome the information restrictions derived from the standard model of rational decision making. It will also address the controversy that for more than thirty years has been maintained between currents that inherited the limited rationality initially proposed by Herbert Simon and that has had an impact on the mainstream of economics

science by influencing other currents such as experimental economics. The turn that has taken place in the philosophy of science, paying special attention to science and its practices, finds an important place of application and reflection in this area of the human models used in economics science and it shows the interest in addressing apparently simple but highly relevant methodological aspects such as the difference between optimal and maximal (as Amartya Sen has pointed out).

Speakers:
1) HERNANDEZ JOSAFAT: Towards a historically bounded rationality: Herbert A. Simon and his critique of the neoclassical notion of the rational agent
2) MELINA GASTELUM VARGAS: Behavioral settings and ecological reasonings
3) SERGIO MARTINEZ: Metaphors as dynamical doings support scientific understanding
4) FRANCISCO ALVAREZ: Controversies on the road to behavioral economics

14:30 – 15:00
Josafat Hernandez (UNAM) - Towards a historically bounded rationality: Herbert A. Simon and his critique of the neoclassical notion of the rational agent.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: The paper presents Herbert A. Simon's critique of the two basic assumptions of the neoclassical notion of agent: perfect rationality and self-interest. It shows how Simon critize both assumptions by recognizing that the cognitive capacities of agents are limited, showing that there are specific problems that do not have optimal solutions and that there are other motivations irreducible to self-interest such as loyalty and group identification that are fundamental for understanding the behavior of organizations. It is shown how Simon pointed towards a notion of rationality historically bounded by the interaction of the agent with its environment, which presents a complex and dynamic vision of human behavior. However, the article also shows the difficulties Simon had in achieving the full realization of this project by assuming an assumption of individualistic cognition that prevented him from giving a more substantive role to the environment in structuring agents´ behaviors.
It ends by showing how the notion of habits can give a more substantive role to the environment in order to develop a historically bounded conception of rationality.

15:00 – 15:30
Melina Gastelum Vargas (UNAM) - Behavioral settings and ecological reasonings.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: In this work we will use the paradigm of embodied cognition, mainly the principles of ecological psychology, to delve into understanding how the ecology of reasoning should consider interactions with the environment as a constitutive part of reasoning abilities. To do this, I will start from the idea of practice developed by Martínez and Huang (2015) and from the conception of reasoning developed from a situated approach (Fonseca 2020) to delve into and explain the way in which ecological reasoning occurs within practices that generate behavioral configurations (Barker & Wright 1951) or settings with particular relationships and interactions within that practice. I propose this ecological reasoning from a conjunction between enactivism and ecological psychology, particularly taking up the ideas of habitat and umwelt to explain how experiences that guide behavior are developed in particular trajectories embedded in certain contexts or niches that promote interaction modalities that become in types of reasoning embedded in practices and material culture.

Particularly, I will use as an example the trajectories that many women have experienced in scientific practices and as a consequence have developed proper types of ecological reasonings that incorporate certain epistemic injustices.

15:30 – 16:00

Sergio F. Martínez (Universidad Nacional Autónoma de México), Ana Laura Fonseca (Universidad Autónoma de San Luis Potosí) - Metaphors as dynamical doings support scientific understanding.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: Metaphors have been mainly discussed in the philosophy of science as simplifying tools or embellishments of the language of science. It is commonly argued that metaphors are only the scaffolds we use to construct the model, but that once constructed we can dispense with the metaphors. But this view is problematic and as we argue ultimately untenable. Mary Hesse forcefully argued for several decades in the second half of the 20th century that metaphors should be taken seriously as important components of explanations and above all as important resources allowing us to mediate among different kinds of social knowledge. One of her main claims was that models in science were metaphors. She understood models as models of theories as most philosophers of science at the time believed. The theories then provided an ultimate epistemic backing to the metaphors in their role as models

Nowadays there is important work in the natural and social sciences promoting the view that models in science do not need to be models of theories. Models can have explanatory power (or more generally, being valuable tools in scientific understanding) without assuming that they are derivable from a general theory. But then, where do metaphors turned into models get their epistemic backing?

The question is important because there is plenty of evidence that most models (if not all) in science consists in the development of metaphors structured in narratives. We shall review literature in biology, cognitive sciences and economy supporting this claim (Di Bernardo 2017, Nersessian 2015, Hampe 2017, McCloskey 1995, Truc 2021, Morgan et al. 2022, Gentner and Hoyos 2017, Olson et al. 2019). But, wherefrom do metaphors and narratives get its epistemic weight?

In an earlier paper we had argued that a key point of disagreement between the Heuristic and Bias tradition and the program of Fast and Frugal Heuristics in the psychology of reasoning is about what are the standards of what can be considered good heuristic reasoning (Fonseca & Martínez 2017). Such standards, we argue, are closely related with assumptions about what is the architecture of reasoning. In the present paper we argue that the situated character of cognition allows us to explain how metaphors and narratives enter into the construction of local norms supporting the epistemic role of models. The key idea is that metaphors in the context of embodied and distributed cognition are not discrete events inside an individual's head, rather, they are constraints on action leading to social affordances and norms supporting the epistemic role of models.

16:00 – 16:30

J. Francisco Alvarez (UNED. Universidad Nacional de Educación a Distancia) - Controversies on the road to Behavioral Economics.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: In the field of bounded rationality, various research programs have been developed, which maintain a certain family air with the pioneering works of Herbert Simon (Administrative Behavior

(1947), Models of Man (1957)). In particular, the Heuristic and Bias (HB) program developed by Daniel Kahneman and Amos Tversky, and the Fast and Frugal (FF) approach promoted by G. Gigerenzer and the ABC Group (Center for Adaptive Behavior and Cognition Group). An active and intense controversy has been generated at various times between these two tendencies, that have formed part of the so-called rationality war in psychology (Anna Wójtowicz and Jan Winkowski: Heuristics: Daniel Kahneman vs Gerd Gigerenzer (2018)).The controversy deserves to be reviewed taking into account other approaches and methodological proposals not so close to bounded rationality, for example, the works of Amartya K. Sen in relation to the act of choice and his distinction between optimal and maximal(A. Sen: Reason and Justice: The Optimal and the Maximal (2016), with the importance of taking partial order relationships into account .The most recent controversy between the two approaches, is the one held between Gerd Gigerenzer and Cass R. Sunstein, mainly produced in relation to "nudges" and libertarian paternalism, but which is connected to various aspects related to conceptual issues, methodological problems and, of course, with implementation proposals of public policies that have practical and political consequences. This controversy can give us clues to better understand the important shift that has been taking place over the last seventy years in economics science, unfolding from the pioneering works of Herbert Simon on administrative behavior and bounded rationality, with the corresponding critique of substantive rationality and to the human models of rational choice, and which has culminated in experimental economics and behavioral economics (Dhami S, al-Nowaihi A, Sunstein CR. "Heuristics and Public Policy: Decision-making Under Bounded Rationality". Studies in Microeconomics. 2019). All together they make up a true alternative program to the once mainstream economics, even with new problems and subjects as the new study of Noise (Cass Sunstein, Daniel Kahneman and Olivier Sibony -2021-)

There is a clear possibility of jointly understanding Sen's and Simon's observations and seeing that they allow us to better specify what is interesting about the controversy between Kahneman and Gigerenzer which has been going on for some thirty years and, especially considering the current revitalization of the controversy, now between Gigerenzer and Cass R. Sunstein. It seems to me that we can discover from these polemics and from these two phases of controversy some important elements of the conceptual and methodological revolution that is taking place in contemporary economics science.

ROOM 03

(APPIN)
Symposium: Applications of Informal Logic

Chair: Lastres, Pamela

Topic: A.2 Philosophical Logic

Abstract: The symposium studies important elements of informal logic and the process of reasoning in action. The talks deal with the kind of logic we use every day. It includes five talks (20 minutes presentation, 10 minutes discussion) with a break after the third one.

The first contribution deals with the debate about the normativity of logic. Logic studies the laws by which reason operates. Is there really a gap between the laws of logic and the principles that human beings employ in real-life reasoning? From a philosophical point of view, the question of the normativity of logic is fundamental because it tries to determine whether logical theories play any role

in our everyday reasoning. In this sense, a philosophical application of informal logic is proposed in order to provide a broad conception of logic as the study of inference in ordinary language.

The next two contributions explore abductive reasoning, a way to reach a logical conclusion that is probable but not exclusive. The second talk discusses how the rhetorical discourse is a means for generating hypothesis in the context of discovery. The author argues that the inventive part of rhetoric is an epistemological means for the discovery of a scientific discourse. The third talk examines the abductive reasoning in law and its applications. What kind of procedures should be followed when investigating what explains a fact in the field of law? In this case, informal logic tools are used to formulate, organize, compare, and eliminate hypotheses.

The fourth and fifth talks study the connections between epistemic injustice, credibility and informal fallacies.

Usually the teaching of good argumentation and reasoning errors in informal logic books is questioned by feminists or logicians who propose modify the adversarial way of arguing and the traditional and pedagogical way of teaching fallacies. The fourth talk explores how the "adversary method paradigm" is associated with aggressive or discriminative behavior. The approach to fallacies has a direct relationship with epistemic authorities that legitimize or delegitimize certain arguments and, as a consequence, perpetuate injustices both epistemic and political.

Finally, the last talk explores the personal attacks from a non-androcentric approach. It studies a specific type of the ad hominem argument: the ad feminam. This kind of personal attack against women produce a deficit in their credibility. Established prejudices reinforce the effectiveness of the ad feminam arguments even though the speakers recognize their condition of flawed arguments. The talk discuses cases of ad feminam arguments in which testimonial injustice is expressed in terms of credibility deficit.

Speakers:
1) Alba Masolo: Using Informal Logic to argue for the normativity of Logic
2) Sandro D'Onofrio: The epistemic dimension of rhetorical invenio as abduction
3) César Higa: The abductive procedure as the form of reasoning in the investigation phase of a case in Law
4) Natalí Cardoza Rojas: Epistemic and social considerations in the approach to fallacies in Informal Logic
5) Pamela Lastres: Prejudices, ad feminam Arguments and Epistemic Injustice

14:30 – 15:00

Alba Massolo (Universidad Nacional de Córdoba) - Using Informal Logic to argue for the normativity of Logic.

Topic: A.2 Philosophical Logic

Abstract: According to a robustly settled idea in the philosophical tradition, logic plays a normative role in human reasoning, i.e., to reason correctly, an agent should follow logical laws. However, in recent years, the normativity thesis has faced different challenges. One of the most well-known challenges claims that there is a gap between the laws of logic and the principles that human beings employ in their real-life reasoning (Harman, 1986). Thus, the special relevance of logic for reasoning has been strongly questioned.

This criticism against the normative status of logic for reasoning relies on a specific conception of logic and reasoning (Goldstein, 1988; Mackenzie, 1989). On the one hand, logic is conceived as a calculus. It aims to analyze relations between truth-bearers and thus establish the valid rules of a formal system. On the other hand, reasoning is conceived as a solitary process of drawing inferences.

Much of the empirical evidence used to understand human reasoning has shown that humans do not follow valid logical rules when resolving deductive tasks individually (Elqayam & Evans, 2011). Consequently, if logic validates formal rules but those rules are not applied in human reasoning processes, then it seems pointless to maintain that this discipline is normative for reasoning.

Nevertheless, it is possible to adopt an alternative conception of logic and reasoning. This presentation aims to deal with the debate about logic's normativity, taking this alternative conception as a starting point. To do this, I consider the study of argumentative practices carried out in the field of Informal Logic. A close look at current work in this field will allow us to justify a normative role of logic for reasoning. Firstly, I will support a conception of logic as the study of inference in ordinary language. I will show that this is the spirit underlying the consolidation of the field of Informal Logic (Groarke, 2021). Besides, this conception allows for the restoration of the original dialogical elements proper of logic that were overshadowed in the most recent formal logic tradition (Dutilh-Novaes, 2021). Secondly, I will consider reasoning as a social activity based on linguistic interactions among agents (Mackenzie, 1989). Thus, reasoning is a process of argumentative exchange. I will critically analyze the idea of the natural normativity of argumentation (Jackson, 2019). And from there, it will be discussed that this broader conception makes logic and reasoning two activities very closely related.

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15:00 – 15:30

Sandro R D'Onofrio (Pontificia Universidad Catolica del Peru) - The epistemic dimension of rhetorical invenio as abduction

Topic: A.2 Philosophical Logic

Abstract: Rhetoric is still wrongfully regarded as a technique for improving the acceptance of an argument that has already been formulated. However, taking into account the critical perspective of scientific realism, this traditional role must be questioned. The epistemic role of rhetorical invention offers a point of view in which truth is not a given fact but rather make up from the interaction of the scientific researcher with the natural world. Accordingly, abductive scientific reasoning matches with the rhetorical invention of an argument. A rehabilitation of rhetoric does not simply imply a better method of argumentative correction; essentially entails a better epistemic approach to contriving an argument. In this essay I argue that the inventive part of rhetoric is an epistemic means for the discovery of scientific arguments as such.

In order to do this, I assume that scientific work is fundamentally done through abductive reasoning, as has been claimed by Harré, Lipton and Psillos, among others. Since even the hardest scientific realism admits that our standard of truth is defeasible, the Platonic conception of episteme must be called into question; given that truth is not simply there, without interaction with the scientific researcher, this leads to an argumentative conception that is more abductive than deductive.

Having established that our contemporary scientific point of view is abductive, I will briefly describe how the inventive part of rhetoric works. As is known, this way of looking at human understanding does not take into account a definitive episteme to be reached. As Isocrates and Quintilian maintain, finding the best argument is looking for the true facts or, failing that, the most plausible ones. In view of this, classical rhetoric offers a way of establishing arguments that correspond to a contemporary conception of truth considered as defeasible.

Finally, I will show how our abductive scientific point of view fits very well with rhetorical invenio, thus recovering the epistemic dimension of this old way of understanding and comprehending the world.

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15:30 – 16:00

César Higa (Pontificia Universidad Católica del Perú) - The abductive procedure as the form of reasoning in the investigation phase of a case in Law.

Topic: A.2 Philosophical Logic

Abstract: Before filing a case with the court, lawyers must investigate a series of hypotheses and the quality of the evidence that supports each hypothesis. This paper focuses on the type of reasoning and activities that lawyers can carry out in the investigation phase to generate, build, eliminate, evaluate and compare hypotheses. In the field of Law, the phase of investigation of a case has not been the subject of study and it is left to the creativity of each investigator on how to proceed.

The phase of investigación is extremely creative, due to we consider that the reasoning towards the generation of hypotheses, the search for evidence, and the elimination of hypotheses are the activities that have the greatest role in this stage. This paper aims to explore what type of procedure and criteria could be followed when the lawyer investigates what can explain a certain fact within the field of Law. In the investigation stage of a case, the way of reasoning of the investigative bodies consists in the search for hypotheses and evidence, which does not have to be blind, but can be facilitated by a reasoning of the discovery (Aliseda 2014 – p. 24). The type of reasoning that could

be used is the abductive one understood as a process of inquiry (Aliseda 2014 – pp. 47 – 48) to generate, review and eliminate hypotheses in the field of investigation of a fact in Law.

This does not mean that deductive and inductive reasoning do not have some role, but this is preponderant not so much for the formulation of hypotheses, but rather for the evaluation of the argument structure and solidity of each hypothesis. Thus, there are two types of activities that are carried out in this stage: a) the creative one; and, b) the evaluative one. The first type of activities will be the focus of this work.

This type of research is related to informal logic to the extent that various tools will be used to organize, visualize and compare hypotheses, as well as procedures to eliminate them.

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Symposium continues in the same room, next time slot.

ROOM 04

(PM) From same room, previous time slot.

Symposium in Memory of Pablo Melogno

14:30 – 15:00

Hernán Miguel (Universidad de Buenos Aires), Leandro Giri (Universidad Nacional de Tres de Febrero / Consejo Nacional de Investigaciones Científicas y Técnicas) **- Double prevention in the counterfactual theory of causation: Melogno versus Hall.**

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: Causation has long been a central issue in the philosophy of science, but it remains a topic that has yet to be fully understood. The counterfactual approach to causation, which was introduced by David Lewis in his works from 1973, 1986, and 2004, has been one of the most influential approaches in the field. This approach suggests that causation can be understood in terms of events that are related by counterfactual conditionals, where the occurrence of one event depends counterfactually on the occurrence of another event.

One of the key aspects of the counterfactual approach to causation is that it involves related events that occur in the same spatiotemporal region. The idea is that if event A had not occurred, event

B would not have occurred either, and this is what establishes the counterfactual dependence between the two events. If there is a chain of counterfactual dependencies between event A and event B, then we can say that there is a causal dependence between the two events.
However, Ned Hall (2004) has argued that the counterfactual approach to causation does not work well in cases of double prevention, which occur when the occurrence of event A prevents the occurrence of event B, which would have prevented the occurrence of a third event C. In these cases, event A counts as a cause of event C. Hall argues that it is difficult to apply the two key conditions of the counterfactual approach to these cases, namely, counterfactual dependence and locality.

Pablo Melogno (2011) has responded to Hall's argument by examining the presuppositions underlying his critique. Melogno argues that Hall's analysis fails to account for the notion of locality, and that this is what creates the difficulty in applying the counterfactual approach to cases of double prevention. Melogno suggests that locality is a crucial concept that needs to be further examined in order to fully understand the nature of causation.

In this talk, we will further explore Melogno's insights and analyze the interrelationship between the notions of locality and physical causation. By doing so, we aim to show that the distinction between a differentiated physical theory of causation and one based on counterfactual dependence is not as clear-cut as previously thought. We will argue that the concept of locality is fundamental to understanding the nature of causation, and that it must be taken into account in any analysis of causal relations.

Overall, our analysis will contribute to a deeper understanding of the challenges involved in analyzing causation, and the extent to which the counterfactual approach can be successfully applied to a variety of different cases, including those involving double prevention.

15:00 – 15:30

Pio Garcia (Universidad Nacional de Cordoba (UNC)), Andrés Ilcic (Universidad Nacional de Córdoba) - The Discovery-Justification Distinction: Comments on Melogno's Analysis of a Kuhnian Account.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: "In a 2019 paper, Pablo Melogno discusses the scope of Kuhn's distinction between discovery and justification contexts (D-J) in light of a static approach within philosophy of science. How to approach this distinction was a major focus for Kuhn (1970, 2000), and its implications and scope have been the subject of controversy (Hoyningen-Huene, 1987, 2006). Melogno's analysis centers on the first Thalheimer Lecture that Kuhn delivered in 1984 (Kuhn, 2017). As a primary strategy, Melogno compares Kuhn's historiographical thought and his critique of the distinction to conclude that ""Kuhn's rejection of the D-J distinction, both in content and in scope, results from his adoption of the historiographical matrix provided by the dynamic approach in the history of science"" (Melogno, 2019). The static perspective Kuhn rejects is one built on Cartesian and Baconian presuppositions.

In this presentation, we will evaluate Melogno's reconstruction and discuss some assumptions surrounding the D-J distinction. As Melogno has pointed out, in most of his work, but especially in the Thalheimer Lectures, Kuhn has emphasized that his critique of traditional philosophy of science is tied to a change in the unit of analysis, proposing a shift towards collective approaches instead of focusing solely on individuals. As we have shown elsewhere (Garcia, 2023), much of a Kuhnian critique of traditional philosophy of science can be kept by means of a more sophisticated unit of analysis. Here, we will focus on the assumptions that led to a critique of the D-J distinction.

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15:30 – 16:00

Victoria Lavorerio (Universidad de la República) - Rational Choice between Incommensurables.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: One of the most controversial theses of the Kuhn's philosophy is that scientists who operate within incommensurable paradigms use the same terms, but with different meanings. This thesis is known as ""linguistic incommensurability"" (or conceptual or semantic incommensurability). Although it looks modest, this thesis seems to lead to two theses that are very hard to accept: a) scientists who defend incommensurable paradigms do not understand each other and b) as a consequence of (a), there can be no rational way to convince someone of switching paradigm. These theses seem to entail the pessimistic thesis that there can be no rational choice between incommensurable paradigms.

Much of Pablo Melogno's work, however, was dedicated to proving that incommensurability is compatible with rational choice of theories. On this occasion, I review some of the arguments with which he defended this thesis, such as the existence of a metalanguage, the partiality of incommensurability, and the methodical continuity as a shared basis among scientists.

16:00 – 16:30

Daian Flórez (Universidad de Caldas-Universidad Nacional de Colombia) - Incommensurability as a philosophical bomb: Why the conversation with Pablo Melogno must go on.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: "After the development of the philosophy of science as a mature discipline in the 20th century, many of us were eclipsed by the devastating power of some of the approaches of philosophers such as Kuhn. The effect of the thesis of the incommensurability of theories as a incredibly powerful philosophical bomb lies in the fact that, if it is true, a lot of carefully crafted

theories would collapse. Moreover, if the incommensurability thesis is correct, some of the most beloved dogmas of ""orthodox"" philosophers of science would have to be abandoned, including the thesis that there is invariance in the meaning of terms across scientific theories, and Popper's theory of falsifiability.

It seems that Pablo, like me, succumbed to Kuhn's approaches precisely because of their devastating nature. And like me, he has vehemently defended in his writings that there is no need to fear incommensurability. That is why in this tribute, I would like to show the thread of the premises that Pablo subscribed to in order to defend that incommensurability does not threaten the rationality of science. To do this, I will focus on examining the semantic commitments that underlie the incommensurability thesis, including the requirement of a common domain of reference that explains how the choice between incommensurable theories operates. After doing this, I would like to share with the audience how Pablo's ideas have illuminated my own philosophical work and I will argue that there is also semantic incommensurability in the domain of technology."

ROOM 05

14:30 – 15:00

Xiangyu Liu (National Academy of Innovation Strategy, China Association for Science and Technology), Li Zhang (National Academy of Innovation Strategy, China Association for Science and Technology), Guoqiang Wang (National Academy of Innovation Strategy, China Association for Science and Technology) - Global Science and Technology Governance from the Perspective of Science and Technology Diplomacy.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: The international environment has become more complicated under the influence of uncertainty in the future and tension among countries, however, the globalization of science and technology remains the main theme of the times. With the increasing interaction of science and technology with society under the trend of globalization, the role of science and technology competitiveness in international relations is gradually strengthened, which brings profound changes to the global science and technology governance system. From the perspective of science and technology diplomacy, we analyzed the significance of the construction of global science and technology governance system for science & technology development and innovation cooperation.

The global science and technology governance system has gradually expanded from the ethical governance to the scientific solution to global challenges, including the priorities, risk management, and the guidance for the whole life cycle of science research and technology application. The operations of science and technology governance reflect the scientific communication among countries to promote solutions of the societal challenges, and the establishment of a novel and mutually beneficial international relation by means of sharing and exchanges.

Global science and technology governance is essentially the pursuit of "win-win cooperation". On the one hand, the participants contribute their own strength to dealing with the common challenges. On the other hand, it can also enhance the governance capacity of the participants in cooperation.

Science and technology governance is a powerful opportunity to apply scientific knowledge, analytical skills, and research experience of scientists and engineers to policymaking. It emphasizes

the important role of scientific evidence in the policy realm, when we develop and execute solutions to address societal challenges.

We discussed the significant roles of the global science and technology governance system in four aspects. It facilitates the solution of scientific issues encountered among countries, further guiding the high-quality development of science and technology. Scientists actively carry out academic exchanges and research cooperation, which make science and technology better serve the progress of human society. The global science and technology governance system also promotes the circulation and sharing of innovation resources, laying a foundation for mutually beneficial international relations practice, which is conducive to creating an open and innovative ecological environment. Furthermore, the global science and technology governance system provides opportunities for scientists and engineers to participate in policymaking using scientific evidence, and improve their ability of public decision-making consultation.

Finally, we put forward several suggestions on enhancing the capacity of global science and technology governance. We need to accurately grasp the development trend of science and technology, gain insight into the forefront of science and technology, improve the layout of the innovation chain of emerging technologies to seize the development opportunities of emerging markets. It is also necessary to assess, manage and control risks caused by emerging technologies. Carrying out all-round and multi-level collaborative research and standard setting on major scientific issues of common global concern and challenges around the world is essential. In addition, we must value and incorporate scientific evidence in the design of public policy.

15:00 – 15:30

Rodrigo Nascimento (UFSC) - A discussion about the sociopolitical aspects in philipp frank's philosophy of science.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: It is possible to notice some relevant political, educational, and social aspects in the philosophical analyses carried through by Philipp Frank. These aspects can be regarded not only as interesting sources of reflection about Frank's philosophy but also as guidelines for the interpretation of the Vienna Circle discussions. In this talk, I shall discuss the role played by these social-political aspects in some of Philipp Frank's philosophical concepts, such as that of common sense and his philosophical rendering of the law of causality. I shall argue that Frank proposes such concepts in a critical reaction to the intellectual mainstream of philosophical, social-political, and religious perspectives in Central Europe during the first decades of the twentieth century. That is, Frank elaborates his concepts in an attempt to overcome xenophobic, racist, and antisemitic ideas that impregnated the scientific outlook of eminent philosophical and political circles. To sketch such a contextualized understanding of logical empiricist philosophy, this talk will follow historical studies developed by authors such as Janek Wasserman, Friedrich Stadler, and George L. Mosse. The overview provided by recent scholarship offers an extensive description of the cultural and intellectual background in the German and Austrian societies from the last decades of the nineteenth century to the first decades of the twentieth century.

15:30 – 16:00

Katrina Nicole Matheson (York University) - Breaking Epistemes: Foucauldian Perspectives on Climate Change, Artificial Intelligence, and Values in Science and Technology.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Fifty years ago, Jesse Steinfeld (1972: 223) argued to the scientific community that "to make rational judgments, we need to know what price we're paying for what progress." Since then, increasing numbers of academics, particularly in environmental fields, have chosen to blur the line between scientist and activist (Isopp, 2014). This awakening portends a fundamental shift in the relationship of scientists to their labour: from modern careerists to impassioned beings, signaling a departure from Foucault's (2018 [1970]) archetypical 'man.' This change has arguably been brought on by individual awareness of an increasingly hostile and inhospitable Earth, a realization that unconsciously returns (Judeo-Christian) man to its metaphorical origins: on the brink of expulsion from a proverbial Eden. I argue that it is solely by virtue of this origin-story confrontation that man has any hope at all for catalyzing desirable epistemic change. Drawing from Latour (2018), I dub the emergent episteme arising out of the shock of climatic disruption as the 'Terrestrial Episteme.'

The Terrestrial Episteme, however, is not the only episteme in formation. Emerging simultaneously is a competing epistemic shift capable of rupturing the foundations of knowledge itself through advancements in AI. Precipitating this alternative 'AI Episteme' are applications that manipulate language through recursive autoregression. These technologies, such as Chat GPT, take modern language and iterate its meaning against billions of information inputs. The result, I argue, is language that devolves past Foucault's (2018 [1970]) notion of fragmentation, to a state of further removal from meaning and knowledge. This projected shift in language, from a self-contained to recursive relationship to meaning, parallels that of Foucault's (2018 [1970]) man in the 19th century. Accordingly, it is now words, rather than man, that will henceforth require ongoing reference to billions of pieces of external information to make sense of itself. Still, while AI-mediated language stands poised to take an epistemic turn, modern man's metaphysical relationship to life and labour would persist as it is, continuing to trap man within a meaningless cycle of toil, and pitting man against a ticking clock that compels a return to origins that manifest ominously as the impending 'Singularity' (Vinge, 1993).

Projections of the future typically offer AI as a technology of promise, and climate change as a portent of peril. The truth is that both futures invoke Foucault's (2018 [1970]) notion of the Promise-Threat. However, it is only climate change that provides man a lifeline to a worthwhile new episteme. The AI and Terrestrial Epistemes, as they exist in their respective potentialities, are therefore oriented in direct conflict. Embracing the Terrestrial demands a reconstitution of fragmented language through a return to durable knowledge and public discourse; a realignment of man towards its new figuration as a 'terrestrial'; and finally, the metaphysical cleaving of positivist and eschatological aspects of science and technology which exist, like man, as an empirico-transcendental doublet.

ROOM 06

(NOMOS) From previous time slot, same room.
Symposium: Laws and Powers in the Metaphysics of Science

14:30 – 15:00
Stavros Ioannidis (National and Kapodistrian University of Athens) - Laws and Powers in Descartes.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: According to a traditional view, in the seventeenth century the concept of laws of nature replaced the aristotelian notion of powers in natural philosophy. However, a closer look at the work of central figures of the period, such as Descartes, Leibniz and Newton, reveals a more complex conceptual landscape, where the notion of power is not abandoned but transformed and reconceptualised. Thus, a dualist model, where both laws and powers are needed to understand the nomological structure of the world, seems to better account for the views of various early modern thinkers.

The aim of this paper is to examine the relationship between laws and powers in the thought of René Descartes, and defend a realist solution to what is known as the 'problem of force' in Cartesian physics, i.e. the problem of how to understand the ontological status of forces in Descartes's Principia. Three main readings have been offered concerning this problem: (i) fictionalist accounts, according to which bodies do not literally have forces (Garber 1993, Ott 2020)—such a view goes hand in hand with an occasionalist interpretation of body-body causation; (ii) non-fictionalist double aspect accounts that view forces as an aspect of God's action in nature (e.g. Des Chene 1996); and (iii) full-blown realist accounts (e.g. Schmaltz 2008) that view forces as real entities that bodies possess, and that can ground causal relations in the world.

I will offer a new defence of the realist view of forces by showing that Descartes has a concept of force that is structurally similar to the aristotelian notion of power. Powers in Aristotle and in medieval thinking are principles of change, act by contact, are active or passive, can be potential or actual, are relative (ad aliquid) and are accidents. I show that cartesian forces have similar features: they are causes of changes in motion, act by contact, are active or passive, can be potential or actual, are relative and are modes of bodies. I will explain the connections among the Cartesian notions of force, tendency, striving and inclination, focusing mainly in their role in the demonstrations of the three laws of nature in the Principia, and I will reply to two criticisms: that Descartes cannot be a realist about forces, given his arguments against substantial forms and real qualities; and that, even if forces exist, they are grounded in God. I conclude that forces in Descartes are modes of bodies grounded in motion and in turn ground body-body causation; thus, a dualist model of the metaphysics of Cartesian physics looks very promising.

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15:00 – 15:30

Maria Panagiotatou (National and Kapodistrian University of Athens) - Laws and powers in light of the wave function.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: In a recent paper, Ioannidis, Livanios, and Psillos (2021) proposed a dualist model that treats laws and powers as equally fundamental concerning their role in the nomological structure of the world. The aim is to examine the prospects of their dualist model in light of the status of the wave function.

Broadly speaking, the wave function is a mathematical representation of a quantum state; in other words, the wave function of a system (individual or entangled) at some instant describes the system's state at that instant and incorporates its dynamical properties. Despite this straightforward description of the wave function, the correct way to understand it has been, since the birth of quantum mechanics, an ambiguous issue.

I will look into recent views that attribute a law-like status to the wave function, and views that give power-based descriptions of it. For example, Goldstein and Zanghì (2013) discuss in the context of Bohmian mechanics a nomological or a quasi-nomological role of the wave function. Allori (2017) describes how the wave function behaves more like a gauge potential than a field, and also proposes a nomological (law-like) view of the wave function instead of an ontological view. In contrast, Suárez (2015) criticises the nomological interpretations of the wave function because of its dynamical nature, since laws are not supposed to change with time. Therefore, Suárez proposes a dispositionalist interpretation of the wave function in Bohmian mechanics. Dorato and Esfeld (2010) claim that the Ghirardi, Rimini, and Weber formulation of quantum mechanics favours an ontology of powers or dispositions.

Considering the above, I will examine whether there is room for unifying the law-based and the power-based views about the wave function in order to give a better understanding of its role in the context of nonrelativistic quantum mechanics, and, if possible, achieve this without adopting a particular interpretation. My proposal will be to view the wave function as an encoder of the powers or dispositions of quantum entities, which need a governing law, like the Schrödinger equation, to govern their behaviour. If this is the case, I will cheque whether the dualist model of Ioannidis, Livanios, and Psillos can accommodate this possible perspective.

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ROOM 07

14:30 – 15:00

Sho Fujita (Japan Society for the Promotion of Science) - Spacetime is emergent or fundamental?

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Physics and philosophy have a long-standing interest in understanding the nature of spacetime. Historically, there has been a common idea that spacetime is a concrete physical realm. The General

Theory of Relativity (GTR) significantly influenced the way people viewed space and time, and spacetime has come to be described more mathematically. Spacetime is dynamic, as the metric tensors or Riemann tensors defined at all spacetime points change, allowing for interaction with matter and
physical fields. If we interpret the metric field as the physical field, namely gravitational field, we can conclude that spacetime is a structure with a duality of matter and traditional spacetime (Dorato, 2000). Without a metric, the spacetime manifold is highly abstract.

However, contemporary physics deals with abstract physical realms that don't presuppose a spatiotemporal structure. For example, Loop quantum gravity theory utilizes a spin network showing that space is made up of many discrete "atoms of space". As Wüthrich states, spin network representations result in the loss of information about "locality", one of the geometrical features in a macro spacetime region (Huggett & Wüthrich 2013; Wüthrich 2018). Although a microstructure of spin network can be obtained through quantization of the metric, the metrical properties are still lost. Spacetime is said to emerge or be derived from the micro-structures of spin networks. It may be natural to consider micro-constituents as being more fundamental than compositions. However,
Shaffer proposes "priority monism," which suggests that the whole, rather than the parts, is a priori and that the universe as a whole is the most fundamental (Schaffer 2010). He doesn't argue that parts are not real, but rather that they only exist once they are given their own role within the entire system. From this perspective, it is not clear whether it can be easily concluded that spacetime emerges solely because a micro-structure of spin network is a part of the whole spacetime.

Le Bihan acknowledges that spacetime emerges from a more fundamental entity, which he refers to as the "whole universe". This suggests that a spatiotemporal structure, rather than micro-structures, is conversely a part of the larger entity. I want to re-examine the relationship between parts and the whole, and re-consider the question of what constitutes a spatiotemporal structure, particularly whether non-metrical abstract properties are included in it.

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15:00 – 15:30

Helen Meskhidze (University of California, Irvine), James Weatherall (University of California, Irvine) - Are General Relativity and Teleparallel Gravity Theoretically Equivalent?

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Teleparallel Gravity (TPG) (Aldrovandi and Geraldo Pereira 2013; Maluf 2013) is a theory of gravitation that is (1) relativistic, i.e., its metrical structure is Lorentzian; (2) geometrized, i.e., the metric is dynamically related to stress-energy; and (3) empirically equivalent to general relativity (GR), at least locally. But whereas in GR, space-time is curved in the presence of matter, in TPG, space-time

is always flat, as in (non-geometrized) Newtonian gravitation. The characteristic phenomena of GR arise in TPG from space-time torsion, rather than space-time curvature.

Philosophers have been interested in TPG for a variety of reasons. Knox (2011), for instance, argues that TPG presents a risk of underdetermination, but concludes that it does not if one interprets space-time theories via a version of the equivalence principle. More recently, Read and Teh (2018) have argued that the relationship between GR and TPG is analogous to that between geometrized and standard Newtonian gravitation.

It is broadly taken for granted within the physics literature that GR and TPG are not only empirically equivalent, but theoretically equivalent as well. Aldrovandi and Geraldo Pereira (2013), for instance, write "Teleparallel Gravity … is an alternative description that, though equivalent to General Relativity, separates gravitation from inertia… (vii)." In other literature, Teleparallel Gravity is referred to as the "Teleparallel Equivalent to General Relativity (TEGR)" (Maluf 2013).

This equivalence claim, though important in motivating TPG, has not been seriously scrutinized by philosophers. In this talk, we will show that it is, in fact, false: GR and TPG are not equivalent, on any of the criteria of theoretical equivalence entertained by philosophers of science. The reason is that the theories do not satisfy a necessary condition for equivalence first identified by Glymour (1970): models of TPG do not stand in a one-to-one relationship to models of GR. Indeed, one can show a precise sense in which TPG attributes more structure to the world than GR (c.f. Weatherall 2016b). We conclude by discussing the relationship between this result and similar results for Newtonian gravitation (Weatherall 2016a); and comparing our arguments to those of Combi and Romero (2017), who defend the same thesis for different reasons.

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15:30 – 16:00

Anastasiia Lazutkina (University of Tartu) - Karl Popper and the problem of time.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: The problem of time has been puzzling contemporary theoretical physics and philosophy of physics for several decades. As it is often stated by proponents of atemporal quantum gravity, nothing in the fundamental description of the world resembles what we would be inclined to call time (Calamari 2021). This is considered problematic due to our phenomenal experience of time and the past successes of temporal theories such as general relativity (GR) and quantum mechanics.

A more specific problem concerns the direction of time. The problem already appears in GR where time is effectively conceived of as another dimension. An argument against the view that time does not have an arrow is based on the second law of thermodynamics and the increase of entropy. Karl Popper (1956) saw a flaw in this argument. He convincingly argues that radiation and not entropy is the irreversible process that matters in establishing an arrow of time (Price 1996). However, Esfeld (2006) has shown that neither entropy or radiation is sufficient for an explanation of irreversibility and the correct place to look for an answer is cosmology and theories of quantum gravity.

Although it is not possible to say how Popper would respond to Esfeld's argument, it is possible to consider what resources would be available to Popper given his entire body of work. This paper will focus not only on how Popper could respond to Esfeld but also how he would view the more general problem of time that has emerged more recently. In particular, I plan to describe how Popper's general framework of understanding scientific progress as an interplay between scientific theories and their "metaphysical research programmes" (MRP) (Popper's (1982) term). In the case of atemporal approaches to quantum gravity, the MRP at play includes at least the notion of quantum fundamentalism, i.e. that the world is fundamentally to be described in terms of quantum theoretical notions. I will examine whether some of those atemporal approaches are from Popper's methodological perspective similar to Boltzmann's subjective theory of time, which Popper famously attacked (1976).

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16:00 – 16:30

Kevin Chalas (Institut Supérieur de Philosophie, Université Catholique de Louvain) - Relativistic physics, inferentialism, and ontological pluralism: getting out of the eternalist trap.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: I propose to defend that a form of "Presentist Existential Pluralism" (PEP) (McDaniel 2017) is compatible with spacetime physics, repelling the inference from relativistic physics to eternalism. The argument will rely on tying this ontological pluralism to the inferential uses of representations in the practice of physics.

The received view concerning philosophy of time via relativity is that the latter entails eternalism (the ontological commitment to the existence simpliciter of all events; past, present, and future) as exemplified in (Wüthrich 2013). It then feeds the claim that this scientific image differs from the manifest, which arguably takes the "present" to be metaphysically distinguished and denies the existence of past/future events. Following Wüthrich, presentism claims that the domain of quantification for the existential quantifier is a proper subset of the full set of events constituting spacetime. The argument for eternalism then goes as follows. The co-existence of events is grounded

on their simultaneity. Simultaneity in relativistic spacetimes is frame-dependent. There is no privileged frame. Hence, when quantifying over all co-existing events in a relativistic spacetime, the domain of quantification ends up spanning the whole universe.

This argumentation relies on a representationalist position tied to the ontological framing of the question. The jump from quantification on the models to the existence simpliciter of events in reality is legitimized only if one believes that there is a direct relation (e.g. a morphism between structures, or a notion of "reference") between the representations and the world; that the formers are "approximately true" of the latter in a non-epistemic way.

This position is criticized in the literature on models in light of the 'turn to practice' in philosophy of science; notably by Suárez (Suárez and Pero 2019) who argues instead that scientific representation is constituted by its inferential function. Accordingly, I defend, the manners in which representations are used should inform us on the way they connect to the world (their content). In practice, the spacetime models are used by an agent to infer via "physical laws" the potential evolutions (and their descriptions by different agents/reference frames) of a given physical system. I will consequently argue that, should we conserve the ontological framing, one should take the events in the spacetime representation to have, at best, potential existence. Only the events we take to represent our present state, and those taken (according to our reference frame) to represent that of the target we which to infer the evolution of, will enjoy actual existence. It is a proper subset of spacetime. Hence, we implement PEP by grounding it on an inferentialist account of representations, tying the mode of existence of past/future events to physical potentiality and that of present events to relativized actuality.

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ROOM 09

(INFER)
Symposium: What are Inferences? Some Reflections In-Between Logic, Language, and Cognition (part II)

Chairs: Aguilera, Mariela; Visokolskis, Sandra

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: The classical view of inference states that inferences are conscious logical transitions over propositionally structured beliefs. According to this view, inferences are transitions that belong to the personal level in that they are operations for which the agent can be held responsible (Boghossian, 2014; Broome, 2013; Valaris, 2017). This view conceives inferences as operations over beliefs, that is, over propositional attitudes that aim at truth. Given that these operations are rule-governed transitions that obey some kind of logic (Boghossian, 2014; Broome, 2013), this view maintains that only propositionally structured belief can participate in inferences. As long as it is generally assumed that only linguistic representations possess a structure sensitive to logical rules, this view argues that inferences involve transitions between representations with a linguistic format.

Although this view can be traced back to Frege, Sellars, Davidson, and McDowell, it has been recently defended in a strong version by Boghossian and Broome. This strong version has generated an intense debate during the last ten years. The goal of this symposium is to challenge the classical view of inferences based on recent criticism. Particularly, we want to challenge the reflective, logical, propositional, rule-following account to inferences.

In contrast, the contributions to this symposium will extend the focus of analysis to inferences that are: (i) non-deductive, such as abduction, induction, and analogy; (ii) non-conscious, which might involve intuitions, insights, or sub-personal processes; (iii) non-propositional, including models, affects, and representations with different formats, such as diagrammatic, iconic, cartographic.

Speakers:
1) Mariela Aguilera: The Dynamic Nature of (Cartographic) Inference
2) Wade Munroe: Why Can't We Just Believe What We Want? Inference, Metacognition, and Executive Control.
3) Sanja Sreckovic: Inference over Affective Representations
4) Joan Sebastián Mejía-Rendón: I Feel I'm Inferring: The Phenomenological Experience of Inference
5) Nora Alejandrina Schwartz: Scientific Modelling and Distributed Representations
6) Diego Letzen: A Social, Dialogue-Based Account of Inference
7) Felipe Morales: What Achilles Should Have Asked the Tortoise
8) Gabriela Fulugonio: Implicit Inference Rules in the Begriffsschrift
9) Davide Rizza: Inference in the Context of Enquiry
10) Matías Osta-Vélez: Inference and the Structure of Mental Representation
11) Sandra Visokolskis: Are Associations Some Kind of Inferences? The Case for Creative Inferences

15:00 – 15:30
Felipe Morales (Universidad de Chile) - What Achilles should have asked the Tortoise.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: In Lewis Carroll's famous dialogue 'What the Tortoise said to Achilles', the Tortoise presents Achilles with a problem concerning the requirements for someone to accept a logical argument. Given an argument with premises {A, A→ B} and conclusion {B}, it would seem that logic couldn't force somebody to accept the conclusion unless they also accepted that (A & A → B) → B as a premise, which then leads to a regress.

That the problem still remains in some shape alive for us may be due in part to the fact that the Tortoise is somewhat convincing—even though their refusal to accept the conclusion of the argument while accepting their premises is puzzling, their challenge seems to makes sense. However, how could the Tortoise be logical in any sense if they didn't accept the inferences that they ask Achilles to defend? More importantly: how could they reason through the suppositions of their argument? These are questions that Achilles should have asked.

The Tortoise presents the problem to Achilles in a way that draws them in. The questions they ask Achilles are the right ones. He makes Achilles consider the possibility that someone accepts some premises without accepting their conclusion. The Tortoise must have reasoned that this was a relevant possibility. How did they do it if they didn't accept the kind of inference that they make Achilles try to convince them about? If we examine things from this angle, it becomes difficult to see how the Tortoise could have herself not accepted the conclusion—we have to think that the Tortoise is playing a double game. In one, they seem to reject or to fail to endorse a common inference pattern. In the other, they have no such qualms. Some have (most famously, Ryle 1950) raised the point that the Carrollian dialogue rests on a confusion between logical rules and logical truths. This is probably

not fair about the Tortoise, although it may be true of Achilles (whether this is the intended meaning of the dialogue is another question; on this point, compare with Woods 2016). This is another point which Achilles should have pushed the Tortoise on. Had he done so, what would the Tortoise have answered?

In that case, the Tortoise should have discussed a different scenario: suppose that we read Euclid and find some premises of the form {A → B, A}. What does then follow? How can we know? The problem isn't how we can apply the relevant modus ponens rule; rather, the question is how we can realize that modus ponens is a relevant rule in this scenario—a more general problem.

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15:30 – 16:00

María Gabriela Fulugonio (Universidad de Buenos Aires) - Implicit Inference Rules in the Begriffsschrift.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: As early as in the "Preface" to his seminal work of 1879 [1], Gottlob Frege indicated his concern with the problem of inference, particularly in the field of scientific knowledge, and proposed himself to "see how far one could get in arithmetic by inferences alone, supported only by the laws of thought that transcend all particulars (...) Out of this need came the idea of the present Begriffsschrift". Towards the end of the preface we read: "The restriction, in §6, to a single mode of inference is justified by the fact that in laying the foundation of a such a Begriffsschrift the primitive elements must be as simple as possible." Thus, presented the way of generating sentences in the first part of the Bs., in the second part we find an axiomatic system for higher order classic logic with modus ponens as the only explicit rule.

Following the Lakatosian idea that science progresses within the framework of research programs which, as such, are born imprecise and it is one of the tasks of any scientific program to develop itself towards a more precise methodological program, the future of Frege's program will be no different. Frege declares his guiding methodological concern is to make explicit every deductive step within his demonstrations, and the construction of his innovative language pursues precisely this purpose. Yet, in his demonstrations he uses more resources than the one announced, such as instantiation, generalization and substitution of equivalents. Probably because substitution is the rule of transformation par excellence in mathematics, Frege overlooked the need of making it explicit. But from this rule follows in Frege's system the well-known principle of comprehension according to which every propositional function defines a concept, fact that becomes at least controversial if the principle applies unrestrictedly (a clear and concise exposition found in [2]). Furthermore, in his major work, (1903) Grundgesetze der Arithmetik, Frege adds an axiom to characterize extensions of concepts as objects, necessary for number definition, which, in conjunction with the above-mentioned rule, makes the system contradictory.

In my contribution, following another seminal work in Fregean research [3], I try to show that Frege himself has found it much more difficult than conjectured to remove intuition in general from his demonstrations and definitions. In particular, I will dwell on (i) § 11: Die Allegemeinheit, in which, in addition to the well-known use of concavity in the content stroke, I highlight something about the use of lower-case Latin letters that remains unclear in the text and in the most well-known literature.

(ii) the relationship between its influential definition of ancestral and the paraphrase Frege offers in natural language.

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16:00 – 16:30

Davide Rizza (University of East Anglia) - Inference in the context of enquiry

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: The classical view of inference places a descriptive stress on conscious belief transitions. It remains, however, silent on the reason why they occur, which affects, to an extent, what they are. Further, the situation of inference at the personal level leaves a gap between the internal belief state of an agent and the practical consequences that may be assigned to that agent's beliefs.

These gaps of the classical view cannot be filled without changing its character, by relating it to the stages that precede and follow the inferential phase within inquiry. In this talk I show that this can be done with the help of Dewey's logical work (in this talk I focus on ch.7 of Dewey (1910) and ch. 8 of Dewey (1938)), which sets inference within a global account of knowledge capable of encompassing a vista broader than that allowed by the self-imposed restraint of the classical view.
Dewey locates inference as an episode arising within the symbolic phase of inquiry, itself understood as an organic and behavioural process of reorganisation. Inquiry is so understood because the inferring agent is not engaging in mental readjustments only but it is continuously prompted and directed by the environment (be it a laboratory setting, a law court or the current results about a mathematical problem).

When inference is set in the broader context of inquiry, several lines of investigation closed to or independent of the classical view are made pertinent and accessible. The motivation for inference can be identified and examined, it is possible to distinguish between modes of inference (including abductive, see the study of Dewey's logic in Marcio (2001)) and it is possible to indicate the relevance of inferential practice to broader contexts than are classically assigned it. The latter possibility is of special interest in view of a suggestion put forward by J. Barwise, to the effect that 'logic should seek to understand meaning and inference within a general theory of information, one that takes us outside the realm of sentences and relations between sentences of any language, natural or formal' (cited in Burke (1994: 2)).

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ROOM 10

(SULOMET) From previous time slot, same room.
Symposium: Substructural Logic and Metainferences

14:30 – 15:00
Jitka Kadlečíková (Palacký University Olomouc), Thomas Ferguson (Czech Academy of Sciences) - The Ethical Case Against Cut and Its Resolution.

Topic: A.2 Philosophical Logic

Abstract: The transitivity rule, or Cut, is an essential validity-preserving tool. However, unrestricted application of Cut can lead to undesirable consequences. Therefore, it calls for a restriction of scope. While there exist veridical arguments against Cut, such as those involving the Liar, we will present an ethical argument against Cut based on topic-theoretic considerations. The metatheory which allows this formal demonstration is based on the bounds consequence approach to the sequent calculus. Moreover, our interpretation presupposes the existence of monstrous content, i.e., positions which are out-of-bounds in virtue of their content. We argue that the meta-inferential rules involving monstrous content can be understood as being rooted in ethical considerations.

At the same time, however, we recognize that Cut is in many ways indispensable. Therefore, we will provide a unified reinterpretation of Cut which provides a more nuanced account of the ways in which Cut can be said to be valid. This will invite discussion about the formal calculi that can provide the necessary formalization and meta-inferential rules for a topic-theoretic account of Cut. The hierarchy of such meta-inferential systems embeds into paraconsistent weak Kleene in the same way as ST hierarchy embeds into LP, which leads to some interesting philosophical questions about the difference between the two.

15:00 – 15:30
Damian Szmuc (University of Buenos Aires and IIF-SADAF, CONICET, Argentina), Bruno Da Ré (University of Buenos Aires and IIF-SADAF, CONICET, Argentina) - Canonical, co-canonical, and combined sequent rules for classical logic.

Topic: A.2 Philosophical Logic

Abstract: The aim of this presentation is to try and narrow down the set of all suitable Cut-free sequent calculi for classical logic, that is, all sequent calculi for classical logic where the Cut rule is admissible although not necessarily derivable. Of course, this class is quite large and not necessarily uniform, thus we shift focus to collections of rather well-behaved systems. For this purpose, we study calculi with generalized well-behaved introduction rules in the form of canonical calculi, as defined in Avron & Lev (2005). Similarly, we study calculi with generalized well-behaved elimination rules in the form of what we choose to call co-canonical calculi, dualizing what has been already done by the previous authors. For matters of exhaustiveness, we also consider combined calculi where canonical and co-canonical rules are featured. With these calculi in mind, we present an algorithmic way of extracting

non-deterministic semantics out of the rules in question, later using these valuations to establish matters of derivability within the target rule systems. This is done by extending the results in Avron & Lev (2005), and the expansions thereof presented later in Lahav (2013), to cope with the newly introduced cases of co-canonical and combined calculi. After discussing the characterization of all the three-valued presentations of classical logic, we conclude this work by presenting a decision method to establish whether a given canonical, co-canonical, or combined Cut-free sequent calculus, is sound and complete for classical logic.

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15:30 – 16:00

Eliana Franceschini (IIF-SADAF-CONICET-UBA) - Metainferential negation

Topic: A.2 Philosophical Logic

Abstract: The aim of this article is to take a step towards a full understanding of the notion of negation in the context of metainferential logics. Roughly speaking, metainferences are inferences between collections of inferences, and thus substructural logics can be regarded as those which have fewer valid metainferences that Classical Logic. In the last few years, much attention has been paid to the study of metainferences, and in particular, to the question of what are the valid metainferences of a given logic. Nevertheless, there's no agreement at all about how to understand some particular phenomena and properties of the metainferential level, such as the notion of metainferential duality or the one of metainferential paraconsistency. One of the problems at present is that it doesn't exist a unified perspective about what we could call (following the work of C. Fiore, F. Pailos, and M. Rubin, 2022) inferential constants, and in particular, about the notion of negation for the metainferential level. In this article I offer an analysis of the different negations presented in the recent literature on metainferences, in the light of certain philosophical discussions about the meaning of negation. I will problematize in particular the concept of negation given by B. Da Re, F. Pailos, D. Szmuc, and P. Teijeiro (2020) and it's impact on their explanation of the notion of metainferential duality. For this purpose I provide a model-theoretic characterization of validity for a metainferential language in which it is possible to define a metainferential negation that, as I will argue, works better and it has more negation like properties than the others available in the literature. Finally I will use this negation to show some different results regarding the phenomenon of duality between some substructural logics as TS, ST and RND.

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16:00 – 16:30

Federico Pailos (IIF-SADAF-CONICET & University of Buenos Aires) - Non-exhaustive and non-exclusive structural solutions to the Validity Paradox.

Topic: A.2 Philosophical Logic

Abstract: There are many kinds of semantic paradoxes. One thing that all of them have in common is that, in order to derive the undesirable result—i.e., triviality, the empty sequent or what not—it seems necessary, at some point, to apply an inferential principle associated with a given logical constant, i.e., some kind of introduction or elimination rule for the given connective.

Recently, Beall and Murzi presented in [1] what seems like a version of Curry Paradox. Nevertheless, what seems more relevant from this paradox is that no inferential principle involving any logical connective—i.e., no operational principle is involved in the derivation of the undesirable result. The only inferential rules used are (i) principles related to a naive validity predicate—i.e., the Validity Paradox rule—the rule for introducing the predicate on the right side of the consequence sign—and the Validity Detachment rule (i.e. the rule for introducing the predicate on the left of the consequence sign), and (ii) structural principles like Cut and Contraction not related in a specific way to any specific logical constant. To solve the paradox it is necessary to give up at least one of these principles. And operational approaches—i.e., the ones that validate every classically valid structural principle—seems to have no choice but to give up one of the principles that regulate the naive use of the validity predicate. Thus, operational approaches cannot be the basis of a theory of naıve validity—or at least cannot be the basis of one that validate both naıve principles.

In this presentation, we will present what seems like an unteanable position: an operational solution to the Validity Paradox that retains both naıve principles while not giving up no structural rule. The main idea behind these solutions is to break up the link between satisfaction of an inference and not being a counterexample to that sequent—or, similarly, to being a counterexample to an inference and not satisfying it. A philosophical consequence of this technical move is that, in some of these theories, VD will be accepted, while at the same time rejected, while in others, VD won't be rejected, though it will not be accepted. Anyway, it will not be possible to have the problematic instances of VD as axioms of the derivations that lead to the paradoxical result.

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Symposium continues in the same room, next time slot.

ROOM 11

14:30 – 15:00

Gustavo Bodanza (Universidad Nacional del Sur and CONICET), Esteban Freidin (IIESS-CONICET) - Empirical evaluation of a value-based argumentation model.

Topic: C.6 Philosophy of Computing and Computation

Abstract: Settling a dispute by arguing from different value-based viewpoints can sometimes be effective and sometimes sterile. In the legal court, cases well founded in evidence are usually lost due to arguments that point to procedural vices. The resource is usually effective because the rules of judicial procedure have a higher value than the evidence. On the side of sterile argumentation, dead end debates about the legalization of abortion are common, with favorable arguments from, e.g., the value frameworks of women rights and collective health, and contrary arguments from the frameworks of religion and the rights of the unborn. In this case, argumentation tend to be sterile due to disagreements on the superiority of one framework of values over another.

Value-based argumentation frameworks (VAFs) (Bench-Capon 2002, 2003a, 2003b, etc.; Gabbay 2014) are computational models of persuasion intended to serve in particular areas of practical reasoning and decision making. The strength of arguments vary according to the values they promote and the assessment of those values by the particular audience they address. An argument is defeated if it is attacked by other argument that promotes a value which is at least as preferred (by the audience) to the value it promotes, but it is strong enough to withstand the attack if the value it promotes is preferred. Then, argument interactions through an attack relation can be analyzed to find the best justified arguments for the audience. Accordingly, VAF can account for solving dilemmas by specifying an order of preference over values (representing the audience's preference). This intuition prescribes guidelines for the computational treatment of persuasion through argumentation.

VAF can also be considered as a theory about persuasion in real people, and psychological experiments could provide empirical support for the underlying insights. In addition, empirical data could suggest hypotheses to enrich the model for more and better applications. Contrary to the model, our experiments showed that people choose arguments that promote the value they prefer regardless of other variables. Moreover, the relative importance of values is assessed with different degrees, and the same argument can promote different values with different strengths. The evaluation can in turn be modulated by framing effects, and people usually change their perception on the relative importance of values depending on biases that incline their feelings towards conclusions. This finding is in agreement with well-known bias effects reported by experimental psychologists.

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15:00 – 15:30

Lucas Bang (Harvey Mudd College) - On the Experience of Program Size.

Topic: C.6 Philosophy of Computing and Computation

Abstract: Size is a fundamental but overlooked program characteristic that impinges on the phenomenological experience of programming, namely surveyability. Program size has a sparse philosophical history that deserves closer examination. I argue for a philosophy of program size, using a relatively obscure theorem of Blum [2] as a beacon.

Discussions of Blum's Size Theorem (BST) are sparse. Constable and Meyer explored program size theory in the 1970s [3, 6]. More recently, Harper summed up the consequences of BST: for a system in which you are guaranteed to know for certain that any program behaves as desired, there are specifiable problems for which the smallest solution is an unfathomably large program [4].

To argue for a philosophy of program size, I borrow from related analyses regarding incomputability. Wadler [8] and Soare [7] argued that a critical difference between the work of Turing and Church is that Turing explicitly connected his abstract model of computation to the experience of calculating, whereas Church did not. They agree that it was Turing's phenomenological argument that finally convinced Godel that lambda-calculus, Turing machines, and the theory of recursive functions are equivalent ways of capturing the notion of 'effective computability'.

Wadler refers to Turing's elaboration of the mapping between the tedium of rote calculation by human hand and the operation of the abstract machine. I interpret Turing's argument as a broader intersubjective case for the relevance of phenomenology in computability theory: foregrounding experience informs the theory of computation. Inspired by Wadler's and Soare's observations, I seek to inject what I find to be the missing experiential intersubjectivity into theoretical results on program size.

I claim that program size is key to the daily activity of programming and to programs' social effects. Computational abstractions are born, to some degree, to manage program surveyability. To support my arguments, I examine cases of coding in restricted programming systems in attempts to ensure correctness of code, ease of review, and affordance for static analysis including theoret ical frameworks (Godel's System T [1]), practical dependently typed total languages (Idris), and informal restrictions (NASA JPL's coding standards for safety critical systems [5]). Overall, my goals in the present work are to (1) draw attention to program size as a fundamental issue in the history and philosophy of theoretical computer science and (2) argue for the relevance of program size in the experience of programming.

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ROOM 12

(MMK) From previous time slot, same room.
Symposium: Mathematics, Modality and Knowledge Symposium

14:30 – 15:00
Katrina Torsoe (University of Miami) - Normativity in the Act of Logic Selection

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Logical pluralism and mathematical pluralism give rise to normative questions in both domains. Logical normativists see logic as prescribing norms for correct reasoning or as granting valid conclusions normative force, thus giving the systems at hand a prescriptive status. On the other hand, logical descriptivists view logic as a descriptive tool without normative force, akin to scientific description. Similarly, given that mathematical pluralism is grounded in logical pluralism, we can infer that for mathematical pluralists, mathematical structures will have analogous sorts of descriptive or prescriptive features.

However, this debate around logic's normativity places insufficient emphasis on another possible source of normativity for pluralists: the act of selecting a logic (or set of contextually identical logics), and subsequent mathematical framework, when presented with competing viable options. Standard pluralist accounts must assign some selection criteria for logics in various contexts which are meant to motivate the choice of a system or systems for that context. However, I argue that this is a choice and consequently an action, thus requiring these criteria to be granted some normative force just as any action requires some sort of normative valuation. It must be granted that in some cases this choice may be restricted by features of the relevant domain. Nonetheless, where applicable, the presence of any choice raises worries concerning the source of these valuations, especially for logical descriptivists, since it seems that these valuations cannot be derived from the criteria themselves. This likely points to us, the actors, as the ones assigning valuative force with perhaps little epistemic grounding. This may pose a unique skeptical challenge through its application to logic and mathematics since both fields are so closely tied to basic features of reasoning.

15:00 – 15:30
Jonas Becker Arenhart (Federal University of Santa Catarina) - Paraconsistent mathematics, descriptive and the normative

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)
Abstract: One of the philosophically notable features of recent paraconsistent approaches to mathematics seems to be a kind of tension between the descriptive and normative character of its theories. On the one hand, such theories are proposed as descriptions of alternative versions of the same theories in classical mathematics, and on the other hand, there are sometimes also some more normative claims to the effect that paraconsistent mathematics, at least in some cases, are the right or the correct approach to some mathematical theories (most notably, set theory), so that these are theories that should be pursued. The situation emulates what happened one century ago with

intuitionistic mathematics: it was originally developed and promoted as an alternative to classical mathematics, which was deemed wrong by most practicing intuitionists (most notably, Brouwer). One century latter, there is no longer a dispute concerning the right way of doing mathematics, with approaches finding a place in current mathematical practice. In this talk, a naturalistic approach to mathematics is suggested according to which such disputes concerning the correct mathematics are dissolved as ill guided. It is proposed that each family of approach has its own internal standards of correctness, and, accordingly, its own ontology guided by such standards. Disputes about which mathematical version of set theory is correct, for an example, are then deflated, given the absence of an external mathematical reality independent of a descriptive framework delimiting the possibilities inside a theory. Whether a theory becomes part of the current broadly understood practice of mathematics depends on whether it poses interesting and fruitful theories, so that it becomes part of the research activities of mathematicians.

15:30 – 16:00

Nikolaj Jang Lee Linding Pedersen (Yonsei University), Matteo Zicchetti (University of Warsaw) - Non-evidentialism about mathematical foundations: Moore, mathematics and transmission failure.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Moore is widely known for his claim that he could rigorously prove the existence of an external world by uttering “Here is one hand” (while making a certain gesture with the right hand) and “Here is another” (while making a certain gesture with the left hand). Crispin Wright has offered an influential diagnosis of why one might find Moore’s ‘proof’ epistemically defective: it cannot be used to acquire an evidential warrant for thinking that there is an external world because it is epistemically circular. In light of this failure Wright has proposed a non-evidential notion of warrant—epistemic entitlement—applicable to acceptance of the existence of an external world. We transpose Moore’s ‘proof’ to the case of arithmetic. Crucial steps of the transposition include the articulation of relevant metaphysical and epistemological commitments—in particular: what is the fundamental nature of reality? And which faculties or capacities facilitate our thinking about it? We introduce minimal realism to answer the first, metaphysical question. According to minimal realism about a given domain D, D states of affairs are objective in the sense of being mind-independent. (Hence the realism.) At the same time, beyond mind-independence, minimal realism is neutral with respect to the metaphysical character or constitution of states of affairs. (Hence the minimalism.) To answer the second, epistemological question we adopt a quasi-perceptual account of intuition. Against the background of minimal realism and quasi-perceptualism about intuition we argue that Moore-style ‘proofs’ in the case of arithmetic are bound to fail. Intuition-driven attempts to acquire an evidential warrant for thinking that arithmetic has a subject matter are epistemically circular. In light of this failure we explore Wright-style entitlement as a candidate epistemology of basic mathematical ontology.

16:00 – 16:30

Paweł Stacewicz (Warsaw University of Technology), Paula Quinon (Warsaw University of Technology) - Analog computation - continuous vs empirical.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: We discuss different ways of how the expression “analog” is used in the methodology of computer science and related engineering disciplines:

1. AN-C (ANalog – Continuous), involve the processing of continuous data that, at the level of mathematical description, are characterized by real numbers from some continuous domain (e.g., from the interval [0,1]) (Moore 1996).

2. AN-E (ANalog – Empirical), refers to empirical computations whose purpose is to implement dedicated physical processes that are natural analogons of certain mathematical operations. In this case, the expression "analog" might sound misleading as it does not refer here to continuous processes, but to empirical ones. Some AN-Es are most adequately modeled by a model of continuous computation (e.g., some biochemical systems), but some other by a model of digital computation (e.g., some engineering artifacts).

In our talk we will focus on those AN-E which are modeled by models of continuous processes, so AN-C models.

There are several theoretical models of AN-C computation (running in continuous time, like the General Purpose Analog Computer model (Shannon 1941) or the Real Recursive Functions model (Costa&Graca 2003); or running in discrete time, like recurrent neural networks (Siegelmann 1998) or the Blum-Shub-Smale (BSS) model (1989). These models, like the Universal Turing Machine model for digital computing (Turing 1936), abstract from the physical properties of natural processes, in particular abstracting from whether continuous quantities exist in nature.

AN-E computations are dedicated, hence there is no one-fits-all model that determines the elementary (mathematical) operations and structures to describe each AN-E computation. Conversely, there are local models, which are fragments of theory that justify assigning some (simple or complex) mathematical operation to some physical process. For example, a model of computation performed by a mechanical dedicated differential system would be the fragment of theoretical mechanics which describes the motion of bodies by means of differential calculus.

In our earlier work (Quinon&Stacewicz, submitted), from within the framework of Carnapian explications (Quinon 2022), and we argue that any model of AN-C provides an explication of all those empirical computations that correspond to the intuition that certain devices operating on continuous quantities perform computations (AN-Es). We call this "the analog continuous thesis" ("the AN-C thesis"), and we show how it is similar to other theses used to account for computations, such as the Church-Turing thesis or the Cobham-Edmonds thesis.

In this paper, we stay within the Carnap framework, but extend our study to other conceptualisations of intuitions related to analog empirical computation. We analyse the historical example of Turing, where we focus on a possible non-mechanistic and partly empirical interpretation of Turing's work (Greif&Kubiak&Stacewicz, manuscript). We also look at interpretations of physical computation from (Piccinini 2015, 2020) and analog computation from (Maley 2011, 2021).

We contribute to The Mathematics, Modality and Knowledge Symposium by showing how different intuitions about physical and analog computation coordinate with formal accounts of what computation means.

ROOM 13

(EAI) From previous time slot, same room.

Symposium: Ethics and Artificial Intelligence from fundamental issues to new challenges

14:30 – 15:00

Carolina Mayag (Chief of Staff) - It is time to revamp Human-Centered Design Framework using an ethical perspective.

Topic: C.6 Philosophy of Computing and Computation

Abstract: Human-Centered Design Framework (HCDF), the approach used in most tech developments, frequently generates unexpected negative externalities. HCDF aims to suit users' needs and requirements (NIST, 2021) through attractive and easy-to-use features. However, the framework doesn't consider the negative consequences and cost imposed on society (Biglan, 2009) of producing a new tech solution. Without an ethical perspective, systems failures risk becoming system features (Gall, 1977).

Over the past decade, machine-learning techniques have been integrated into home appliances and personal devices. These technologies use a large amount of personal and sensitive data, including voice, face, biometrics, photos, and geolocalization, to train algorithms to recognize patterns (GUO, 2022). However, to make datasets useful, human data labelers are needed to make data «understandable» for algorithms. This human-in-the-loop process "gives companies broad discretion in how they disseminate and analyze consumer information" (GUO, 2022). Inevitable issues arise: first, consumers are not explicitly informed their data has to be processed by another human being, which represents a data privacy issue. Second, human data labelers are a keystone of data processing, although they are the «weakest feature» of the system. Low-paid contract workers in precarious labor conditions (Perrigo, 2023), with doubtful data security protocols (GUO, 2022), handle the most valuable asset of Ai solutions: Your data. A negative externality example, people's intimate photos taken by a vacuum robot where leaked on social media by data labelers in 2020 (Guo, 2022).

The product design process focuses on the ends without evaluating the negative externalities of the means. We believe this aproach carries unnecesary risk and the design industry must adapt the framework. The HCDF only considers end-users' satisfaction overlooking how this is done (Figure 1).

Figure 1.HCDF

Empathize (Identify needs)→Define (Understand needs)→ Prototype→Test

To mitigate this negative externalities risk, we will proposed an ethically enhanced HCDF (Figure 2).

Figure 2

Empathize (Identify needs)→Define (Understand needs)→ Prototype→Test→Ethical probe (detect negative externalities)→Mitigate

Our ethically-enhaced HCDF will not guarantee the emergence of negative externalities in future tech solutions. However our approach should trigger necessary discussions about the necessary role of ethics in the technology design process.

As part of our contribution, we encourage further research and academic collaboration on how ethics can become an inherent part of the technological design process.

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15:00 – 15:30

Damian Furman (Instituto de Ciencias de la Computación (CONICET - Universidad de Buenos Aires)), Maria Vanina Martinez (Artificial Intelligence Research Institute (IIIA - CSIC)), Laura Alonso Alemany (Universidad de Cordoba) - AI to fight hate speech in social media.

Topic: C.6 Philosophy of Computing and Computation

Abstract: It is indisputable that social interactions mold, to different degrees, people’s knowledge, beliefs, personalities, and behavior. With the rapid growth of social media platforms, hate speech and messages that were already present in our society found a way to spread faster and increase their reach. People increasingly base their daily decisions on what they find on such platforms, making them a very useful and convenient tool but also a very vulnerable one as many attacks often take the form of misinformation and other forms of malicious content, with the potential for causing great damage to the users and society as a whole.

Hate speech represents in itself a grave danger for societies. The International Convention on the Elimination of all Forms of Racial Discrimination (CERD) [1], understands hate speech as "a form of speech directed at others that rejects basic human rights principles of human dignity and equality and seeks to degrade the position of individuals and groups in society's esteem".

Social media platforms allows amplification of its effects, deepening prejudice and stereotypes. The development of responsible and ethical technology urges us to try to detect and neutralize such phenomenon. This is, however, a Herculean task that cannot be solved manually, due to the enormous amount of data and information available online. Recent advances in Artificial Intelligence reveal the potential of using Natural Language Processing (NLP) tools to address this problem, however, not in a complete autonomous way as the current state of the field fails to interpret the inherent uncertainty and subjectivity of the task.

From a theoretical point of view, we developed a framework for an argumentative analysis of hate speech, aimed to provide more useful insights into this phenomenon and facilitate more effective (semi) automatic downstream treatment. We base our framework on Wagemann’s approach [2] to argument analysis, seeking to detect the core of the user’s reasoning, going beyond the typical argumentative components such as justifications and conclusions. This allowed us to identify domain-specific categories representing specific characteristics of hate speech, and describe these argumentative components and the results of applying them to manually annotate the Hateval corpus [3], releasing both the annotated corpus and the annotation manual.

We have also carried out a series of experiments to assess the feasibility of automatic argumentative analysis under different settings, including monolingual and multilingual, showing that for most components, performance is close to human annotators, but that some components are easier to recognize than others. A deeper qualitative analysis of the output examples allowed us to identify critical components and discuss ways for improving the recognition process.

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15:30 – 16:00

Eduardo Rivera López (IIF-SADAF-Conicet) - Predictive Algorithms and Fairness.

Topic: C.6 Philosophy of Computing and Computation

Abstract: The ethical challenges of artificial intelligence are pressing already today and will be still more pressing in the near future. One aspect of these challenges concerns the increasing capacity of computational algorithms to predict human behavior. This kind of prediction is, of course, not new. In order to make decisions that affect other people, we make predictions about those people all the time.

These probability judgments are predictive judgments. With the development of computing and artificial intelligence, which are capable of processing enormous amounts of data, these predictive judgments are delegated to algorithms. These computational mechanisms, by processing enormous amounts of information, supposedly achieve better, or more accurate predictions.

A question that has been raised is whether these algorithms can be unfair to some individuals in virtue of their membership to a certain group. The most famous and discussed example of this type of possible unfairness is COMPAS, an algorithm designed to predict recidivism in convicted persons. COMPAS is used in several courts in the United States to make decisions about granting parole. In May 2016, the NGO ProPublica
published a study accusing COMPAS of giving biased results detrimental to African- Americans (Angwin et al. 2016). ProPublica found that the rate of false positives and false negatives was different in both groups. However, the company (Northpointe) responded to this objection by arguing that the result pointed out by ProPublica is due to the fact that the base rates of the two groups are different (i.e., the probability of recidivism of members of each group). What is relevant is not the differential rate of false positives or false negatives, but that the predictive value of the algorithm is the same for members of each group. And these values, the company argues, are similar for white and African-American people (Dieterich 2016).

One might wonder how is it possible for an algorithm to have equal accuracy (or equal predictive power) between the two groups and yet have unequal false positive and false negative rates. Despite being counter-intuitive, it has been shown that, not only is it compatible for both to occur, but it is not possible to have, under realistic conditions, equal accuracy or predictive power and, at the same time, equal false positive and false negative rates among groups (Chouldechova 2017; Kleinberg 2016).

My aim is to advance ideas about how these algorithms should be construed in order to avoid discriminatory biases. More precisely, I ask whether it is plausible (against some authors like Hedden) to sacrifice some degree of predictive power in order to fulfill other requirements of fairness.

16:00 – 16:30

Luciana Benotti (Universidad Nacional de Córdoba, CONICET, Fundación Vía Libre), Laura Alonso Alemany (Universidad Nacional de Córdoba) - Stereotypes and discrimination in Artificial Intelligence.

Topic: C.6 Philosophy of Computing and Computation

Abstract: Natural Language Processing is crucial to a wide range of applications in our everyday lives. Some of these applications directly affect human rights, mostly the right to non-discrimination, like the automatic processing of resumes, automatic grading or even psychological profiling. At the core of these technologies there are artifacts like word embeddings and large language models. These artifacts are inferred with machine learning techniques from big volumes of text. In the process of inference, the biases and stereotypes in texts are crystallized into the artifacts, and subsequently carried into downstream applications.

Typically, experts in discrimination have been precluded from a central role in bias assessment in these artifacts because existing approaches to bias assessment require a high degree of technical skills, both programming and statistics. In this talk, we will show how many of the concepts that have been deemed key in bias assessment approaches function as practical gatekeeping devices, namely.

Metrics as the primary way of assessment: Metrics are opaque and counterintuitive for non-technical users (and for a good part of technical users as well). However, they need not be the main way to assess bias, among other reasons, because they have been shown to be poor representations if the conditions for measurement change, for example, to measure different biases, with different lists of words, or different word embeddings. As an alternative to metrics, we show how visualizations provide a more intuitive assessment of bias, they can be integrated as a complement to metrics, but users have also found them as useful devices to carry out the exploration process and to obtain conclusions that can be effectively communicated.

Mathematical or statistical concepts have been used to describe the process of representation and assessment of bias. Such concepts tend to create the impression that people who have not studied them cannot understand the process. Instead, we have devised ways to address the process of bias representation and assessment without resorting to specific mathematical, statistical or machine learning concepts, instead replacing them with more mundane, intuitive concepts. We then tested these terminologies with users and found them to be satisfactory.

The role of mitigation in the process has been very central in previous approaches, but we find the way mitigation is addressed in other works relegates bias assessment to a peripheral role, similar to the shallow patches that are currently being employed in productive applications. We find that assessment should instead be carried out at early stages in the development of language technologies, so that more integral, preventive measures can be taken, like using other word embeddings or language models, re-training them, or re-thinking the approach altogether.

We have developed a tool and methodology where no programming or statistics skills are necessary to explore and assess biases, thus making it possible to engage experts that usually do not have such skills. We have tested the usability and usefulness of the approach in various workshops with interdisciplinary teams, with great success.

16:30 - 17:00 COFFEE BREAK

17:00 - 18:00

AUDITORIUM 2

(FE) From AUDITORIUM 2, 14:30 – 16:30
Symposium: Special Symposium: What's New in Formal Epistemology?

17:00 – 17:30
Michael Titelbaum (University of Wisconsin-Madison) - What's New in Permissivism? I

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: A spectre is haunting epistemology. We have grown interested in questions often best framed in terms of "epistemic standards". We know the role they're meant to play—what's represented by priors, what's left over when an agent's evidence is subtracted from her opinions. But what are epistemic standards? What is that which plays this role? What do we know about them, and what would it be most useful to know?

17:30 – 18:00
Kenny Easwaran (Texas A&M University) - What's New in Permissivism? II

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: A spectre is haunting epistemology. We have grown interested in questions often best framed in terms of "epistemic standards". We know the role they're meant to play—what's represented by priors, what's left over when an agent's evidence is subtracted from her opinions. But what are epistemic standards? What is that which plays this role? What do we know about them, and what would it be most useful to know?

ROOM 01

17:00 – 17:30
Chrysi Malouchou Kanellopoulou (University of Edinburgh) - Unpacking 'prospectivity' in selective realism.

Topic: B.1 Methodology

Abstract: Evidence in favour of selective realism should be gathered only through analyses of past theories carried out with criteria that can be prospectively applied to identify essential or inessential theoretical components (Stanford, 2003). Selective realists aim at obtaining evidence from the history of science for the claim that the theoretical elements essential to the success of past theories were preserved across theory change; whereas the idle elements were ultimately abandoned. If selective realists retrospectively identified the elements of past theories essentially responsible for the success by relying on current theoretical knowledge of what was retained, then, Stanford claims, the evidence they would have gathered would be partial and illegitimate (Stanford, 2003). Indeed, several proponents of selective realism have attempted to provide prospectively applicable criteria, such as Vickers (2013, 2017, 2019).

But this methodological requirement for prospectivity is not free of conceptual consequences. If one believes that it is possible to prospectively determine which elements of past theories are worthy (or unworthy) of realist commitment, then one should also believe that we can determine such elements in current scientific theories. Commitment to prospectivity as a methodological

requirement entails a conceptual commitment to the idea that we can predict which parts of present theories are likely to be abandoned or retained in future science. In that light, selective realism may appear helpful to the public: especially in contexts such as the pandemic, it can be beneficial to know how to identify theoretical claims that are likely to be overturned in the future. However, doing so may have the unintended consequence of waning the public's trust in science, since it may entail a constant questioning of scientific discourse. These conceptual consequences of prospectivity have not been sufficiently discussed in the literature, resulting in ambiguity regarding the meaning of 'realism' in selective realism.

In my paper, I start by examining whether Vickers's criteria for the identification of essential or inessential theoretical assumptions may fulfil the prospectivity requirement. I argue that Vickers's criteria provide consistent analyses of the same theoretical assumptions only if hindsight is involved. Namely, Vickers's criteria are not prospectively applicable. Then, I question whether the impossibility of providing prospectively applicable criteria undermines the realism in the selective realism project: is selective realism a viable realist position only if it guarantees that we can prospectively identify essential elements in theories? I argue that selective realism is not meant to be a position telling us how to predict which parts of present science are likely to be preserved. Selective realism sheds light on the epistemic dynamics of theory change. Even without prospectively applicable criteria, selective realism may still support a properly realist position.

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17:30 – 18:00

Luis Meza Chavarría (Universidad de Costa Rica) - Could there be an algorithm for theory choice?

Topic: B.1 Methodology

Abstract: How are scientists supposed to choose over competing theories? The standard answer goes by appealing to theoretical virtues (also known as epistemic values) such as accuracy, simplicity, consistency and the like. Together, they are meant to provide the rational basis for theory choice, or at least some believe so. In a famous article called "Objectivity, Value Judgement and Theory Choice" (1977), Thomas Kuhn raised a well-known objection against its alleged objectivity: theoretical virtues can be understood in several ways, and more often than not enter into conflict with one another. This calls for a trade-off between them, but there is no unique way to do so. For Kuhn this meant that "there is no neutral algorithm for theory-choice, no systematic decision procedure which, properly applied, must lead each individual in the group to the same decision" (1970, p. 200), so that, when choosing theories, different scientists may legitimately end up getting different results. My purpose in this presentation is to assess if we have reason to believe Kuhn's objection succeeds.

The outline of the talk is as follows: [1] the report of Kuhn's original argument, [2] the informal reconstruction in natural language, [3] the formal reconstruction using first-order logic, together with [4] the development of a formal proof of validity, and, last but not least, [5] the analysis of the rational support of the premises, in order to determine if the argument is in fact sound. In this final section, Kuhn's claims are confronted with current results from formal and social epistemology, machine

learning, decision theory and experimental philosophy of science. In particular, it is shown that framing the problem in terms of the mathematical field known as Multi-criteria decision analysis (MCDA) offers valuable insights into its possible resolution.

ROOM 02

17:00 – 17:30

Jill Hernandez (Texas Tech University), Sue Whatley (Stephen F. Austin State University) - The Multivalent Logic of Death and Communion.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: The existential indubitable—that I am my body and that my body will die—has reinforced a philosophical bivalence of the self and other. Yet, French existentialist Gabriel Marcel argued that death is the springboard of hope, because it is "the crisis which completely shatters all faith in existence, all certitude of presence" (1973, 234). If Marcel is right, and death can succeed in shattering the certitude of presence, death must involve something beyond the bivalence of the existential indubitable, since my body and its finitude grounds the possibility of presence with the other.

This paper will contend that an immature existential view of death is rooted in bivalence, but that a mature existential conception of death depends on intersubjectivity between the self and the other—and that this conception can create hope, facilitate meaning, and help subjects triumph over existential despair through the act of communion. The success of the paper resides in understanding both that "intersubjectivity" is a relational quality that subsists when one's presence counts as a reason for acting, and that "love" occurs in an intersubjective relationship when the other will always be present in the subject's life. To love a being, Marcel wrote, was to say that you will never die (1965, 144).

The existential presence required for death to deconstruct the certitude of a person's physical presence to another is a radical commitment to multivalence, that has at least three results for philosophy. First, Marcelian presence magnifies the humanist problem of evil. Whereas most philosophers of religion care deeply whether evil in the world threatens the concept of divine existence, for Marcel, whether there is evil in the world is only understandable in the context of concrete communication of one person with another (1965, 140). If death permanently silences a loved one from a beloved, the evil suffered is gratuitous. If, however, the loved one's presence continues to communicate hope for the beloved, suffering is experienced within the context of a loss of physical proximity only. Second, death is a springboard to hope just in virtue of the fact that communion counteracts the seeming 'infinite resources' of despair that can accompany the loss of a loved one.

If death reinforces the loved shared between persons, and highlights paths towards moral repair and improvement, then the communion of those who love each other outlives the physical body of either person. Finally, communion invites those who grieve to a community that is grounded in something other than self-love. Despair—so prevalent in existential thought- is a point of departure for those who encounter only the bivalence of the existential indubitable. But, for those who engage meaningfully and intersubjectively, despair becomes one of a set of experiences, rather than a subject's defining experience.

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17:30 – 18:00

Washington Morales Maciel (University of the Republic) - On Life Narratives and Literary Narratives (Epistemological and Metacritical Problems).

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: It is a common thesis in the philosophy of personal identity, in metacritics of literature, and finally, in some trends in psychology that the constitution of personal identity works as if the self and its unity were some kind of literary narrative. So, for example, Donald Polkinghorne asserts that "Self identity becomes linked to a person's life story, which connects up the actions into an integrating plot." (Polkinghorne 1988: 151). We can find the same when Alasdair MacIntyre wonders, "In what does the unity of an individual life consist? The answer is that its unity is the unity of a narrative embodied in a single life." (MacIntyre 1981: 218-9). In both cases, personal narratives behave as if they were literary narratives in such a way that they even involve plots. In the same trend, Erwin Goffman's dramaturgical analysis tries to explain social interactions using notions such as those of performers, acts, stages, and audiences (Goffman 1956). However, many counter-arguments have been held against those approaches by pointing out relevant differences between personal and literary narratives, especially those fictional. Peter Lamarque, for example, infers from his conventional theory of literature that those principles involved in constructing and reading literature have nothing to do with our self-narratives. According to him, since interpreting literature depends on the conventional demands of the literary objects, reading critically literary pieces consists of appreciating the, so to speak, internal connections of those details that configure the modes of presentation of the fictional subjects (Lamarque 2004, 2014, 2015). The ideas of literary opacity, i.e., our disposition to focus on the ways of presentations of fictional subjects, and the teleological principle of literature, which says that every detail has a function related to the sum of details and the whole piece, draw up the difference between those two kinds of narrative. While descriptions constitute fictional characters, events, and objects, functionally and teleologically, it is at least polemic to say, first, that personal identity responds to constitutions under description, and, second, even if it is the case so, it is not clear at all that descriptions of everyday experiences are akin to those of literature. Of course, curious mystical beliefs sometimes say "things happen for a reason" and similar phrases, but they are outside the philosophical and scientific dominions. Also, even those theories on making up people, like that by Ian Hacking (Martínez Rodríguez 2021), do not provide clear evidence for advocating the literary character of classifications. This proposal aims to extend and refine these arguments by Peter Lamarque, appealing to new approaches to personal narratives (Fabry 2023). My point is that neither memories nor autobiographies nor even less narrative spontaneous conversational narratives respond to those literary principles of literature. That, I affirm, implies problems for both literary humanism and human sciences, compelling alternative ways of thinking about the aesthetic link between literature and the self.

ROOM 03

(APPIN) From previous time slot, same room.
Symposium: Applications of Informal Logic

17:00 – 17:30

Natalí Cardoza Rojas (PUCP) - Epistemic and social considerations in the approach to fallacies in Informal Logic.

Topic: A.2 Philosophical Logic

Abstract: Although the methodology and research within logic comply with a scientific, rational and objective rigor, it should be noted that these schemes are behind a bias associated with masculinity within the philosophical tradition (Haslanger 2008; Garavaso 2016; Hundbley 2021). This is evidenced, for example, in the evaluation of the arguments that must be fulfilled under an approach of rationality and avoid those errors of reasoning also recognized as fallacies. However, as a result of this, Janice Moulton has identified a paradigm within this approach dubbed "The Adversary Method Paradigm." This method of discussion considers philosophically irrelevant other approaches to reasoning in order for the argumentation itself to be defended by defeating the opponent's arguments. In this talk, it will be postulated that the adversarial method not only excludes other forms of reasoning, but also enters a discussion with the realms of social justice and epistemology. To defend this position, it will begin with a brief explanation of the adversary paradigm associated with aggressive behavior and whose acceptance in the philosophical community allows domination in the approaches to logic, in addition to misrepresentation in the evaluation of fallacies. A different approach to fallacies will be introduced, allowing them to be associated with a different formulation of rationality (Burke 1984; Hundleby 2010). From these premises it will be shown that, at least, in cases such as ad verencudiam and ad hominem, a line of reasoning can plausibly be sustained. Likewise, it will be argued that, from the books of logic that have been governed by the adversary method, this is part of the problem of epistemic or argumentative injustice, by legitimizing certain discourses over others or recognizing one argument against another (Fricker 2007; Bondy 2010; Hundleby 2021). The objective of this research is, finally, to give relevance to the reformulation of the study and the application of informal logic, together with the epistemic recognition of anyone who defends an argument or testimony.

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17:30 – 18:00

Pamela Lastres (Pontificia Universidad Católica del Perú) - Prejudices, ad feminam Arguments and Epistemic Injustice

Topic: A.2 Philosophical Logic

Abstract: Informal fallacies known as ad hominem arguments are cases of personal attack that ignore or fail to address the issue in question rather than properly answering to it. This talk specifically addresses personal attacks on women and analyzes how they could produce situations of epistemic injustice. The contribution uses concepts from informal logic and epistemology to analyze a specific type of dialogical exchange between real and socially situated people: the ad feminam arguments.

The talk also explores the connection of ad feminam arguments with situations of epistemic injustice, that is, those in which harm is inflicted on someone —a woman— as a subject of knowledge. It deals particularly with the variant of testimonial injustice (Miranda Fricker). It shows cases of ad feminam arguments in which testimonial injustice is expressed in terms of a deficit in credibility: these arguments damage the rhetorical credibility of the female speaker. Finally, it suggests that, while acknowledging their irrelevance, the impact of ad feminam arguments can be explained (at least in part) by appealing to deeply held gender prejudices.

The talk aims to explore this type of argument from a non-androcentric approach (Lorraine Code). Credibility (people willing to believe you) is a survival tool, therefore detracting someone's credibility is a form of violence (Solnit). The argumentum ad feminam is epistemically more damaging than the other common types of ad hominem arguments.

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ROOM 04

17:00 – 17:30

Jonah Schupbach (University of Utah) - Creative Intelligence, Abduction, and IBE.

Topic: C.9 Philosophy of Emerging and Interdisciplinary Sciences

Abstract: Peirce famously distinguishes three distinct types of reasoning: deduction, induction, and abduction. For Peirce, "induction never can originate any idea whatever. No more can deduction. All the ideas of science come to it by the way of abduction, [which] consists in studying facts and devising a theory to explain them" (CP 5.145). Abduction is our creative intelligence, "the loftiest of our merely instinctive powers," a "faculty for guessing" that is correct remarkably often (though "not oftener right than wrong"). Much of this same language and sentiment is repeated by Turing (1938) in his notion of "intuition," the intelligent faculty of making spontaneous judgments that are "often but by no means invariably correct."

This line of thought suggests that the development of artificial general intelligence, human-level and beyond, may wait upon a fundamental theory of creative intelligence. As a first step toward this end, this paper explores the prospects for the Peircean, abductive idea that we creatively infer new ideas by attempting to explain the world; we create by attempting to answer 'why?' questions.

If creative abduction could be described in a precise algorithm, well-known shortcomings of modern AI would plausibly be greatly improved. I argue for this by looking specifically at current AI performance on natural language understanding tasks. Even state of the art AI (e.g., ChatGPT's transformer architecture) continues to be easy to "trick" with classic prompts (e.g., Bar-Hillel's famous "the box is in the pen" example, and Winograd schema questions). AI scientists commonly take such shortcomings to indicate a lack of genuine understanding in machines (Levesque 2017, Woolridge 2020). I argue that, if computers were able abductively to infer new ideas along with the explanatory relations that these bear to other concepts, this could indeed provide a path to deeper, more genuine understanding.

I explore Inference to the Best Explanation [IBE] in particular, investigating whether it can provide a logic of creative abduction. Prominent objections to IBE claim, each in their own way, that IBE is non-creative, putting certain explanatorily desirable ideas out of reach and undiscoverable. After showing that these objections all unwittingly rest upon an uncharitable interpretation of "best explanation," I propose a novel interpretation that sidesteps these objections. This interpretation implies a sense in which creative intelligence can indeed be captured by IBE. I show that a formal explication of explanatory goodness helpfully guides reasoning when IBE is so reinterpreted. A creative aspect of intelligence can then be formalized and (in principle) automated using a naïve search algorithm over the space of Boolean combinations of hypotheses. Since such an algorithm runs into the usual challenge of computational complexity, I discuss various heuristics that are available for making creative AI tractable.

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17:30 – 18:00

Mariana Olezza (IIEP/UBA), Javier Legris (IIEP/UBA/CONICET) - Peirce on logical machines and semiotics.

Topic: A.4 Historical Aspects of Logic

Abstract: In the dawn of symbolic logic, Charles S. Peirce (1839–1914) discussed the logical machines devised at that time in a short paper published in 1887 in The American Journal of Psychology. In it, Peirce applied his own ideas on the theory of signs and reasoning. In the following, we show that, in doing this, Peirce advanced later semiotic reflections on Artificial Intelligence. The idea of theorematic reasoning, indispensable in Peirce's account of mathematical proof, will play an important role in the discussion

Peirce discussed the logical machines respectively designed by W. Stanley Jevons (1836–1882) and Allan Marquand (1853–1924). Jevons developed a "logical abacus" and more noticeably, the logical piano, in order to reduce complex boolean expressions. Marquand conceived the first electromechanical logical machine along with Peirce.

In this discussion, Peirce argued that semiosis is not reducible to mechanical causal factors. Our paper will take into account his semiotic concept of mind. Machines possess quasi-semiosis, a simulation of semiosis, and while human beings are "semiotic systems", logical machines are not. According to James H. Fetzer, it is the ability to make mistakes that characterizes a semiotic system. However, this criteria to distinguish a semiotic system should be revised, because artificial neural networks (ANN) in general can misclassify data. So: or it is not necessary for a system to be semiotic for it to generate an error, or ANNs could also be considered semiotic systems.

At this point, Peirce introduced in the discussion the idea of theorematic reasoning, which goes beyond mere mechanical procedures. Theorematic deduction "resorts to more complex processes of thinking" (Peirce EP II, p.442). These processes involve the introduction of information that was not included in the premises of the deduction. With theorematic reasoning, Peirce attempts to explain the generation of new knowledge in mathematics, trying to explain what is usually called "mathematical creativity".

Now, is it possible to jump the leap from deductive reasoning to theorematic reasoning through learning mechanisms? Will creativity be achieved through ANNs,? Faced with this, we find ourselves with the well-known "Lovelace objection", raised by the first programmer Ada Lovelace (1815–1852), who expressed in 1843 that the Analytical Engine designed by Charles Babbage had no pretensions to originate anything. It can only do what we order it to perform. Alan Turing (1912–1954) replied to the objection stating that while Lady Lovevace in her day probably had no reason to think that machines were not capable of generating something original, that was not necessarily true of machine learning, and he began a project in 1950 to advance the field of AI based on learning. That project is currently being continued in what is known as ANNs. Today we have systems such as GPT-3 which, in the case of "creativity", offers us to discuss systems like DALL-e. In our contribution, we will examine this new achievements in the framework of Peirce's thinking.

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ROOM 05

17:00 – 17:30

Agustín Mauro (Instituto de Humanidades, CONICET/UNC) - Disciplinary niche construction. A conceptual framework for disciplinary expertise.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: As the philosophy of science has moved towards pluralistic and social perspectives on scientific knowledge, it has become more relevant to understand disciplinary expertise, i.e. the ability of a discipline to establish an area of competence. How is the expertise or competence of a discipline established? What processes determine its area? Ultimately, how do they arrive at "true" discourses on certain phenomena? These questions are not only relevant for theory but also become pressing when establishing interdisciplinary spaces or in scientific controversies, spaces where expertise is disputed between disciplines. In this theoretical-argumentative presentation I seek to show the possibilities of looking at processes of disciplinary expertise production as analogous to the evolution and construction of niches (Jablonka & Lamb, 2014; Odling-Smee et al., 2003). While "niche" is a concept from ecology, there are other philosophical uses for understanding cognition (Clark, 2005), technological change (Schot & Geels, 2007), and even online communities (Arfini et al., 2019), but not for conceptualising disciplines and specialties. In this metaphorical extrapolation I intend to show how disciplinary expertise can be thought of as a n-dimensional space established by a distribution of factors and resources, which a discipline constructed in order to produce knowledge about one or several domains. This framework makes explicit how the local actions of epistemic agents and the availabilities objectified in more global aspects of the scientific production system, both in terms of environmental factors and resources, guide the evolution of disciplines and enable agents to establish an area of expertise. Furthermore, the framework can inherit the perspectives of other authors such as the non-differentiation between the cognitive and the social (Bloor, 1991), the role of non-humans (Latour, 2005) or the diversity of resource relations in scientific research(Knorr-Cetina, 1982). Finally, the conceptual framework provides a link between discussions in the philosophy of science and discussions on the Anthropocene and Capitalocene (Haraway, 2015).

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17:30 – 18:00

Rafael Miranda (Universidad Católica del Maule) - Burden of proof, implicit metaethical intuitions and moral objetivism

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Recently, Wagner et al. (2021) have developed a critique of the pro-moral objectivist metaethical position, based on what they call the "burden of proof argument" (p.2). This is basically a rejection of the fact that the burden of proof in the objectivism-non-moral objectivism debate lies with the non-objectivist position, and that this therefore results in an initial advantage for the objectivist position, the one that holds that there are moral truths. I argue in this paper that the argument fails on a central presupposition that is rejected by the objectivist stance: that moral truths depend on the epistemic states of a subject S or group G. Therefore, it is not relevant from a metaethical perspective what intuitions have, or do not have, a certain group G or subject S. Nevertheless, the consequences of holding the non-centrality of intuitions (Machery 2017) for a metaethical stance are assessed, and how intuitions cannot therefore be a way for a non-objectivist stance nor for an objectivist stance. This precludes reaching the central conclusion of the analysis developed by Wagner et alia (2021), namely that the default metaethical stance is what they call metaethical pluralism, and that a non-objectivist moral stance attributable from folk intuitions derives from this pluralism.

ROOM 08

17:00 – 17:30

Thodoris Dimitrakos (University of Patras) - Scientific Realism and Naturalism: a love-hate relationship.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: In the history of 20th century philosophy of science we can distinguish between, at least, three kinds of views on the relation between scientific realism (SR) and naturalism. The first kind can be called the ‘relationship of overt rivalry’ and includes perspectives which are explicitly naturalistic and antirealistic at the same time. The perspectives in question took the form of historicism or sociologism (e.g. Strong Programme [Bloor 1991]) (among other forms) and apart from SR they also challenged the autonomy of scientific rationality in a way that led to relativism. The second can be called the ‘relationship of selective coordination’ and includes perspectives which challenged the traditional aprioristic epistemology from a naturalistic standpoint, without aiming at rejecting the autonomy of scientific rationality. Rationality, in this context, is taken in its hypothetical form (Laudan 1990, Giere 1988) and SR is at best defended in the least robust version (Giere). Finally, there is the ‘relationship of espousal’.From these perspectives, epistemological naturalism and (robust) SR support each other and both of them combined are the best defense of scientific rationality.

In the present paper I am concerned with the relationship of espousal. My aim is to show that scientific realism is compatible with naturalism only if the latter is understood in its liberal (de Caro & Macarthur 2022) -as opposed to its restrictive or eliminative- version. I examine the most elaborate account of naturalistic realism (Boyd 1980; 1984; 1989).Boyd provides an ‘explanationist’ (Psillos 2017) defense of SR. His view forms an explanatory pyramide: scientific method is explained by the instrumental reliability which provides and the instrumental reliability by the (approximate) truth of scientific theories. Furthermore, epistemology is turned into an empirical enterprise which aims at

empirically justifying the scientific method. I argue that Boyd's account faces an unwanted dilemma: the scientific method should be taken either in its purely naturalized version (as what a scientific community takes to be the proper method) or in its genuinely normative version (as what really contributes to science's instrumental reliability). The first horn is compatible with the conception of epistemology as an empirical enterprise but, I argue, leads inevitably to relativism. The second horn of the dilemma avoids relativism but it is incompatible with the conception of epistemology as an empirical enterprise. I suggest that we should go for the second horn by embracing a liberal version of naturalism which takes the normative realm to be non reducible to the domain of empirical descriptions. This move could provide a coherent philosophical image of scientific change which defends the autonomy of scientific rationality within a naturalistic framework.

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17:30 – 18:00

David Rojas Lizama (Universidad de Santiago de Chile) - The problem of scientific representation within Nancy Cartwright's works.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: During the last decades, the semantic view in philosophy of science has shown a particular hegemony over the syntactic one, motivated by the rejection of the linguistic dependency of the latter (Gelfert, 2016; Suárez, 2019; Suppe, 1989; Van Fraassen, 1980). This approach understands science as a set of models that play an epistemic role in situated scientific practices (Bailer-Jones, 2009; Barker & Kitcher, 2013; Frigg & Hartmann, 2020; Suárez, 2019). In this context, a profuse discussion has been developed around the epistemic credentials of representations in the scientific praxis (Bailer-Jones, 2003; Boesch, 2017; Bueno & French, 2011; Cartwright, 1983; Contessa, 2007; Costa & French, 2003; Downes, 1992; Frigg, 2010b, 2022, 2022; Frigg & Nguyen, 2020a, 2020b, 2020a; Gelfert, 2016; Giere, 1988, 2006; Godfrey-Smith, 2009; Morgan & Morrison, 1999; Morrison, 2015; Nguyen, 2016; Suárez, 2003, 2009a; Toon, 2012; Van Fraasen, 2008; Weisberg, 2013).

The aim of this paper is to review the evolution of Nancy Cartwright's philosophy of science around the problem of scientific representation and the use of models in science, with emphasis on the physical sciences. To do this, I will begin with a discussion of the main ideas of his influential book How the Laws of Physics Lie (1983), in which the author defends the priority of approximate models over general laws and supports the proposal of a simulacrum account of explanation. In this context, we will discuss her affinity with contemporary fictionalism. (Fine, 1993; Frigg, 2010b, 2010a; Godfrey-Smith, 2009, 2009; Suárez, 2009a), taking into consideration its aforementioned definition of model, namely, "a model is a work of fiction" (1983, p. 153).

In a second moment, we will review her collection The Dappled World (1999), in which she summarizes the evolution of her thought since the publication of her first book and makes a

retrospective look at it. With this objective, we will review her criticism of the inherited vision (scientific theory as vending machine), her defense of scientific work as a patchwork of laws that guide the construction of approximate models, the text "Fables and models" and those chapters dedicated to physics, with emphasis on the use of the example of superconductors.

Finally, we will review his most recent opinions expressed in The Paul Carus Lectures of 2017 and published in Nature, the Artful Modeler (2019), where the author supports the thesis that the models are design in an artful way, inasmuch as they imitate Nature, who works in the same way. In this sense, she proposes the metaphor of nature as an artful modeler over other alternative metaphors. In this context, we will address her criticism of the idea that nature is a rule follower or does it “by the book”. We will also review in some detail the Robert Millikan's example of oil drop experiment to measure the charge of the electron in 1909. Finally, we will describe the place and function of the imagination in the context of the use of models in scientific practice, as has been understood by Nancy Cartwright.

ROOM 09

(INFER) From previous time slot, same room.
Symposium: What are Inferences? Some Reflections In-Between Logic, Language, and Cognition

17:00 – 17:30
Matias Osta-Vélez (Heinrich-Heine-Universität Düsseldorf) - Inference and the structure of mental representation.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: There is a long-standing tradition in philosophy and cognitive science that sees inference as a syntactically-driven process (e.g. Fodor, 1998). According to it, thoughts are sentence-like structures with specific syntactic properties (logical forms); and inferences are transitions between thoughts motivated only by the formal relations between their truth-functional structure. Reasoning must be, then, a computational/formal process depending on some finite set of topic-neutral rules of inference like those of proof-theory.

In recent decades this view began to lose strength. On the one hand, cognitive scientists started to doubt the psychological plausibility of it because of some important findings of empirical psychology: (1) reasoning is highly sensitive to content; and (2) people are quite bad when reasoning following abstract rules. On the other hand, philosophers also started to challenge the aforementioned view. For instance, Gilbert Harman (2002) influentially argued that logic has almost nothing to do with reasoning, and that their association comes from a categorical mistake of identifying inference with implication.

There is an alternative way of understanding inference that challenges the formalist thesis and propose to understand it as semantically-driven. This view emerged during the last decades, both in philosophy and in cognitive science, from ideas of Sellars (1953) and Piaget (Byrnes, 1992). According to it, rules of inference are mainly conceptual (or “material”) rules: they are based on the content of the concepts involved in predicates and not only on the meaning of the logical constants. In this talk, I will push this line of thought further by proposing a general definition of inference as a cognitive mechanism that works by exploiting structural properties of underlying representational structures.

I will explain this approach by focusing on a new model of concept-based inference that uses conceptual spaces as the underlying representational system. I will then show how this general definition can work as a common framework for understanding a wide variety of inferential processes that have been studied in psychology, artificial intelligence and philosophy (notably, perceptual inference, logical inference, and model-based inference). Finally, I will discuss how this approach relates to the structural view of mental representation and how it provides a solution to the discussion between the formal and the semantic view of inference and reasoning.

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17:30 – 18:00

Sandra Visokolskis (FFyh-UNC/UNVM) - Are Associations Some Kind of Inferences? The Case for Creative Inferences.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: The present work is part of the philosophy of reasoning. An attempt is made to elucidate what role associations play within the broad spectrum of inferences. It is appropriate to discuss this topic, for two reasons: on the one hand, since the recent article titled What is inference?, by Paul Boghossian (2014), several authors have contributed to raising positive and/or negative criticisms of the notion of association as a type of inference (Boghossian 2018, Broome 2014, Quilty-Dunn & Mandelbaum 2017, 2020, Munroe 2021, Valaris 2017, among others). And, on the other hand, the investigations carried out by Charles Sanders Peirce regarding the delimitation and classification of the kinds of inferences that, according to him, exist, also led to the exclusion in some sense of associations within this Peircean typology.

Specifically speaking, in the case of the systematic configuration of creative processes aimed at building concepts, propositions and/or theories, Peirce contributed by providing the notion of abduction (in its various formats and interpretations), considered by him as the only kind of inference that introduces novelty (Peirce, CP 5.172). We assume that Peirce described in his later writings that the process of hypothesis formation (one of the two components of abduction, the other being hypothesis adoption) consisted of an instinctive task. In this sense, in previous writings we have pointed out the difficulties of this Peircean interpretation, introducing a variant of abduction that involves various types of associations in the formation of hypotheses. We have come to call such associative argumentative conglomerate “transduction”. In this way, we defend a position for which associations would intervene in the formation of creative hypotheses, in the best inferential style. To support this perspective, we will discuss in this paper how associations contribute by operating inferentially, against the criticisms that authors such as Quilty-Dunn and Mandelbaum have provided (Mandelbaum 2022 [2015], Quilty-Dunn & Mandelbaum 2017, 2020). To do this, we seek to characterize abduction in imaginative and suppositional terms, following texts that Peirce himself had written, although he would not have related them to the themes presented here.

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ROOM 10

(SULOMET) From previous time slot, same room.
Symposium: Substructural Logic and Metainferences

17:00 – 17:30
Joaquín Toranzo Calderón (IIF-SADAF-CONICET), Camillo Fiore (IIF-SADAF-CONICET, Department of Philosophy (UBA)) - The Heretic Family Grows: Model Theory.

Topic: A.2 Philosophical Logic

Abstract: The standard presentation of multiple-conclusion classical logic asks that, in valid arguments, some conclusion is true whenever all the premises are true. Thus, it imposes what we call an existential reading of conclusions, and a universal reading of premises. This is the orthodox reading of multiple conclusions and premises, but it is not the only one possible. In this talk we introduce and study a family of logical systems that deviate from standard multiple-conclusion classical logic by challenging this orthodox reading. Accordingly, we call our systems "heretic classical logics."

We built this family upon a truth-preservation notion of validity and work with the classical interpretations of the language. The first movement is to consider the multiple-conclusion systems that can be obtained by allowing a universal or existential reading of premises or conclusions; this results in four systems (standard classical logic and three more). We show that they are all contralogics of one another, i.e. none of them is included in any of the other three. Then, we also characterise the systems that constitute their union and their intersection. These two receive a reading of multiple formulae that is neither universal nor existential, but works in terms of the quantifiers ⋀ and ⋁:

$(\bigwedge\sigma\in\Sigma)\phi \coloneqq \Sigma\neq\emptyset \wedge (\forall\sigma\in\Sigma)\phi$
$(\bigvee\sigma\in\Sigma)\phi \coloneqq \Sigma=\emptyset \vee (\forall\sigma\in\Sigma)\phi$

which can be understood as quantifiers with and without existential import on their domain of quantification, respectively. Lastly, we expand our family to all those logics that can be obtained by reading premises and/or conclusions universally, or existentially, or in terms of ⩓ or ⩔. More precisely, the family contains the 16 systems that instantiate the following schema:

Γ ⊨(Q1,Q2) Δ iff [∀v∈V, if (Q1 γ∈V)v(γ)=1 then (Q2 δ∈Δ)v(δ)=1]

where Γ and Δ are sets of sentences, V is the set of classical interpretations of the language, and Q1 and Q2 are any quantifiers in the set {∀,∃,⩓,⩔}.

On the one hand, except for standard classical logic, all systems in our family violate some of the Tarskian properties of reflexivity, transitivity and monotonicity. This gives us a family of substructural logics; interestingly, their substructurality is independent of the details of the object language in play. On the other hand, we also show that most are also what we call "suprastructural," this meaning that they enjoy some structural properties that Tarskian relations don't.

At the end of this talk we propose some intuitive ways of understanding our heretic classical logics, and some philosophical applications for them. As an example, we provide an interpretation where each system represents informational contexts where agents have some limited resources or specific goals in their reasoning. The work in this talk has a second part, which is to presented in the talk entitled "The Heretic Family Grows: Proof-Theory.

17:30 – 18:00

Camillo Fiore (IIF-SADAF-CONICET, Department of Philosophy (UBA)), Joaquín Toranzo Calderón (IIF-SADAF-CONICET) - The Heretic Family Grows: Proof-Theory.

Topic: A.2 Philosophical Logic

Abstract: This talk continues the work to be presented in "The Heretic Family Grows: Model-Theory". There, we introduce a family of logical systems, each of which results from taking multiple-conclusion classical logic and modifying the definition of validity so as to induce a (perhaps) non-standard reading of multiple premises and/or multiple conclusions. More precisely, the family consists of the 16 systems that can be defined by means of the following schema:

Γ⊨(Q1,Q2)Δ iff [∀v∈V, if (Q1 γ∈V)v(γ)=1 then (Q2 δ∈Δ)v(δ)=1]

where Γ and Δ are sets of sentences, V is the set of the classical interpretations of the language, and Q1 and Q2 are quantifiers in {∀,∃,⩓,⩔}, with ⩓ and ⩔ defined thus: (⩓σ∈Σ)ϕ ≔Σ≠∅∧(∀σ∈Σ)ϕ

(⩔σ∈Σ)ϕ ≔ Σ=∅∨(∀σ∈Σ)ϕ

When Q1 is ∀ and Q2 is ∃, the schema delivers standard multiple-conclusion classical logic, here denoted CL(∀∃). For all other cases, the resulting systems deviate from CL(∀∃) both in their valid inferences and in their structural properties; we call them 'heretic'. The talk mentioned above is devoted to the model-theory of these systems, as well as some potential motivations and applications. The present talk addresses the proof-theory, as well as a brief philosophical discussion.

We focus on sequent calculi. Our strategy is simple, and it proceeds in three steps. First, we provide a single-premise and single-conclusion sequent calculus S that is sound and complete with respect to the formula-formula fragment of classical logic. Then, we define a number of rules which talk about the behaviour of multiple premises and multiple conclusions. Lastly, we give a recipe that tells us, given any logic L in our family, how to extend S with the appropriate subset of those rules so as to obtain a new calculus that is sound and complete with respect to L. The whole procedure exhibits certain elegance (or so we claim) for it illuminates both the central core that all these logics share and the structural features that differentiate them from one another.

The philosophical discussion that closes the talk concerns the question of how to characterise ‘classical logic’. Very briefly, we suggest that our heretic systems can be understood as alternative presentations of classical logic. One technical reason for this is that they are defined in terms of truth

preservation in the classical interpretations of the language. A more philosophical reason is that each of these systems can be interpreted as applying classical reasoning to a particular epistemic context (where the agent has some given resources and goals). If our suggestion is taken, it forces us to rethink the way in which we ascribe structural properties to classical logic. Those properties will no longer characterise classical logic simpliciter. They will be properties of some particular presentation of this logic---perhaps the orthodox one, but just a presentation nonetheless.

ROOM 12

(MMK) From previous time slot, same room.
Symposium: Mathematics, Modality and Knowledge Symposium (MMK)

17:00 – 17:30
Fenrong Liu (Tsinghua University) - How do Players Reason in the Cops and Robber Game?

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: The cops and robber game is well-known in the CS research community, as a multi-agent model of players' strategic interactions. The game is usually played on graphs and extensive research has been done from the algorithmic and combinatorial perspectives. The current work takes a logical point of view, with a focus on players' reasoning abilities, namely, how they reason about the positions of themselves and their opponents by making use of knowledge and information that they receive during the play, depending on the extent of their observational powers (termed as sight of the players). We propose a formal framework, namely, LCR (Logic of Cops and Robber), to make the core notions of the game precise, for instance, players' positions, knowledge, and also the winning conditions of the game. Applying LCR to analyze the game, we obtain a novel and automated way of tracking interactions between players and characterizing their information-updates during the play. The update mechanism is defined by a new dynamic operator and its formal properties are studied and illustrated in detail. I will present some interesting logic properties of the LCR. In addition, an equivalent modal framework for LCR is proposed, which provides us with a better insight in understanding the interplay between players' information and actions in these games. This is joint work with Dazhu Li and Sujata Ghosh.

17:30 – 18:00
Giuseppe Rosolini (Università di Genova) - Abstracting Logic.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Grothendieck fibrations provide a unifying algebraic framework that underlies the treatment of various form of logics, such as first order logic, higher order logics and dependent type theories. The approach dates back to the seminal work of F.W. Lawvere on functorial semantics, in particular his work on hyperdoctrines. One of the many remarkable features of the Lawverian proposal for a categorical approach to logic is the systematic use of adjoint functors to describe the logical operations, in particular, and quite remarkably, equality.

Taking advantage of the modular perspective provided by category theory, one can look at those Grothendieck fibrations which sustain just the structure of equality. We present a characterisation of such fibrations that contributes to shed light on the relationship between the several approaches to equality.

ROOM 13

17:00 – 17:30

Michal Gajda (Migamake Pte Ltd) - Consistent Ultrafinitist Logic.

Topic: A.3 Computational Logic and Applications of Logic

Abstract: Ultrafinitism(Kornai 2003; Podnieks 2005; Yessenin-Volpin 1970; Gefter 2013; Lenchner 2020) postulates that we can only reason and compute relatively short objects(Lloyd 2000, 2002; Krauss and Starkman 2004; Sazonov 1995; Gorelik 2010), and numbers beyond certain value are not available. Some philosophers also question the physical existence of real numbers beyond a certain level of accurracy(Gisin 2019). This approach would also forbid many forms of infinitary reasoning and allow removing many from paradoxes stemming from a countable enumeration. However, philosophers still disagree on whether such a finitist logic could be consistent(Magidor 2007), while constructivist mathematicians claim that “no satisfactory developments exist”(Troelstra 1988). We present preliminary work on a proof system based on Curry-Howard isomorphism(Howard 1980) and explicit bounds for computational complexity.

This approach invalidates logical paradoxes that stem from a profligate use of transfinite reasoning(Benardete 1964; Nolan forthcoming; Schirn and Niebergall 2005), and assures that we only state problems that are decidable by the limit on input size, proof size, or the number of steps(Tarski, Mostowski, and Robinson 1955). Consideration of complexity also solves other paradoxes, in particular the “para- dox of inference” existing in classical theory of semantic information(Bar-Hillel and Carnap 1953; Duzi 2010). Using a bound on cost and depth of the term for each inference, we independently developed a very similar approach to that used for cost bounding in higher-order rewriting(Vale and Kop 2021). By finitism we understand the mathematical logic that tries to absolve us from transfinite inductions(Kornai 2003). Ultrafinitism goes even further by postulating a definite limit for the complexity of objects that we can compute
with(Lloyd 2000, 2002; Krauss and Starkman 2004; Sazonov 1995; Gorelik 2010). We assume these without committing to a particular limit.

We explicitly bound the computational complexity of our propositions and proofs. That means that we forbid proofs that go for an arbitrarily long time and require a deadline for any proof or computation.

For the sake of generality, we will attach this deadline in the form of bounding function that takes as arguments depths of input terms, and outputs the upper bound on the number of steps that the proof is permitted to make. Depths of input terms are a convenient upper bound on the complexity of normalized proof terms (those without the cut.)

After elision of bounds and rule subsume we see the rules for intuitionistic logic. Thus consistency can be proved by the consistency of intuitionistic logic(Brouwer 1981). Every valid proposition with a fixed bound on input n can be checked by enumerating inputs, and is thus decidable. We prove that logic can express bounded Turing machine programs. Expressing statements about undecidability implicitly requires unbounded computational effort. Since all our proofs and arguments are explicitly bounded, there is no room to state undecidability. We thus define statements

that are both true, and computable a given limit(Gorelik 2010). Presented but not accepted for publication on: TYPES2022, CIE2022, CLA 2023, LAP 2021. Submitted for evaluation to LICS 2023.

17:30 – 18:00

Alejandro Solares-Rojas (University of Milan) - Tractable propositional approximations via KE-style systems.

Topic: A.3 Computational Logic and Applications of Logic

Abstract: Many propositional logics are likely to be intractable. E.g., Classical Propositional Logic (CPL), First-Degree Entailment (FDE), the Logic of Paradox (LP) and Strong Kleene Logic (K3) are all co-NP-complete, while Intuitionistic Propositional Logic (IPL) is PSPACE-complete. So, we cannot expect a real agent to be always able to recognize practically that a certain conclusion follows from a given set of assumptions.

In [2], a hierarchy of tractable approximations to CPL was defined, whose levels can be naturally related to the inferential power of realisitic resource-bounded agents. This hierarchy is based on a non-standard system consisting of linear introduction and elimination (intelim) rules, and a single branching structural rule called PB since it expresses the Principle of Bivalence and which is an analytic cut rule. While the intelim rules fix the meaning of the connectives solely in terms of information that is practically accessible to the agent, PB governs the manipulation of hypothetical information. Intuitively, the more times hypothetical information must be invoked via PB, the harder the corresponding inference is for the agent. So, the nested applications of PB provide a sensible measure of inferential depth. The hierarchy is accordingly defined in terms of the maximum number of allowed nested applications of PB.

The system consisting only of the elimination rules and PB is complete for CPL, and a well-known refutation system called KE. Following a suggestion given in [1] and related to the approach taken in [3], in this paper, we define and explore a hierarchy of depth-bounded approximations to CPL based on KE, which is analogous to the hierarchy based on intelim rules but may be preferred for applications in automated reasoning. We show that the hierarchy based on KE admits a 3-valued non-deterministic semantics. Further, we provide KE-style systems for FDE, LP, K3 and IPL, and show that each of them naturally leads to defining a hierarchy of tractable approximations to the respective logic. Each of these systems: is formulated via signed formulae, where the signs express generalized notions of informational truth and falsity; has linear elimination rules which fix the meaning of the connectives only in terms of practically accessible information; and has (a) branching structural rule(s) that express(es) a generalized PB rule, is (are) analytic cut rule(s), and govern(s) the manipulation of hypothetical information. Thus, analogously to the classical case, we define the corresponding hierarchies in terms of the maximum number of allowed nested applications of the branching rule(s). As for CPL, the nested applications of the branching rule(s) provide a sensible measure of inferential depth, and so the hierarchies can be naturally related to the inferential power of non-classical agents.

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WEDNESDAY, JULY 26TH

09:00 - 10:00 INVITED SPEAKER: PAULA QUINON

AUDITORIUM 1

INVITED SPEAKER
Paula Quinon (Warsaw University of Technology)

What "computing" means?

Chair: João Marcos (Federal University of Rio Grande do Norte)

Topic: C.6 Philosophy of Computing and Computation

Abstract: In the age of digitalisation, the concept of computation has become central in various areas, scientific, socio-anthropological or even artistic. Different mathematical contexts formalise different intuitions of what it means to compute, with models traditionally focusing on operations on discrete domains. However, intuitions have broadened to include other types of computation: real number computation, analogue computation, or feasible computation. A fundamental question is how best to justify philosophically the differences between these intuitions, and how to choose an appropriate formalisation.

This talk proposes that Carnapian explications provide a philosophical method for addressing the intentional differences between models of computation. Carnapian explications serve as a framework for transforming intuitive concepts used in everyday communication into formal concepts within an existing formal theory. The Church-Turing Thesis (CTT) has been claimed as a Carnapian explication for the traditional notion of computation. A less studied Cobham-Edmonds Thesis (CET) is currently being studied as an explication of feasible computation (corresponding to computational complexity research). Finally, it can be claimed that analogue continuous computation refers to the intuition that certain devices operating on continuous quantities perform computations; these intuitions are captured by a model of real computation, forming an AN-C thesis.

10:00 - 11:00 INVITED SPEAKER: JULIET FLOYD

AUDITORIUM 1

INVITED SPEAKER
Juliet Floyd (Boston University)

The Turing Test as a View From Somewhere:
Hilbert, Wittgenstein and Turing on 'Surveyability'

Chair: Jonas Becker Arenhart, Jonas (Federal University of Santa Catarina)

Topic: C.6 Philosophy of Computing and Computation

Abstract: Recent debates about the philosophical status of formalization and mechanization of proof may be illuminated by considering the mutual impact Wittgenstein and Turing had on one another around issues concerning the evolution of notations in symbolic logic. When Wittgenstein remarked in 1937 that 'a proof must be surveyable' he was reworking ideas of Frege, Hilbert and Turing. "Surveyability" for Wittgenstein was neither a verificationist requirement nor a refutation of the claim that all proofs must have corresponding formal proofs, much less a refutation of logicism. Instead, it placed front and center what mathematicians do, i.e., it explores what logicism comes to in an everyday sense. The idea -- consonant with certain trends in so-called "philosophy of mathematical practice", including recent work by Kennedy on "formalism freeness", and Floyd's on "everyday phraseology" -- is not to provide or ask for a "foundation" for mathematics in any ordinary sense, but rather to take a pragmatic and mathematically flexible approach to the very idea of "foundations".

In 1939 Wittgenstein and Turing discussed these ideas in Wittgenstein's Cambridge lectures on the foundations of mathematics, sparking some of Turing's subsequent work on types. The relevant ideas here draw out new ways of looking at Turing's 1936 paper, as well as his more speculative writings in the late 1940s about "intelligent machinery" and his 1950 "Turing Test".

9:00 - 11:00

AUDITORIUM 2

(HUM)
Symposium: From Latin America to Europe and Back. A Symposium Dedicated to the Philosophy of C. Ulises Moulines

Chair: Pablo Lorenzano

Topic: B.1 Methodology

Abstract: C. Ulises Moulines was born in Venezuela on October 26, 1946. He studied Physics, Philosophy, and Psychology at the University of Barcelona, obtaining a Degree in Philosophy from that same University and a PhD in Philosophy from the University of Munich, supervised by Wolfgang Stegmüller. He has held research positions and chairs in philosophy of science at the UNAM (Mexico, 1976-1983), at the University of Bielefeld (Germany, 1983-1988), at the Free University of Berlin (Germany, 1988-1993), and at the University of Munich (Germany, 1993-2012, the year of his official retirement). He has published 12 books in four languages and more than 200 articles.

Moulines has made substantial research contributions to different areas of philosophy: semantics, ontology, epistemology, metaphilosophy, political philosophy, and, of course, philosophy of science. His work in the latter area is both in general philosophy of science and philosophy of

physics, making contributions to the formal philosophy of science, to the historical philosophy of science, and even to the history of the philosophy of science.

Moulines is one of the leading proponents, developers and promoters of the semantic or model-theoretic view of scientific theories known as structuralist view of theories, structuralist metatheory or metatheoretical structuralism. His doctoral thesis, later book, on thermodynamics is the first application of the ideas of metatheoretical structuralism in the complete reconstruction of a physical theory outside of Sneed's reconstruction of Newtonian mechanics in his pioneering 1971 book. He also wrote, together with Sneed and Balzer, the standard and most comprehensive exposition of metatheoretical structuralism, An Architectonic for Science (1987).

Moulines' philosophical work is characterized by satisfying the Carnapian desiderata of clarity and precision. With his work, Moulines shows that it is possible to develop a systematic synchronic and diachronic philosophy of science. Besides, Moulines acknowledges the essential presence of irreducibly pragmatic and historically relative elements in the identity of empirical theories. But, although these elements cannot be fully formalized, they can be addressed through rigorous conceptual analysis.

Moulines has also been an exceptional teacher and supervisor. Through personal contact or through his extensive work, he has contributed to forging new generations of philosophers and philosophers of science, in Europe and Latin America.

This symposium is an opportunity for the international philosophical community to appraise his contribution to the discipline.

Speakers:
1) José Díez: Formalism meets pragmatism"
2) Pablo Lorenzano: Modeling Theory Construction with Models
3) Wolfgang Balzer & Daniel Kurzawe: Form and Content: A New Aspect
4) Adolfo García de la Sienra: Non-archimedian extensive measurement
5) Holger Andreas: How not to be a Metaphysical Realist
6) Gerhard Ernst: Rational and irrational doubts. Some thoughts on the skeptical challenge
7) Ambrosio Velasco: From Cognitive Pluralism to Political Pluralism in C. Ulises Moulines
8) César Lorenzano: Ulises and I. A long philosophical and personal friendship

9:30 – 10:00
Jose Diez (University of Barcelona) - Formalism meets Pragmatism.

Topic: B.1 Methodology

Abstract: During the last decades, many philosophers of science have witnessed the failure of formal analysis of key aspects of scientific practice such as explaining, representing, or testing. This failure has made some(actually many) of them renounce traditional analytical projects and withdraw towards either pluralist or deflationary positions. The goal of this talk is to resist such a move and defend the possibility of monistic analysis weakening them in two dimensions. First, changing the traditional demand of "sufficiency" with "quasi-sufficiency". Second, and more importantly, accepting the introduction of some crucial pragmatic elements in the formal analysis. This strategy is exemplified by the analysis of the concepts of explanation and of representation.

10:00 – 10:30
Pablo Lorenzano (Universidad Nacional de Quilmes/CONICET) - Modeling Theory Construction with Models.

Topic: B.1 Methodology

Abstract: Genetics crystallized as a distinct biological discipline with difficulty through the work of William Bateson and his collaborators. This happened neither overnight nor without opposition. On the contrary, this is a process that took place during a great part of the first decade of the twentieth century and in which Bateson's so called "Mendelism" had to take stand against other perspectives that addressed the problem of heredity at the time, such as biometrics, cytology and experimental embryology. However, and despite the lack of complete agreement on the part of the scientific community either before or after such crystallization on the issues of which were the problems to be solved, which the acceptable answers, which the criteria that such answers should satisfy, which the appropriate techniques and which the interesting phenomena, it was the theory founded by Bateson the one that would come to bear the name "genetics" and would have the greatest acceptance by the scientific community early in the second decade of the twentieth century. This theory, on the other hand, differs both from the work done by Mendel and his rediscoverers and from that carried out later by Morgan and his collaborators.

The communication aims to model the process of construction of Bateson's Mendelism (1909) as an example of what Moulines (2011, 2014) calls "crystallization", i.e., a process in which the models of a new theory are constructed in a piecemeal way, through many intermediate, fragmentary stages, before a fully developed, consolidated single theory comes into the scene.

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10:30 -11:00

Wolfgang Balzer (Ludwig-Maximilians-Universität München-MCMP), Daniel Kurzawe (SUB Göttingen) - Form and Content: a New Aspect.

Topic: B.1 Methodology

Abstract: The last decade has seen the emergence of a new type of entity: Distributed Persons. This kind of person is a real extension of the concept of person and is made possible by technical and economical changes. We introduce and analyse such entities in their form and content. In addition to human and legal persons, distributed persons have two new and unique properties.

Distributed persons can be independent of human and legal persons and operate on global accessible data and distributed information sources. We describe the structure of a class of distributed persons and outline the content of this class. As an example, we look into the structure of generative pre-trained transformers and language models, like the popular question answering system ChatGPT, by OpenAI, which acts as the 'brain' of a distributed person.

ROOM 1

9:30 – 10:00

Brendan Hogan (New York University) - A pragmatic philosophy of social science

Topic: B.1 Methodology

Abstract: The idea that science has a unified core of principles that govern any exercise of inquiry that would qualify as science is a hotly contested one to this day. 20th century debates between various philosophies of science continued the methodenstreit over the status of and differences between the human sciences and the natural sciences of the previous century. In particular, the dispute between pragmatists and positivists on this question bears an instructive lesson for reflection on the role of values in science concerning such questions as 1) the role of science in society, 2) the fact/value distinction, 3) the goal of scientific inquiry 4) the possibility of a social science and 5) the impact of these reflections on larger questions of scientific methodology.

For a variety of reasons, beginning with Peirce's denunciations of traditional metaphysics and culminating with Dewey's assertion that the structure of inquiry has a 'general pattern', pragmatism has been misunderstood as a species of, or close cousin to, positivism. Indeed, something of a renewal of interest in Rudolf Carnap and Vienna Circle philosophy of science in wider philosophical circles has recently fueled a variety of texts on the similarities and shared features of positivist and pragmatist theories of inquiry.

This paper argues that while some general features of the positivist approach to philosophy of science are shared, this should not be emphasized to the neglect of huge distances on just those questions numbered above. Specifically, the issue of the practice and aims of science and the viability of the social sciences is explored using the advances pragmatic thinkers such as Hilary Putnam, Philip Kitcher, and Richard J. Bernstein have made on these earlier positions.

The consequences for the questions of the goals of social science and the relation of values to scientific inquiry will be emphasized, particular with relation to problems stemming from identifiable social structures.

10:00 – 10:30

Seán Muller (University of Johannesburg) - The Do-Calculus Does Not 'Solve' the Transportability and Data Fusion Problems.

Topic: B.1 Methodology

Abstract: A problem of significant importance for empirical analysis is establishing whether, when and how inferences may be drawn from the results of particular studies for other populations or contexts. Related to this is the problem of integrating findings or evidence from different analyses, not least when such analyses have been conducted using different data types and different methods. The first challenge is known as the external validity, generalizability, or transportability problem. The second is referred to by some scholars as the data fusion problem. Pearl and Bareinboim (2014) and Bareinboim and Pearl (2016) suggest that using the do-calculus developed by Pearl (2000) 'solves' the transportability and data fusion problems, respectively. This paper critically assesses these, connected, claims.

One problem with assertions based on the do-calculus is that it is often not made clear what the equivalent statements would be in statistical or econometric notation – if indeed there are any such equivalents. The analysis begins, therefore, by presenting the transportability problem in econometric form – following Hotz, Imbens, and Mortimer (2005) and Muller (2015). It then utilises an exchange between Deaton and Cartwright (2018) and Pearl (2018) to sharpen the nature of the latter's claim. Deaton and Cartwright suggest that the contradiction demonstrated in Muller's work applies to the do-calculus, but Pearl disagrees and argues that their assessment is based on a misunderstanding of both the problem and the solutions proffered by Pearl and Bareinboim (2014) and Bareinboim and Pearl (2016).

The paper proceeds to show that the challenge posed by causal interaction (Muller 2015) applies to graph-based methods no less than it does to more widely-used econometric or statistical frameworks. Furthermore, it follows that the data fusion problem is also not solved, in any substantive sense, by these approaches. The conclusion is that claims that the problems of 'transportability' and 'Data Fusion' have been solved are either incorrect or rest on a superficial notion of what constitutes a solution.

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10:30- 11:00

Arto Mutanen (Finnish Naval Academy & Finnish National Defence University), Eero Kallio (Finnish Naval Academy & Finnish National Defence University) - On Methodology of Design Science and Engineering Science.

Topic: B.1 Methodology

Abstract: In philosophy of science the traditional distinction between curiosity-driven basic science and aim-oriented applied science. The fundamental utilities of the basic science are epistemic and of applied science besides epistemic also practical utilities. (Niiniluoto 2014.) The practical utilities imply that applied sciences truthful knowledge has instrumental value. Both basic science and applied sciences are theoretical in the Aristotelean sense: they intend to achieve new scientific knowledge. The practical changes in the reality are done by developers and technicians.

Engineering sciences can be understood as part of the development research in which the intention is to design and to construct some actual artifacts, like actual water system. This entails that engineering science cannot be reduced neither to basic science not to applied sciences. Engineering sciences "is an enterprise of its own creating its own body of knowledge and featuring its own methods and methodology" (Hendricks, Jakobsen & Pedersen 2000). In applied sciences the fundamental theoretical notion of technical norm which connects context sensitively the practical aim and causal means together. Design science is a special case of applied sciences where causal law provides a manipulative means to achieve ends. (Niiniluoto 2014; 2022)

The methodological basis of basic science and applied science has the same root. The practical aims make applied science value-dependent which connects applied science to engineering science. Unlike in applied science or design science, truth does not play a central role in engineering science (Hendricks, Jakobsen & Pedersen 2000). In design science fundamental intention is not to describe the reality but to "tell how things ought to be" (Niiniluoto 2022). The intention of engineering science is not to tell how things ought to be, but to construct new artifacts. So, design science explicates the connection between a structure and the intention of the artifact, the engineer sciences explain artefact's structure and functionality. A possibility to explicate the difference is to analyse further means-ends relationship which can be done by using formal semantics (Hughes, Kroes & Zwart 2007) which brings forth the dynamic aspects of causal reasoning which plays central role in engineering science. The methodology of engineering science is fundamentally similar as the methodology of development science, but the latter is committed deeply to progress. Unfortunately, it has been difficult to characterize the value-laden notion of progress. The difficulty – or even impossibility – to define the notion implies the "myth of progress" (von Wright 1993).

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ROOM 02

9:00 – 9:30

Jakob Koscholke (University of Hamburg) - A New but Puzzling Condition for Agglomeration in Probabilistic Support

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: Probabilistic support is known to violate an inference pattern often referred to as Agglomeration. That is, a proposition A can fail to probabilistically support a conjunction B ∧ C even though A probabilistically supports the two conjuncts B and C individually (one of the first philosophers to notice this was Carnap 1950). But there are conditions under which such failures

cannot occur, most notably what is known as Screening-off (see Reichenbach 1956) or what could be called Relaxed Screening-off (see Cohen 1977). The present paper, however, identifies a new condition that rules out failures of Agglomeration. This condition is not only less demanding than the two aforementioned, it also helps us to see an interesting logical relationship between Agglomeration and another inference pattern from the literature on non-monotonic reasoning and the logic of conditionals (see Kraus et al. 1990 and Lewis 1973, respectively). Most interestingly, however, the new condition reveals a puzzling phenomenon that is reminiscent of certain well-known paradoxes in probability theory such as Bernstein's or Simpson's Paradox and is related to what Atkinson et al. (2009) have called the Alan Author Theorem.

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9:30 – 10:00

Mario Guenther (LMU) - Assertion and Belief.

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: I assert propositions and so do you. But when is it justified to assert a proposition? One norm says you should assert A only if A is true. Another says you should assert A only if you know that A (MacFarlane, 2011). In this paper, we argue for yet another norm: a proposition is assertable if and only if you are justified to believe that proposition.
On this view, whatever we assert should express what we are justified to believe.

I should assert A only if I am justified to believe A to be true. When you assert A, I believe that you justifiedly believe A to be true.

What norms govern beliefs? Beliefs aim at truth. You should believe a proposition iff the proposition is true. Inconsistent beliefs cannot be true. Hence, your beliefs should be consistent. If you believe that A is the case, you should not believe that ¬A is the case as well. Finally, your beliefs should be deductively closed. If you believe "if A then B" and you believe A, then you should believe B as well. So far so good

When is it justified to have a particular belief? Lockeans answer: you should believe A iff your degree of belief in A is high (Foley, 1993). The Lockean answer leads, however, to inconsistent beliefs in cases like the lottery paradox. Let's say exactly one ticket out of a million will win in a fair lottery. You should then believe that exactly one ticket will win. And you should believe of each ticket that it will lose. If your beliefs are deductively closed, you have inconsistent beliefs: you should believe that one ticket wins and that all tickets lose at the same time. It seems we need to give up at least one of the norms on belief, or else reject the Lockean answer. In the full paper, we argue that rejecting the Lockean answer wholesale is too costly.

We proceed as follows. We offer a notion of belief suitable for the belief norm of assertability. We then compare the belief norm of assertability to the knowledge norm of assertion. Our conclusion is that no knowledge norm is required for assertion. Justified belief is all we need.

We offer now a notion of belief that satisfies the above mentioned norms on belief: consistency of belief, deductive closure of belief, and a Lockean answer for when it is justified to have a particular belief. You should believe a proposition iff you have a high credence in it, and you anticipate continued confidence in it. The latter conjunct means that you anticipate no relevant possibility that would lower your credence to 1/2 or below.

We show that this notion of belief solves the lottery paradox, and that we should favor the resulting belief norm of assertability to the knowledge norm on assertion. [...]

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Essays.

10:00 – 10:30

Johannes Mierau (Witten/Herdecke University) - Bourbaki's Legacy in the Structuralism of Physics.

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: Nicolas Bourbaki was once the epitome of structuralism. But his impact faded away about the time he published his formal specification of 'structure'. Since then more convenient approaches have completely superseded the Bourbakian techniques for reconstructing mathematical structures. The aim of my contribution is to explain why the structuralists of physical theories still adhere to the Bourbakian concepts in spite of the existence of supposedly more promising alternatives. I identify two major incentives: 1) the attraction of the Bourbaki programme as outlined in the popular writings of Bourbaki and Jean Dieudonné, and 2) the belief that Bourbakian structures are the most appropriate choice for the needs of physical theories, even though they may not be for mathematics.

The first motivation has also been maintained in other domains which have been significantly influenced by Bourbaki's general ideas. Prominent figures in philosophy of science are Patrick Suppes with his ambition "to write a kind of Bourbaki of physics showing how set-theoretical methods can be used to organize all parts of theoretical physics and bring to all branches of theoretical physics a uniform language and conceptual approach" (Suppes, 1969, p. 191), as well as Wolfgang Stegmüller's intention to develop an "Analogue of the Bourbaki Programme in Physical Science" (1979). These ideas turn out to be misguided: The formal elaboration of Bourbaki's concept of structure could not accomplish any of the previously proclaimed programmatic aims (Corry 2004).

The second motive applies exclusively to the structuralism of physics. I will argue that it constitutes a sound justification to stick to this seemingly outmoded approach. Structures in theories of physics are generally more complex than fundamental mathematical structures. Most often they are built on multiple base sets, and involve higher order relations, that can be constructed with ease using Bourbaki's echolon schemes. Furthermore, the separation of the physical content from the mathematical framework is a central step in the rational reconstruction of physical theories. This is made possible by employing Bourbaki's distinction between principal base terms (physical) and auxiliary base terms (mathematical). Finally, the intricate relations between physical theories cannot be described adequately in terms of logical implications or functors between categories. A foundation on set theory permits to rigorously define limit and asymptotic relationships that are central to the current debates in the philosophy of physics. Therefore, I assert that Bourbakian species of structures are still an appropriate formal tool for the reconstruction of physical theories.

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10:30 – 11:00

Michal Hladky (University of Geneva) - All that glitters is not a deduction: Non-deductive methods in computational modelling.

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: Is deduction a suitable criterion to demarcate simulations from experiments? Many authors share the intuition that as computer simulations rely on computation and computational steps can be reconstructed as deductive steps, deduction should play the central role for their epistemic assessments. Interestingly, deduction is central for seemingly incompatible positions: i) Beisbart (2012; 2018) and Beisbart and Norton (2012) claim that simulations are deductive arguments and therefore theoretical and not experimental; ii) Humphreys (1994) claims that they are sui generis numerical experiments and although they follow deductive steps, due to the epistemic opacity and weak emergence (Humphreys 2008; 2009; Bedau [1997] 2008; 2010), they require new epistemology; iii) Boge (2018), contrary to Beisbart, claims that computer simulations are surrogate experiments. While accepting Beisbart's view that the computer simulations "respect the logic of (deductively valid) arguments", Boge claims that "they neither agree with their pragmatics nor their epistemology."

As the saying goes, in theory there is no difference between theory and practice, while in practice there is. The differences in the above-mentioned positions can be attributed to different conceptions of the relevant epistemic agent performing the inferences – computer and the scientist (extended cognition) for Beisbart, while Humphreys and Boge take the perspective of a scientist. Focusing on deduction is, prima facie, very intuitive and practical. But as another saying goes, that works very well in practice, but how does it work in theory?

With a model theoretic reconstruction of in silico experiments conducted within the Blue Brain Project (Markram et al. 2015), I demonstrate the limits of deductivism. I will set aside the obvious obstacles – discretisation, idealisations and approximations of the roundoff errors – noted by its proponents (Beisbart 2012), although not fully recognised as such (Fillion 2022).

Instead, I show that even with a strong assumption of a correct theory, some results of the BBP were not deduced and are not deducible from the background theory. Although every inference can ultimately be transformed into a valid, deductive argument by complementing it with suitable assumptions, these come sometimes at an untenable costs.

Attempts to deduce results of the BBP in silico experimentation face following difficulties: i) the predicate mismatch between the languages of sources and targets require a relaxation of interpretation for the terms of the sources; ii) the expressibility of predicates describing emerging observed behaviour in terms of original ones is analogous to non-homogeneous reductions (Nagel [1970] 2008) iii) the non-deterministic nature of the BBP algorithms requiring semantic saturation (Barberousse et al. 2009) by the pseudo-random number generators allow for deductive reconstruction of instances, which however conflicts with assumptions needed for causal claims about dispositional properties of neural circuits and can not be subsumed under Beisbart and Norton (2012) Monte Carlo meta-deductive reconstruction; iv) the observed emergent properties do not result from weak emergence or computational incompressibility (Humphreys 1994; 2008) which would be compatible with deductivism, but from incompleteness relative to the sample set.

Rather than deductions, creative abductions (Schurz 2008; Magnani 2001) are adequate for BBP.

ROOM 03

9:30 – 10:00

Rafael Velloso (State University of Rio de Janeiro (UERJ)) - The role of worldview in the construction of physical knowledge: the case of Austrian physics.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: The controversies surrounding quantum theory, or rather, the so-called Kopenhagener Geist (commonly referred to as the Copenhagen Interpretation), after almost 100 years of its elaboration, still produces physical and philosophical debates about its foundations and its ontological and epistemological consequences. The first decades of the 20th century, which condensed important moments in the discussion and elaboration of quantum theory, were permeated by debates in the physics community, especially between German and Austrian physicists who, despite collaborating, had distinct conceptions about what a physical theory is, after all. Some of these points of divergence concern the role of metaphysics, intuition (Anschauung), experience (Erfahrung) and worldviews (Weltanschauung) in the development and interpretation of physical knowledge.

Within Austrian physics, it is possible to identify a certain tradition of physicists/philosophers who defend (to a greater or lesser degree and in different ways) the central role that worldviews (Weltanschauung), metaphysics and epistemological crises play in the construction of physical knowledge. Among them, we can mention Ernst Mach, Ludwig Boltzmann, Franz Exner, Erwin Schrödinger, Philipp Frank, Guido Beck and even Paul Feyerabend (already in the second half of the 20th century). We also have Boltzmann affirming the positive character of crises in physical knowledge. For the Austrian physicist, it is precisely these crises in knowledge that foster debate and enable the creative elaboration of new ideas and theories. These are some of the aspects that, despite the different periods and philosophical positions, are present in the thought of the mentioned Austrian physicists/philosophers.

It is not uncommon to find material in which these terms appear in the title, as is the case of Schrödinger's Wandlung des Weltbildes. In a bibliographical survey I recently conducted, I observed a certain differentiation in the use of the terms Weltanschauung and Weltbild: while the first, in general, refers to broader issues, involving different aspects of knowledge, the second seems to be more restricted to a specific area (classical mechanics, for example). These terms are quite difficult to translate into English and Portuguese, and it is common to interpret them as synonyms and expressed as worldviews. However, the care taken in the treatment of these Austrian physicists regarding these terms, besides indicating importance, also point to a difference in meaning, even if subtle.

In this sense, the aim of the present paper is to discuss how the Austrian physicists mentioned above interpreted the terms Weltanschauung, Weltbild and Weltauffassung, by asking: what were their motivations and possible goals for such an attitude towards the construction of physical knowledge?

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10:00 – 10:30

Xiuyuan An (Fudan University) - Choice of Variables and the Difficulty of Causal Inference.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: Causal relations may be true for one set of choice of variables but not for another (see Woodward, 2016). Sober's (1987, 2001) Venetian sea levels and British bread prices example raises question about whether it violates the Principle of the Common Cause (PCC). Most of the discussions are based on: (1) probabilities in the counterexample are in fact not homogeneous through time and (2) while the levels of bread prices and the sea may be highly correlated, changes in the levels need not be correlated (e.g., Forster, 1988; Hausman & Woodward, 1999; Papineau, 1992; Steel, 2003; and Hoover 2003).

This paper argues that we should be careful when choosing units as well as variable. In some cases, units are entities instantiated by single variable, while in other cases, units also can be defined by diverse variables. In order to make correct causal inference, we have to get fine-grained causal model, so to keep probability distribution among samples and population are present as nearly the same, if they are not incommensurable.

Section 2 introduces two concepts, i.e., inter-unit and intra-unit causation, to review Sober's counterexample. Zhang and Spirtes (2014) diagnose that causal Markov condition (CMC) is formulated in terms of causal structures that depict intra-unit causal relations only. Section 3 evaluates the Independent and Identical Distributions (IID) assumption that all probabilistic hypothesis tests will depend on. I point out that IID is violated just because there exist relevant properties across units, so as why the generalization of PCC (i.e., CMC) can't apply. Section 4 proposes a multiple-regression approach to select appropriated variables. Section 5 explains how multiple-regression helps to make fine-grained causal modeling, and further to make causal inference.

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10:30 – 11:00

Tatiana Denisova (The University of the Aegean) - Truth as an existential event: aletheia versus veritas.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: Since truth is considered the goal of scientific inquiry, the definition of truth is a fundamental question. Two concepts to understanding truth are distinguished in the history of Western thought: the early Greek concept of aletheia and the Latin concept of veritas.

Truth as veritas. The truth's main features as veritas are its correspondence to the state of affairs and objectivity. Truth has nothing to do with the aim and means of the cognizing subject, who is not responsible for the consequences of the truth discovered. Delusions and deviations from the way to the truth are estimated negatively as annoying obstacles. Truth is exhausted by its content, while delusion is regarded as an epistemological failure.

Communicating one's version of the truth is essential, i.e., the form of the proposition, the style of discourse, and the circumstances under which the truth is discovered, formulated, affirmed, and communicated. The obstacles encountered in its acceptance (political, ideological, linguistic, cultural-historical, etc.) do not affect the truth but its defender. Moreover, it is not the truth that is tested but the subject who affirms it; the fate of the truth depends on its defender, courage, strength, and belief in one's rightness.

The understanding of truth as veritas disregards the fact that truth includes the subject, not only as a cognizer but also as existent and comprehending his existence in the light of the truth he discovered. That is, truth is an existential event of his life.

An existential event is an event that affects the very foundations of human existence and concerns the problems of life and death, freedom and responsibility, the place in the world and the relations with the world of inquiry, the world that gives personal meaning to life.

Truth as aletheia. The early Greek understanding of truth as aletheia has the following features.

1. Truth is universal.
2. Truth as aletheia, which Heidegger interprets as "unconcealedness", implies, in addition to "unconcealed", the presence, the sphere of "concealed", implicit, unknown to man. It negates lethe (oblivion, forgetfulness, concealment).
3. Neither nature nor God consciously conceals the truth from man so that it becomes fundamentally inaccessible. Truth is available to everyone, but its comprehension requires personal effort.
4. Truth is not outside the human world. It is always possible to expand the "unconcealed" as a result of cognition and disclosure, approaching the Heraclitean "secret harmony", which is "better than explicit".
5. Delusion, deviation, and digression are included in the search for truth.

Conclusions. Veritas is an engineering interpretation of the world, irrespectively from how and why the world exists (and the man in it); the main thing is how it works. Aletheia touches on the problem of human existence and its meanings in general. Acceptance of the concept of aletheia makes the reason for striving for truth clear: man is occupied with searching for it not because of irrational curiosity but because of concern for his existence.

(FEYER)
Symposium: Symposium Paul K. Feyerabend

Topic: B.6 Historical Aspects in the Philosophy of Science

Chair: Garcia da Silva Oliveira, Deivide

Abstract: The major attempts at a comprehensive understanding of the thought of Paul Feyerabend (1924-1994), which appeared in the years following his death, highlighted the role of Karl Popper in Feyerabend's intellectual development. As a result, Feyerabend has been portrayed alternatively as a disappointed Popperian (Preston 1997), as ultimately a pluralistic Popperian across the board (Farrell, 2003), or as an intellectual opportunist and, hence, a non-Popperian (Oberheim, 2012 [2006]). More recently, Feyerabend's philosophical output has been reconstructed quite independently of its Popperian connections, including an early (c. 1951-1975), a middle (c. 1978-1987), and a later (c. 1989-1994) stage (Brown-Kidd 2016). Because of these recent developments in the study of Feyerabend's work, old topics have being readdressed and many new contributions have been made during the last 15-20 years. Considering that Feyerabend's centennial is near (2024), our Symposium (FEYERABENDIANA) takes this opportunity of Feyerabend's centennial and the CLMPST in South America to celebrate the plurality and importance of Paul K. Feyerabend not only to philosophy but to another areas of knowledge (arts, education, cognitive sciences, social sciences and topics like feminism and black feminism). Thus, we aim to illustrate part of these recent developments in Feyerabend's work, made by acknowledged Feyerabendian scholars from various parts of the world, under a plurality of problems and topics that will be presented to the general and specialized public of philosophy (Brown, 2016; Bschir & Shaw, 2021; Chaitin & Chaitin, 2018; Collodel & Oberheim, 2020; Duque & Arango, 2010; Leal, 2020; Oliveira, 2021; Oliveira & Queiroz, 2021; Tsou, 2003).

Speakers:
1) MATTEO COLLODEL: Feyerabend's Farewell to Critical Rationalism: Chronicle of a Long Goodbye
2) DEIVIDE GARCÍA DA SILVA OLIVEIRA: A Sketch of Feyerabend's theory of experience
3) JONATHAN TSOU AND JAMIE SHAW: Feyerabend's Metaphysical Turn and the Stanford School
4) MATTHEW BROWN: Science and Imagination in an Abundant World: Feyerabend's Epistemological Anarchism as Philosophy of Creativity
5) KARIM BSCHIR: What is "humanitarian" about Feyerabend's pluralism?
6) LILIA QUEIROZ: Scientific errors and Feyerabend's philosophy
7) PALOMA O. DE SANTOS, VIRGINIA M. F. G. CHAITIN, JOSÉ ABDALLA HELAYËL-NETO & PAULO H. de S. PICCIANI: Other epistemologies: the relevance of the arts in feyerabendian thought.
8) VIRGINIA MARIA FONTES GONÇALVES CHAITIN, JOSÉ ABDALLA HELAYËL-NETO, PALOMA O. DE SANTOS & PAULO H. de S. PICCIANI: Transgressive Sciences: dialogues between Feyerabend and Dirac.

9:00 – 9:30
Matteo Collodel (Ca' Foscari University of Venice) - Feyerabend's Farewell to Critical Rationalism: Chronicle of A Long Goodbye.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: By combining the positive insights of past scholarship with the results of extensive research work on Feyerabend's Nachlass, this paper reconsiders the periodization of Feyerabend's philosophical trajectory and tentatively advances a more fine-grained comprehensive account of the development of Feyerabend's thought which strives to illuminate Feyerabend's enduring efforts to emancipate himself from the yoke of his intellectual bond to Popper.

After his university studies in post-war Vienna and London, Feyerabend became known in academic philosophy in the second half of the 1950s for his contributions to the philosophy of quantum theory, developed in critical dialogue with Popper. Feyerabend's philosophical breakthrough, however, came only in the first half of the 1960s, when he abandoned the philosophy of quantum theory due to the negative reception that his work had met and focused on the methodology of science. Reviving intuitions dating back to his formative years within a critical rationalist framework, Feyerabend advanced his research program of theoretical pluralism as an enhanced version of Popper's falsificationism. This pushed to the extreme the pluralistic and fallibilist components of the latter, prescribing to maximize the empirical content of a given theory by developing alternatives (proliferation) and by preserving apparently refuted rivals from rejection (tenacity).

Yet, as he was refining his proposal to rebut criticism, Feyerabend went through a skeptical phase, triggered by personal discussions with Kuhn and C.F. von Weizsäcker and fostered by historical studies in the Galileo myth. Throughout the second half of the 1960s, Feyerabend became increasingly concerned with the problem of the limits of rationality and questioned the feasibility not only of Popper's falsificationism but of the very normative approach to general philosophy of science assumed by his theoretical pluralism as opposed to descriptive, case-study inquiries in the history of science which only seemed able to account for the complexity of scientific practice. In the process, Feyerabend shortly resumed his work on quantum physics to attack Popper's interpretation of Bohr.

Feyerabend's efforts to consolidate the normative stance surviving the crisis of his methodological project found a resolution only at the end of the 1960s, after his discovery of J.S. Mill's fallibilist pluralism, understood by Feyerabend as an archetypal and more humane version of Popper's critical rationalism. Feyerabend's novel position — which he had provisionally called "hedonism", "anarchism", "dadaism", or "new liberalism" — was fully displayed under the rubric "epistemological anarchism" in his controversial book Against Method (1975), in which Feyerabend's criticism of Popper also acquired vicious overtones. Throughout the 1970s and 1980s, Feyerabend explored the political implications of his anti-methodological perspective and targeted Popper and the Popperian School in increasingly vocal terms. Trying to dispel Popper's suspicion concerning the totalitarian dangers inherent in it, Feyerabend emphasized the relativist component of his epistemological anarchism, outlining the political model of a pluralistic Free Society.

Only at the turn of the 1990s, after abandoning the most radical aspects of his mature views and developing a sophisticated metaphysics, Feyerabend managed to reconcile himself to his Popperian past.

9:30 – 10:00

Deivide Garcia da Silva Oliveira (Universidade Federal do Recôncavo da Bahia) **- A Sketch of Feyerabend's Theory of Experience: Experience Fluidness and Plurality**

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: Feyerabend's understanding of experience is central to his philosophy of science, yet it remains an overlooked subject. This paper aims to provide a clear explanation of Feyerabend's theory of experience by refuting the widely held misconception that he rejected the importance of experience in scientific knowledge development (especially because of some titles of his papers (e.g. "science

without experience" (1969) or "knowledge without foundations" (1961), which adds fuel to relativistic-anarchistic fire (Farrell, 2003)). We argue that Feyerabend's theory of experience is characterized by three key features: first, it is theoretically dependent; second, it is fluid and plural rather than stable; and third, it has a role in the development of knowledge but not a foundational place. Together, they shape a theory of experience. But does Feyerabend have a theory of experience? Feyerabend actually developed "a sketch of a new theory of experience" (Feyerabend, 1965, p. 186), therefore, the term theory here is a broad outline that indicates how science deals with experience (Feyerabend, 1993).

We argue that Feyerabend's philosophy is not just a proposal for deconstruction (Feyerabend, 1999 [1963]), but also an attempt to reconstruct the relationship between experience and theory in a way that recognizes the autonomy of each. The paper also provides a clear interpretation of Feyerabend's view on experience by showing that it is not intended to serve as the main foundation of knowledge because of a supposed stability, but rather to increase the empirical content and provide a proliferation of alternative epistemological views (Feyerabend, 1999 [1963]; Oliveira, 2021). Thus we will debunk the approach that Feyerabend's philosophy rejects experience, turning it into something with no importance at all to knowledge, while also saving part of a critical empiricism. By presenting a case for a Feyerabend's theory of experience in a clear and concise manner, this paper contributes to a better understanding of his philosophy.

10:00 – 10:30

Jamie Shaw (Leibniz University), Jon Tsou (University of Texas, Dallas) - Feyerabend's Metaphysical Turn and the Stanford School

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: During the late 1980s and early 1990s, Feyerabend's thought took a distinctively metaphysical turn. Culminating in Conquest of Abundance, Feyerabend outlines a theory of 'Being' wherein reality is "pliable" to our wishes. As recent literature has shown, Feyerabend was influenced by and contributed to the Stanford School's 'disunity of science' movement which formulated metaphysical hypotheses in which the universe is understood as fractured and amenable to pluralism of some variety (Cat and Shaw 2023). This is in stark contrast to Feyerabend's earlier works, where he never cashes out a particular metaphysical theory though he acknowledges that scientific method cannot be understood without some metaphysical theory.

The goal of this paper is to investigate Feyerabend's metaphysical turn. In doing so, we make two primary claims. First, Feyerabend's later works represent a dramatic change in his thinking and the views expressed in Conquest of Abundance cannot be seen as a continuation of his work from the 1970s and early 80s. Moreover, we argue that this metaphysical turn – while interesting and provocative – is regressive. Indeed, we should how the early Feyerabend provides strong reasons to think that Feyerabend's metaphysical turn is a turn towards dogmatism. We conclude by suggesting a characterization of Feyerabend's work in Conquest of Abundance which is more plausible than Feyerabend himself offered. This revised version of the later Feyerabend offers a 'metaphysics without dogmatism.'

10:30 – 11:00

Karim Bschir (University St.Gallen, Switzerland) - What is "humanitarian" about Feyerabend's humanism?

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: A strong commitment to pluralism on multiple levels (methodological, theoretical, ontological as well as political) is a defining feature of Paul Feyerabend's philosophical corpus. At various points in his writings, Feyerabend uses the term "humanitarian" to characterize his pluralist stance.

In "Against Method" he writes that "a method that encourages variety is also the only method that is compatible with a humanitarian outlook" (1975, p. 31). In the Introduction to the Chinese edition of "Against Method" he states that his "main motive in writing the book was humanitarian, not intellectual" (ibid., p. 3). In another passage, he associates Kuhn's model of scientific change with "anti-humanitarian tendencies" (1970, p. 197).

However, Feyerabend never clearly explains what he exactly means by these (and similar) pronouncements. Neither has the relationship between Feyerabend's pluralism and humanitarianism (or his allegations of anti-humanitarianism towards those positions that he criticizes) been properly examined in the secondary literature.

In this paper, I will tackle two questions. The first is hermeneutical: How is Feyerabend's self-ascribed humanitarianism to be understood, and what does he mean when he says that only pluralism is compatible with a humanitarian outlook?

Answering this question will require a renewed look at Feyerabend's frequent references to John Stuart Mill's "On Liberty" and the alleged implications of Millian Liberalism for the philosophy of science. This will also include a critical analysis of Feyerabend's interpretation of Mill and the potential misunderstandings it might include.

The second question is systematic: Does the purported relationship between pluralism and humanitarianism exist, and is it true, as Feyerabend claims, that any form of monism or dogmatism is anti-humanitarian?

In accordance with Kusch (2021), I will conclude my analysis by showing that Feyerabend's frequent invocations and commitments to humanitarianism can be best understood as providing a normative frame for his epistemological anarchism. This frame can be seen as a normative stance consisting of a specific set of values and principles (a VEPP in Kush's terms). I will also show that Feyerabend uses this normative frame as an argumentative tool for two specific purposes: a) to shield his epistemological position from allegations of unbounded relativism (i.e. when he needs to invoke normative constraints for pluralism), and b) to weaken the positions of his philosophical adversaries (e.g. Popper or Kuhn) on normative grounds.

I will conclude that both argumentative strategies fail, not because humanitarianism (as understood by Feyerabend) is incompatible with pluralism, but because is also compatible with positions such as Popper's critical rationalism or positions that value mild forms of dogmatism in scientific knowledge production. Pluralists therefore cannot claim exclusive rights to humanitarianism.

ROOM 05

9:00 – 9:30

Gabriel Paravano (Universidad Nacional de San Juan) - Models and Metaphors: on their place in the epistemology of Carnap and Hempel.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: Contemporary readings on the studies of "logical positivism" or "neopositivism" (p. 7; Uebel, T., 2022) have considered that, for the authors of this philosophical current, the metaphor has no real content because it does not say how things “really” are (Cábal, R. S. 2014), i. e., the authors understand that literal language is the best tool for the objective characterization of reality that scientific statements seek to develop (Ortony, A., 2012, p. 10), therefore, the use of a metaphor in this attempt could only either give a distortion of what the world is or give statements lacking empirical references. Beyond the theoretical disagreements, it seems that there is a basic and historical agreement, in this philosophical perspective, that the metaphor does not play a cognitive role in scientific practice.

Since Carnap and Hempel are two of the sharpest thinkers from this perspective, and to whom different readings are attributed to the structures and constitution of scientific theories, this paper will attempt to account for the following: although the metaphor has no empirical significance for these thinkers, this does not mean that -for both- it does not have a place in scientific practice.

The value of this debate has two sources, on the one hand, recovering a central element of these debates, mainly the problem of how a symbolic language -such as the scientific one- can reduce the figurations of its discourse and, with it, be able to to address the world as literally as possible. On the other hand, presenting the cognitive problem of scientific language from a different perspective than how it has been treated in traditional epistemological studies, concerned either with the problem of the verification of scientific concepts or with the problem of practical implications- social science concepts.

This paper will defend the thesis that, for Carnap and Hempel, metaphor has a role in scientific practice, specifically, in the use of scientific models.

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9:30 – 10:00

José Filipe Silva (University of Helsinki) - The unity of matter in late medieval natural philosophy

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: The topic of matter, that is the stuff that constitutes existing things in the world, has been at the centre of philosophical inquiry since its beginning. First the pre-Socratics, then Plato and Aristotle struggled in their own way with the question about the nature of the ultimate constituent of reality: Is there something underlying even the most basic element of the physical world? Following the translation into Latin of Aristotle's works on natural philosophy (what we nowadays would call 'physics') from mid-twelfth century and their circulation in the recently created Universities of Paris and Oxford, answers to the question about nature of matter were mostly written in an Aristotelian framework. In this framework, the substrate of substantial change (generation and corruption) is prime matter, conceived of as pure potentiality or receptivity to form. Generation (coming into being) means to receive a form that makes a thing to be what it is: to have a form of a substantial kind is to be an individual of a certain species, to be this cat or this birch tree; matter is that which receives that form and subject to its formal, essential determinations. But the matter that is the subject of generation (and corruption) is just one kind of matter.

In the second half of the thirteenth century, philosophers delved into the question of the unity of matter, that is to say whether there is a matter common to celestial and terrestrial bodies, and common to spiritual and corporeal beings, and what is the meaning of 'common' here – numerical identity, common genus, etc. Although this debate has been noted by other scholars, my paper aims at providing new insights into how the question about the unity of matter relates to two hot-topics of the period, namely (i) the nature of matter as the substrate for change and (ii) the plurality of forms in any given individual substance. For instance, does the commitment to the numerical unity of matter entail a certain view in the debate between unicity versus plurality of forms? As the notion of potentiality is central to both topics, I also aim at understanding what is the relation between unity of matter and potentiality. My starting points are the views of Bonaventure, Robert Kilwardby, Roger Bacon, and Geoffrey of Aspall, all authors from the second half of the thirteenth century. Although their views on matter may seem remote from the perspective of contemporary science, they represent an important moment in the development of physical science and its quest to understand the ultimate nature of reality.

10:00 – 10:30

Hannah Allen (University of Utah) - Race and Pharmacogenetics: A Historical Reckoning.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: The systematic racialization of pharmacogenetics occurred decades earlier than has previously been acknowledged. Current historical literature dates the practice of correlating drug response with race to the emergence of Werner Kalow, who popularized the science with his 1962 book, Pharmacogenetics: Heredity and the Response to Drugs. While Kalow certainly contributed to the early adoption and propagation of race talk correlated with medication tolerance, his own racialization is an inherited practice. In this project, I point to two other major instances of racialization in the early cross-pollination between pharmacology and genetics which affect contemporary precision medicine and pharmacogenetics. Unpacking the historical preoccupation with race disperses responsibility for racializing pharmacogenetics over a continuum of figures and points in time, pointing out how these values were recreated over and over again by different empirical observations and figures.

By 1926, the German pharmacologist Peter Mühlens had created the first effective, synthetic version of quinine, plasmochin, and in an act of cultural propaganda, Mühlens marketed the drug abroad in Latin America. The United Fruit Company was interested. Quinine supply was limited and their workers often suffered from malaria, reducing productivity. Physicians at the company noticed, however, that while the drug was an effective antimalarial, it also caused a percentage of "male adults

of the African race" to experience an extreme toxic reaction from taking the drug (Cordes 1927). Results from these crudely run drug trials were published in the company's annual reports.

This racialization continued just a few decades later during an American military-funded scientific exploration to find a better and less toxic antimalarial medication. They employed scientists from the University of Chicago to test such drugs on prisoners in Stateville Penitentiary. The first phase of this research identified the highly effective antimalarial drug primaquine. A second phase capitalized on their secondary finding that just about 5-10% of the prisoners researchers identified as "Black" who were administered primaquine had a severe toxic hemolytic reaction to the drug, a reaction that results in the body's red blood cells being killed off at a higher rate than they are being produced. Researchers at Stateville spent a decade or so exploiting the Black prisoners in these sorts of experiments, and published dozens of scientific articles. Notably, while they focused on Black prisoners, this hemolytic reaction to primaquine was also known to occur in other ancestral groups, such as Italians and Israelis. Kalow also used the Stateville studies as formative material for his 1962 text.

Contemporary pharmacogenetics concerns itself with how an individual's genes will affect responses to medication, and often, researchers correlate projected drug responses with an individual's race, ethnicity and/or ancestry. This correlation is often discussed, debated, and even contested, yet the underlying history of the practice remains underexplored. This approach oversimplifies the history of pharmacogenetics, as well the entrenchment of race language in the field. Clarifying the history will help elucidate current practice; this project therefore has liberatory aims to make pharmacogenetics a more inclusive and effective practice.

10:30 – 11:00

Zuraya Monroy-Nasr (UNAM) - Malgré tout: hypothesis and evidence in r. descartes' philosophy of nature.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: The work of René Descartes has been interpreted in different ways over the centuries. The dominant interpretation since the 17th century has considered Cartesian philosophy as metaphysics. Towards the end of the 20th century, another interpretation acquired importance, and Descartes' philosophy of nature is recognized as the perspective underpinning this author's thought. However, in the history of science, the contribution of the French philosopher is seldom recognized.

This may explain why, in Godfrey Guillaumin's book, The emergence of the notion of evidence. A study of historical epistemology on the idea of scientific evidence, does not have a chapter dedicated to Descartes. Guillaumin studied the development of the notion of evidence from antiquity to modernity. His work begins by examining Ian Hacking's conception of evidence and probability. The author uses Hacking's notion of internal evidence and inferences from signs to analyze Hippocratic medicine, highlighting Sextus Empiricus' attack on this form of inference. The author also reviews Hipparchus' observational astronomy and his remarkable visualization of the problem of the relationship between observational data and theory. He presents Ptolemy's conception of the relationship between his observations and theory and Gilbert's new experimental philosophy, where experimental results gain strength. The last two chapters are devoted to Galileo and his rejection of Aristotle's everyday experience and then to Newton's successful predictions as probative evidence. And Descartes? Well, Descartes was not summoned. But that is not unusual. In fact, it would be unusual to have a chapter devoted to the role of evidence in Descartes's natural philosophy.

To better understand certain aspects of Descartes' natural philosophy and to see if the exclusion is justified, I will examine the role of hypothesis, evidence, and the kind of explanations that the Touraine philosopher seems to favor. To this end, some of Guillaumin's considerations about the

hypotheses and evidences in the comparison that he makes between Descartes' and Newton's behavior will be presented. I will also review the role that Hempel establishes for hypotheses in collecting evidence and its classification of deductive and inductive scientific explanations. Hempel's conceptualization allows us to reflect on some questions raised by Guillaumin, bringing in Descartes' contributions regarding the use of hypotheses, the type of evidence, and the explanations he develops.

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ROOM 06

(BGIA)
Symposium: Entanglements of science and culture in the discussion of bodies, gender, identity and affect

Chair: Mariela Solana

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Claiming that technoscience is a social and political practice is far from new. For decades now, social epistemologies, especially feminists epistemologies, have insisted on the situated, contextual and inherently political character of scientific and technological knowledge. In this sense, important science scholars -such as Helen Longino, Donna Haraway, Evelyn Fox Keller and Karen Barad, just to name a few of the authors that will be discussed at the symposium- have shown not only how cultural values shape the production of scientific knowledge but also how science influences the debates that take place in the public sphere. These authors invite us to transcend disciplinary boundaries and to focus on those phenomena that break with classical dualisms such as nature and culture, body and mind, matter and meaning, social and natural science, and science and politics.

The presentations in this symposium are inspired by these feminist and social epistemologies in their attempt to understand how certain phenomena -mainly the body, gender, identity and affect- shape and are shaped by scientific, technical and academic practices. Our main goal is to analyze these entanglements of science and culture without falling into the aforementioned dualisms. In order to do this, we shall revisit classic debates of science studies and feminist epistemology, but adding a particular focus on a set of scientific and political developments of the 21st century.

The first paper analyzes a set of epistemological and ontological questions related to the historical and philosophical role of placebos in clinical randomized trials (RCTs). Its goal is to show that paying attention to the placebo effect allows us to understand the intra-active character of the affective, embodied and physiological experience of depression. The second paper also reflects on the limits of nature-culture dualism. It explores how feminist new materialisms use certain scientific concepts -such as atoms and bacteria- in order to offer more dynamic and contingent images of matter but also as a way to intervene in feminist debates about identity, gender and sexuality. The third paper also addresses feminist debates as it attempts to show the co-produced nature of the concept of gender in present day Argentina. Its goal is to explore the productive possibility of an

interlocution between academia, activism and public debates (as well as policies) that may foster critical thinking. The fourth and final paper also examines the relation between science, history and politics in contemporary Argentina. This talk discusses a set of controversies surrounding the use of direct-to-consumer DNA tests and how this new technology alters notions of family, identity, ancestry and kinship.

Speakers:
1) RENATA PRATI: Listening to placebos: depression, technoscience and the mind-body problem
2) MARIELA SOLANA: Queer atoms and bacteria: on the uses of scientific concepts in feminist new materialisms
3) MARÍA INÉS LA GRECA: Critical thinking as interlocution between feminist epistemologies and the Argentinian new feminist wave
4) MARÍA JULIETA MASSACESE: Direct-to-consumer DNA tests: re-shaping ancestry and family through genetic kinship

9:00 – 9:30

Renata Prati (CONICET/UBA) - Listening to placebos: depression, technoscience and the mind-body problem.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: The aim of this paper is to explore a set of epistemological and ontological questions related to the historical and philosophical role of placebos in clinical randomized trials (RCTs) for antidepressant psychopharmaceuticals. In the turn of the century, closely following the hype around SSRIs antidepressants such as Prozac, a heated debate broke around the efficacy and safety of such drugs. Here, I would like to shift slightly the terms of the discussion, in order to make two main points around placebos, placebo effects, and depression both as a diagnostic category and a lived affective experience.

Firstly, understanding placebos as an essential epistemic tool for biomedical psychiatry, I will put forth an epistemological argument. The diagnostic category of depression was pivotal in the rise of biomedical psychiatry, mainly through the effects of the antidepressants boom: as Fox Keller (2007) put it, "psychopharmaceuticals have been more effective in persuading people of their essentially mechanistic and physical-chemical nature than all of our modern science put together". This, however, was only possible thanks to the institutional frame of RCTs, which crucially depend on placebos as controls –and placebos, in turn, are inextricably tied to something as volatile and open-ended as beliefs and expectancies. My first argument is then that placebos play a crucial and paradoxical role: they act as the cornerstone of the evidence-based building of psychiatric technoscience, but they also erode its very foundations. Placebo dynamics show the irreducible entanglement of facts, theories, values, histories, and social worlds.

Secondly, moving on to an understanding of placebos as a clinical tool with known therapeutic effects –something which is intimately related to the first meaning, but also in tension with it–, I aim to contribute to ontological debates around the mind-body problem and the relation between nature and culture, the biological and the experiential, the material and the semiotic. Although placebos are usually perceived in a negative light, as "sham, fake, false, inert, and empty" (Kirsh 2005), recent research has stressed that the placebo effect is a very powerful phenomenon, with distinguishable neurobiological pathways that are being extensively explored. However, even if current research tends to focus on the underlying neurobiological mechanisms, the crucial "trigger" (Evans 2004) or "driver" (Hall 2022) in placebo effects is still, unquestionably, in the volatile and open-ended realm of expectancies. My second argument is that placebos and the placebo effect then "hack" from within a

central tenet of psychiatric technoscience: the assumption of a strictly one-way, biological causality. Rather, the placebo effect dynamics bring to light the looped, intra-active character of the affective, embodied and physiological experience of depression.

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9:30 – 10:00

Mariela Solana (UNAJ/UBA/CONICET) - Queer atoms and bacteria: on the uses of scientific concepts in feminist new materialisms.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Redefining key concepts such as nature, body and matter –without falling into biologicist or essentialist accounts– is one of the most important challenges that feminist new materialisms (FNM) are facing today. To that end, FNM have developed images of the material world that highlight its contingency, creativity and radical transformation. Agency is no longer considered a property exclusive of human beings but also of matter, both organic and inorganic.

In the specific field of gender and sexuality studies, FNM have joined feminist epistemology and philosophy of science in their efforts to bring to light the semiotic-material entanglements that constitute our sexed body. One of the strategies used by FNM is to turn to the natural sciences to find tools, figures and models for a deeper understanding of the intertwining of matter and meaning. In this paper, I analyze the work of Karen Barad (2011) and Myra Hird (2004) on the queerness of nature in order to reflect on some of the epistemological and political consequences of this strategy.

Barad's essay is titled "Nature's Queer Performativity" (2011) and its goal is to draw attention to the unpredictability and contingency of the processes of differentiation that take place in the natural world. To this end, Barad explores various "queer critters": atoms, lightning bolts, stingrays, dinoflagellates. The study of these critters helps her to revise notions such as origin, causality, relationship, and change, but it also allows her to intervene in feminist and queer debates on identity. In the case of Hird, her source of inspiration is the nonlinear biology of Lynn Margulis and Dorian Sagan. Her essay is titled "Naturally Queer" (2004) and it can be read, according to her, as an "ode to bacteria" (p. 86). Paying attention to the history of bacteria allows her to minimize the anthropocentric importance that, even in feminist circles, we usually give to sexual reproduction and to sexual dimorphism.

As it is made clear from these examples, talking about the queerness of nature is an opportunity to take a stand in feminist and queer debates about identity, gender and sex. The aim of this paper, therefore, is to understand what happens when we use scientific concepts not just to rethink nature but also to revise feminist and queer notions. Is there anything to be gained by turning to quantum physics and bacterial biology to understand gender, identity and sexuality? What do we hope to learn from atoms and bacteria that we do not already know from social and cultural analyses? These are some of the questions that this paper seeks to answer.

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10:00 – 10:30

María Inés La Greca (CONICET-UNTREF-UBA) - Critical Thinking as Interlocution between Feminist Epistemologies and the Argentinian New Feminist Wave.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Although gender is from the start an interdisciplinary category, it has a special relation to feminist epistemologies and the way they have revised our notions of objectivity, science, knowledge, and their relation to politics. From a twenty-first century perspective, this paper analyses the relevance of gender in discussions within the humanities, social and natural sciences but also beyond academia, in current public debates related to women and LGBTQ+ human rights around the globe. What we understand by “gender” affects the way that research is carried out in several disciplines as much as it contributes to arguments presented in national and international institutions and organizations in charge of the promotion of sex-gender policies. As Judith Butler puts it, gender figures as a precondition for the production and maintenance of human legibility.

Basic cultural assumptions can be challenged both from developments in scientific research and critical thinking and from social movements, when subaltern or marginalized subjects raise their voice against the inequalities and violence that those assumptions entail for them. This has been the case regarding sex-gender issues: gender is a category developed within feminist theory both as a critical resource to rethink scientific bodies of knowledge and as a political resource to effect change in society at large. Regretfully, to the extent that the advancement in political freedom challenges these very basic cultural assumptions, there are social groups that react against change on the sex-gender status quo. Current public discussions and debates over human rights legislation evince two opposite attitudes toward gender: on the one hand, the massive re-emergence since 2015 of political demands from the feminist and LGBTQ+ movement against gender violence on a global scale; and, on the other hand, the rise of what has come to be known as “the backlash against gender ideology”.

Focusing on the Argentinian feminist wave, this paper explores how the vocabulary of its demands is clearly nourished by the activist and academic resources gained since the second half of the 20th century, both by the ongoing feminist and LGTBQ+ activist traditions and by the critical production of academia, specifically, feminist epistemologies. Creative feedback between researchers and public debates is part of the new wave, particularly in the way that academics are demanded to offer more theoretical and empirical knowledge in the face of this public agenda. Of course, the feedback between academia, activism and public debate is not an easy dialogue and the circulation of these concepts exceeds its “expert” or “proper” academic use, or it is even redefined in interesting but strange ways: for example, a typical well spread claim is that people who are undergoing a feminist self-critic or awareness experience in their lives are “deconstructing themselves” or “have been deconstructed”.

This paper studies how gender is used, claimed, and redefined by current feminist and LGTBQ+ debates in Argentina in order to affirm the productive possibility of an interlocution between academia, activism, and public debates (and policies) that may foster critical thinking, in the spirit of the tradition of feminist epistemologies.

10:30 – 11:00

María Julieta Massacese (CONICET - Argentina) - Direct-to-consumer DNA tests: Re-shaping ancestry and family through genetic kinship.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: The purpose of this paper is to discuss some controversies of the direct-to-consumer DNA tests, in particular those that concern ancestry and kinship. In previous research I claimed that these technologies display some of the promises of the genomics era and some of its limits. In the narratives of the Human Genome Project, as genetics was considered to be the key to biology, its final goal was to codify and read "The Book of Life". This entire process can be understood, in retrospect, as a bubble phenomenon, and its results have sometimes been considered to be disappointing because they offered more and less than expected. Although some of the deterministic and reductionist approaches to genomics (Haraway, 1997/2018) have been left behind in the post-genomic era, the genomics database business (now affordable for consumers) presents a lot of risks and disadvantages in terms of misleading information, limitations of reference database and concerns of genetic and data privacy.

I want not only to point out, but also to expand the controversies of the home DNA tests related to ancestry and familiar identity. Among other motivations, people turn to DNA tests to know their genealogical background, both in a short scope (which includes their familiar immediate kinship) and in a wider one (that can include their "ethnicity" or "ancestry" over the centuries). Genetic tests, such as those which indicate "ancestry", can reveal unexpected and interesting information, but can also reinforce racism in people with little understanding of genetics (Roth et al., 2020). I will argue that in many cases, the information provided by these tests can be trivial, exaggerated, or distorted, due to bias of the initial database, in which some populations are not well represented.

Home DNA tests can also reveal information that affects personal and familiar identities (Theunissen, 2022). Sometimes tests allow people to discover that they were adopted, they were conceived by assisted fertilization techniques or that they have unknown siblings or relatives. Argentina in particular has been a pioneer in the building of genetic databases, due to its history of fighting against human rights violations. Also, as a post-colonial country, it is not rare that people are unaware of their familiar history on short and long scales. As DNA tests are an incipient business in Argentina, there is not yet a genetic database big enough to present some issues that have appeared in other countries, like those that confront the right of privacy with the right of identity, but I consider this is one of the potential issues that these technologies face.

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ROOM 07

(MAREP)
Symposium: The many faces of reduction in physics and chemistry

Chair: Olimpia Lombardi

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Since the pre-Socratic search for the substance out of which everything is made, reduction has been a philosophical concern. This idea runs deep through the history of thought reaching contemporary science and finding its clearest expression in the standard model of particles in physics.

Although the locus classicus of the philosophical discussion about reduction is Nagel's 1961 book, the notion has branched out in many directions ever since. One layer of additional complexity – particularly relevant today– is given by the varied ways in which different scientific theories, and even different scientific disciplines, relate to each other.

This symposium aims to discuss the concept of reduction and associated notions in the context of the physico-chemical sciences. It will be organized in three parts and 10 talks.

First part: General discussion

The first two talks set the general framework for discussion, weighing arguments against reductionism, from a neo-Kantian perspective, and in favor of reductionism, assuming that scientific theories do not fix the ontology.

Second part: Physical sciences

This part features five talks, four devoted to the philosophy of quantum mechanics –involving the reduction of quantum time and quantum systems to an ontology of relations, the ontological status of quasi-particles, and the problem of the relation between classical and quantum logic– and one to the philosophy of space-time –discussing the super-substantivalist approach to space-time in the context of general relativity–.

Third part: Chemical sciences

This part is composed of three talks focusing on the traditional problem of the philosophy of chemistry: the interdisciplinary relationship between chemistry and physics. In this context, the Quantum Theory of Atoms in Molecules is approached from an Aristotelian point of view, the particular limit used in the Born-Oppenheimer approximation is analyzed, and the ontological status of nano-materials is discussed.

Speakers:

1) Olimpia Lombardi: In defense of ontological pluralism
2) Cristian López: In defense of ontological reduction
3) Matías Pasqualini and Sebastian Fortin: Phonons as a case of intra-domain pluralism compatible with reduction
4) Ignacio Rojas: Relations all the way down»: reductionism, entanglement and Ontic Structural Realism
5) Sebastian Fortin and Matías Pasqualini: Quantum time reduced to interaction relations
6) Federico Holik, Juan Pablo Jorge, and Décio Krause: Quasets, quasi-sets, and the foundations of quantum mechanics
7) Manuel Herrera: Fundamentality and space-time: reductionist and emergentist approaches
8) Jesús Jaimes Arriaga: Questioning microphysicalism: a hylomorphic account of quantum chemistry
9) Hernán Accorinti and Juan Camilo Martínez González: The role of idealizations in the debate about reduction
10) Alfio Zambon, Fiorela Alassia, and Mariana Córdoba: The problem of identity in nanochemistry

9:00 – 9:30

Olimpia Lombardi (CONICET-Universidad de Buenos Aires) - In defense of ontological pluralism.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: The idea that science moves forward by reaching truths as it unravels the veil of reality is strongly present in many areas. In addition, it is usually supposed that certain disciplines and theories count on the privilege of describing the fundamental level of reality. This view pervades the scientific community because it is an intuitive, commonsense realism. It is also still powerful among philosophers of science, mainly when they are concerned with explaining how secondary disciplines and phenomenological theories are related to the fundamental descriptions of the world.

The aim of this talk is to recall Kant's insights, and to apply them to the philosophy of science. But learning from a philosopher does not amount to glossing and repeating his works: complete fidelity is not necessary to recognize his value. I will find my inspiration in Kantian philosophy to face present-day problems, although at some point I will be forced to depart from the philosopher's doctrine. In fact, Kant's philosophy is built upon two main ideas, which were very novel at his time: the role of the subject in the constitution of the object, and the transcendental character of categories that makes them a priori conditions of any possible knowledge. I will definitely accept the first idea, but at the same time I will reject the second one in its original version, turning it into the view of a relative a priori that underlies any theoretical body of knowledge. This not-completely Kantian but Kantian-rooted perspective admits the existence of different conceptual schemes, both diachronically and synchronically. This view leads to an ontological pluralism that allows for the coexistence of different, even incompatible ontologies, breaking down the assumption about the priority of certain scientific theories and disciplines over others.

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9:30 – 10:00

Cristian López (University of Lausanne / University of BuenosAires) - In defense of ontological reduction.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: It is being increasingly acknowledged that reductionism is not a mammoth doctrine, but parceled and multifaceted. If this is the case, then the failures of reductionism in some parcels do not imply failures in others. Nor does a failure in one parcel entail the failure of the whole doctrine. In this presentation, I am concerned with the relation between inter-theory reduction and ontological reduction. It has been argued that the failures of inter-theory reduction imply (or, at least, suggest) that ontological reductionism also fails. This would, in turn, imply some form of ontological emergence or pluralism for a lack of a better choice (see previous talk). But for this argument to go through, it must assume that scientific theories somehow fix the ontology. The argument would hence look as follows:

1. Scientific theories fix the ontology.
2. Scientific theories fix reductive, emergent or pluralist ontologies.
3. Ontological reduction entails inter-theory reduction.
4. Inter-theory reduction fails.
5. Therefore, ontological reduction also fails.

C. Emergentism or pluralism are the only options left

I believe that (1) and (2) are untenable. Without them, the argument does not go through. In consonance, I will defend two theses in this presentation. First, the failures of inter-theory reduction are compatible with metaphysical reduction. This follows from showing that scientific theories do not fix the ontology, which means that failures of ontological reduction should be argued for independently from failures of inter-theory reduction. Second, I believe that metaphysical reduction is not only an attractive doctrine within science, but also inevitable. In virtue of this, it is hard to reject.

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10:00 – 10:30

Matías Daniel Pasqualini (Universidad de Buenos Aires), Sebastian Fortin (CONICET-UBA) - Phonons as a case of intra-domain pluralism compatible with reduction.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: As it is well-known, a phononic description of a crystal lattice entails significant explanatory novelty in comparison with a description consisting of a periodic array of atoms. Nonetheless, in the practice of physics it is usual to endow phonons with a weakened ontological status, that of quasi-particles. In the field of the philosophy of physics, efforts framed in an emergence approach have been made to place phonons on an equal ontological footing with emergent particles, such as photons. Particularly, Franklin and Knox (2018) assume Butterfield's (2011) notion of emergence compatible with intertheoretic reduction and argue in favor of phonons as a case of inter-domain emergence compatible with reduction. In this presentation, we critically assess that proposal. We argue that both atomic and phononic descriptions of a crystal lattice can be framed in standard quantum mechanics. As a consequence, the intertheoretic relation of reduction between descriptions required by inter-domain emergence could not hold. Contrarily, we build the case of phonons as one of ontic pluralism, assuming the notion put forward by Lombardi and Ferreira Ruiz (2019). From our perspective, the ontology of atoms and phonons are on an equal footing, both being relative to particular tensor product structure (TPS) of the total quantum system. To fulfill this purpose, we appeal to a TPS approach and to an ontology of properties for quantum mechanics. Since both particular ontologies can be framed and reduced to a more general metaphysical framework of bundles of properties, as a final result we build the case of phonons as one of intra-domain plurality compatible with reduction.

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10:30 – 11:00

Ignacio Rojas (Universidad de Buenos Aires) - «Relations all the way down»: reductionism, entanglement and Ontic Structural Realism.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Ontic Structural Realism (OSR) (French 2014) can be understood as a reductionist project: according to which all there is are relations. These are the fundamental components of the physical world. Beyond the intense debate that OSR has generated by postulating an ontology of 'relations without relata' and its supposed incoherence as an ontological position (Chakravartty 2003), a crucial aspect of the OSR is to conceive, precisely, relations as ontologically non-supervening on their relata.

Quantum entanglement has been cited in the literature as a fundamental example of this type of relation. Thus, Howard (2007) has understood that entanglement, involved in the experimental

violation of Bell's inequalities, implies assuming the non-separability of quantum systems and, therefore, it would be a clear case of ontological emergence: entanglement, understood as a relationship between systems that have previously interacted, does not ontologically supervene on the state of the particles involved. As a consequence, if OSR wanted to postulate itself as a reductionist position of the ontology of the physical world to non-supervening relations, the phenomenon of entanglement, whose consequences have been experimentally verified, would be an exemplary case on which to support an ontology of relations.

The aim of this work is to show that the idea of understanding entanglement as non-supervening relation, and therefore supporting the OSR ontological project, crucially depends on an interpretation of the Hilbert space formalism of quantum mechanics. As Fortin and Lombardi (2022) have shown, entanglement is a subtle and conceptually more complex notion than what is normally assumed in the literature. Being formally represented as the non-factorization of the state of the composite system in terms of the states of the component subsystems, entanglement is usually interpreted as a type of relationship between two particles that have previously interacted. However, this interpretation can be challenged by adopting the algebraic formalism of quantum mechanics, where quantum entangled states are defined by the type of correlations between probabilities. This formalism makes clear that the composite system can be decomposed in many different ways: the decomposition that is normally interpreted in terms of states of 'particles' does not possess any special privilege and, therefore, no fundamental ontological import. This way of understanding entanglement would imply the need to review its interpretation as a non-supervening relation between particles and to provide an interpretation that embraces all the multiple aspects of quantum entanglement.

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Symposium continues in the same room, at 14:30

ROOM 08

9:00 – 9:30

Konstantin Skripnik (Southern Federal University) - Towards metaphilosophical conceptualizations of the history of philosophy.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: The aim of the report is to consider the opportunities of the meta philosophical approach to the history of philosophy. It seems, one of the first topics of the metaphilosophical study of the history of philosophy is the question of the description, analysis and comparison of various variants of the conceptualization of the history of philosophy. The report suggests considering several such options, which can be called diachronic, "oppositional", "based-on-turns", and "conceptual-thematic".

It is known that the genre of the "general history of philosophy" manifests itself approximately in the middle of the XVII century in such pioneering works as such pioneering works as the books of Thomas Stanley, Georg Horn and Jakob Thomasius. At present, the "histories of philosophy" by G.Hegel and L.Feuerbach, B.Russell and W. Tatarkiewicz, D.Antaseri & G.Reale and F.Ch.Copleston, E. Gilson and M.Sweeney are well known, as well as H.Corbin on the history of Islamic philosophy, Féng Yǒulán on Chinese, S. Chatterjee & D.Datta and Sarvepalli Radhakrishnan – on Indian. If Western philosophy is presented, then the presentation follows the diachronic principle, which considers the history of philosophy by epochs, combined with the personal principle, when figures of individual philosophers are isolated in each epoch. The diachronic principle is combined with the synchronic presentation of individual philosophical "schools".

In contrast to the “purely” diachronic scheme, the variant of "oppositional" conceptualization represents a number of philosophical oppositions characteristic of the general history of philosophy (the Marxist opposition of the "Democritus line" and the "Plato line" or materialism and idealism) or for its separate periods (the opposition of rationalism and empiricism, scientism or anti-scientism). In oppositions, both the histories of individual fields of philosophy and general philosophical approaches can be conceptualized; oppositions can serve the purposes of "external" presentation of the history of philosophy or be used for "internal" conceptualization or in order to ensure the self-identification of a philosophical tradition, school or movement (the opposition of analytical and continental philosophy is an example).

In recent years, metaphilosophical conceptualizations of the history of philosophy based on the turns in philosophy have emerged. The concept of a turn can characterize the general history of philosophy ("analytical turn", "linguistic turn" or "pragmatic turn"), can refer to a certain philosophical tradition ("historical turn of analytical philosophy"). The concept of a turn can come into the philosophical "narrative" from other fields of science or humanities (for example, an ontological turn) or, on the contrary, lead to consideration of such a turn in the other domains of knowledge (speech-act theory in linguistics, or a pragmatic turn in cognitive sciences, in Humanities, and in Neuroscience)

The conceptual and thematic conceptualization of the history of philosophy, which is based on a certain concept and a "family" of concepts, is very interesting. As an example, the report examines the idea of J. Deeley, presented in his book "Four Ages of Understanding", in which the semiotic concept of a sign and related concepts is at the heart of the conceptual scheme of the history of philosophy.

9:30 – 10:00

Itsue Nakaya Perez (CUNY, The Graduate Center) - Reconsidering Taxonomies: a Decolonial View of Scientific Classification.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: Taxonomies aim to objectively represent how things are disposed of. When they are good, we say that they crave nature in its joints—they track real structures in the world. If they accomplish this purpose, they are useful in scientific projects. However, we can find several examples of inadequate classifications, including colonial taxonomies of castes in the Americas and Borges’

infamous animal catalog. Unsurprisingly, philosophers have given arguments both in favor of and against them. However, it is not clear what exactly these arguments hold and what they are about: are they about taxonomies in general? The history attached to them? Some of their features? Or their consequences? In this paper, I try to give an answer to these questions. Specifically, I engage with the question of whether taxonomies are necessarily oppressive. This question arises usually in the context of decolonial philosophy, and many of the arguments I take into consideration come from them. While my interest is in human classification, I take into consideration arguments against classifications in general. First, I address the relationship between the rejection of taxonomies and decolonial thinking. I consider an argument built on the history of racial classification in the Americas and reconstrue an argument to expand such criticism to any human categorization. Then, I argue that this criticism is better understood as consisting of different arguments, which I divide into ontological, epistemological, and political ones. Relying on literature on philosophy of science, I argue that many of these arguments are directed at contingent features of taxonomies. Finally, I engage with the question of what we should do with human classifications—whether they can serve liberating purposes or whether, at least, it is possible to resist them.

10:00 – 10:30

Yafeng Wang (Institute of Philosophy, Chinese Academy of Sciences) - Process tracing and the problem of establishing causal links within a case.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: Process tracing is a family of social science research methods that seek to establish the presence or absence of a hypothesized causal mechanism in at least one actual case (i.e., one actual instance of a type of phenomenon), using observations within that case (Beach and Pederson 2013). The standard strategy of process tracing is to unpack the hypothesized causal mechanism into a series of causally connected intermediate stages, and then to (1) test for the presence or absence of each intermediate stage within the case and (2) test for the causal links between different intermediate stages within the case.

In the first part of my paper, I present a problem for process tracing practitioners, which I call "the problem of establishing causal links within a case". The problem is that testing for the causal links between different intermediate stages of a causal mechanism within a single case appears to be difficult. If a hypothesized causal mechanism is present in an actual case, any causal link within the mechanism is a token-level causal relationship. It is unclear what counts as the observable traces of this token-level causal relationship within the case, and what kind of within-case observations constitute evidence for or against this relationship. Versions of this problem have been raised by some scholars (Steel 2007, Runhardt 2015), but there are few attempts to address this problem systematically in the methodology literature on process tracing.

In the second part of my paper, I present a partial solution to the problem of establishing causal links within a case, which I call "feature dependence". The basic ideas of feature dependence are: (1) the relata of token-level causal relationships within a case are rich in detail, and I call the details "features". (2) A token-level causal relationship between two causal factors C and E is typically associated with a set of dependence relationships between features of C and features of E. That is, If there is an actual causal relationship between two token-level causal factors C and E, there should be a dependence relationship between at least some feature X of C and some feature Y of E: If C had feature X, then E would have feature Y; or vice versa. Therefore, if we use within-case observations to check whether the causal factors C and E indeed possess their corresponding features X and Y, we could have some evidence for or against the hypothesized causal relationship between C and E.

After introducing the basic ideas of feature dependence and explicitly formulating various conditional statements that capture feature dependence relationships, I use one process tracing research conducted by political scientist Vesla Weaver as a case study. The case study shows how feature dependence can be used to support causal links within a hypothesized causal mechanism in a single case. Finally, I examine the evidential basis of feature dependence relationships. I conclude that making sense of the evidential basis of feature dependence does not require a commitment to any specific metaphysical theory of causation.

10:30 – 11:00

Alejandro Mantilla (Pontificia Universidad Javeriana) - Social Meaning, Habitable Categories and Epistemic Values.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: According to Haslanger, social meaning is the glue that holds social structures together; social structures are networks of social relations, and social relations are constituted through entrenched and repeated practices that relate us to each other and to the material world. “Schemas consist in clusters of culturally shared concepts, beliefs, and other attitudes that enable us to interpret and organize information and coordinate action, thought, and affect”. The schemas are the basis for social meaning (Haslanger 2014). The definition of social meaning has particular relevance for categorizing objects in the world, especially social entities. However, some social categories are contested in polarized societies, or in societies with processes of cultural and political change. In some cases, these controversies are related to the definition of what Barceló calls ‘habitable categories’, like those pertaining to our nationalities, gender, class, marital status, etc (Barceló, 2020). Our classificatory language relating to social groups has two distinguishable aspects. On the one hand, the language we use to socially classify individuals may or may not have some theoretical or political utility; on the other hand, our theoretical understanding of this classificatory language may legitimize our commitments in everyday language. The social meaning of some habitable categories plays an important role in current political debates on social justice, because the criteria we adopt to define belonging to a social group may allow the recognition of such groups, or on the contrary, may favor practices of symbolic violence, discrimination or inequality. Our concepts serve both cognitive and practical purposes, we should seek to leverage our conceptual resources to be more successful in our theoretical and political purposes (Haslanger, 2005).

The aim of this paper is to provide insights on the epistemic virtues required to investigate and define the social meaning of habitable categories, by seeking to refine our conceptual resources for categorizing social groups. I will distinguish between the epistemic virtues that have an explanatory purpose, such as those required in social science research, and the epistemic virtues required for the categorization of the social world, in relation to the debates of contemporary social ontology.

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ROOM 10

(ECUM)
Symposium: Harmonic coexistence of logical systems

Chairs: Pereira, Luiz Carlos; Pimentel, Elaine; Rodríguez, Ricardo Oscar

Topic: A.2 Philosophical Logic

Abstract: Recent works on ecumenical systems [1,2], where connectives from classical and intuitionistic logics can co-exist in peace, warmed the discussion of proof systems for combining logics [3,4,5]. Some questions naturally arise with respect to ecumenical systems: what (really) are ecumenical systems? What are they good for? Why should anyone be interested in ecumenical systems? What is the real motivation behind the definition and development of ecumenical systems? This symposium intends to bring together researchers working in the broad area of proof.

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[1] Dag Prawitz. Classical versus intuitionistic logic. Why is this a Proof?, Festschrift for Luiz Carlos Pereira, 27:15–32, 2015.
[2] Elaine Pimentel, Luiz Carlos Pereira, and Valeria de Paiva. An ecumenical notion of entailment. Synthese, 2019.
[3] L. F. del Cerro and A. Herzig. Combining classical and intuitionistic logic, or: Intuitionistic implication as a conditional. FroCoS, 1996.
[4] Carlos Caleiro, Jaime Ramos: Combining Classical and Intuitionistic Implications. FroCoS, 2007.
[5] Carlos Caleiro, Sérgio Marcelino, João Marcos: Combining fragments of classical logic: When are interaction principles needed? Soft Comput. 23(7): 2213-2231, 2019.

Speakers:
1) VICTOR NASCIMENTO, LUIZ CARLOS PEREIRA & ELAINE PIMENTEL: Classical versus Intuitionistic Proof: Ecumenical Proof-theoretic Semantics.
2) LUIZ CARLOS PEREIRA & ELAINE PIMENTEL: Translations and Prawitz Ecumenical system
3) ELAINE PIMENTEL, DELIA KESNER, LUIZ CARLOS PEREIRA & MARIANA MILICICH: Ecumenical Types.
4) MARÍA PAULA MENCHÓN & RICARDO RODRÍGUEZ: Algebraic Semantics for modal constructive logic with strong negation.
5) MARCELO CONIGLIO, FRANCESC ESTEVA, JUAN GISPERT & LLUIS GODO: Ideal and saturated paraconsistent logics arising from Godel logics expanded with an involutive negation.
6) UMBERTO RIVIECCIO & SERGIO CELANI: Intuitionistic modal algebras.
7) JEAN-BAPTISTE JOINET: Ecumenism and linear logic's exponentials: dissymmetrizing exponentials to analyze the space between intuitionistic and classic computations.
8) RENATO LEME: A decision procedure for intuitionistic and ecumenical logic based on restricted non-deterministic matrices.

9:00 – 9:30
Victor Nascimento (Universidade do Estado do Rio de Janeiro - UERJ), Luiz Carlos Pereira (PUC-Rio), Elaine Pimentel (UCL) - Classical versus Intuitionistic Proof: Ecumenical Proof-theoretic Semantics.

Topic: A.2 Philosophical Logic

Abstract: Debates concerning philosophical grounds for the validity of classical and intuitionistic logic often have the very nature of logical proofs as one of the main points of controversy. The intuitionist advocates for a stric notion of constructive proof, while the classical logician advocates for a notion which allows non-construtive proofs through reductio ad absurdum. A great deal of controversy still subsists to this day on the matter, as there is no agreement between disputants on the precise standing of non-constructive methods.

Two very distinct approaches to logic are currently providing interesting contributions to this debate. The first, oftentimes called Logical Ecumenism [1], aims to provide a unified framework in which two "rival" logics may peacefully coexist, thus providing some sort of neutral ground for the contestants. The second, Proof-theoretic Semantics [2], aims not only to elucidate the meaning of a logical proof, but also to provide means for its use as a basic concept of semantic analysis. Logical Ecumenism thus provides a medium in which meaningful interactions may occur between classical and intuitionistic logic, whilst Proof-theoretic Semantics provides a way of clarifying what is at stake when one accepts or denies reductio ad absurdum as a meaningful proof method.

Our proposal aims to combine both approaches by providing not only a medium in which classical and intuitionistic logic may coexist, but also one in which classical and intuitionistic notions of proof may coexist. This is done through the use of atomic systems [3] and base-extension semantics [4], which may be used to codify (I) a instuitionistic proof of an atom A as the constructibility of A in the atomic system, and (II) a classical proof of the atom A as the consistency of A with respect to the atomic system.

This distinction allows us not only to obtain classical behavior for formulas containing classical atoms and intuitionistic behavior for formulas containing intuitionistic atoms, but also to put on the spotlight some basic properties of semantic entailment which are not always evident on traditional semantic analysis. As such, it may shed light on semantic differences between intuitionistic and classical logic from an even broader perspective.

References

[1] Prawitz, Dag. Classical versus intuitionistic logic. Why is this a Proof?, Festschrift for Luiz Carlos Pereira, 27:15–32, 2015.

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9:30 – 10:00

Luiz Carlos Pereira (PUC-Rio), Elaine Pimentel (UCL) - Translations and Prawitz Ecumenical system

Topic: A.2 Philosophical Logic

Abstract: Ecumenical systems are formal codications where two or more logics, even rival logics, can co-exist in peace, and this means that these logics accept and reject the same things, the same rules and the same basic principles. In [2], Dag Prawitz proposed a natural deduction ecumenical system, where classical logic and intuitionistic logic are codified in the same system (see also [1]). In this system, the classical logician and the intuitionistic logician would share the universal quantifier, conjunction, negation and the constant for the absurd, but they would each have their own existential quantifier, disjunction and implication, with different meanings. Prawitz main idea is that these different meanings are given by a semantical framework that can be accepted by both parties. That there is a relation between translations and the ecumenical perspective is undeniable. Prawitz himself observes in his paper that

Highly relevant to these discussions are the well-known translations of classical predicate logic into intuitionistic predicate logic, first discovered by Gentzen and Gödel. Also of some relevance is the (less well-known) translation of intuitionistic predicate logic into quantifieed classical S4 established by Prawitz & Malmnäs (1968). These translations will not be dealt with here. The emphasis will instead be on meaning-theoretical considerations, but they can be seen to some extent as spelling out the philosophical significance of the fact that classical logic can be translated into intuitionistic logic.

But it is also undeniable that the very nature of this relationship is controversial. In the limit, we could even think that in fact there is nothing new in the ecumenical perspective: the classical operators could be eliminated by definitions, like (A →c B) := ¬(A ^ ¬B). The aim of this short note is to show, in the propositional case, that there are interesting relations between the Gödel-Gentzen translation and the ecumenical perspective, but that the later cannot be reduced to the former, much less identified with the former.

References

1. Pimentel, E., Pereira, Luiz C. and de Paiva, Valeria, An ecumenical notion of entailment (2020), Synthese, v. 198, p. 5391-5413, 2019, URL https://doi.org/10.1007/s11229-019-02226-5
2. Prawitz, Dag, Classical versus intuitionistic logic. Why is this a Proof? Festschrift for Luiz Carlos Pereira, edited by Edward Hermann Haeusler, Wagner Sanz and Bruno Lopes, 15-32, UK: College Books, 2015.

10:00 – 10:30

Elaine Pimentel (UCL), Delia Kesner (Université Paris Cité), Luiz Carlos Pereira (PUC-Rio), Mariana Milicich (Université Paris Cité) - Ecumenical types.

Topic: A.2 Philosophical Logic

Abstract: Natural deduction systems, as proposed by Gentzen and further studied by Prawitz, is one of the most well known proof-theoretical frameworks. Part of its success is based on the fact that natural deduction rules present a simple characterization of logical constants, especially in the case of intuitionistic logic. However, there has been a lot of criticism on extensions of the intuitionistic set of rules in order to deal with classical logic. Indeed, most of such extensions add, to the usual introduction and elimination rules, extra rules governing negation. As a consequence, several meta-logical properties, the most prominent one being harmony, are lost.

In 2015 Dag Prawitz proposed a natural deduction ecumenical system, where classical logic and intuitionistic logic are codified in the same system. In this system,
the classical logician and the intuitionistic logician would share the universal quantifier, conjunction, negation and the constant for the absurd, but they would each have their own existential quantifier,

disjunction and implication, with different meanings. Prawitz' main idea is that these different meanings are given by a semantical framework that can be accepted by both parties.

In his ecumenical system, Prawitz recovers the harmony of rules, but the rules for the classical operators do not satisfy separability. In fact, the classical rules are not pure, in the sense that negation is used in the definition of the introduction and elimination rules for the classical operators.

In a recent work we proposed a system adapting, to the natural deduction framework, Girard's mechanism of stoup. This allowed the definition of a pure harmonic natural deduction system LEp for the propositional fragment of Prawitz' ecumenical logic.

In this talk, we will show the proposal of an ecumenical term calculus based on Parigot's lambda-mu-calculus, where the idea of distant reductions is applied in the context of for general natural deduction rules.

10:30 – 11:00

María Paula Menchón (Nicolaus Copernicus University in Toruń), Ricardo Oscar Rodriguez (Universidad de Buenos Aires) **- Algebraic Semantics for modal contructive logic with strong negation.**

Topic: A.2 Philosophical Logic

Abstract: In the present study, we consider extensions of constructive logic with strong negation by means of unary modal operations. The constructive logic with strong negation has been defined by Nelson and independently by Markov and can be considered a substructural logic. Essentially, this logic is a formalization of the following idea. Usually, we refute a sentence ϕ either by reductio ad absurdum or by constructing a counter-example of ϕ. From a constructive point of view, these two ways are not equivalent. In an ecumenical sense, we have two kinds of negation because they obey two different principles: the principle of the third-excluded middle and the principle of non-contradiction.

Nelson lattices (N3-lattices) are an algebraic semantics for this logic. They were introduced by H. Rasiowa, and it is known that they form a variety. An interesting result is that every Nelson lattice can be represented as a twist-structure over a Heyting algebra. A Twist structure over a lattice is a construction used by Kalman that allows us to represent an algebra as a subalgebra of a special binary power of the lattice obtained by considering its direct product and its order-dual.

From a result of Sendlewski, we know that for every Nelson lattice A, there exists a Heyting algebra H such that A is isomorphic to a subalgebra of a twist structure over H. Indeed, (Sendlewski + Theorem 3.1 in [1]) given a Heyting algebra $H = (H, \wedge, \vee, \rightarrow, \top, \bot)$ and a Boolean filter F of H, let
$R(H, F) := \{(x, y) \in H \times H : x \wedge y = \bot \text{ and } x \vee y \in F\}$.
Then we have:

1. $R(H, F) = (R(H, F), \wedge, \vee, *, \Rightarrow, \bot, \top)$ is a Nelson lattice, where the operations are defined as follows:
   - $(x, y) \vee (s, t) = (x \vee s, y \wedge t)$,
   - $(x, y) \wedge (s, t) = (x \wedge s, y \vee t)$,
   - $(x, y) * (s, t) = (x \wedge s, (x \rightarrow t) \wedge (s \rightarrow y))$,
   - $(x, y) \Rightarrow (s, t) = ((x \rightarrow s) \wedge (t \rightarrow y), x \wedge t)$,
   - $\top = (\top, \bot), \bot = (\bot, \top)$.
2. $\neg(x, y) = (y, x)$,

Given a Nelson lattice A, there is a Heyting algebra HA, unique up to isomorphism, and a unique Boolean filter FA of HA such that A is isomorphic to R(HA, FA).

In our work, we introduce an extension of the previous twist-structure construction. We consider N3-lattices endowed with two unary modal operators. Finally, we show the connection

between the twist representation and the calculus proposed in [2], in the propositional case and its extension to the modal case, using relational semantics.

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Symposium continues in the same room, at 14:30.

ROOM 11

9:00 – 9:30

Tuomas Vesterinen (University of Helsinki) - A Value-Sensitive Approach to Employing Artificial Intelligence and Robotics in Psychiatry

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: Artificial intelligence and robotics are increasingly being employed in psychiatry. They seem to promise a novel and cost efficient means to supplement research, diagnoses, and monitoring of mental disorders. This far, however, not enough attention has been paid to the interactive and culture-dependent nature of mental disorders, and to the role that non-epistemic values play in psychiatric research and classification. In this paper, I address these concerns by examining the responsibility issues raised by the automatization of psychiatry in light of the distinct nature of mental disorders. I argue that the design and implementation of artificial intelligence and robotics in psychiatric research, classification and treatment requires value-sensitivity that reflects the social and cultural context of their deployment.

I compare my approach to the Value-Sensitive Design (VSD) account in care robotics, which is a framework for integrating values into the design and implementation process (Burr et al. 2020). I assert that the ethical challenges concerning automatization in psychiatry differ from the ones concerning somatic medicine. In particular, I assert that the VSD account requires modifications in psychiatric research, classification and treatment contexts for two reasons. First, mental disorders are commonly held to be bad to have, and therefore induce interactive or looping effects. The looping effect is a notion coined by Ian Hacking (1999), according to which value-laden beliefs associated with classifications and diagnoses may induce reaction from those classified to the extent that the original classifications may need to be amended. Second, there is considerable cross-cultural variation in conceptions of mental disorder, as well as how the disorders are expressed and experienced. I argue that unless these factors are acknowledged in the design of automatic or semi-automatic healthcare systems, their implementation can induce stigma, cultural distortions and interactive reactions. This is the case especially if those systems are applied in alternative cultural settings.

To address these risks, I argue that the employment of artificial intelligence and social robots in psychiatry requires value-sensitivity in their design and implementation. That is, the choice over which values and conception are integrated into artificial intelligence and social robots in psychiatry should be partly based on their sociocultural context of application. In particular, value-sensitive

considerations are required in the specification of mental disorders, choices over alternative explanatory models, and choices over whether to pathologize certain conditions in specific cultural-contexts at all. Consequently, a value-sensitive approach to automatized psychiatry may require re-designs that reflect the culture-dependent conception of a mental disorder, or alternatively, an explicit ameliorative approach that aims to alter extant biases or other harmful conceptions. In support of this approach, I analyze the risks involved in employing artificial intelligence to diagnose, monitor and treat cultural syndromes.

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9:30 – 10:00

Shunkichi Matsumoto (Tokai University) - Continuities and Discontinuities between Evolutionary Psychology and Evolutionary Psychiatry

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: Evolutionary psychiatry has often been described as an application of evolutionary psychology. In this talk, I examine the extent to which this view holds.

Evolutionary medicine is an attempt to explicate the ultimate evolutionary cause (etiology) of why a particular disease occurred in the course of human evolution and has been maintained to date without being winnowed out by negative selection, based on a working hypothesis that some adaptive significance may be lurking behind seemingly dysfunctional symptoms.

When this method is applied to mental disorders such as schizophrenia, depression, or anxiety, it diagnoses these disorders as originating from some mental dispositions that might have been adaptively acquired in antiquity but have now become occasionally dysfunctional or "mismatched" in modern novel environments. The working hypothesis of this type illustrates a stark resemblance to the basic tenet of evolutionary psychology, where many of the psychological mechanisms of modern humans are thought to have been shaped by natural selection in the human environment of evolutionary adaptedness (EEA) of the Pleistocene as a response to then-predominant environmental challenges but have become almost maladaptive in the modern high-tech milieu that drastically differs from the original environment.

Another aspect in which to find a deep conceptual connection between evolutionary psychology and evolutionary psychiatry concerns the definition of mental disorders: given that a clear definition of what should be considered mental disorders was lacking in psychiatry, evolutionary psychology was expected to provide scientifically legitimate explanations of what biologically normal functions of our mind are, which could then be used to delineate mental disorders as a state of dysfunction—of not performing normal functions (Wakefield 2005). In this sense, evolutionary psychology and evolutionary psychiatry are akin to the two sides of a coin.

The most noticeable commonality between the two is that both rely on adaptationism as their primary heuristics (Matsumoto 2021). However, this is also where their stances begin to diverge. In evolutionary psychology, the force of natural selection is deemed powerful enough to forge optimal solutions to the initial adaptive problems in the EEA. By contrast, in evolutionary medicine (including psychiatry), optimality is the exception rather than the norm: compromised—not perfected—selection and resulting maladaptation is medicine's foremost focus. However, this necessitates evolutionary psychiatrists, or evolutionary medicine researchers in general, to resort to notions such as tradeoffs, changing environments, or time constraints much more routinely than evolutionary psychologists.

In this talk, I will discuss these continuities and discontinuities between the two disciplines in view of the issue of the applicability of the evolutionary approach to behavioral sciences and medicine.

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10:00 – 10:30

Federico Burdman (University of Buenos Aires) - Is Addiction a Disease?

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: Is addiction a disease? Both in ordinary conversation and in medical contexts, it is commonly assumed that the answer to this question is a clear ‘yes’, even though it is typically underspecified exactly what this means. On the way of evaluating the disease claim concerning addiction stands the fact that there is no prior consensus about what is, in general, a (‘mental’ or ‘psychiatric’) disease (or ‘disorder’). (Footnote: There are probably good reasons to make a distinction between ‘disease’, ‘disorder’ and other semantically-proximal terms. For the purposes of this paper, I will not assume such a distinction from the outset.)

On naturalist accounts (Boorse, 1975; Matthewson & Griffiths, 2017), the essential feature of mental diseases is that they are explained by underlying pathological dysfunction —a view most often associated with the ‘Brain Disease’ model of addiction (Kalivas & Volkow, 2005; Volkow et al., 2016). This view faces a seemingly unsurmountable problem: we currently lack a sufficiently rich picture of ‘healthy’ brain functioning. Brains are highly plastic organs that are modified by experience, and there is no purely neural-level way of distinguishing between brain changes that are pathological and those that are adaptive (Levy, 2013; Lewis, 2017).

Any such distinction will have to rely on the effects of brain changes on personal-level phenomena. Among these, two candidates seem especially relevant for the issue at hand: the impairment of psychological or behavioral capacities, and the presence of harmful consequences. Normativist accounts of mental disease (Cooper, 2002; Reznek, 1987) emphasize the ways in which any assessment along these dimensions involves an ineliminable reference to normative criteria. Producing a defensible account of such norms is a high toll, among other things, because an assessment of what functions well or what is harmful is partly dependent on contingent features of agents’ environments (Oliver & Barnes, 2012). Presumably, 'disease' is meant to refer to phenomena which are not thus context-dependent.

A third way of unpacking the disease claim is pragmatic. It may be argued that labelling addiction a disease is warranted insofar as this contributes to the attainment of valuable outcomes, such as getting health-care providers to guarantee the requisite sorts of services, or disarming moralistic attitudes towards drug use (e.g., Volkow et al., 2016, p. 368). However, there is no clear evidence that adopting the disease label actually contributes to attaining such goods, and it may be counterproductive in some ways (Lie et al., 2022). Moreover, those outcomes seem to be attainable without involving the disease claim.

In sum, my argument is consistent with a view of addiction as involving some form of impairment of abilities at the personal level, a feature that typically results in harmful consequences (AUTHOR). But such a view of addiction falls short of implicating the claim that addiction is a disease.

The good news is that endorsing the disease claim does not seem to be required for attaining various valuable outcomes.

10:30 – 11:00

Cristian Saborido (UNED), Jesús Zamora (UNED) - Diseases as Social Problems

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: In this paper, we propose to consider that diseases are a particular type of social problem, a key notion in social ontology and in the philosophy of the social sciences (Treviño 2016, Zamora-Bonilla Forthcoming). According to Hart's classic definition:

> "A social problem is a problem which actually or potentially affects large numbers of people in a common way so that it may best be solved by some measure or measures applied to the problem as a whole rather than by dealing with each individual as an isolated case, or which requires concerted or organized human action." (Hart 1923).

This notion fits quite well in the case of diseases. Diseases are problems that affect groups of people -even in the case of rare diseases- in a relatively uniform way, which precisely allows diseases to be identified and medically categorized under specific labels (tuberculosis, hypertension, schizophrenia...). Furthermore, even though the experience of disease is a subjective experience, the way in which it is responded to is through the coordinated and complex action of medical institutions, which involve very different social agents: physicians, patients, financial backers, governments, insurance companies, etc.

This allows us to overcome the traditional distinction between naturalism (e.g. Boorse 1977) and constructivism (Nordenfelt 1987) for it forces us to reconsider the opposition between the positive and the normative in social reality. Social problems like diseases are facts, after all, and they can be 'objectively' measured, can be subject to statistical causality tests, etc., but they are unavoidably 'value-laden', not only in the sense that it is people's valuations what makes them be problems to begin with, but also because some of the concepts by means of which those facts are described (and hence, some of the properties that constitute the facts themselves) are intrinsically normative, especially when they involve rights and duties, statuses and institutional or cultural roles. This means, of course, that the descriptions and theoretical explanations of the facts that constitute social problems cannot be 'purely descriptive', but they naturally have to 'point' in the direction of possible 'solutions' to the problem; i.e., the analysis of those facts has to be 'experienced' (so to say) by the social agents to the service of which the former act as 'experts', as an analysis from which 'positive' courses of action should appear as derivable.

This does not imply assuming that there is no objective rationale for the identification of diseases as social problems. The 'essential value-ladenness' of social facts and social science entailed by the 'constitutive normativity' of social problems is in no way an obstacle for the application of 'hard' empirical methods of testing, but even a strong incentive for hardening those methods in the attempt to discard 'bad' solutions. In this sense, medicine is not different from other 'practical', problem-centered sciences, like engineering: that 'disease' is an intrinsically normative or value-laden concept does not make the theory and practice of medicine a purely 'subjective' question.

ROOM 12

9:00 – 9:30

Jared Ifland (Florida State University) - Metaontology in Light of the Frege-Hilbert Controversy.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Recently, insights from the philosophy of mathematics have been brought to bear upon metaphilosophical disputes related to a priori knowledge by both Justin Clarke-Doane (2020, 2022) and Jared Warren (2020, 2022). But elsewhere, the debate over whether category theory provides a foundation for mathematical structuralism unearthed a deeper disagreement over what it means for a theory to provide such a foundation. As noted by both critics (Shapiro 2005) and defenders (Landry 2011) of 'categorical foundations', this disagreement has its roots in the Frege-Hilbert controversy over the role of axioms in mathematical theories, which in turn reveals differences of opinion over the relationship between method and metaphysics. My aim is to reexamine current debates in metaontology from the lens of the Frege-Hilbert controversy.

On the one hand, Clarke-Doane argues for radical metaphysical pluralism to guarantee that we could not have easily had false mathematical beliefs, and further claims that the broader philosophical ramifications include a complementary pluralism about modality, logic, and normative theory. Purportedly, this vindicates a realist construal of Carnapian pragmatism. On the other hand, Warren has sought to revitalize logical and mathematical conventionalism by developing an unrestricted inferentialist theory of the meanings of logical constants. He argues that this leads to trivial ontological realism, where mathematical objects are merely byproducts of our use of mathematical language and nothing more. While the term 'realism' appears in both accounts, the manner in which it does differs in a crucial way: for Clarke-Doane, radical metaphysical pluralism guarantees the safety of our mathematical beliefs, whereas for Warren, our ontological commitments are explained by our linguistic conventions.

Like Frege and Hilbert, Clarke-Doane and Warren adopt different stances toward the relationship between method and metaphysics. For Frege and Clarke-Doane, the reliability of method must be certified by a complementary metaphysical account, whereas for Hilbert and Warren, no appeal to more fundamental principles is needed to justify method. Using mathematics as a bridge, I argue that the Frege-Hilbert controversy sheds light upon contemporary metaontological disputes. Contra Clarke-Doane, I submit that Carnapian pragmatism is in no need of a realist construal and that postulating a mathematical pluriverse to save mathematical knowledge 'would be like "saving" Moore's paradox by postulating clairvoyance' (van Fraassen 2008, 261).

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9:30 – 10:00

Guillermo Nigro-Puente (Instituto de Profesores "Artigas" (Uruguay)) - Purity of Methods and the Dialectic of "unity and disunity" of Mathematics: The Case of Kronecker and Dedekind in Algebraic Number Theory

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: The division of modern science into disciplines is a fundamental fact that, as far as we know, no one disputes. At most, individual cases have differences of opinion about the relative degree of independence of the field in question (e.g., about whether it is a particular intradisciplinary field, a unique discipline, or a discipline "proper"). It is no less evident that systematic processes of forming new disciplines characterize recent science, that the associated tendency to increase the number of disciplines continues, and that there is no end to this process, even in the foreseeable future (Stichweh, 1984).

The above scenario suggests several philosophical as well as historical and sociological questions: What are the institutional conditions and consequences of specialization for scientific practice? Are such phenomena inherent in the subject matter itself? Is it somehow a mark of "scientific progress"? This talk concerns the possible methodological aspects behind specialization in modern mathematics. As is well known, the 19th and early 20th-century mathematics participated too in this process of specialization and proliferation of new mathematical disciplines. Salient examples were the new non-euclidean geometries or set theory. The emergence of these new branches of mathematics is a hallmark of modern mathematics and, therefore, represents an exciting playground for testing and suggesting explanations on methodological backgrounds that promote the proliferation of disciplines in mathematics.

In this talk, we suggest that theory building (or "theory shape") had an essential role in the mentioned proliferation. In particular, we identify a methodological demand behind theory building (mainly present in 19th German mathematics): the purity of methods demand. Roughly, this demand says that the theory's chosen methods must be "adequate" to the subject matter of the theory, meaning by this that the methods must be "intrinsic" to that subject matter (Ferreirós, 2015, p. 32). Although some people have pointed out the connection between purity, autonomy, and specialization (e.g., Detlefsen (2008), this talk tries to shed light on the context that motivates the preference for pure methods in 19th theory-building practices. Thus, a theory satisfying a purity of methods demand is an autonomous theory modulo that subject matter. In this sense, purity had a twofold role: on the one hand, purity is a way to guarantee the conceptual and methodological unity of a particular preexistent body of knowledge. This is almost an invariant motivation for purity preferences.
On the other hand, this unity is possible at the cost of internal division of mathematics —i.e., a "disunity." This is no less worry from F. Klein and Hilbert's perspective. Finally, after describing how purity demands come in theory-building practices, we illustrate the point roughly by comparing the point of view of L. Kronecker and R. Dedekind on algebraic number theory.

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10:00 – 10:30

Robby Finley (University of Maine) - A pragmatist epistemology for theory choice in logic

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Much of recent work in epistemology of logic has centered on two problems: how to rationally resolve logical disagreement and whether justified revision of logic is even possible. One answer to these problems suggests that logic is "unexceptional" and that theory choice in logic works just as it does in the sciences. According to some versions of this "anti-exceptionalist" view of logic, choices between logical theories and revisions are justified by a theory's ability to capture the logical "data," e.g. intuitions about logical validity, and a theory's virtues, e.g. simplicity, unifying power, strength, and so on. Logic has no special epistemic status, and it is revised on the same grounds as scientific theories (Hjortland 2017, Martin and Hjortland 2021). Anti-exceptionalists face a strong challenge though: abductive justifications themselves appear to rely on a background logic for evaluating arguments for adequacy or for comparisons of virtues, which itself remains unjustified. This background logic problem is not unique to the anti-exceptionalist theory of logic, but it nevertheless requires an answer for the theory to be a satisfying.

In this paper, I argue that anti-exceptionalism about logic is on the right track but not quite right: the correct process for logical revision may be abductive, but logic nevertheless has unique theoretical virtues that motivate theory choice. To defend this point, I turn to a series of case studies from foundational debates in mathematics in the twentieth century (Brouwer, Hilbert, and Zermelo) where we find actual disagreement on the role of logic and its value for mathematical practice. Taking inspiration from some of Peirce's writings on logic (esp. Peirce 1998), I suggest that lessons from pragmatist views in epistemology can help us formulate an abductive framework that better captures the case studies. Further, this pragmatism about logical theory choice better answers the background logic problem: from a pragmatist perspective, the problem itself is steeped in foundationalist assumptions and should be reframed. We should not ask what makes a particular logic justified, but instead we should ask what counts as progress in revising a theory of logic. A theory of logic is a unique tool that we rely on to serve a special role in inquiry, and this role is what leads to unique virtues that we can and do appeal to when evaluating revision and disagreement.

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10:30 – 11:00

Piotr Błaszczyk, (Pedagogical University of Cracow); Anna Petiurenko, (Pedagogical University of Cracow) **- Infinity of Euclid's straight line and circular inversion**

Topic: C.1. Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: 1. Mathematics tamed the concept of infinity through numbers: Cantor's cardinal and ordinal numbers or inverses of infinitesimals developed by Euler. Sharing a similar understanding of finitude, be it a structure of natural numbers, or an Archimedean field, these two approaches diverge regarding infinity: Cantor ordinal arithmetic does not satisfy standard rules, e.g., commutativity, while inverses of infinitesimals comply with all the laws of an ordered field. The field of Conway numbers includes ordinal numbers and infinitesimals in one structure. Thus Euler's idea of infinity as an inverse of infinitesimals prevailed over Cantor's arithmetic of ordinal numbers [1],[2],[4]. We aim to implement the idea of infinity as the inverse of infinitesimals into Euclid's geometry. 2. The concept of infinity (apeiron) occurs in the definition of parallel lines and the Fifth Postulate, which evokes a line

``being produced infinitely". Some view this proviso as potential infinity, meaning reiterated prolongation of a straight line [7]. We present a model of a semi-Euclidean plane to demonstrate that potential infinity does not guarantee straight lines satisfy the parallel axiom. It is a subspace of the Cartesian plane over the non-Archimedean field of hyperreal numbers in which angles in a triangle sum up to \pi, and the parallel axiom fails [2]. Standard models of non-Euclidean plane involve a non-Euclidean representation of straight lines (Poincare) or angles (Klein), in our model, both straight lines and angles are Euclidean. As all triangles in our model are also Euclidean, locally, it is the Euclidean plane, yet straight lines are `too short' to meet the parallel postulate. We propose a characteristic of infinite straight lines in terms of Euclid's geometry alone with no reference to the concept of "being produced infinitely" or a number. 3. Since a semi-Euclidean and Archimedean plane satisfies the parallel postulate [6], what makes straight lines 'too short' are infinitesimal lines and angles. We introduce infinitesimals by negating Aristotle's axiom and thus do not refer to numbers [5]. Then we study inverses of infinitesimals. The geometric counterpart of a multiplicative inverse operation in a field is the construction of circular inversion (Elements, III.37). We show that it guarantees straight lines meet the parallel postulate and present an equivalent version of that construction. It is that for any base and acute angle, there exists an isosceles triangle. It is an equivalent version of the Fifth Postulate showing inverses of infinitesimals exists in a plane.

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ROOM 13

9:30 – 10:00

Samuel G. da Silva (Federal University of Bahia UFBA), Valeria de Paiva (Topos Institute and University of Birmingham) - Kolmogorov-Veloso Problems, Dialectica Categories and Choice Principles

Topic: A.3 Computational Logic and Applications of Logic

Abstract: Blass' paper on questions and answers (Blass) makes a surprising connection between de Paiva's Dialectica categories (models of Linear Logic, (Paiva1, Paiva2), Vojt\'a\v s' (Vojtas) methods to prove inequalities between cardinal characteristics of the continuum (Set Theory) and complexity theoretical notions of problems (and reductions) between these. We recently realized that Kolmogorov's very abstract notion of problem, which is not related to specific complexity issues, can also be intrinsically related to Blass' examples above. Kolmogorov's notion of abstract problem

produces an alternative intuitive semantics for Propositional Intuitionistic Logic, an essential component of the celebrated Brouwer-Heyting-Kolmogorov (BHK) interpretation. In this work
we connect Kolmogorov's problems to objects of the Dialectica construction, thereby connecting them to Veloso's problems as well (Veloso). However, we have left clear that Veloso's notions of problems and solutions commit us to a stronger set-theory -- namely, the acceptance of the Axiom of Choice within the framework is somehow implied. Nevertheless, we defend that whether this requirement of stronger foundations is a bug or a feature depends on the personal taste and conviction of each researcher. In this talk, we focus on the intrinsic relationship between Veloso's general theory of problems and a number of choice principles (including the Axiom of Choice itself, the Axiom of Countable Choice and the Principle of Dependent Choices).
Dedicated to the memory of Prof. Paulo Veloso (1944-2020).

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10:00 – 10:30

Eduardo Ugalde-Reyes (National Autonomous University of Mexico), Favio Ezequiel Miranda-Perea (National Autonomous University of Mexico) - Diagrammatic vs Linear Thinking: Proof-Translations and the Interpretation of Natural Deduction with General Elimination Rules in Lambda Calculus.

Topic: A.3 Computational Logic and Applications of Logic

Abstract: Natural deduction and lambda calculus are formal systems for the representation and manipulation of proofs as proper mathematical objects, and they accomplish this task pursuing distinct, albeit complementary vias.
The Curry-Howard correspondence provides us with valuable insights into the intimate relationship between proof and computation in three respects (Wadler 2014, p.75):

(a) propositions-as-types, (b) proofs-as-terms, and (c) normalization as evaluation of programs.

Proofs can give us insight or serve us to explain why a proved proposition is true, and proofs have computational content that justifies or guarantees the assertion (Robinson 2000, p.279).
We deal here with both aspects of proofs and address the matter in a special setting. Joachimski and Matthes (2003) gave a constructive proof of the strong normalization theorem for the system of natural deduction with general elimination rules (NG) using a type system in order to cope with the dynamics

of normalization that poses the generalized version of natural deduction as presented by Negri & von Plato (2001, 2011).
We take a rather closer look at the construction of that proof to address two separate concerns:

(1) In a previous work, we expelled the required formal machinery to retest that NG strongly normalizes following the method of Joachimski and Matthes (2003) as part of the preliminary stage for its mechanization in a proof-assistant such as Coq. The challenge that comes with this goal in mind consists in, how do we deal with the diagrams of NG so as to manage the process of normalizing proofs? We will show proof-translations of the diagrams of NG into their linearized version in lambda calculus, and exhibit the construction of the set of strongly normalizing terms that will provide us with a better guide when dealing with the combinatorial behavior involved in the process of normalization in a more efficient way than directly manipulating the diagrams.

(2) The use of formal mathematical results like the Curry-Howard correspondence imposes not only challenges that pertain to the task of reaching a complete formalization of mathematics, but often those challenges come pregnant with philosophical questions. For instance, when translating results of natural deduction into the lambda calculus is it better to use natural deduction in its standard version or the sequent style? Comparing results from NG into the lambda calculus creates a formal environment (Kennedy 2022, p.5) that enables us to deal with the diagrams and their translations, but who is who in this environment, is the syntax/semantics of natural deduction the proper one or is it the other way round with the lambda calculus? (Martin-Löf 1993, pp.137-168)

Computability is formalism independent, however the Curry-Howard correspondence points out that there is some degree of entanglement between natural deduction and lambda calculus. Then, we ask "how sensitive is a structure or concept to an underlying formalism" (Kennedy 2022, p.18) given the initial motivations to create natural deduction or the lambda calculus? Does their notation externalize the mathematical reasoning they were intended to formalize?

10:30 – 11:00

Emilie Grienenberger (Université Paris-Saclay, Inria, CNRS, ENS Paris-Saclay, LMF) - An ecumenical logic for the interoperability of proof systems.

Topic: A.3 Computational Logic and Applications of Logic

Abstract: Intuitionistic and classical systems rely on different sets of axioms, thus intuitionistic and classical symbols have different meanings. It is unsatisfactory to use a same symbol for two connectives with different meanings, thus intuitionistic and classical symbols should written differently. Ecumenical systems in which classical and intuitionistic logics coexist have been designed [2, 4, 5, 6]. An ecumenical expression of logic, and of mathematics, has many advantages. First, it allows to use the expressivity of classical logic while keeping constructive properties. For example, a constructive proof of a classical specification reflects the fact that an algorithm can both be effective and have a classical correctness proof. Second, intuitionistic and classical proofs coexisting in the same logical system can be stored in a common database of formal proofs, while using two separate logical systems entails two separate databases — or the loss of readily available constructive information.

We present an ecumenical system called NE and based on many-sorted natural deduction. Classical and intuitionistic versions of logical connectives and quantifiers coexist in NE, in addition to a new connective prenex to every NE formula. Intuitively, a classical connective is equivalent to its intuitionistic counterpart with internal double negations, and the classical prenex connective corresponds to a prenex double negation. This definition allows us to avoid features of other ecumenical systems poorly suited for interoperability, such as a restriction to total provability [2] or

the doubling of predicates [6].The intuitionistic and classical symbols and their associated introduction and elimination rules in NE define two fragments isomorphic to respectively NJ and NK.

A NE modulo theory framework is introduced to express computational as well as axiomatic ecumenical theories. Cut elimination is proven to hold in this system in any computational theory admitting a premodel [3]. Corollaries of these results are the consistency and constructive properties to externally intuitionistic objects, for exemple the witness property for formulas with an external intuitionistic connective.

The NE modulo theory framework is expressive enough to define an ecumenical version of Simple Type Theory [1], setting the basis for an ecumenical formalization of mathematics. Such a framework, one implemented, can be used to store proofs from diverse proof assitants and their logics.

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11.30 – 13:00 PLENARY SPEAKER: ITALA D'OTTAVIANO

AUDITORIUM 1

PLENARY SPEAKER

Italia Maria Loffredo D'Ottaviano
(State University of Campinas - UNICAMP)

Illuminating contradiction: Paraconsistent reasoning in Western thought

Abstract: The study of the logical meaning of consistency and inconsistency is found throughout the various periods of the history of philosophy, logic and science. In this talk we will survey the most distinguished logical contributions in Western thought in order to understand how a truly paraconsistent perspective has been constituted, as well as how logical principles, rules and systems have expressed the various concepts of paraconsistency. We will track answers for some fundamental questions, including principles and rules, according to which not everything may be deduced from a contradiction, or something may be rejected, were conceived, evoked or introduced within certain theoretical contexts and traditions.

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13:00 - 14:30 LUNCH

14:30 - 15:30 INVITED SPEAKER: JOHN DUPRÉ

AUDITORIUM 1

INVITED SPEAKER
John Dupré (University of Exeter)

From physical chaos to human processes

Chair: Atocha Aliseda (Universidad Nacional Autónoma de México, and Universidad Nacional de Educación a Distancia)

Topic: C.3 Philosophy of the Biological Sciences

Abstract: It is common to think about the world as containing things, sometimes assembled into bigger things, all obeying a set of physical laws. I want to propose a wholly different worldview. Think instead of a lawless world of chaotic and entangled process. In this chaos eddies emerge, with the ability to channel some of the energy in the surrounding chaos into the maintenance of pattern or order. Organisms are a prime example of such processes, and humans, as organisms should also be understood as processes.

Another key process in biology is the lineage or species. Lineages have evolved to become increasingly coherent processes, notably through sexual reproduction and sociality. Humans are also part of such a process, stretching back through the millennia, the lineage out of which they evolved. The human species has evolved a unique kind of cooperation, also reflecting unique features of the human organism.

In this talk I will describe these two kinds of process, the organism and the lineage, which interact with one another in a process of mutual stabilization. I shall try to illustrate the value of this perspective on human life, by showing how it provides insight into the ways we distinguish kinds among humans, including kinds sometimes thought to be biological, notably race and gender, but also indisputably cultural kinds, such as nation, tribe or religion.

14:30 - 15:30 INVITED SPEAKER: ANYA PLUTYNSKI

AUDITORIUM 1

INVITED SPEAKER
Anya Plutynski (Washington University in St.Louis)

Complexity & Functional Attribution in Psychiatric Disorder

Chair: Cristian Saborido (Universidad Nacional de Educación a Distancia)

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: Psychiatric disorders have been identified as characteristically "complex" disease, though there is no clear consensus on what it means for a disease to be "complex" (Mitchell, 2008, 2009). Moreover, some aspects or features of psychiatric disorders have been described as having "functions," even though the disorders as a whole are widely agreed to be harmful or "dysfunctional." In this talk, I consider whether, and how, these issues are related. I draw in part on Lilienfeld's et, al.'s (2019) characterization of DSM Cluster B conditions as "emergent interpersonal syndromes." The emergence and dynamics of progression in such cases may involve "functional" trade-offs that lead to entrenched patterns of behavior, belief, and affect. I consider whether this case is part of a larger pattern; or, more broadly, whether there are common features of complex diseases, or whether such comparisons involve making mistaken conflations of different senses of either "entrenchment," "function," or both.

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14:30 - 16:30

AUDITORIUM 2

(HUM) From previous slot, same room.
Symposium: From Latin America to Europe and Back. A Symposium Dedicated to the Philosophy of C. Ulises Moulines

14:30 – 15:00

Adolfo García de la Sienra (Universidad Veracruzana) - Non-Archimedian Extensive Measurement

Topic: B.1 Methodology

Abstract: In his seminal “Die Axiome der Quantität und die Lehre
vom Mass”, Otto Hölder (1901, 1996, 1997) showed with all rigor the existence of numerical representations of what he called “quantities” or “magnitudes” (Quantitäten oder Grössen), an instance of which are the lengths of the intervals of a straight line, fulfilling in this way the program that Newton had announced in his Arithmetica universalis (1761), namely that any two quantities of the same kind can be represented by a positive real number. Hölder’s work is the starting point of the theory of measurement as represented, mainly, by the work of Krantz, Luce, Suppes and Tverski (KLST 1971, 1989, 1990).

Suppes (1951) showed that Hölder’s theory, as a theory of extensive measurement, is too strong for a general characterization of extensive quantities, and introduced a new system of axioms for extensive quantities that avoids the defects of Hölder’s axiomatization. The aim of the present paper is to introduce a modification of Suppes’ system in order to establish the existence of a representation theorem for non- Archimedian magnitudes.

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15 :00 – 15 :30

Holger Andreas (The University of British Columbia) - How not to be a Metaphysical Realist?

Topic: B.1 Methodology

Abstract: In his paper "Wer bestimmt, was es gibt? Zum Verhältnis zwischen Ontologie und Wissenschaftstheorie", Ulises Moulines (1994) argues that ontology should not be done without epistemology. His line of reasoning begins with a brief review of Quine’s and Putnam’s model-

theoretic arguments against metaphysical realism. These arguments are endorsed. Specifically, Ulises endorses Putnam's claim that traditional ontology presuppose some sort of God's eye point of view.

However, it's not so easy not to be a metaphysical realist. Putnam (1981) suggested internal realism as a way of the predicament of the model-theoretic argument: (i) truth is justification under idealised epistemic conditions. (ii) Justification is relative to a conceptual scheme. A major problem surfacing here is that conceptual schemes may well have the form of theories and theoretical frameworks, for which we use sentential representations. So, what is the basis for the assignment of truth values to the propositions of the theories that figure as conceptual schemes?

Ulises suspects that internal realism is too much of a dialectical notion. As an alternative, he unfolds what my be called a 'structuralist view of ontology': ontologies which are theory-laden and which work with a structuralist conception of scientific theories. And yet, it's difficult to abandon our entrenched philosophical categories when reading Ulises's paper. Does he recommend some form of realism, some form of idealism, some dialectical combination of the two? Does the structuralist relativization of ontology help us find some form of metaphysical peace and neutrality?

Unlike Putnam (1981), Putnam (1980) is more readily prepared to give up realist intuitions when expounding the model-theoretic argument. His main target of criticism is what he calls the 'moderate realist position which seeks to preserve the centrality of the classical notions of truth and reference without postulating nonnatural mental powers'. I think Putnam (1980) is right: if we want to take sceptical challenge of model-theoretic arguments seriously, we have to accept a great deal of idealism and non-realism.

More specifically, I suggest adopting a doxastic interpretation of LeBlanc's (1976) truth-value semantics, which is merged with belief revision theory by Gärdenfors (1988). Unlike Putnam's (1981) internal realism, the resulting semantics is well defined. The way out of the predicament of the model-theoretic argument is straightforward. I conclude with some references to Hegel, suggesting a Hegelian, yet non-dialectical view of objects.

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15:30 – 16:00

Gerhard Ernst (FAU Erlangen-Nürnberg) - Rational and irrational doubts. Some thoughts on the skeptical challenge.

Topic: B.1 Methodology

Abstract: In "Gibt es etwas außer mir selbst? Überlegungen zur semantischen Begründung des Realismus" Ulises Moulines draws our attention to the sceptical potential of a story from Calderón's "Life's a dream". In my paper I will try to evaluate this and draw wider conclusions for our view of scepticism. As it turns out a reply to scepticism can draw on the distinction between rational and irrational doubts – and Calderón's story can help us see the difference.

16:00 – 16:30

Ambrosio Velasco-Gomez (Instituto de Investigaciones Filosóficas Universidad Nacional Autónoma de México) - Del pluralismo cognoscitivo al pluralismo político en Ulises Moulines.

Topic: B.1 Methodology

Abstract: My paper will focus on the relations between epistemic, ethical and political aspects of the philosophy of science of Ulises Moulines, mainly on his VIPS principle (Intrinsic Value of Plurality of beings). According to my interpretation, this principle involves heuristic hypothesis to develop a political and multicultural approach to philosophy of science, which is appropriate to prevent any kind of epistemic authoritarianism (epistemocracy) and promote intellectual and political autonomy in truly free, democratic and open societies based on epistemic, cultural and political plurality and equity.

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ROOM 01

14:30

Franziska Reinhard (University of Vienna) - Elucidating and Embedding: Two Functions of How-Possibly Explanations.

Topic: B.1 Methodology

Abstract: Scientific explanations do not always refer to how a phenomenon actually happened, but often to how it could have happened – they involve possibilities. Realizing this, philosophers of science have variously tried to characterise how-possibly explanations (HPEs) and distinguish them from how-actually explanations (HAEs). Two conflicting characterisations exist in the literature:

Independence-thesis: HPEs and HAEs are difference, independent types of explanation. They fulfil different tasks and answer different explanation-seeking questions (e.g. Dray, 1957).

Continuity-thesis: HPEs and HAEs are the same type of explanation lying on a continuum of degrees of empirical support. HPEs are less empirically supported (e.g. Brandon 1990).

In a recent paper, Wirling and Grüne-Yanoff (forthcoming) argue that these characterisations are actually compatible. They propose that the theses merely presuppose different types of possibilities. While the independence-thesis takes possibilities to be objective possibilities, the continuity-thesis presupposes epistemic possibilities.

This paper has two aims. First, I will argue that Wirling and Grüne-Yanoff's proposal has significant shortcomings. Presupposing objective possibilities is neither necessary nor sufficient for holding the independence-thesis. On the one hand, you can sufficiently pursue the independence-thesis without presupposing objective possibilities – in fact, most of its' supporters seem to have epistemic possibilities in mind. On the other hand, objective possibilities do not necessarily imply the independence-thesis either since HAEs are always also objectively possible.

Nevertheless, Wirling and Grüne-Yanoff's analysis still highlights that HPEs seem to come in different forms. My second aim is to argue that to properly account for different HPEs, we need to instead focus on the different functions possibilities play in scientific investigations. To bring these functions to the fore, I introduce the following distinction:

Elucidating HPEs: Specifying and demonstrating a possible process accounting for a research target.

Embedding HPEs: Demonstrating how a research target fits into – is embedded in – a space of suitably constrained possibilities.

I specify both functions of HPEs with reference to two case studies from prebiotic chemistry, a subfield of origins-of-life research. Prebiotic chemists try to understand how biomolecules formed from simple precursors on the Earth more than 3.5 billion years ago. This is a promising case for exploring the role of possibilities in science because investigating the origins-of-life is so difficult. Researchers can often only try to infer possible, or perhaps plausible explanations for how biomolecules and ultimately life first emerged. As I will highlight, there are at least two strategies to do so, corresponding to my distinction between elucidating and embedding HPEs. By contrast, Wirling and Grüne-Yanoff's focus on objective and epistemic possibilities misses important aspects of the scientific practice in the case studies. Finally, I spell out the consequences of my distinction between elucidating and embeddings HPEs for the debate over the independence- and the continuity thesis.

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15:00 – 15:30

Alexander Linsbichler (Johannes Kepler University Linz) - Reasoning with Models in Thought Experiments: Applying Häggqvist's Template to Economics.

Topic: B.1 Methodology

Abstract: A central theme in methodology of economics is reconstructing how economists reason with models (see e.g. Sugden 2002, Morgan 2012, Jhun 2021). Acknowledging that the role of thought experiments in economics as well as the relation between thought experiments and models are contested (see e.g. Reiss 2016, Thoma 2016), this paper provides an account of reasoning with models as centrepieces of thought experiments.

Numerous thought experiments can be reconstructed as arguments (Norton 2004). More specifically, many thought experiments in philosophy and the natural sciences can be spelled out by one argument template (Häggqvist 2009). This paper substantiates the applicability of Häggqvist's template and of its refinement devised by Linsbichler and Cunha (2023a, 2023b) to economics. Consequently, at least some instances of thought experimenting in economics are compatible with strict empiricism.

Applying Häggqvist's template, many thought experiments can be regimented as consisting of four groups of propositions: i) a counterfactual scenario C which the thought experiment describes

as possible, ii) a theory T to be tested, iii) the claim that if scenario C were the case, then a state of affairs W would obtain, iv) the claim that T implies that (if C were the case, then W would not obtain). This account of thought experiments can nicely be integrated with the emerging literature on narratives in economics (see e.g. Morgan & Stapleford 2023), since claim iii) is typically made plausible by narratively tracking the development of the scenario C from its starting position to a state of affairs W.

The paper will illustrate the applicability of the template to reasoning with models in economics by interpreting economic models as counterfactual scenarios C of thought experiments (cf. Suppes 1960). Thus, the model and its animation do not comprise the entire thought experiment and a model by its own is not yet a thought experiment, but models can be employed as centrepieces of thought experiments. Examples include Schelling's checkerboard, reasoning with so-called "imaginary constructions", and Neurath's scientific utopianism. Some Neurathian thought experiments prompt changes to the conceptual basis of welfare economics in a manner suggested by Kuhn (1964/1977). In particular, Neurath uses thought experiments to advocate irreducibly multidimensional notions of well-being.

Finally, the paper will argue that some instances of reasoning with models in economics do not fit Häggqvist's template without distortion. Moreover, some instances of reasoning with models in economics arguably do not even qualify as thought experiments. The paper briefly discusses the status of such likely counterexamples including the market for lemons and Robinsonades. Yet, Häggqvist's proposal might serve as an impetus to construct additional templates to capture other modes of reasoning with models.

Selected References

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15:30 – 16:00

Huanfang Dong (Tsinghua University) - Model selection, Bias and Inductive Problems

Topic: B.1 Methodology

Abstract: 1.Model selection as ground of inductive problems

Model selection [1] is a concept of statistical inference like AIC, BIC. Statistical inference consists of model selection and parameter estimation. So model selection is ground of statistical inference and learning. We call this statement as the Ground statement. We generalize the meaning of model. Model could be language, conceptual space, confirmation measure or neural network. We generalize the Ground statement into classical inductive problems, which will be helpful to uniformly study inductive problem. With this uniform perspective, we could possibly study fundamental issues like transparency and fairness in machine learning and AI in the framework of philosophy of science, also could build a bridge between the community of philosophy of science and the community of fundamental research in machine learning.

We will justify the Ground statement on Grue problem. According to Peter Gardenfors' theory of three levels of inductive inference [2], any inductive problem could be inferred in three possible levels, i.e. linguistic level, conceptual level and subconceptual level. Grue problem have been tried from many perspectives [3]. Quine's solution [4] is in the linguistic level, and Grue problem was reduced into language selection. Gardenfors' solution [5] is in the conceptual level and Grue problem

was reduced into selection of best conceptual space. Sober's solution [6] is in the subconceptual level and Grue problem is reduced into either selection of prior probability or confirmation measure. We can conclude that model selection is more basic than Grue problem in the sense of scientific reduction.

2.Bias caused by methods for model selection

Bias is a core concept in statistical learning theory [7]. No-free-lunch theorem (NFL) is one pillar of statistical learning theory. NFL states the relation between bias and model selection [8]. Methods for model selection cause one class of bias in statistical learning. . Harman [9] proposed in a solution for Grue problem by linking Grue problem and regression problem and applying simplicity. In this section we will give a uniform analysis of bias caused by methods for model selection in inductive inference consisting of Grue problem, statistical inference, machine learning and causal discovery.

The underlying idea of AIC is a tradeoff between best fitting and simplicity characterized by the number of parameters. Both AIC and BIC cause bias, which are justified in statistics [12] and in philosophy [13]. also bias in causal discovery problem [14] [15].

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16:00 – 16:30

Lilia Gurova (New Bulgarian University) - Should explanation and prediction be pursued independently of each other?

Topic: B.1 Methodology

Abstract: In the last years we have seen calls for a "predictive turn" in some areas of cognitive sciences, neuroscience and biomedicine (see e.g. Yarkoni & Westfall, 2017; Bzdok & Ioannidis, 2019), which have been followed by the attempts of some philosophers of science (e.g. Weiskopf, 2022) to reveal the rationale behind the alleged turn thus justifying it. At the heart of the calls for a "predictive turn" are two claims: (1) predictions have value in their own and therefore should not be treated solely as a tool for testing explanatory theories; and (2) prediction and explanation are two distinct and independent goals of scientific inquiry that must be pursued in parallel and independently of each other. I will argue that while there are good reasons to embrace (1), this is not the case with (2). Those who support the claim that prediction and explanation are distinct, and hence should be pursued independently of each other, usually stress that (a) explanation and prediction seek answers to different questions, and (b) a good explanatory theory (or a model) does not necessarily lead to good predictions, and vice versa, a theory (or a model) that makes accurate predictions does not necessarily

have a good explanatory power. While the statements (a) and (b) are true, it can be shown that they do not provide sufficient support for the claim that prediction and explanation should be pursued in parallel and independently of each other. This is because there are cases where the answer to the predictive question "what will happen" requires that we first answer the explanatory questions "why" and "how" something happens. Such a case will be demonstrated on the example of the so-called hostile attributional bias (HAB), which was found to be a good predictor of reactive aggression in ambiguous social situations (Dodge, 2006). To predict, however, what might lead to the reduction of HAB and related manifestations of unwarranted aggression, we need a theory-based explanatory model, which points to the factors that lead to the formation of HAB and addresses the question which of these factors are manageable (Dodge, 2006). The moral suggested is that although explanation and prediction have distinct epistemic values and answer to different questions, they must not be pursued independently as the answers they look for are often interdependent.

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ROOM 02

14:30 – 15:00

Atoosa Kasirzadeh (University of Edinburgh) - Explainable Artificial Intelligence and Values.

Topic: C.6 Philosophy of Computing and Computation

Abstract: The use of ineliminably opaque machine learning algorithms in various areas of inquiry, from science to high-stakes decision making, is expanding quickly. This expansion has resulted in a surge of interest in two seemingly separated problems. (1) The explanation problem asks why and how the outputs of opaque algorithms are obtained. (2) The value problem asks whether and how the outputs of opaque algorithms are in accordance with value-free ideals. In this paper, I argue that the explanation problem and the value problem are two sides of the same coin. I show, in particular, how values are inherent to the demands of machine learning explanations and how explanations reveal value judgments essential to the machine learning practice. The recognition of the relation between these two problems highlights how reactions to the value problem help characterize our demands from a vigorous research program --- Explainable Artificial Intelligence (XAI) --- for resolving the explanation problem.

The remainder of this paper is structured as follows. In Section 2, I categorize machine-learning explanations into two main groups: feature-based token explanations and design explanations. I argue that the importance of design explanations is often undermined as a response to the explanation problem. In Section 3, I present five classes of epistemic and non-epistemic value judgments that pertain to the characterization of XAI. I argue that these judgments are responses to

the value problem. In Section 4, I draw on the aforementioned arguments to demonstrate how the explanation problem and the value problem are two sides of the same coin. I revise the classical, Humphreysian-based definition of explainable ML systems in light of my arguments from Sections 2 and 3. Finally, Section 5 concludes the paper with some directions for future research.

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15:00 – 15:30

Paul Femenía (CONICET/Universidad Tecnológica Nacional), Graciela Colome (Universidad Nacional de San Juan) - Construction of a semiotic ontology for electrical measurements.

Topic: C.6 Philosophy of Computing and Computation

Abstract: Based on the experience in teaching research methodology courses to IEE-UNSJ-CONICET postgraduate students, two shortcomings were detected in the attendees, firstly, the difficulty of structuring an investigation, and secondly, the difficulty of being able to build their own. object of investigation and relate it to the environment.

Taking into account that ontology is defined as "a formal, explicit specification of a shared conceptualization, where conceptualization is understood as an abstract and simple vision of the world that one wishes to represent, a representation of knowledge based on objects, concepts and entities that "exist "in the area of study, and the relationships that exist between them", we see that the problem of postgraduate students is then the lack of an ontology in the specific areas that allows them to quickly locate themselves in the work area and from it detect a research problem and build a theoretical framework.

Taking into account that Peirce defines an object as:

"Consider what effects, which may conceivably have practical repercussions, you conceive the objects of your conception to have. Thus your conception of those effects is the whole of your conception of the object.

This implies that an object is something more than its meaning, that is, its semantic dimension, but also has a pragmatic dimension due to the future effects of the same definition and a syntactic dimension that relates all that network of concepts that define the object.

Just as the terms in a given language have a syntactic relationship based on rules, the same happens with the measurement elements, the instruments are connected with the object to be measured under rules, but this syntax is not independent, it also depends on the purpose of the measurement. , that is, the syntax depends on the pragmatic dimension of the measurement. The measurement is interpreted in relation to the objects, this would be the semantic dimension of the measurement.

As we see the measurements fulfill the same functions of language, that is, the syntactic, semantic and pragmatic dimensions, this isomorphism is what allows us to generate an ontology based on Peircean semiotics.Therefore, it seeks to determine a structure for the generic construction of an ontology in engineering based on the syntactic, semantic and pragmatic dimensions used in language, which can later be used with any ontology construction language.

To build this ontology, the following steps were established

1. Analysis of the concept networks presented in the graduate theses already approved in the area of WAMPAC applications based on PMU measurements presented by the graduate students of the IEE-UNSJ-CONICET

2. A file was implemented in which current postgraduate students explain the networks of concepts in which they are working in the area of PMUs

3. Other concepts and their relationships were sought after reading specialized bibliography on WAMPAC applications and PMU technology.

15:30 – 16:00

Ana Victoria Martín del Campo Alcocer (Universidad Panamericana) - From explanations to predictions: opaque AI models as valid scientific instruments.

Topic: C.6 Philosophy of Computing and Computation

Abstract: The validity of scientific discovery is judged based on its explanatory power. Explanations have been a core part of science as they permit the formulation of theories and reliable generalization and prediction. Applications of Artificial Intelligence (AI) such as AlfaFold are scientific instruments, however, they lack explainability. In this work, we seek to refine the discourse on explainable AI as a scientific instrument. First, we examine the notion of weak opacity and strong opacity within an AI model and how it relates to the capacity of an AI to be explainable and to help provide better explanations. Then, we address the issue of how a scientific instrument is usually considered valid only if it presents evidence which supports an explanation. To be able to say that AI is a scientific instrument, it is necessary to accept that explanation is not a fundamental part of the objectives of scientific instruments. Furthermore, a paradigm shift in the notion of science is necessary, the validity of scientific discovery should not rely exclusively on its capacity to provide a robust and better explanation of a phenomenon, but also on its capacity to make more accurate predictions. Therefore opaque models that do not add explanations to a theory, but can improve accurate predictions and permits the creation of generalizationalist models, would still be considered scientific instruments as they advance scientific discovery. Then, to provide an example, we examine how AlfaFold provides better predictions that inform scientific understanding without providing robust explanations. AlfaFold uses the coupled pair method to predict the three-dimensional structure of a protein from its amino acid sequence to predict its secondary, tertiary, and quaternary structure. With that example in mind, in this section, we spell out the various desiderata of explainability research through the lens of the available literature and explore the arising demands for more explainable AI.

In light of the above, we explore the definition of understanding under the competing notions of explainability and prediction. In particular given the many levels of abstraction one can take to analyze a system, we explore whether understanding can be seen as a prediction at every level of the system following Dicarlo's. This informs a new understanding of scientific models in which explanations are complemented by predictability and which include AI as a scientific instrument.

16:00 – 16:30

Steven Meyer (Tachyon Design Automation) - Turing Machines are weak - philosophical discussion of computational hardness.

Topic: C.6 Philosophy of Computing and Computation

Abstract: Paper makes two arguments. First Polya Lakatos quasi-empirical philosophy of mathematics is the best current method for discussing philosophy of computation (Polya called it heuristics). Second that the famous P?=NP problem is either malformed or P=NP because following John von Neumann, computational hardness should use the MRAM model instead of weak Turing Machine (TM) model.

References are mostly omitted from this abstract. References relating to Polya Lakatos philosophy of mathematics are in this 2022 Lakatos Centenary Conference talk (URLs slides with images: http://www.tdl.com/~smeyer/docs/polya-contrib-lak-phil-math.pdf). References giving background and von Neumann's conception of computation are in P-versus-NP page solution number 113 https://www.win.tue.nl/~wscor/woeginger/P-versus-NP.htm and arXiv.1603.06018v1 for the solution).

The paper discusses Hilbert's 1920s program that all knowledge can be expressed as predicate formula. TMs are the natural expression of that program because anything computable using the Church Turing thesis can be computed by TMs. The paper gives a coarse time line of rejection of the Hilbert program events by various applied mathematicians.

The P?=NP problem is then defined. TMs are universal, but if one wants to ask how hard a computational problem is, the P?=NP question that asks if a problem can be solved in a polynomial number of steps on a deterministic TM is more precise. If non deterministic TMS (NDTMs) are needed a problem is considered hard and in the class NP. A NDTM can be viewed as solving a problem if any one simultaneous calculation solves it.

TMs are weak because they only allow unary problem coding. Neumann discussd and understood this during his development in the 1950s of his von Neumann architecture. TMs have an unbounded number of cells that can only contain 0 or 1. The MRAM computation model as envisioned by von Neumann contains a finite number of unbounded size cells with a more powerful computation unit that implements unit time multiply and ability to select parts of cells. Deterministic MRAMs can simulate NDTMs in a polynomial bounded number of steps so P is equal to NP. Neumann's argument is that a problem must fit on the computer used to solve it. To solve a larger problem add more RAM and a wider multiply unit.

I argue Peter Shor's claim that MRAMs work by allowing "exponential growth in precision" (see Shor, P. quantum algorith paper 1996) is wrong. The possibility that if the MRAM model is accepted for modeling computation hardness, QC are not faster than conventional computers is discussed. The paper concludes with discussions of blog exchanges involving the P?=NP problem. Deolalikar's solution (P?=NP page no. 65) that maps P?=NP to statistical properties of Boltzmann gases rejection by the formalist computer science (CS) community is discussed. The P?=NP problem's mapping of all problems to the 3-SAT problem is discussed since it removes all problem specific details. The paper concludes with use of Lakatos style monster baring of hard problem instances in the machine learning (ML) area (see Singer, Y. et. al.) to express my view that study of anomalies is important for anti-formalist research programme progress.

ROOM 03

(REFINA)

Symposium: Realism, Fictionalism and Naturalism

Chair: Nélida Gentile

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: The traditional debate between scientific realism and antirealism, together with some selective versions of scientific realism generated as responses to the main antirealist argument -the pessimistic meta-induction argument- gave rise to a number of nuances, and crossed with other philosophical positions such as naturalism, pragmatism and fictionalism. For example, while some authors present realism and fictionalism as opposed conceptions, others defend their compatibility. Moreover, while some supporters of fictionalism extend this conception to both empirical sciences and formal sciences, others believe that it is wrong to embrace fictionalism in the field of mathematics. Something similar can be contended regarding the relationship between realism and pragmatism, while in some cases both positions are interpreted as doctrines in tension, there are others who, on the contrary, defend a pragmatic realism. Likewise, scientific researchers often assume a tacit commitment to naturalism, especially when they expect that the results of an empirical investigation will give support to a realist or antirealist attitude, as noted in one of the articles of the symposium.

The contributions to the symposium illustrate different aspects of this situation. The first contribution examines, on the one hand, the role of fictionalism in empirical sciences; the authors consider strong fictionalism as a special version of anti-realism and offers a minimal interpretation of fictionalism in relation to scientific models. On the other hand, they analyze both positions, fictionalism and realism, in Mathematics, and argue that the confrontation between realists and fictionalists need not be completely exclusive.

The second contribution analyzes the particular conception of pragmatic realism held by Haack, that has been characterized as "innocent realism", specially its analysis of statements about natural kinds. Haack's pragmatist view brings a new perspective to the contemporary debate about scientific realism that offers an important contribution to the topic of the symposium. In addition, it is capable of clarifying why, even if there is a degree of convention in scientific statements, a partially correspondentist view of truth is required.

In the same line of thought, the third communication deals with Haack's attempt to balance, through a pragmatic instinct, the excesses that metaphysicians are prone to commit when considering naturalism and realism. Within this framework, Haack's innocent realism offers an original and conciliatory proposal regarding the realism-anti-realism debate.

Finally, the fourth contribution explores how the possibility of adopting a realist or anti-realist attitude can influence the development of a scientific discipline and vice versa. The author assesses the role of realist and anti-realist attitudes in the case of a forthcoming revolution in the study of consciousness.

Speakers:
1) Nélida Gentile and Susana Lucero: Instrumentalism, Realism and Fictionalism
2) Sofia Inês A. Stein: Innocent realism and the "generals"
3) Adriano Naves De Brito: Haack's subtle naturalism
4) Osvaldo Pessoa Jr.: Realism and the forthcoming revolution in the scientific study of consciousness

14:30 – 15:00

Nélida Gentile (University of Buenos Aires), Susana Lucero (University of Buenos Aires), Rodolfo Gaeta (University of Buenos Aires) - Instrumentalism, Realism and Fictionalism

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: From the last decades to the present, the famous debate between realism and anti-realism has been one of the main topics in the current discussions of Philosophy of Science. In the present paper we will focus on the role of fictionalism in empirical sciences and mathematics.

Regarding to empirical sciences, fictionalism is postulated in connection to the building of scientific models. In this context, fictions appear in two types of actions: the processes of abstraction and distortion (idealization), and in the postulation of entities that do not exist, for example the ether model. Suárez assumes fictionalism of both types; we call this position "strong fictionalism". Suárez states that what distinguishes a fiction is the function rather than its nature or even its true value. Fictions allow to formulate quick and expedient inferences from the model to the real phenomenon; the truth values does not matter (Suárez 2010). But if this were the case, there would not be a greater contrast between fictionalism and instrumentalism, which conceives theoretical statements as mere resources for prediction but lacking true values.

Regarding to Mathematics, we believe that the confrontation between realists and fictionalists need not be completely exclusive. There seems to be agreement between the two sides about the semantic thesis: mathematical statements are to be understood in a literal sense. The crucial difference arises around the ontological aspect. Realists take it for granted that mathematical entities exist and, consequently, statements that correctly describe them are true. Fictionalists, on the contrary, say that such entities do not exist, so that all mathematical statements are false. The two positions seem irreconcilable, but only if the ontological commitments are adopted in an unconditioned, absolute way. Hence, as answers to questions posed from the metaphysical level—a conception that Putnam has distanced himself— they only could be resolved from the inaccessible point of view of the eye of God. However, in our opinion, there are other alternatives to avoid the conflict.

In sum, the main proposal of our talk is to offer a critical analysis of several positions defended by some philosophers of science. With respect to the empirical sciences, our conclusion argues for the rejection of a strong form of fictionalism and in favor of a minimal version that incorporates fictional elements along with real components in the content of a theory or model. With respect to Mathematics, we propose that internal realism and ontological relativism open up other alternatives concerning the need to choose between platonism and fictionalism. Both topics are relevant to the subject of the symposium, as they address an important issue: the relationship between realism and fictionalism in the formal and empirical sciences.

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15:00 – 15:30

Sofia Inês A. Stein (CNPq / Universidade de São Paulo) - Innocent realism and the "generals".

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: I will analyze the relationship between the realist notion of truth and the identification of 'generals' in Haack's pragmatic realism. In Defending Science – within Reason (2003), Susan Haack faces the problem of bringing together two views of science. On the one hand, there is the classical

view, according to which science is ruled by a strict method of inquiry. On the other hand, there is a view of science, which considers it to be determined by social, political, economic and cultural events. According to Haack, it is not enough to reconcile these views. It is also necessary to show, how science develops. A more complete explanation of science, and also of truth, must include both a metaphysical and an epistemological scrutiny concerning the likelihood of scientific theories establishing a true representation of reality. In epistemology, it is well known that Haack has an empiricist and pragmatist understanding of our capacity to know the world (Haack, 2003, p.125). We are dependent on our capacity of perceiving things around us. Moreover, we depend on the instruments we have constructed to help us in our scientific work; and these are not only material instruments, but also theoretical and even fictional ones. Sense capacities have to be supplemented by capacities such as classifying, perceiving similarities, imagining contra-factual situations, figuring out general hypotheses, and, as Haack puts it, by a kind of 'instinct' that helps scientists 'sniff out' the better hypothesis. In metaphysical terms, Haack supports an innocent realism. This realism goes beyond the claim that there are groupings of properties that can receive a standard naming. These clusters are ruled by laws that are independent of our classifications. In this way, realism gets an unexpected additional strength. However, she does not go as far as to claim that our classifications are always correlated to real natural kinds since classifications can change. She agrees that there is an evolutionary aspect in scientific classifications, i.e. the conceptual changes. We do not need essentialism in order to acknowledge the reality of natural species or the truth of statements that contain general terms. Even if changes occur in the extension of a classification, or in the intension of the terms used to classify sets of objects, or even if generals are substituted by others and the sets of objects change, one could say that at least previous truths about the classifications would be partly kept in line with scientific progress. In my talk I will evaluate the particular conception of pragmatic realism held by Haack and characterized as "innocent realism", specially its analysis of statements about natural kinds. Haack's pragmatist and, at the same time, realist proposal brings a new perspective to the contemporary debate about scientific realism that is addressed in the symposium and is capable of clarifying why, even if there is a degree of convention in scientific statements, a partially correspondentist view of truth is required.

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Haack, S. 2003. Defending Science — within reason: Between Scientism and Cynicism. New York: Prometheus Books.

15:30 – 16:00

Adriano Naves De Brito (CNPq) - Haack's subtle naturalism.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: There seems to be something odd about being a philosopher and a naturalist since if science can give an account of every aspect of the world, then what is the point of doing philosophy? Moreover, if philosophy is not concerned with understanding the world, what is the point of being a naturalist in philosophy? The formulation is paradoxical enough to make us suspect it means more than it conveys at first glance. Nevertheless, its astonishing effect remains because each conditional points to something generally accepted. Indeed, on the one hand, science has become the sole oracle for questions concerning the world and its furnishings. While, of course, not compulsory, this view entails a kind of naturalism which professes that everything in existence exists within the realm of nature and that beyond nature, there is nothing. This thesis is the core of ontological naturalism.

Furthermore, since science and its methods, laws, and descriptions provide our only access to nature — this is the core idea of methodological naturalism — no investigation could give an

acceptable account of the physical world, or of life, human nature and suchlike beyond that of science. Accordingly, if philosophy could deliver any valuable answers to meaningful questions concerning the world, then it would have to be understood as a science and, as such, to be committed to ontological and methodological naturalism.

On the other hand, it is not unusual to take philosophy as a kind of discourse that is irreducible to a description of what there is. A discourse about discourses; a metadiscourse to which even science, and perhaps especially science, has to be subjected. In this sense, philosophy is not prima facie about the world but about our knowledge of the world, which does not place philosophy outside of nature, but does grant it a particular role in acquiring knowledge or even in the organization of the knowledge science can deliver.

Hidden in the paradox of philosophical naturalism is a complex relationship between science and philosophy and between science and the world, which means between the language of science and the objects in the world. One of the most appealing notes of Susan Haack's philosophy has always been its search for equilibrium. A way to seal between Scylla and Charybdis in every theme she laid her keen mind over. In this talk, I would like to address her effort to balance and put down to earth, through a pragmatic instinct, metaphysicians are prone to commit excesses when considering naturalism and realism.

In my communication, I address Haack's proposal, innocent realism, tending to achieve a balance between naturalism and realism and avoid the excesses that some metaphysical conceptions incur. Within this framework, Haack's innocent realism offers an original and conciliatory proposal regarding the realism-anti-realism debate.

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16:00 – 16:30

Osvaldo Pessoa Jr. (University of São Paulo) - Realism and the forthcoming revolution in the scientific study of consciousness.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: In this presentation, I speculate on what will be the role of realist/antirealist attitudes in the forthcoming revolution in the scientific study of consciousness. The thesis to be upheld is that a realist attitude towards subjective qualities (qualia) will be better adapted to conceptual transformations than an antirealist approach, by stimulating speculation and novel experiments. As such, the talk fits in the present Symposium by exploring a case study, projected to the future, of the "scientific realism versus antirealism" debate.

This specific Kuhnian revolution will possibly begin when one finds the answer to the question of the localization of consciousness, i.e. to the immediate neural correlate of consciousness. Such immediate neural correlate has been traditionally termed "sensorium" in localizationist views.

The answer to the problem of localization will allow, as the next step, the empirical investigation of the psychophysical bridge laws that connect brain states and qualitative mental states. These unexplained empirical principles will be the way that science will deal with the "explanatory gap" (Levine, 1983).

A significant part of the philosophical and scientific community tends to downplay the importance of qualia (these have been called “type A materialists” by David Chalmers, 1996). Many such authors, such as Daniel Dennett, have also a clearly antirealist approach to the philosophy of science. On the other hand “type B materialists” and “type C property dualists” may be characterized as those that interpret qualia in a realist way.

The first stage of the forthcoming revolution will be the empirical establishment of psychophysical laws in human beings. A typical experiment after the onset of such revolution will be the injection of a specific chemical substance in the subject’s sensorium, followed by his verbal report of the change in his subjective qualitative experience. The realist interpretation of qualia not only is the natural ontological attitude in this context, since the scientist does not have direct access to the subject’s subjective experience, but shall be pragmatically important for having stimulated speculation on novel experiments. On the other hand, an antirealist attitude towards qualia will still be tenable, since the empirical studies will be based on verbal reports of the subjects, besides other behavioral cues, in such a way that the description of these behaviors may replace reference to qualia. But the antirealist attitude towards qualia would tend to neglect the heuristic value of such experiments. This argument in favor of a realist attitude in this context constitutes the main prediction of this paper.

In a second stage of the future science of consciousness, scientists will attempt to establish psychophysical laws for other animals. Here the realist interpretation of qualia will be extended also to qualitative states that are not experienced by human beings, as can be seen by a method of analogy termed “triangulation”. What will guide the postulation of novel qualitative states will have to be theoretical considerations, based on measureable differences between the sensoria of humans and the specific animal.

ROOM 04

15:00 – 15:30

Catalina Hynes (Universidad Nacional de Tucumán, Sociedad Latinoamericana Peirce) - Peirce's Photometric Researches: epistemic conclusions.

Topic: A.4 Historical Aspects of Logic

Abstract: Charles Peirce's Photometric Researches (1878) is the only book he ever published. In my opinion, this work should not be neglected. Peirce claimed that every step in the history of science is a lesson in logic, and I personally think that it was his own activity as a professional scientist, coupled with his great capacity for theorizing, that made it possible to forge his philosophical ideas about knowledge. Such ideas were bold enough to break with the Cartesian and Kantian tradition, on the one hand, and highly creative, on the other. Likewise, his accurate criticisms of metaphysicians who reflect without taking into account the facts or the way things are undoubtedly come from the scientific practice to which Peirce devoted himself practically from his childhood.

As an assistant to the Harvard Observatory and the USA Coast Survey, Peirce was charged with observing stars between 40° and 50° north declination. He carried out this work between 1872 and 1875, and produced a report of these observations that was finally published in 1878. The book was edited by Wilhelm Engelmann in Leipzig as volume 9 of the Annals of the Astronomical Observatory of Harvard College. Photometric Researches is formally-or is supposed to be-a catalog of stellar

magnitudes. But they are much more than that beacuse Peirce intends to offer more than a mere record of observations, he wants to inculcate ideas.

In addition to making the planned observations, Peirce compared his with almost all existing catalogs, both ancient and contemporary. Peirce called these comparisons "historical" investigations. (chapter4) This is not a mere historical curiosity, but the effective comparison of what has been recorded by different observers, in order to stabilize a number as approximately accurate as possible. The ideal of accuracy in science has to be confronted with all the inaccuracies actually operating in scientific measurement, with its ineliminable errors and with the multiplicity of observers. Far from drawing a skeptical conclusion regarding our knowledge of the real world, Peirce learns that only communal work can aspire to arrive at a stable result.

In this paper, I will point out the importance of Peirce's pioneering work in early astrophysics, especially in the shift from qualities to quantities in measurements. A step that perhaps completes the revolution initiated by Copernicus. Epistemic conclusions will also be drawn from his work in astronomy.

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15:30 – 16:00

Jean Christian Egoavil (Universidad del Pacífico) - The historical philosophical development of logic in the sixteenth and seventeenth centuries. Between Europe and South America.

Topic: A.4 Historical Aspects of Logic

Abstract: The main objective of this paper is to analyse, firstly, the ways in which logic was transmitted from the European continent to South America and, secondly, the consolidation of the main logical topics in the American territory in the sixteenth and seventeenth centuries. To this end, the main sources that prove this approach will be presented. With regard to the first point, it is important to mention that the logic transmitted to America was that developed during the 15th and 16th centuries in the European philosophical schools, especially the Thomist, Scotus and Nominalist schools, discussed and expanded in the main universities (among which the University of Salamanca and the University of Alcalá de Henares stand out). These schools were transmitted and taught by the main representatives and professors in the American universities (University of San Marcos in Lima). In this sense, this first point is the historical section that reconstructs the process of transmission of logical thought ("translatio studiorum").

With regard to the second point, I will concentrate on presenting the main logical topics that were developed in this part of the world, such as, for example, the topic of universals, the predication of terms, verbal functions, and so on. It is important to mention that the theories of modal logic and terministic logic were the most studied and debated. It is also substantial to argue that there was a

predominance of logical themes in the development of American thought in those centuries. The main reason was the need for a linguistic logical apparatus that would allow for the construction of a "lingua universalis" that would permit understanding between mentalities as dissimilar as those of Europe and the American Indians. The main testimonies of this last statement are the documentary decrees of the famous Third Limense Council (1583-1591) and the publication of the first treatise on philosophy in South America: the Logica in via Scoti in Lima in 1610, whose author was the Peruvian Fray Jerónimo de Valera.

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16:00 – 16:30

Evandro Luís Gomes (Universidade Estadual de Maringá), Itala Maria Loffredo D'Ottaviano (State University of Campinas - UNICAMP) **- On the notion of semantic and syntactic contributions to the history of logic.**

Topic: A.4 Historical Aspects of Logic

Abstract: What the historian seeks to identify and analyze in the sources of the history of logic is the notion of logical contribution. Vega Reñon (Una guía de historia de la lógica, 1997: 40–45) characterizes the definition of logical contribution in an intuitively recursive way. Let T be a text. T is logically significant if T has to do with the presuppositions, questions, or applications in the field of knowledge covered by logic in a certain historical landmark M. Consequently, (i) if T_L is a logically significant text, then T_L^* is a logical contribution with respect to the notions, problems, methods, or results that have characterized the cultivation of logic as a discipline at some moment of its historical course; (ii) T_L^(*p) is a potential logical contribution in a determined historical landmark M, if T_L^* can be recognized by practitioners of logic in M as a logical contribution; (iii) T_L^(*e) is an effective logical contribution in a determined historical mark M, if T_L^* can be recognized or assumed by practitioners of logic in M as a logical contribution; (iv) T_L^(*lt) is an historical contribution in the broad sense (a memorable contribution), if there is some historical landmark M from which T_L^* comes to be seen as either a potential or effective logical contribution; (v) T_L^(*st) is an historical contribution in the strict sense, if there is a historical mark M in which T_L^* was an effective logical contribution T_L^(*e). Categories such as syntactic and semantic contribution to the history of logic may be also required by an historiographical point of view as internal criteria. Intentionality is also a decisive factor in determining if a contribution to the history of logic is purely syntactic or also semantic. These notions can be stated more precisely as follows: (1) A syntactic or accidental

contribution to the history of logic (or a purely formal one) occurs when an author proposes a logical innovation (in either the narrow or the strict sense) in accordance with interpretations proper to the historical mark M within which it appears, and he or she does not offer an explicit interpretation of it or has little or no consciousness of what he or she has just proposed; (2) A semantic or intentional contribution to the history of logic occurs when a logical innovation (in either the narrow or the strict sense), in accordance with interpretations proper to the historical mark M within which it appears, is introduced with an explicit motivation and with full awareness on the part of its contributor. These new categories allow improve analysis and establish clear criteria which historically enumerate different logical systems, whether they are mutually dependent in a branch of the development of logic. In addition, such intentional character must be readily recognized in the relevant historical landmark M in the community of practitioners of logic at the time. Considering reasons given above, purely chronological criteria appear to be simplistic.

ROOM 05

(KUHN2)
Symposium: History of Science, Philosophy of Science and Historiography

Chair: Leandro Giri

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: The dual characterisation of Thomas Kuhn as a philosopher and historian of science runs through the whole of his work, which can be read as providing both a philosophical theory of the dynamics of scientific progress and a historiographical theory of how best to conduct enquiries into the science of the past. The recent publication of unpublished materials by the author (Thalheimer Lectures, 1984/2017; Lowell Lectures, 1951/2021; Notre Dame Lectures, 1981/in press; Plurality of Worlds, in press) deepens the dual character of Kuhnian work, which, according to the typical presuppositions of historicist philosophy of science, presupposes some kind of structure or pattern in the history of science: such a structure is elucidable by philosophical methods, and once made explicit, allows for more or less coherent historical reconstructions. However, this classical reading is currently challenged by authors such as Lorraine Daston (2016) and others, who prefer interpretations of historical facts in science as contingencies, devoid of any structure. Thus, we currently find within Kuhnian studies a scenario in which the recovery of the author's teachings (presumably driven by the publication of the unpublished works) coexists with the emergence of historiographical schools that are at odds with him and refer to his work in a critical way. This symposium sets out to discuss questions essential to Kuhnian studies but also to philosophy of science in general (and historically oriented philosophy in particular): what lessons remain to be discovered about the historiographical consequences of Kuhnian philosophy; how do these lessons stand up to criticisms of the idea of a history of science based on contingencies; what is the future of the historicist philosophy of science popularised by his locus classicus, The Structure of Scientific Revolutions (Kuhn, 1962)?

Speakers:
1) Hasok Chang: Kuhn and the Challenge of Integrated History and Philosophy of Science
2) Jamie Shaw: The Impact of Science Funding Policy on Kuhn's Structure of Scientific Revolutions

3) Paulo Pirozelli: A Role for History? Kuhnian Dilemmas over the Relation of History and Philosophy of Science
4) Nicolás Salvi: Kuhn's Structures and Legal Studies. An Epistemological and Aesthetic Review
5) Víctor Garay: The historian of science as ethnographer. Incommensurability and hermeneutics
6) Leandro Giri & Matías Giri: "A Structure for History: Reflections from Kuhn's Historiographic Studies

14:30 – 15:00

Hasok Chang (University of Cambridge) - Kuhn and the Challenge of Integrated History and Philosophy of Science.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: Despite his crucial role in promoting the interaction between the history of science and the philosophy of science, Kuhn was profoundly uneasy about the relation between the two. He remarked that one could do both history and philosophy, but not at once. He was particularly critical of the Lakatosian mode of integrated history and philosophy of science (HPS), and later he took broader aim at what he designated as the "historical philosophy of science", in his Rothschild Lecture at Harvard in 1991. The latter occasion was nothing short of the main instigator of the "historical turn" in the philosophy of science apparently condemning the whole enterprise.

This paper has two main aims. One is to reach a better understanding of the ways in which Kuhn practiced the history and the philosophy of science, as relevant background for the unease he expressed about integrating the two. His major works in the history of science were done with little explicit framing in terms of the philosophy of science. He seems to have been entirely comfortable in this line of work, which was respected by most of his fellow historians, and largely accepted without controversy. On the other hand, his early philosophical work, first becoming famous with The Structure of Scientific Revolutions, was heavily shot through with historical examples, and would have lacked much of its persuasive power without them. At the same time, this history-based mode of argument was heavily criticised by professional philosophers. Kuhn's wariness about integrated HPS is quite understandable in light of his own experience of comfortable success in non-philosophical history and notoriety and controversy in historical philosophy.

The other main aim of this paper is to propose a way in which practitioners of integrated HPS can overcome the obstacles to integration that Kuhn perceived. I believe that the core of the difficulty was Kuhn's (and others') attachment to standard analytic philosophy, particularly the narrow view of knowledge as consisting of propositions. Kuhn rightly perceived that such philosophy was not helpful for historical work, but he did not reach for other philosophical traditions (such as pragmatism, hermeneutics and phenomenology) that would have been more helpful. Instead he created his own philosophical framework of paradigms, normal science and revolutions, which was rejected by most philosophers. The later Kuhn tried in vain to get his ideas accepted by analytic philosophers by adopting their methods, for example by trying to reduce incommensurability to cross-cutting boundaries of the extensions of terms. I propose that we can develop a more authentic Kuhnian historiography by giving a pragmatist rendition of Kuhn's key philosophical ideas, and employing them as explicit framing devices for historical narrative and analysis. This approach can also help us overcome the problems of "historical philosophy of science" that Kuhn pointed out. Instead of treating the philosophy–history relation as that of a defective inductive proof of theory from a small base of contaminated evidence, we can see it as a dynamic relation of iterative mutual stimulation and improvement.

15:00 – 15:30

Jamie Shaw (Leibniz University) - The Influence of Science Funding Policy on Kuhn's Structure.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: During his PhD and immediately afterwards, Kuhn was closely adjacent to heated debates concerning the creation of the National Science Foundation. These debates were wide-ranging, touching upon topics such as the value of 'basic science', the democratic obligations of scientific institutions, and the scientific status of the social sciences. Kuhn was involved indirectly though his mentor, James Conant, was one of the most prominent voices in these debates. In Kuhn's later writings, he gestures towards this intellectual context as highly influential during his formative years and, more importantly, in the early days of composing The Structure of Scientific Revolutions. The purpose of this paper will be to take a close look at Kuhn's involvement and exposure to debates about science funding policy and their influence on the composition of Structure. I will argue that an appreciation of this context suggests a novel politicized reading of Kuhn's conceptions of 'paradigms', normal science, and his internalist approach to historiography.

15:30 – 16:00

Paulo Pirozelli (University of São Paulo) - A Role for History? Kuhnian Dilemmas over the Relation of History and Philosophy of Science.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: The Structure of Scientific Revolutions opens with a methodological reflection. Titled "A Role for History", the first chapter of the book explains Kuhn's view on the relation between history and philosophy of science. According to him, the history of science is a source of evidence from which a new image of science emerges. Our conception about the nature of science and the philosophical consequences implied by it is derived from an attentive look at the historical record. The relation between these two disciplines, however, may not be as simple as Structure suggests. In this presentation, my aim is to highlight three moments in Kuhn's works that contradict this standard reading of the role of history of science. These points, loosely related, put some doubt on the actual role of history to philosophy of science in Kuhn's work. First, the historical pattern of science initially described by Kuhn is softened and deprived from apparently essential elements: crises are not a precondition to revolutions anymore, many paradigms can coexist, and even immature science may involve paradigmatic research. Second, in his later writings, Kuhn advances an evolutionary theory of science that seems to dispense with history altogether. Finally, in "The Relations between the History and Philosophy of Science" (1977), Kuhn asserts that the two disciplines have distinct goals and methods; for this reason, one should never do both things at the same time. Hence, if in Structure, history occupied a central place, grounding a philosophical theory about science, at least three problems put this role into question: the process of historical development becomes less clear; history is abandoned as the primary methodological component; and the two disciplinary fields are conceived as autonomous and independent. A few solutions have been proposed to these difficulties. Sharrock & Reading (2002), for instance, claim that Kuhn's historical analyses would have only a sort of therapeutic function in freeing us from a common sense view of science. I believe that the connection between philosophy and history is stronger than that, and that another reading of Kuhn can give a more proactive role for history in establishing our view of science. To start, I first distinguish between history (case studies), meta-history (general pattern) and philosophy (abstract concepts). Meta-history is less schematic than conceived by the Structure, preventing the direct and unrestricted application of the scientific model proposed in Kuhn's book. This, however, does not eliminate the

usefulness of history to philosophy of science. Kuhn's historical analyses, although nor providing a universal schema of scientific development, highlight certain dynamics that are recurrent in the history of science. Careful observation of historiographical material offers, therefore, a valuable tool to look at important aspects of science (often aided by philosophical vocabulary); even if not all of these elements are always present or if they behave differently than what is described in the Structure. On another level, what I am proposing here is a form of "historiographical pluralism" that is able to use different meta-historical views for understanding historical events in science.

16:00 – 16:30

Nicolás Salvi (Universidad San Pablo-Tucumán - Universidad Nacional de Tucumán - Universidad de Buenos Aires) - Kuhn's Structures and Legal Studies. An epistemological and aesthetic review.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: Like the vast majority of the Humanities and Social Sciences, Legal Studies has imbibed Kuhnian language in its epistemological and methodological writings (Marcum 2015). However, it has been done more aesthetically than faithfully to Kuhn's ideas.

The impact of The Structure of Scientific Revolutions on jurists can be seen in the attempts to define the scientific status of the possible science of law based on Kuhn's proposal. Some works stand out, for example, such as those of Aulis Aarnio (1984) and Enrique Zuleta Puceiro (1980), who understand that the disciplinary matrix that guides legal science is legal dogmatics.

But beyond this epistemological-methodological use, a large number of jurists have made use of Kuhn's concepts in a more ornamental way to decorate their ideas with scientificity. The most popular term is "paradigm", which is used interchangeably with any kind of worldview within various legal disciplines. For example, from the history of law, Mariana Isern (2005) freely uses terms such as paradigm, normal science or revolution to refer to a linear history of continental law; as for classical legal dogmatics, we can exemplify with the articles by Jorge W. Peyrano (2012) and Roberto González Álvarez (2011), who use the idea of paradigm shifts to speak of changes in technique in the practice of civil procedural law; or Joan Prats i Catalá (1993) who speaks of a supposed clash of paradigms between classical administrative law and management in public administrations.

In our work, we propose to carry out a review and comparative analysis of the use of Kuhnian tools in Legal Studies. From their most traditional use in legal epistemology, to their most distant use from the Kuhnian tradition, trying to understand the reason for the aesthetic use of the terms of Kuhn's theoretical scaffolding. Finally, we will explore the spaces of Kuhnian ideas that have not been received by jurists.

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ROOM 06

14:30 – 15:00

Petar Nurkic (Institute for Philosophy Faculty of Philosophy University of Belgrade) - Division of scientific labor and epistemic approach to modeling trust in the expertise.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: The daily activities and interactions that we embark on have significant epistemic characteristics. Whether it is deciding what to purchase in the supermarket, where to go for the winter holidays, choosing theater tickets, or believing in the recommendations of experts we observe on television screens, epistemic networking is all around us. Our everyday life is one big epistemic community and information environment that imposes its cognitive demands on us. This includes forming beliefs, justifying the truthfulness of those beliefs, and acting on those epistemic inputs. One of the key factors of any epistemic community is the time during which an epistemic process envelopes and within which true beliefs are acquired. Numerous theories within laboratory ethnography suggest how to structure the diversity of scientific teams so that the period for which they achieve significant epistemic successes and scientific discoveries is as short as possible (Zollman, 2007; Zollman, 2010; Muldon, 2013). This presentation aims to borrow these epistemic models to examine how best to structure epistemic experts and divide their labor to reach a satisfactory level of trust that other epistemic agents have in them in the shortest possible time. In this way, we achieve two goals: we will examine what kind of errors can occur in communication between epistemic experts (such as virologists, epidemiologists, and immunologists) and other epistemic agents; and based on these errors, we will offer a strategy that avoids the heuristics and biases that can occur in poorly structured information proliferation. For this purpose, we will use the mentioned models of division of scientific work and examine specific situations within countries such as Serbia, the USA, and New Zealand (Shaffer, 2009; Radenović & Nurkić, 2021). The nodes of our epistemic model will be relevant ethical and political factors within the epistemic community (such as the social well-being of citizens, the sustainability of the health care system, a populist-rhetorical strategy to strengthen the authority of the epistemic expert, and the economic consequences of a given crisis). While sampling of data, according to the mentioned epistemic nodes, will be done through a qualitative analysis of statements for the media given by medical epistemic experts and political decision-makers. We hope that the offered analysis will illustrate that it is possible to bridge the gap between political and ethical aspects within epistemic communities and the formal structural nature in the philosophy of science of this problem.

15:00 – 15:30

Ilya Kasavin (RAS Institute of Philosophy) - Boris Hessen and Vienna Circle: shifts and parallels in the history & philosophy of science.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Boris Hessen phenomenon is extremely important for understanding how the science studies happened in the 20th century and, in particular, how they formed a discipline dubbed the “history and philosophy of science” and the STS. At the beginning of the last century, these issues had been intensively and fruitfully discussed in Russian intellectual community and not without considerable influence of Marxist restructuring programs of science and society as a whole. Two main issues – theoretical and practical – defined the agenda. The first of them runs as follows: how to treat the "bourgeois science", which entered the unconventional phase in its development? How to combine the excellence of natural sciences and the social and cultural context, which hardly fits the Enlightenment ideas about the cumulative progress of the mind? The second question reads: whether one can and should administer science to guarantee social progress and what are the mechanisms of such management?

The concretization of these issues forced to wonder about the status of the discipline of studying science. Should it be the philosophy of science, special science of science or something else? And consequently, that for philosophy seeks to justify the relationship between science and society? What is the ideological background for understanding of science’s autonomy or executing science policy? Surprisingly, the case of Boris Hessen reveals a parallel with the history of the Vienna Circle, in which the externalist idea of scientific philosophy as a means for social progress and a socialist project of science planning came in conflict with the externalist totalitarian science policy.

15:30 – 16:00

Guilhem Corot (School for Advanced Studies in the Social Sciences (EHESS)) - Caring society as a model to secure epistemic trust in science.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Contemporary philosophy of science has abandoned the strict separation that previously prevailed between epistemic and non-epistemic values, partly because of the epistemic role played by values that also have non-epistemic dimensions. This is typically the case of trust, which is becoming increasingly central in the analysis of knowledge. Indeed, there is a growing awareness about the situation of epistemic dependence that conditions our most general access to knowledge in everyday life (Origgi, 2019) as well as the very constitution of scientific knowledge (Wilholt, 2013), or the relationship of the public to expertise and scientific knowledge (Goldman, 2001).

Trust encapsulates value judgments about both the competence and the benevolence of the person or institution whom one trusts. Typically, one expects from a scientist not only certain knowledge and skills, but also that she will not cheat, hide her results, or mislead about their interpretation, etc. Epistemic trust, including among researchers, therefore incorporates an evaluation of responsibility that necessarily mixes epistemic criteria with moral and political ones.

I suggest to take into account these results by going back to the normative proposal of standpoint epistemology to frame social epistemology on a value of social responsibility (Harding, 1991), and to frame social responsibility on a political analysis of caring (Rose, 1994). I argue that this framework allows to build a useful theoretical bridge between developments about the role of trust in knowledge, issues about values and diversity in social epistemology, and feminist political philosophy that proposed the concept of caring society as a political framework (Glenn, 2000; Tronto, 2020).

Concisely, my point is, first, that since trust is central to securing knowledge, and since some shared moral values are central to securing trust, therefore normative social epistemology cannot rely on mere value diversity but must secure a set of shared moral values to avoid epistemic schisms. However, this argument does not tell us which values to choose. Therefore, the second line of the argument is to argue that from a democratic perspective that considers power inequalities and

epistemic injustice, to frame social epistemology on the political model of the caring society would secure epistemic trust among everyone who recognises herself in democratic values of justice and equity.

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ROOM 07

(MAREP) From previous time slot, same room.
Symposium: The many faces of reduction in physics and chemistry

14:30 – 15:00
Sebastian Fortin (CONICET-UBA), Matias Pasqualini (CONICET-UBA-UNR) - Quantum time reduced to relations

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: The discussion about the relational or substantial character of time took place predominantly within the field of classical mechanics. Only in the last few decades some studies have appeared motivated by the quantum gravity program, which seek to reduce the dynamic time of quantum mechanics to correlations between quantum observables. However, a distinction must be made in quantum mechanics between a parameter-time, which controls the dynamical evolution of the state of a system, and an observable- or event-time, which corresponds to the time in which an observable acquires a definite value or an event occurs. In general, the theory only assigns a probability distribution to a set of possible events, but does not determine when or which of those events will be observed. Famously, Pauli argued that the quantum formalism does not allow to define an operator that represents the event-time.

However, if we assume the postulates of the modal-Hamiltonian interpretation (MHI), it is possible to define the event-time in a relational way. The MHI's interpretative postulates establish that closed systems acquire definite values of energy and other observables compatible with the Hamiltonian independently of the dynamical evolution of the system. These postulates, in conjunction with the well-known indeterminacy relation between energy and time that holds in quantum mechanics, entails that the occurrence of quantum events is attached to the beginning and

end of interactions between systems. In this presentation, based on the model that the interpretation provides for consecutive measurements, a scheme is offered by means of which it is possible to reduce the event-time of quantum mechanics to the interaction relations between different systems.

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15:00 – 15:30

Federico Holik (Insituto de Fisica de La Plata), Juan Pablo Jorge (Universidad de Buenos Aires), Décio Krause (Graduate Program in Logic and Metaphysics/PPGLM, Federal University of Rio de Janeiro.) **- Quasets, quasi-sets, and the foundations of quantum mechanics.**

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Quaset theory (QST) (Dalla Chiara et al. 1998) was developed with the aim of considering collections of entities such as quanta, which should not be considered as sets in the standard sense of collections of well-defined collections of classical objects. Quasets of quantum entities would behave differently from standard sets, since in some cases, we may be in doubt whether a certain entity does belong or not to a quaset. So, the theory resembles fuzzy sets to some extent, since it copes with the idea that may be uncertain if an element does belong or not to it. But in this theory, all elements continue to obey the standard theory of identity (STI): they are individuals, contrary to some interpretations of quantum theory. Quasi-sets overcome such a problem (French and Krause 2006); now we may have collections (the quasi-sets) where all elements are absolutely indistinguishable, without turning to be the same element, as would be imposed by STI. Such collections can have a cardinal, but not an ordinal. In quasi-set theory, the (so to say) frontiers of the collections are sharp: either an element does belong to it or not. In this paper we mix the theories, creating collections lacking both things: the elements may be indistinguishable and the frontiers may be fuzzy. We apply the theory to quantum physics by interpreting indistinguishable but not identical things as quanta and the elements in between the interior and the exterior of the collections as quantum systems in superposed states.

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15:30 – 16:00

Manuel Herrera (Universidad de Buenos Aires) - Fundamentality and space-time: reductionist and emergentist approaches.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: The core of the super-substantivalism approach to space-time can be expressed by that claim that space-time is more fundamental than, or ontologically prior to, matter. The problem of the fundamentality of space-time is associated with this statement. Given that super-substantivalism endows space-time with a privileged status as a substance that is ontologically prior to matter, it is important then to determine what exactly is meant by “fundamental” or “more fundamental than”: is there any notion of fundamentality available in the metaphysical literature that adequately capture the above super-substantivalism claim? These discussions are part of a trend that has gained strength in recent years and which seeks, in general, to evaluate the substantivalism/relationism debate from the perspective of the fundamentality of space-time instead of that of its existence (or not) (Dasgupta, 2011; North, 2018).

Super-substantivalism has been vigorously discussed in the field of analytical metaphysics, but so far with very little connection to the debate coming from the field of the philosophy of physics. One of the canonical papers on super-substantivalism within the framework of general relativity is that of Lehmkuhl (2016). The author proposes to examine in what sense we are qualified to maintain that space-time is ontologically prior to matter and to evaluate if general relativity gives us reasons to support an assertion like this. According to Lehmkuhl, different notions of ontological priority/fundamentality (and different notions of ontological dependency) will lead us to different super-substantivalism variants that can be more or less fruitful. In this scenario, Lehmkuhl briefly evaluates some candidates to occupy the place of the notion of ontological priority/fundamentality, among them the reductionist and emergentist options. The conclusion of the author is that general relativity does not give us convincing reasons to believe that the existence of matter can be reduced to, or supervenes from, the existence of space-time.

In accordance with what has been stated in the previous paragraphs, this presentation intends to examine the reductionist and emergentist approaches to fundamentality and evaluate in what sense these approaches could give rise to super-substantivalism variants that are compatible with the scenarios proposed by general relativity.

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16:00 – 16:30

Jesus Alberto Jaimes-Arriaga (CONICET-University of Buenos Aires) - Questioning microphysicalism: a hylomorphic account of quantum chemistry.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: In contemporary analytic philosophy there are two disputed philosophies of nature (Koons and Pickavance 2017). The dominant view, sometimes known as Humeanism, is committed to the sufficiency of physics, in particular microphysics, and the priority of parts over wholes. On the contrary, Aristotelianism intends to encompass a larger body of knowledge, including the special sciences, and prioritizes wholes over parts. The doctrine of Humeanism crystallizes in the thesis known as microphysicalism, according to which each material object is ultimately composed of microphysical parts and these parts are metaphysically prior to the whole at stake (Inman 2018). The question of microphysicalism is relevant to the problem of the reduction of chemistry to physics. Since the chemical ontology is ultimately constituted by microphysical entities, then chemistry lacks autonomy and independence, and it is no longer a fundamental scientific description of the real world. In this context, my project aims to question microphysicalism by developing a scientifically informed Aristotelian ontology of hylomorphic substances composed of chemical form and material atomic parts, where chemical wholes are metaphysically prior to its microphysical parts.

The work will be focused on an interesting quantum-chemical theory, namely, the Quantum Theory of Atoms in Molecules (shortly QTAIM). This theory purports to offer a quantum foundation to both the Dalton's atomic theory and the Theory of Chemical Structure (Bader 1994). To achieve this, QTAIM defines the concept of topological atom in terms of that of electron density, which refers to an empirically accessible magnitude. Then, topological atoms are employed to describe the composition of molecules and they reflect two important features of chemical atoms: transferability and additivity. Topological atoms can be transferred between distinct molecular environments and the properties of the whole molecule can be obtained through contributions of topological atoms. However, the present work aims to undertake a mereological analysis of QTAIM's assumptions in order to demonstrate why QTAIM prioritizes whole molecules over their atomic parts. More specifically, why the molecular environment determines the identity of topological atoms. This fact will be reflected in what I called 'topological imprint', a property expressed in terms of the electron density, which characterizes topological atoms as atoms in determined molecular environments. More precisely, when atoms constitute a given molecule, they acquire certain characteristics in virtue of belonging to that and only that molecule. Thus, QTAIM represents a scientific case where wholes are metaphysically prior to their parts and supports a hylomorphic ontology that subscribes the priority of wholes over parts. In this way, it is possible to make the case for an Aristotelian approach that provides independence and autonomy, not only to chemistry, but also to the rest of special sciences.

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ROOM 08

14:30 – 15:00

Uskali Mäki (University of Helsinki) - On the normative authority of economics

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: I will submit something different from the traditional ways of addressing the issue of how the positive and the normative are to be defined and interrelated in the case of economics. These customary ways are mainly put in terms of the syntax and semantics of language (is-ought) or the metaphysics of what this language is about (facts-values). My proposal – that I consider indispensable if we wish to understand the normative ramifications of economics – supplements the previous perspectives by focusing on social and institutional aspects of how economics functions in society. I suggest economics plays "unofficial" normative roles in society, including public policy making, by acquiring and exercising what I call normative authority. Authority is an institutional attribute of the epistemic institution we call economics. Normative authority is authority with normative issues as its subject matter. Regardless of whether economics enjoys epistemic authority concerning matters of economic fact, I argue that it enjoys high normative authority concerning matters of advisable policy, effective institutional design, prudent ways of thinking and acting in contemporary society, and other such things. It also seems evident that these two kinds of authority are not connected such that normative authority would derive from some supreme epistemic authority; we know that economics has a mixed epistemic record. I sketch some pathways by which the normative authority of economics is originated, enabled, exercised, and constrained. Important roles are played by framing issues in economic terms, thereby delimiting the conceptual space within which goals are set and means are chosen. This restricts the range of normative issues and normative viewpoints that can be appropriately expressed and effectively acted upon. Typical elements in the restrictive frameworks include money, market, incentives, efficiency. They contribute to setting the agenda for normative considerations. The frameworks are spread and fortified by means such as economics education and interdisciplinary "imperialism" whereby economic ways of thinking intrude into other disciplines or adopt a hegemonic position in relation to them. Economics has a further advantage of what I call policy tractability as its framings simplify otherwise immensely complex policy issues. On the other hand, the normative authority of economics is potentially constrained by commonsense conceptions regarding economic and related issues.

15:00 – 15:30

Magdalena Malecka (Aarhus University) - Deflate the AI hype, but don't neglect the computer. Rethinking the epistemic role of computer technology in modern economics.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: The contemporary hype around artificial intelligence hasn't escaped economics. PhD graduates in economics are encouraged to embark on careers of data scientists in big tech companies by their more experienced colleagues (Athey & Luca 2019). We also witness increasing interest in the advancements in machine learning among economists who believe that AI tools will improve empirical analysis and evidential basis of modern economics, a proposal that follows earlier similar attempts of behavioural and experimental economists (Mullainathan & Spiess 2017). However, there is an important fact missing in these debates and proposals for a reform of economic research: since its modern development in the mid-20th century, economics has largely been influenced by computer

technology. We learn from historians of economic thought and historians of science that the neoclassical economic approaches, which dominate the field today, were advanced during the Cold War era in the US by scholars who worked in research environments created and supported by military agencies (Mirowski 2002, Sent 2000, Erickson et al. 2013). Digital computers were built in these research environments and new sciences, inspired by the emergence of information technologies, were thriving there: cybernetics, cognitive psychology, systems engineering, AI research (Pickering 1995). Economics was not immune to the transformation by the computer that most modern science underwent.

Yet the philosophical significance of these developments remains understudied. There is only a limited attention paid in philosophy of economics to computer simulations in economic research (Reiss 2011, Lehtinen & Kuorikoski 2021). The aim of my talk is to argue for the importance of a much deeper and extensive philosophical analysis of the epistemic importance of computer technology in producing research in modern economics. Since the topic is vast, I will narrow down my focus to the analysis of the epistemological and methodological consequences of the links between the computer and important theories of modern economics: expected utility theory and prospect theory. I will ask whether idealizations of these theories reflect computational constraints of computer technology. If we can answer the question positively, in the next step I will consider whether this challenges the existing philosophical accounts of the role of idealizations in economic modelling and/or explanation which concern expected utility theory and prospect theory.

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15:30 – 16:00

Leandro De Brasi (Universidad de La Frontera) - Citizens and Collective Deliberation in Social Science.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: Citizen Science is a rapidly growing field, expanding across varied research domains within the sciences, such as astronomy, computer science, ecology and medicine (Kullenberg and Kasperowski, 2016). Citizen science programs involve citizens, who are not professional scientists, in scientific inquiry. These citizens voluntarily contribute toward scientific research in collaboration with professional scientists. Nowadays, opportunities to participate in citizen science are boundless and there are different ways (and degrees) in which people can participate (Novak et al., 2018). Having said that, citizen involvement in citizen science consists typically in data collection. They mainly participate in the process of gathering, annotating and/or categorizing data individually and according to specific scientific protocols. Nevertheless, since its inception, one major strand of citizen

science aimed to have a less limited role for citizens in scientific research (Irwin, 1995). According to this approach, citizens are meant to have more cognitive engagement and influence on scientific projects; for example, by empowering them to collaborate with professional scientists on many core aspects of the projects, such as the interpretation of results and the choice of problem to study. However, the contribution of citizens in scientific research has been questioned on epistemological grounds (Elliott and Rosenberg, 2019). Even research that relies on the restricted contribution of citizens in data collection is often questioned about the epistemic quality of such data.

Here, however, I don't consider such epistemic worries since I'm not concerned with the possible contributions of citizens in data collection. Instead, I focus on the contribution they can make in the collective process of deliberation within research teams. Teamwork in science is ubiquitous and it varies enormously in terms of the number of participants, the social structure and the sorts of work the teams engage in. I argue that, in certain particular conditions related to the intellectual character of the deliberators and their cognitive diversity, small research teams that engage in deliberation in the analysis of data and involve citizens can better promote good epistemic results, in terms of truth-seeking, than those teams which do not involve citizens or do not even deliberate collectively. In particular, certain communities within the social sciences that lack the relevant cognitive diversity among their professionals (for example, in political psychology regarding political values) can take advantage of the diversity found in the citizenry to increase the epistemic quality of their research, as long as the citizens possess the relevant virtues.

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ROOM 09

14:30 – 15:00

Alejandro Cuneo (Universidad Nacional de Córdoba), Ruggero Ferro (Universita di Verona) - Improved empiricism for mathematics.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Empiricism is a philosophic attitude not much appreciated with respect to mathematics: the mathematical entities do not fall under the perception of our five senses, they are not concrete, often they are said abstract. But abstract should mean something else and not just the negation of concrete: humans can compare walks, which are processes they have clear experience of, and the linguistic trick to treat names of processes as names of objects should not lead to identify the two notions. In general, mathematical notions are not objects, even though they are treated as such.

The difficulties of empiricism versus mathematics open the way to other fancy solutions, such as the existence of ideal objects to be discovered, or the presence of inborn notions, or fictionalism. Nevertheless, the classroom experience in teaching mathematics, with its primitive notions, tells us something about how we know mathematics. The development of student's knowledge puzzles us about the alternative solutions. The empirical attitude seems closer to the basic way of knowing.

In this contribution, we propose to upgrade the traditional empiricism by considering not only the usual five senses but also a few well determined internal senses. These, in addition to memory and to specific mental operations producing further perceptions (abstraction, comparison, generalization, idealization by transfer or by negation), are adequate to construct mathematical notions, starting from future and time, and differentiating between consequence and correlation. These tools were initially introduced in the chapter "From the Classroom: Towards A New Philosophy of Mathematics" that we contributed to the book MAA Notes 86 "Using the Philosophy of Mathematics in Teaching Mathematics".

The complication (huge unmanageable amount of data without any interrelation and organization) of the totality of the perceptions received by the individual forces us to accept that it is impossible to know reality completely. Instead, humans refer to a model of reality that each one individual builds into himself. In a model of reality some organization of the data is introduced making the model more complex (huge, structured amount of data that requires navigation skills not to be lost) as it develops, to approximate reality better and better. Models translate complication into complexity introducing organization among data. Using interpersonal communications, models of reality become increasingly faithful and comprehensive of what is perceived, while maintaining their manageability, justifying the acceptance of models approximating reality but clearly depart from what is perceived.

Humans construct models of reality to conveniently act and foresee the effect of their actions. Cooperation among humans, even over the times, makes this an effective and efficient process, but to obtain cooperation, the planned actions should be properly justified: thus, a good model of reality should allow us to understand, justify, and forecast the dynamic of reality.

The unmanageable quantity of different data and the need to simplify situations leads to deal with their multiplicity and to organize it independently of who are the elements involved and the consequent information about them: this human endeavor is what we call mathematics.

15:00 – 15:30

Evelyn Erickson (UFRN) - Theory revision in logic via reflective equilibrium.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Anti-exceptionalism in logic is the broad claim that Logic is not an exceptional discipline in terms of its epistemology. One popular interpretation of this motto is that Logic shares its method of theory revision, usually taken to be Inference to the Best Explanation, with other sciences (Hjortland 2017, Priest 2016, Williamson 2017). This approach is somewhat ill suited, as it is susceptible both to the problem of logic in the background (Woods 2019a) and of selecting evidence (Hlobil 2020). Other anti exceptionalist views claim that Logic shares a method of revision with mathematics (Russell 2018) or with normative disciplines (Resnik 2004, Prawitz 2007). The current work proposes that theory revision in Logic works via reflective equilibrium, maintaining that this is also a method of scientific theory revision (Elgin 1996). The general idea of reflective equilibrium is that there is a dynamic between a currently accepted theory and a new insight, such that, through small steps of revision, the theory comes to accord with these insights. Specifically, revising a logical theory amounts to balancing the inferences permitted by the logical theory and the new evidence which must be accommodated, in successive steps of adjustment. What this means is that a theory and evidence in Logic is brought

into equilibrium not only by revising a theory given some evidence, but also that sometimes evidence might be rejected in light of a theory. As such, there is no one best unique way to revise theories in logic, and so different choices of background logic and evidence will lead to different logical theories to be chosen after a process of revision. While Prawitz (2007) and Resnik (2004) reject the analogy between Logic and Science in claiming that theory revision in logic works via reflective equilibrium, the aim herein is to claim that logic is akin to science exactly because it uses reflective equilibrium.

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15:30 – 16:00

Danielle Macbeth (Haverford College) - Mathematical Thinking: The View from Traditional China.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: In its beginnings in the West, the concern of mathematics is objects, paradigmatically, two-dimensional geometrical objects such as circles and triangles, and various sorts of numbers, where a number is to be conceived as a collection of units. In traditional China, the concern is instead procedures, paradigmatically, calculations. The practice is often assumed to be of only practical significance for just this reason. Work by Chemla shows that this is a mistake. (See also Needham and Martzloff.) Traditional Chinese mathematics is demonstrably general and concerned to justify its results. It has the character of a science. What I aim further to show is, first, that traditional Chinese mathematical work with calculating rods has the structure of a science, and also that the practice of this science involves the use of a (non-symbolic) mathematical language. As a science, the practice involves: first, the introduction of the basic elements of the system, the construction of numbers (construction in something like Kant's sense) together with the modes of addition and subtraction those constructions enable; second, the various legitimate moves, basic and derived, in the system of calculations, that is, products and quotients; and finally, the science proper, the construction and study of polynomials beginning with the finding (constructing) of roots through to solutions of polynomials of arbitrary degree and with indefinitely many unknowns. This work is, furthermore, pursued using only calculating rods on a surface. There is no symbolism, only the manipulation of rods. The second task is to show that this practice with rods on a surface nonetheless involves a kind of Leibnizian language within which to exhibit the contents of mathematical ideas and to reason on the basis of those contents so exhibited. The model here is the Euclidean diagram, which functions not to picture various geometrical entities (points, lines, areas, figures, and so on) in various relations,

but to formulate the contents of geometrical concepts, what it is to be, say, a circle or right-angle triangle (as conceived by the ancient geometer), in a way enabling rigorous reasoning in the system of signs. Similarly, we will see, Chinese rod numerals are not merely instances of collections but instead formulate what it is to be a number (as conceived by the Chinese mathematician), and do so in a way enabling rigorous reasoning in the system of signs. Traditional Chinese mathematical practice with rod numerals is a form of mathematical thinking, and one that promises exciting new insights into the nature and structure of such thinking.

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16:00 – 16:30

Bruno Ramos Mendonca (Universidade Federal da Fronteira Sul) - Dialogical logics and deductive information.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: We have good reasons to think that mathematical demonstrations are frequently ampliative. By demonstrating certain theorems we gain new, often unexpected, knowledge. However, this simple remark raises a philosophical difficulty: in a valid deduction, on what conditions does the content of a conclusion surpasses the content of the premisses? In other words, which demonstrations are informative and what is the cause of their informativeness? This question has challenged the literature in philosophy of logic of the last decades. Different responses have been proposed which highlight different facets of the problem. An interesting new suggestion is due to D'Agostino and Floridi (2009). According to these authors, a proof is informative if it uses virtual information. In their terminology, this is the data carried by dischargeable hypotheses, assumptions entertained in the course of a proof and eliminated before concluding. Only these hypotheses would be able to lead us (temporarily) beyond the information furnished by the proof’s original set of premises. D’Agostino and Floridi’s analysis is quite convincing. Driven by computational reasons, they recognized that dischargeable hypotheses are a source of deductive information. However, we still must address some open questions. Why does the use of dischargeable hypotheses increase the informativeness of a demonstration? For what reason are such provisional assumptions a source of new information in the context of proofs? In this talk, I present a dialogical analysis of D’Agostino and Floridi’s concept of virtual information. I claim that virtual information results from the dynamics between a reasoner and her audience. More precisely, I claim that the audience of a demonstration furnishes dischargeable hypotheses (particularly the virtual information they express) to cooperate with the deductive process. In other words, it is part of the audience’s role to introduce virtual information, data vital for obtaining the argument’s conclusion but not included in the information expressed by its premises (the reasoner’s original set of assumptions). A reasoner roleplays this function of her fictional audience every time she provisionally assumes a hypothesis. This exercise of departing from one’s original premises to embrace data provided by the audience is informative. To this extent, the demonstration does not rely simply on the reasoner’s suppositions but also depends on something else. Consequently, such demonstrations are not informationally analytic. Notwithstanding, they are not

synthetic either. In these cases, the reasoner needs to examine her interlocutors' conceptual entries in the proof instead of entertaining intuitions.

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ROOM 10

(ECUM) From previous time slot, same room.
Symposium: Harmonic coexistence of logical systems

14:30 – 15:00
Marcelo Coniglio (State University of Campinas), Francesc Esteva (IIIA-CSIC), Joan Gispert (Universitat de Barcelona), Lluis Godo (Artificial Intelligence Research Institute, IIIA - CSIC) - Ideal and saturated paraconsistent logics arising from Godel logics expanded with an involutive negation.

Topic: A.2 Philosophical Logic

Abstract: While paraconsistency deals with excessive or dubious information, fuzzy logics were designed for reasoning with imprecise information, in particular, for reasoning with propositions containing vague predicates. Given that both paradigms are able to deal with these two types of information --unreliable, in the case of paraconsistent logics, and imprecise, in the case of fuzzy logics-- it seems reasonable to consider logics which combine both features, namely, paraconsistent fuzzy logics.

In this contribution we survey the main results in [1], where we study paraconsistent logics arising from Gödel fuzzy logic (i.e. the extension of Intuitionistic logic with the prelinearity axiom) expanded with an involutive negation G_\sim, introduced in [2], as well as from its finite n-valued extensions nG_\sim. It is well-known that Gödel logic G coincides with its degree-preserving companion G^leq (since G has the deduction-detachment theorem), but this is not the case for G_\sim. In fact, G_\sim and $\Gsimleq$ are different logics, and moreover, while G^leq_sim is explosive w.r.t. Gödel negation \neg, it is paraconsistent w.r.t. the involutive negation \sim. In fact, G^leq_sim is then a paradefinite logic (w.r.t. \sim) in the sense of Arieli and Avron [3], as it is both paraconsistent and paracomplete, since the law of excluded middle fails, as in all fuzzy logics. In [1] we introduce the notion of saturated paraconsistency, a weaker notion than Avron et al.'s notion of ideal paraconsistency [4]. Them we study the logics between nG^leq_sim (the n-valued Gödel logic with an involutive negation) and CPL, and we find that the ideal paraconsistent logics of this family are only the da Costa and D'Ottaviano's 3-valued logic J_3 and its 4-valued version J_4 introduced in [5]. Moreover, we fully characterize the ideal and the saturated paraconsistent logics between nG^leq_sim and CPL. We also identify a large family of saturated paraconsistent logics in the family of intermediate logics for degree-preserving finite-valued Lukasiewicz logics.

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15:00 – 15:30

Umberto Rivieccio (Universidad Nacional de Educación a Distancia), Sergio Celani (Universidad Nacional del Centro-CONICET) **- Intuitionistic modal algebras.**

Topic: A.2 Philosophical Logic

Abstract: Recent research on algebraic models of quasi-Nelson logic [1] - a non-involutive generalization of Nelson logic - has brought new attention to a number of classes of algebras which result from enriching (subreducts of) Heyting algebras with a special modal operator known in the literature as a “nucleus”.

Among the various algebraic structures thus emerged, for which we employ the umbrella term “intuitionistic modal algebras”, some have been studied since at least the 1970s, usually within the framework of topology and sheaf theory [2, 3]. Others appear more exotic, for their primitive operations arise from algebraic terms of the intuitionistic modal language which have not been previously considered.

We for instance investigate the variety of “weak implicative semilattices”, whose members are (non-necessarily distributive) meet semilattices endowed with a nucleus and an implication operation which is not a relative pseudo-complement but satisfies the postulates of Celani and Jansana’s strict implication [4].

A canonical way of obtaining a weak implicative semilattice is by defining, on any pseudo-complemented semilattice, an implication via the term used by Prawitz to introduce the “classical” implication in his Ecumenical System [5]. Likewise the term interpreting the “classical” disjunction within Prawitz’s system may be used to obtain a class of implicative semilattices enriched with a pseudo-disjunction, which is also one of our main object of study. In my talk I will emphasize these connections and discuss where they may lead in future research.

For each of the above-mentioned new classes of algebras we have established a representation and a topological duality which generalize the known ones for Heyting algebras enriched with a nucleus.

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15:30 – 16:00

Jean-Baptiste Joinet (IRPhIL (University Jean Moulin Lyon 3) & IXXI) - Ecumenism and Linear Logic's Exponentials: dissymetrizing exponentials to analyse the space between intuitionistic and classical computations.

Topic: A.2 Philosophical Logic

Abstract: When one interprets intuitionistic and classical implications in Linear Logic (LL), the difference between them is not caught by distinguishing two implication connectives (as in standard ecumenical attempts), but by using differently the modalities '!' and '?' (LL's exponentials).

As '?' is required only to interpret the classical implication, '!'' is sometimes considered as 'the intuitionistic exponential' while '?' (needed for right structural operations) appears complementary as 'the classical one'. In a sense, the ecumenist question about the 'two implications' is thus converted, in LL, into ecumenist questions about the 'two exponentials': In which respect, could one say that '!' (resp. "?") is "the intuitionistic (resp. classical) exponential'' ? Do they really play such well differentiated roles ? How do they interact dynamically?

In the presented work, we analyse exponentials from the ecumenist viewpoint, showing that the symmetrical interdependency between '!' and '?' which prevails in CLL has to be broken, if one wants them to really play well differentiated, independent roles. Once the symmetry is broken, "intermediate exponentials" may be defined which design computational systems of CLL which are "intermediate" between Intuitionistic LL (ILL) and Classical LL (CLL). Four main systems are designed (Dissymetrical LL, semi-functorial Dissymetrical LL, semi-specialized Dissymetrical LL, bi-conclusion LL).

16:00 – 16:30

Renato Leme (UNICAMP), Marcelo Coniglio (UNICAMP), Bruno Lopes (Universidade Federal Fluminense) - A decision procedure for intuitionistic and ecumenical logic based on restricted non-deterministic matrices.

Topic: A.2 Philosophical Logic

Abstract: Appearing first in the works of C. S. Peirce and L. Wittgenstein, truth tables soon become a synonym for propositional logic semantics. With the advent of intuitionistic propositional logic, however, more was needed. By rejecting the excluded middle principle, one gives up having a finite truth table interpretation for their operators. For a long time, this perception pushed away the efforts to characterize intuitionistic logic with truth tables. In 1932 Gödel proved that intuitionistic logic cannot be characterized by a single finite logical matrix.

While non-deterministic matrices (nmatrices) were introduced in 2001 by A. Avron and I. Lev [1], it has an antecedent in the independent works of J. Kearns [2] and J. Ivlev [3] on modal logics. Kearns proposes a truth table characterization of modal systems S4 and S5 through 4-valued nmatrices with restriction on the valuation (level valuations) as an alternative to Kripke semantics. This method is nowadays called restricted nmatrices.

Unfortunately, Kearns method does not provide a decision procedure for S4 and S5. To solve that, L. Grätz recently proposed in [4] a decision procedure for T and $S4$ by refining Kearns approach. His method shows that one can evaluate modal systems with a 3-valued nmatrix, as long as one provides an appropriate (decidable) filter to delete some rows of the table.

A natural extension to Grätz's technique is to use a restricted nmatrix to offer a decision procedure for intuitionistic propositional logic. We propose to do that with only one additional step,

namely Gödel-McKinsey-Tarki's box translation. This technique can be extended to Prawitz's ecumenical logic. A computational implementation of these methods in Coq was also obtained.

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ROOM 11

14:30 – 15:00

María Alejandra Petino Zappala (Fac. de Ciencias Exactas y Naturales, Fac. de Filosofía y Letras, Universidad de Buenos Aires, CONICET, Argentina), Lucía Ariza (CONICET, Argentina), Natacha Salomé Lima (Fac. de Psicología, Universidad de Buenos Aires, CONICET, Argentina) **- Conceptualization of genotype-phenotype relationships and risk estimation in advertising of Direct-to-Consumer and preimplantation polygenic tests**

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: In the last decades, the promises of precision medicine and the advancements in genomics have powered a shift from the search for one or few causal genetic variants in patients to the genomic screening of the general population in order to estimate polygenic risks for common diseases. Paradoxically, this has also resulted in the acknowledgment of the role played by non-genetic factors in health outcomes.

Lately, the increased availability of health-related genetic tests directly marketed and sold to consumers, bypassing the clinical setting (Direct-to-Consumer or DTC tests), has entailed an increase in their use as devices sought to monitor and enhance health outcomes. In addition, the last years have seen an expansion of preimplantation genetic testing to rank and choose embryos for In Vitro Fertilization according to estimations of polygenic risk (PGT-P) for common, late-onset diseases (like high blood pressure or diabetes). As part of these developments, the role of genetic information has been progressively discussed in the public arena, possibly affecting how we understand our health in terms of our genetic constitution. This begs the question of the role played by the expansion of genetic testing in the so-called "genetization" of our societies, i.e. the tendency to attribute most of the human variability (particularly on health) to genetic factors (Lippmann, 1992).

However, although DTC and PGT-P ultimately rely on the same prediction algorithms, they differ in their aims and the interventions proposed to clients: while DTC guides them toward supposedly optimal behavioral or environmental choices according to their genomic information, PGT-P promotes embryo selection depending on their "genetic risk" for common, multifactorial diseases. The promise of personalized health advice, the cornerstone of DTC, relies on the idea that the optimal environment differs between individuals depending on genotype (i.e. genotype-

environment interaction exists for these traits), embryo selection based on polygenic risk scores conversely presupposes a fixed genotype "ranking", irrespective of environmental factors (i.e. genetic determinism, or either phenotypic plasticity without genotype-environment interaction). Moreover, whereas it is expected that DTCs propose environmental/lifestyle changes as a risk reduction strategy (thus relinquishing genetic determinism), reproductive decisions based on PGT-Ps would emphasize genomic information to the detriment of environmental factors, which will be downplayed or omitted as relevant to phenotypic outcomes.

This paper will analyze and compare the advertising discourse released by providers of DTC and PGT-P to inquire how genotype-phenotype relationships are presented, which environmental factors are considered relevant in disease development, how risk is conceptualized and how the uncertainty of these predictions is communicated and explained to the public.

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15:00 – 15:30

Fiorela Alassia (Universidad Nacional de la Patagonia San Juan Bosco) - How is biological individuality assumed in the health sciences?

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: The philosophical problem of biological individuality is an issue that has been extensively worked on within the philosophy of biology (Lidgard and Nyhart 2017) (Wilson and Barker 2019). It has recently been argued that, in this debate, it would be necessary to include other aspects that have not been sufficiently addressed, such as philosophical questions about biological uniqueness and its relation with biological individuality (Kaiser and Trappes 2021). In many research areas of biology, there is a great interest in studying individual differences as well as the biological features that makes a biological individual "unique" (Trappes 2022).

When we shift the focus from biology to the health sciences, we observe that many of these new inquiries about biological individuality and uniqueness also have a place. Possibly, some of the first questions that we can ask may be how biological individuality is assumed in the health sciences, or if uniqueness is an important aspect of biological individuality as it is assumed in the health sciences.

In medicine, the idea that each patient has a particular and unique way of manifesting a disease over time is closely linked to the idea that each individual patient is unique (although not only biologically unique). The study of individual differences in relation to health and disease has progressively increased its relevance in modern medicine, and the rise of personalized medicine is an example of this. In this field, the "unique" set of characteristics of the individual patient is the basis for personalized diagnoses and treatments (NAS 2011). Another example comes from clinical lab science, where concepts such as intra-individual and inter-individual variability or biochemical individuality are often used.

It is necessary, then, to specify the assumptions that underlie the concept of biological individuality when it is involved in health sciences, and to clarify its relationship with some specific problems in these areas, such as the distinction between healthy and diseased individuals. The purpose of this work is to make a first approximation to address these questions.

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15:30 – 16:00

Bjørn Hofmann (University of Oslo) - Value-based strategies to handle uncertainties in medicine and the health sciences.

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: This presentation starts with reviewing the many kinds of uncertainties identified in medicine and the health sciences. Then it discusses several strategies to manage these uncertainties. In particular it, will investigate several novel modes of knowledge production. A range of new study designs, analysis methods, and synthesis approaches are promising in speeding up and reducing costs in knowledge production. However, they also have some downsides which pose epistemic and ethical challenges. In line with the theme of the conference «Sciences & Values in an Uncertain World» the presentation will address which values are at stake when amending modes of knowledge production in medicine and the health sciences.

16:00 – 16:30

Siteng Ren (Peking University, The School of Health Humanities) - Experiment or not？ Randomized controlled experiments and quasi-experiments

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: As in its name, randomized assignment is the key element in designing randomized controlled experiments. Randomization brings in the fame of “the benchmark of experiment” in fields like life and social sciences today. Proponents emphasize that rigorous random processes, even if they are simple like rolling dices and picking cards, can prevent intentional selection in the allocation process. Thus, potential bias and confounders can be eliminated, and accurate estimation of causal effects can be obtained.

In contrast, quasi-experiments (e.g., natural experiments, instrumental variables, regression discontinuity, etc.) are often questioned for they do not genuinely involve randomized assignment. They basically apply the “as-if randomness” argument to ensure the assignment of experiment subjects is appropriate. There are two main differences between quasi-experiments and RCTs: intervention and assignment. For intervention, I believe that “naturally occurred (i.e., take place beside the control of experimenters)” interventions are equally effective. My focus here is the difference in the allocation of subjects. This paper is intended to demonstrate that quasi-experiment

design is as reliable as a randomized controlled trial in principle, because they provide a proper approximation to random assignment.

First of all, I will show the direct purpose of using randomized assignment is to achieve both chance-equality and outcome-equality. The former equality ensures the procedural justice of the assignment process. The latter balances the characteristics between the experimental and control groups. The overall goal of eliminating bias and confounders can only be achieved when the two are combined.

Using as-if randomness argument, the approximation to random assignment holds on these two aspects. On the one hand, quasi-experiments use statistical tools such as significance tests to examine the assignment results (also can be found in RCTs), thus guarantees outcome-equality. On the other hand, quasi-experimenters collect various forms of qualitative and quantitative evidence to validate the chance-equality in assignment processes. I illustrate how these two aspects work by cases from epidemiology and social sciences.

These two aspects of approximation might be refuted as follows.

First, the protentional problem of applying significant test. A few studies have criticized the overuse and misuse of significance tests in the life sciences. I try to argue that it is appropriate to use significance tests here to examine the assignment outcome.

Second, people may doubt that chance-equality arguments are not as objective and valid as real random processes. Response: by the cases of modified-randomization, it can be shown that using random process alone also encounters problems in practice, that is, a trade-off between chance-equality and outcome-equality. The random process has to be manually altered when the assignment outcome cannot fulfil the goal of outcome-equality. Therefore, randomization in practice is not only a simple “objective” random process, rather, it is under supervision and open to alteration.

ROOM 12

(FTTIC)
Symposium: Foundational Theories, Truth, and Implicit Commitments

Chair: Cezary Cieśliński

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: When working on the foundations of mathematics, agents are committed to several foundational theories. The so-called implicit commitment thesis (ICT) claims that rational agents accepting a theory S ought to be committed to several statements independent from S but somewhat implicit in the acceptance of S. This symposium focuses on two types of implicit commitments: semantic and epistemic. Consider a foundational theory S:

Semantic commitments are all the restrictions on the class of the possible interpretations of S. Epistemic commitments are all the statements we should accept given the acceptance of S.

The philosophical literature has focused on two main projects about implicit commitments: Determining a boundary to those implicit commitments and providing a philosophical analysis and investigation of the concept of implicit commitments. This symposium aims to overview the most recent formal results about the extent of (ICT) and to present its philosophical and epistemological analysis, and it is divided into two parts.

The first half of the symposium investigates the Tarski Boundary programme: within the investigation of (ICT), this programme characterises the impact of adding specific truth-theoretic principles to the compositional truth over our base foundational arithmetical theory S, known as CT^-

[S]. In particular, while CT^-[S] is conservative over S - it proves the same arithmetical theorems as S - the programme aims to determine which principles yield a non-conservative extension of CT^-[S] thereby being outside of the Tarski Boundary.

The first talk of this symposium investigates the principle of disjunctive correctness (DC), stating that a disjunction of arbitrary length is true if and only if one of its disjuncts is true. The author shows an important asymmetry: adding the left-to-right direction of (DC) to CT^-[S] results in a non-conservative extension, whereas the right-to-left direction of (DC) is conservative to CT^-[S]. The second talk analyses the collection scheme, stating that a definable function applied to a bounded set of numbers has a bounded image. The author demonstrates the conservativity of this principle.

The second half of the symposium provides a philosophical and epistemological analysis of (ICT). The third talk of the symposium considers the implicit commitments triggered by a weaker notion of acceptance of a base theory, namely that of an instrumental acceptance. As a case study, the authors investigate this question within the context of Reinhardt's instrumental justification of the truth theory known as Kripke-Feferman (KF). Relatedly, the last talk provides a purely epistemological argument for (ICT). Focusing on the consistency of foundational theories, he argues that the rational acceptability of the consistency of S follows from considerations about the epistemic dependence between higher-order and first-order evidence: the rational acceptance of the consistency of S is necessary for both having justified, first-order acceptance of the S-theorems, and also to make rational, higher-order claims about what we rationally accept. The symposium makes some crucial steps towards a full characterisation and a better understanding of implicit commitments of foundational theory.

Speakers:
1) Matteo Zicchetti: Implicit Commitment Thesis and the Acceptability of Consistency
2) Cezary Cieśliński: The strength of disjunctive correctness
3) Bartosz Wcisło: Truth and the collection scheme
4) Maciej Głowacki and Luca Castaldo: Implicit commitments of Reinhardt's Program

14:30 – 15:00

Matteo Zicchetti (University of Warsaw) - Implicit Commitment Thesis and the Acceptability of Consistency.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: What is the epistemological status of the reliability of our theories? An instance of the implicit commitment thesis (from now on ICT) is that agents ought to be committed to the reliability of any theory S that they rationally accept. For example, agents accepting S ought to be committed to the consistency of S. ICT has been supported by many philosophers (recently in [6] and [5]. For scepticism about ICT see [2].) Most of the work in philosophical logic has been about determining the extent of the commitments implied by ICT employing logico-mathematical tools. Despite the intuitiveness of ICT, it seems to be at odds with general meta-mathematical results. From the Incompleteness Theorems, we know that for any natural and expressive enough consistent theory S, the formal statements expressing the reliability of S are logically independent of S; S alone cannot justify the acceptance of such claims. Due to this limitative result, philosophers have been interested in providing purely epistemological arguments for ICT (for work in this direction see [3], [4] and [7].) This talk provides a novel epistemological argument for ICT. I investigate the epistemic dependence between the acceptability of theorems of a (foundational) theory S and the existence of higher-order evidence for the reliability of S. (This is connected to work in [1].) I will argue that there is a specific dependence between reasons to believe the reliability of S and reasons to accept S theorems. The

commitment to the reliability of S is implicit in the acceptance of S precisely in the following sense: (if one has any doxastic attitude towards S) to believe that S is reliable is necessary for beliefs in S theorems to be justified. I will also show that the same holds concerning our rational claims of justified belief in S theorems. I will show that, in this sense, to believe that a foundational theory S is reliable is an epistemic obligation of any rational agent accepting S.

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15:00 – 15:30

Cezary Cieśliński (Faculty of Philosophy, University of Warsaw, Poland) - The strength of disjunctive correctness.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: The proposed topic is a part of a more general project of investigating the so-called Tarski boundary. It is known that the truth theory CT−, whose axioms contain the familiar Tarski's compositional truth principles (for example, a compositional axiom for negation of the form "For every ϕ, the negation of ϕ is true iff ϕ is not true") but no induction for formulas of the language with the truth predicate, conservatively extends its background arithmetical theory. The aim of the Tarski boundary project is to investigate the strength of extensions of CT−, with the boundary in question being the one between conservative and non-conservative extensions of CT−.

One of the natural principles which can be added to CT−is the disjunctive correctness principle (DC), which states that a disjunction of arbitrary length is true if and only if one of its disjuncts is true. At first sight, the principle seems an innocent generalization of the familiar compositional truth axiom for disjunction ("A disjunction of two sentences is true if and only if one of them is true"). However, since the generalized version applies to disjunctions of arbitrary length, in non-standard models of arithmetic it can be applied also to disjunctions with non-standardly many disjuncts.

Ali Enayat and Fedor Pakhomov (see [1]) demonstrated that adding (DC) to the classical compositional truth theory CT− permits to prove Delta_0 induction for the language with the truth predicate, hence it produces a non-conservative extension of the background arithmetical theory (for the non-conservativity of Delta_0 induction, see [2]).

We will present the proof of a stronger result. Let (DC-Elim) be just one direction of (DC), namely, the implication "If a disjunction of arbitrary length is true, then one of its disjuncts is true". We will demonstrate that already (DC-Elim) carries the full strength of Delta_0 induction; moreover, the proof of this fact is significantly simpler than the original argument of Enayat and Pakhomov. On the other hand, it transpires that the principle (DC-Intro), which is the opposite direction of (DC)

(namely, the implication if a disjunction has a true disjunct, then it is true), can be conservatively added to CT−.

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15:30 – 16:00

Bartosz Wcisło (University of Gdańsk) - Truth and the collection scheme.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Tarski Boundary programme aims to characterise the axioms for the compositional truth predicate which make the resulting truth theory nonconservative over its base theory B.

If U, V are two theories, where U contains V, with the language of V possibly extending the language of U, we say that V is a conservative extension of U if for every sentence A in the language of U if V proves A, then U proves A. In the case where V is a truth theory over a base theory B, this means that the addition of the truth predicate does not enable us to show any new consequences concerning the notions of B which are not available to us in B itself. Tarski Boundary programme, therefore, tries to answer the question which principles of truth ensure that the presence truth predicate tells us something about the non-semantic facts. The philosophical context of the programme and some of its most important results are discussed in [1].

The basic motivation for the question is that if we fix PA as our base theory, then the compositional truth theory for the arithmetical sentences with full induction, CT, allows us to prove consistency of PA (and more) which by Gödel's Theorem is not provable in PA itself. On the other hand, by a theorem of Kotlarski, Krajewski, and Lachlan, CT^-, a theory with full compositional clauses for the arithmetical sentences but without any induction for the formulae containing the truth predicate is in fact conservative. This means that the impact of the truth predicate on the underlying theory depends on whether the formulae containing the truth predicate satisfy the same general principles as the formulae from the base language. Tarski boundary programme tries to understand which general principles can be extended to the formulae including the truth predicate without committing ourselves to new theorems.

In our talk, we would like to focus on the case of the collection scheme. The collection scheme expresses that a definable function applied to a bounded set of numbers has a bounded image. This is one of the possible ways of saying that all bounded sets of natural numbers are finite. This intuition is also the basic idea standing behind the full induction scheme and in fact, the relationship between the two principles were thoroughly analysed in the classical theory of Peano arithmetic and its subsystems.

The theory CT^- + Coll(T) adds to the compositional axioms of CT^- the full scheme of collection applied to the functions defined using truth predicate. In our talk, we show that, as opposed to full induction, CT^- with the full collection scheme yields a conservative extension of PA. This answers in the positive a question posed by Kaye. In our proof, we demonstrate certain new facts about the structure of the models of truth predicates.

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16:00 – 16:30

Maciej Głowacki (University of Warsaw), Luca Castaldo (University of Warsaw) - Implicit commitments of Reinhardt's Program.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: In recent years, we are witnessing the growing interest in the notion of implicit commitments of axiomatic theories. The notion is due to Solomon Feferman and it denotes sentences which are not provable from the axioms of an axiomatic theory Th, but whose acceptance is implicit in the acceptance of Th. Typical examples of such implicit commitments are reflection principles over Th, stating that every theorem of Th is true. The discussion on the existence and scope of implicit commitments focused mostly on a very strong notion of acceptance, namely foundational acceptance. This is an attitude that an agent has toward a theory describing a part of mathematical realm.

However, what about weaker notions of acceptance? In our talk, we analyse the implicit commitments triggered by an instrumental acceptance of a theory. As a case study, we focus on Reinhardt's instrumental justification of the Kripke-Feferman theory of truth (KF).

In the late 70', Feferman devised the just mentioned axiomatic theory known as KF, which characterises the partial conception of truth developed in Kripke's landmark (1975). However, while KF's axioms characterise a partial conception of truth, the theory itself is formulated in classical logic. This discrepancy generates several issues, among which the provability of dubious theorems, such as (T(L)^~L) V (L ^ ~T(L)), for L a liar sentence.

In reaction to these counterintuitive consequences of KF, Reinhardt (1986) suggested an instrumentalist justification of the theory. He argued that some theorems of KF (e.g., some classical tautologies) are a mere instrument for obtaining a 'special' set of sentence. These special sentences are those provably true in KF, i.e., those A, such that KF proves T(A).

In our paper, we investigate the implicit commitments triggered by such an instrumental acceptance of KF. To this end, we use Cieśliński's (2017) framework of the epistemic theory of believability Bel as starting point. We suitably modify Bel in order to model the notion of instrumental acceptance, and provide its formal and philosophical analysis. In particular, we show that the instrumental acceptance triggers some nontrivial implicit commitments and investigate the differences between implicit commitments triggered by different modes of acceptance of KF.

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ROOM 13

14:30 – 15:00

Gregory J. Morgan (Stevens Institute of Technology) - Is virology value-laden?

Topic: C.3 Philosophy of the Biological Sciences

Abstract: The SARS-CoV-2 pandemic has brought virology and epidemiology much scrutiny from the public. This paper examines the multiple ways in which virology is value-laden. As Elliot (2022) points out, values can enter into the process of science in four different ways: steering science, managing science, doing science, and using science. I argue that virology incorporates values in all four ways. There are values involved in choosing which viruses to study, which virology communities to fund, and how to popularize virological knowledge. More centrally, values are necessarily involved in modeling viral pandemics and relatedly values are needed to determine how much evidence is needed before virological findings should inform changes in public health policy. Additionally, questions about whether "gain of function" research should be banned, and more generally, questions about which type of virus research will best generate knowledge that benefits humanity all involve value judgments.

15:00 – 15:30

Andrés Budeguer (Universidad Nacional de Tucumán) - Homology and platonism in Richard Owen.

Topic: C.3 Philosophy of the Biological Sciences

Abstract: The aim of the present work is to examine the concepts of homology and analogy in the thought of Richard Owen (1804-1892). The english anatomist is usually acknowledged by scholars as the one who introduced these notions in the academic field of his time. We will position Owen as the first who defined and characterized these terms clearly, and we will show in which way they became one of the key constructions of his thought.

We will divide our analysis in two parts. Firstly, as we have already advanced, we will characterize the central concepts of analogy and homology. We will provide some examples that we consider relevant, included the ones given in the works of Owen himself. After this first approach, we will identify the subdivisions established by our thinker for the larger category of homology: we are talking about especial, general and serial homology. We will suggest, in this sense, some possible connections between these concepts.

Finally, the second part of our analysis will focus on determining the general character of Owen's thought. We will take into account what we have called "orthodox" interpretation of his system of thought, namely, the one proposed by some scholars of the modern synthesis. By contrasting these postures with our previous analysis we intend to show that the platonism that is attributed to him seems not to be solidly grounded.

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15:30 – 16:00

Raphael Alves Feitosa (Universidade Federal do Ceará), Tibério Sávio Forte Diogo (Universidade Federal do Ceará), Francisco Ecio da Silva (Universidade Federal do Ceará) - Engelsian perspective and Biological Sciences: notes about the "Introduction" to Dialectics of Nature.

Topic: C.3 Philosophy of the Biological Sciences

Abstract: The purpose of this article is to report the result of a document based search about some contributions of Friedrich Engels' work to the study of Biological Sciences, focusing on an exposition and discussion aimed at analyzing the text of the "Introduction" of Dialectic of Nature. Some aspects of the Engelsian manuscript are presented, followed by a brief analysis of the contributions of Engels' perspective to the study of Biological Sciences. Considering the different perspectives of thought that permeate such fields, those linked to historical and dialectical materialism have little space within research centers and universities. Methodologically, this paper is guided through a hermeneutic analysis of the "Introduction" of Dialectic of Nature, associated with the study of the literature that deals with biographical and contextual aspects of the production of the Engels' manuscript. In the book, Engels seeks to develop concepts about the relationship between nature and history, and he concludes that human knowledge is the moment that nature reaches awareness about itself. The German philosopher properly investigated the conflict between the dialectical proposal and the mechanistic ideology in sciences, seen as reductionist and positivist, which dominated the academic and intellectual field. In the Engelsian analysis, the advancement of scientific thought already allowed one to see the foundations of an objective base, whose architecture should no longer consider phenomena and their reflections in thought. The result of this research mainly points to the importance of analyzing the transformations that the Biological Sciences have undergone over time and the need for a more critical approach to it. Furthermore, a brief reference was made to some central elements of the Engelsian dialectic, such as the law of transformation of quantity into quality and the principle of the negation of negation. Another characteristic of the Engelsian dialectical analysis of natural science is associated with the category of totality. The intrinsic movement of nature, in the view of the German thinker, demands a less fragmented view of knowledge, since the understanding of its phenomena lacks an interconnection between the different branches of production of knowledge and scientific work. To endorse his dialectical vision, Engels discusses recent scientific findings regarding the development of matter, the movement of masses and energy in the solar system, the developments that generated the stars and planets, entering into the study of

organic matter and the Earth in primitive atmosphere, reaching the development of the essential functions of life, in addition to the evolution of hominids. In the Engelsian perspective, the science of his time made an immediate analysis of phenomena. In fact, they were mediated by other facts, which can no longer be seen as independent and absolute, but were actually dependent on a system that determined them. The results show that the manuscript brings interesting contributions to think about the historical changes in Biological Sciences, as well as the philosophical aspects underlying the approach to dialectical and materialistic knowledge base.

16:30 – 17:00	COFFEE BREAK

AUDITORIUM 2

(HUM) From previous time slot, same room.
Symposium: From Latin America to Europe and Back. A Symposium Dedicated to the Philosophy of C. Ulises Moulines

17:00 – 17.30
Cesar Lorenzano (UNTREF) - Ulises and I, a long philosophical and personal friendship.

Topic: B.1 Methodology

Abstract: The invitation to participate in the homage to Ulises had -for me- the curious consequence of making me see the inexorable passage of time. Until this moment, Ulises was still in my memory as a young man barely 29 years old, a young Doctor of Philosophy hired by the Philosophical Research Institute – IIF- of the UNAM, that I met when I was leaving my apartment in the Torres de Mixcoac in Mexico DC, to go to the Faculty of Philosophy, in search of my destiny in the country where I arrived escaping from the genocidal massacre of the Argentine dictatorship. Of course, I knew that forty-seven years had passed since July 1976, and that since then we had shared daily and professional lives on multiple occasions. However, the memories of subsequent encounters do not always detach from the images of that first year, when we discovered that we had similar concerns.

For this reason, and perhaps because I feel that this may be the last time we will be together, I am going to begin my story in that moment, when we became friends.

17:30 – 18:00
Ulises Moulines -
Reply to the communications

ROOM 02

17:00 – 17:30

Daniele Cavalli (ÉCOLE NORMALE SUPÉRIEURE DE PARIS - PSL RESEARCH UNIVERSITY) - Re-framing Agency and Autonomy in the Time of Brain-Inspired Computing and the Quantum. A New Materialist Outlook.

Topic: C.6 Philosophy of Computing and Computation

Abstract: We are witnessing an impressive development of ''autonomous'' and ''intelligent'' systems. The boost in GPU capacity has led to the use of increasingly complex machine-learning algorithms and advances in quantum computing promise unprecedented acceleration of processing power. Taking into account the recent deep learning revolution and the diffusion of brain-style computing, it can be said that AI technologies challenges the human in a more profound way, especially in simulating human mental functions beyond pure logic.

A new paradigm is emerging where computer engineering and neurosciences work together to integrate bio-inspired principles within algorithms and hardware. Research in neuromorphic computing systems is indeed becoming a key area. Different from Von Neumann computer, brain-inspired systems use combinations of different approaches employing massive parallelism. A new frontier in AI development in which many are pinning their hopes in reason of the possibility of changing the way we process and store data, especially in terms of energy efficiency.

Thus, we are living in a momentum of an even more radical entanglement between human and machine agency, carbon-based brains and artificial neural networks. In this scenario, the so-called new materialism incorporates fruitful consideration of non-human entities in relational assemblages in which agential capabilities expand beyond the human subject, providing theoretical tools for reframing the accepted notions of agency and autonomy, as to conceptualize the material-informational entanglements active in computing.

In this variegated universe, quantum field theories stand out as benchmarks. They help to reconfigure our analysis at any level of abstraction refusing ethical, ontological, and epistemological imaginaries implicitly related to the Newtonian-Cartesian understanding of reality. Indeed, the keystone is the ontological inseparability of intra-acting agencies: reality is not made of entities but entangled phenomena. This assumption allows us to re-think agency as not an inherent property of an isolated human user-observer but as a dynamism of forces that also involve non-human actors, which may act not only as agents but also as principals. And this perspective goes further than conceptualizing hybridity (e.g. actor-network theories). Refusing substantialist and dualist positions, it pushes to go beyond the everlasting idea of a rational and autonomous subject independent from matter performativity.

Against reflexivity and epistemic certainty, diffraction becomes a challenging methodology: phenomenon would be conceived as the mutual entanglement of the observed and the agencies of observation. It follows that the status of human agency in face of advanced computing systems should be conceptualized as layered and textured clusters of agents, avoiding thinking in terms of relations among entities with fixed properties.

Finally, this contribution aims 1) to show the theoretical fruitfulness, and the possible limits, of more than human notions of agency and autonomy in front of advanced AI systems; and 2) it asks: what ethical-onto-epistemological implications does a new materialist approach have with respect to the current development of brain-inspired computing and neuromorphic technologies? How can thinking about material-informational entanglements and the agential capabilities of non-human actants reframe the way we conceptualize the interaction between human and current AI technologies?

17:30 – 18:00

Ariel Jonathan Roffé (CEFHIC-UNQ-CONICET, UBA) - Building the CLMPST 2023 Schedule Using Phylogenetic Algorithms.

Topic: C.6 Philosophy of Computing and Computation

Abstract: There are a number of existing approaches to schedule building/optimization in the literature (Oude Vrielink et al., 2019). In this presentation, we describe how the CLMPST 2023 schedule was built using phylogenetic algorithms.

In a sense, the problem is similar to the one faced by phylogeneticists when trying to reconstruct ancestry relationships between a set of species (see, e.g., Goloboff, 2022). The number of possible solutions (i.e., trees/cladograms in one case, possible schedules in the other) becomes astronomical when considering an interesting number of organisms/papers. There are also conflicting requirements (i.e., primary homology statements that group the organisms differently; the requirements mentioned above) that can be weighted differently (e.g., by a priori and/or a posteriori weighting schemes). Thus, a number of heuristic algorithms used by phylogeneticists (random addition sequences, swapping methods, etc.) to find optimal trees were applied to the schedule-building problem. These algorithms will be described in more detail and shown to work during the presentation.

The main idea for this work came from a formal reconstruction of cladistic/parsimony methods, a classical methodology in the philosophy of science (Roffé, 2020). Looking at these methods in an abstract fashion highlighted the similarities mentioned above. Thus, the utilization of those methods' techniques will also serve as an illustration of the advantages that formal reconstructions can bring to the fore.

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ROOM 05

(KUHN2) From previous time slot, same room.

Symposium: History of Science, Philosophy of Science and Historiography

17:00 – 17:30

Victor Garay (UBA) - The historian of science as ethnographer. Incommensurability and hermeneutics.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: Since its initial formulation in The Structure, the concept of incommensurability has opened an incessant debate around comparability, rationality and translation. As is well known, Incommensurability metaphorically alludes to the lack of a common unit of measurement that allows translation between theories, understood as sets of statements, without any remainder or loss. From this point of view, comparisons are possible, but there is no common language that guarantees a complete translation.

It is possible to recognize in Kuhn a strong thesis, in his original proposal, and a weak or attenuated one in his later reformulations. Throughout the 1980s and early 1990s, Kuhn defended the idea of local incommensurability, privileging semantic aspects and focusing on the divergences of structures and categories that reflect the languages associated with the paradigms. Thus, compared paradigms are partially incommensurable.

The non-translatable areas from one language to another correspond to terms associated with inconsistent lexical categories and taxonomies. It is here where Kuhn will emphasize the difference between translation and interpretation, opening the task of comprehension as a work of holistic capture in the face of conceptual disparity.

Based on the above, we will argue that the task of the historian of science consists of an ethnographic approach to the paradigms to be interpreted. The conceptual network, the vocabulary and the relationship with the environment would require a hermeneutic task, the latter understood as an interpretive effort that tries to capture the use of untranslatable terms within a lexical network.

Kuhn himself points out in the first of the Talheimer Lectures that the task of historians of science is to explain, describe and often discover how ancient theories could be accepted as the basis of scientific practice. The historian or historian describes the world in which the scientist of the period addressed believed. Making the studied texts intelligible and being able to communicate them requires an ethnographic approach that can account for the way in which scientists used a set of interrelated terms and that, once learned, structure the experience in a different way from the paradigm from which it is addressed. Interpretation, rather than translation, would be the key to avoiding ethnocentrism, i.e., a Whig approach to the texts with which the historian works.

We have called the effort to understand the ways of dividing and categorizing the world used by other “cultures” the “ethnographic approach”, and here the learning of the native language and the hermeneutic task are key.

17:30 – 18:00

Leandro Giri (Universidad Nacional de Tres de Febrero / Consejo Nacional de Investigaciones Científicas y Técnicas), Matías Giri (CEFHIC - Universidad Nacional de Quilmes / Universidad de Buenos Aires) **- A structure for history: reflections from Kuhn’s historiographic studies.**

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: In this paper we propose a reconstruction of Thomas Kuhn's historiographical programme with an apologetic aim: we will defend its relevance from the attacks of the "history of contingencies", a school represented in the position diagrammed by Lorraine Daston (2016). Daston's proposal asserts that the Kuhnian historiographical programme of professionalising the history of science (moving it towards history departments to the detriment of science departments) has been fulfilled but has resulted in the abandonment of the Hegelian spirit from Kuhn's historiography, i.e. the search for a "structure" of the history of science has been abandoned. According to Daston, the esoteric work on historiographical sources has led to the generation of a history of science that does not seek patterns of theoretical change, but instead produces “contextual” narratives focused in practices in which historical episodes are unique in their kind, i.e. contingencies. We are not interested here in questioning whether the academy of the history of science has indeed abandoned the search for

structures in favour of the analysis of contingencies, but rather in defending the relevance of Kuhnian historiography of science, in particular the fertility of a programme that seeks structural patterns in the history of science. To this end, we propose to: a) present a synthetic but refined version of Kuhnian historiography, complementing the usual reconstructions with work on previously unpublished Kuhnian lectures that have been published very recently. b) reconstruct Daston's criticisms of the notion of "structure" and its relevance for historiographical work, as well as the supposedly superior fertility of a history of contingencies. c) to propose a notion of "structure" that is compatible with Kuhnian historiography (but also with the concerns of general philosophy of science, especially about the ways in which theoretical change actually happens), and d) to show the ways in which a historiography of science sustained in such a (meta)theoretical framework is progressive, not only for the history of science but also for the philosophy of science, as originally claimed by the "new philosophy of science", which emerged after the publication of Structure in 1962.

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ROOM 06

17:00 – 17:30

Marta I. González (Universidad de Oviedo), Natalia Fernández-Jimeno (University of Oviedo) - Post-normal science and the New Demarcation Problem: Some insights from feminist philosophy of science

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: The heated debate on values and science that confronted “reasons” and “interests” in the philosophy of science during the 1980s and 1990s has since then been converging towards more nuanced stances that recognize the necessary role that non-epistemic values play in all science. However, this recognition leaves unsolved the issue of when the influence of these values is legitimate and when they act illegitimately, a discussion that has recently gained presence in the field, to such an extent that some authors already speak of a "New Demarcation Problem" (Holman and Wilholt, 2022).

We will defend that the New Demarcation Problem is particularly relevant in cases of what Funtowicz and Ravetz (1993) have termed "post-normal science", a particular scientific problem-solving strategy where we find uncertain facts, values in dispute, high stakes, and urgent decisions. In post-normal contexts, Funtowicz and Ravetz argue, a new framework of "soft facts and hard values" arises, because in the face of the high levels of scientific uncertainty, strong value commitments turned out to be central for any decision adopted, ideally reached upon through dialogue in “extended peer communities”.

In this contribution we will argue that feminist philosophy of science literature on the “bias paradox” —the rejection of the value-free ideal while some value-laden knowledges are defended— (Anthony, 1993) may offer some insights into the problem. General strategies proposed to solve the “bias paradox” in feminist empiricisms (Rolin, 2021) will be shown alongside those offered so far for the New Demarcation Problem, identifying their strengths and weakness. Through this discussion we

will consider the need to clarify the New Demarcation Problem and point towards the possibility that the best approach for its solution may depend upon the scientific "problem-solving" strategy involved (according with Funtowicz and Ravetz's classification: core science, applied science, post-normal science).

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17:30 – 18:00

Chris Mitsch (University of Pittsburgh) - Misinformation and the reporting of external validity

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Philosophers working to understand scientific misinformation often analyze the "inputs" and "outputs" of the scientific process (e.g., de Melo-Martin and Intemann (2018); O'Connor and Weatherall (2019)). However, except in cases of some degree of scientific misbehavior, the function of the scientific process itself receives scant attention. Using research on false memories as an example, I show that experimental design interpretation deserves further attention. In particular, I argue that the virtuous development, analysis, and interpretation of an experimental design can unwittingly contribute to the spread of misinformation even by responsible public actors when the external validity is under-specified or analyzed in research reports.

The paper analyzes the use of Loftus et al.'s results and reporting thereof (e.g., Loftus and Palmer (1974)) as evidence in conversations about sexual violence. Guided by statistics suggesting that false accusations and overzealous labeling of borderline behavior (e.g., Pew (2022)) are major concerns for those opposed to #MeToo, I analyze several widely-shared popular articles which purport to justify these concerns by appealing to Loftus's research (e.g., Yoffe (2017)). This analysis culminates with a list of the non-expert interpretive claims these articles must make for Loftus's research to be relevant; among others, these claims concern commonalities across acts of sexual violence (e.g., how often the perpetrator is a stranger), the form and function of various investigative and disciplinary bodies (e.g., use of witness testimony, standards of evidence), survivors' reasons for reporting, and the reliability of memories.

Second, I review the language used in the original studies to argue that these interpretive claims are prima facie reasonable—specifically in the sense that a non-expert (e.g., news editor or reporter) cannot dismiss them. Third, I show that these non-expert claims are nevertheless false because Loftus's experimental results either do not generalize to, or are not relevant in, the majority of cases of sexual violence. I further show that many of the claims constitute common myths of sexual violence. Claims directly concerning the reliability of survivors' memories, however, were not myths (yet). Instead, these claims prop up the myths, and they do so via whataboutism that non-experts cannot dismiss using the Loftus articles themselves.

I conclude that we should investigate the viability of setting reporting standards for claims about the external validity of experimental results as a way to support non-expert interpretation. I suggest such standards be considered as part of broader movements to reform IRB review and peer-review.

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Cailin O'Connor and James Owen Weatherall. The misinformation age: How false beliefs spread. Yale University Press, 2019.
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ROOM 07

(MAREP) From previous time slot, same room.
Symposium: The many faces of reduction in physics and chemistry

17:00 – 17:30
Hernán Lucas Accorinti (CONICET- University of Buenos Aires), Juan Camilo Martínez González (CONICET- University of Buenos Aires) - The role of idealizations in the debate about reduction.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: The problem of the reduction of chemistry to physics has taken various forms during the last years –although generally seen as a relationship between disciplines and not between theories–, and is far from being resolved. A relevant aspect to evaluate in this context is the fact that, in general, the discussion about the possibility of reducing one discipline to the other is mediated by the discussion about the direct application of quantum mechanics. However, as is well known, the exact solutions for the hydrogen atom can only be applied to chemical systems thanks to a set of approximations/idealizations that allow chemists to abstract information relevant to the practice of chemistry from mathematical equations. In this sense, to evaluate the effectiveness of the reductive strategy, special attention must to be paid to the type of idealization used to stipulate the intertheoretical relationship. Leaving open the dispute of whether or not an intertheoretical relationship can justify an ontological relationship, we consider that the analysis of the different types of idealization (Morrison 2005, Weisberg 2013) put into play can shed light on this long-standing discussion. Indeed, reductive models are usually thought through limiting cases: for example, the classic strategy to justify the inter-theoretical continuity between special relativity and Newtonian mechanics appeals to the limit $v/c \to 0$, because precisely in that limit both equations agree. In this sense, it is claimed that Newtonian mechanics is nothing beyond a limiting case of special relativisty when bodies move at very slow speeds.

Various authors have questioned the conceptual (not mathematical) legitimacy of such borderline cases. Perhaps the case presented does not present relevant difficulties; but when similar strategies are adopted to justify the continuity between classical mechanics and quantum mechanics, the operation of the passage to the limit is neither so simple nor so innocuous (Batterman 1995, Norton 2012). Precisely, in this paper we will analyze the role of idealizations in the discussion of the

reduction of chemistry to quantum mechanics. In line with the strategy development by Batterman, we will analyze the different types of idealizations in scientific practice in order to argue that the particular limit involved in the Born-Oppenheimer approximation, used to apply the Schrödinger equation to polynuclear systems, is a singular limit and, therefore, the argumentative strategies for reduction are not always satisfactory.

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17:30 – 18:00

Alfio Zambon (Universidad Nacional de la Patagonia San Juan Bosco-Universidad Nacional de Río Negro), Fiorela Alassia (Universidad Nacional de la Patagonia San Juan Bosco), Mariana Córdoba (CONICET-University of Buenos Aires)) - The problem of identity in nanochemistry.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: The great relevance of nanotechnology nowadays can be considered as an opportunity to discuss the ontological status of nanomaterials. In this sense, we intend to contribute to the philosophy of chemistry by considering some unexplored problems arising from the analysis of the nature of nanomaterials.

The classical problem of identity has been extensively discussed in the philosophy of science. It is also a classical metaphysical issue, as well as a logical question, widely considered in the history of philosophy. This problem proves to be particularly relevant in the context of nanochemistry, since nanomaterials −traditionally characterized by means of their longitude scale− are the result of the reduction of particles of a chemical substance up to the nanometric scale, in which the materials show properties that are very different from the properties of the substance at the macro-level. Given this situation, it is important to wonder in which sense we refer to the same items in the macro and the nano domains, being the differences in their properties so radical. How are nanomaterials identified?

In this work we will offer an approach to the philosophical issue of identity in its specific application to the nature of nanomaterials. For this purpose, we will first focus on the metaphysical issue of identity, which involves both synchronic and diachronic identity , and so can be formulated as the problem of what makes an item to be identical to itself –and, hence, the same as itself through time– and different from any other item. Regarding the types of identity, we will recover the classification proposed by Ladyman (2007), who distinguishes between intrinsic identity –the traditional view, which is grounded on intrinsic features of the object, regardless the relations that it maintains with other objects)– and contextual identity –grounded on relations. Afterwards, the problem of identity will be applied to chemistry in order to show how the identity of chemical entities is characterized in different ways in the different levels of the chemical world. Finally, we will draw our conclusions, stressing the relevance of this discussion regarding the issue of the reduction of macrochemistry and nanochemistry to molecular chemistry, since the analysis of the ontological

category of the nano items and of the peculiarity of their identity is a strong counterargument to the supposed reduction.

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ROOM 11

17:00 – 17:30

Federico E. Testoni (Instituto de Lingüística, Facultad de Filosofía y Letras, Universidad de Buenos Aires), Mercedes García Carrillo (Instituto de Biociencias, Biotecnología y Biología Traslacional, DFBMC, FCEyN, Universidad de Buenos Aires), Marc-André Gagnon (School of Public Policy and Administration, Carleton University, Ottawa, Canada), Cecilia Rikap (CITYPERC, City, University of London, UK & Consejo Nacional de Investigaciones Científicas y Técnicas, Argentina), Matías Blaustein (Instituto de Biociencias, Biotecnología y Biología Traslacional, DFBMC, FCEyN, Universidad de Buenos Aires) - Key Actors Of The Global Biomedical Agenda And Its Influence On Argentina's CONICET.

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: Background

Conflicts of interest in biomedical research can influence research results and drive research agendas away from public health priorities. We found two shortfalls in previous studies about this: they only account for direct connections between academic institutions and firms, and they are based on researchers' personal beliefs. Our investigaation's goal is to quantitatively analyze the key actors and contents of the prevailing health and biomedical sciences (HBMS) research agenda, and how they influence research in non-core countries like Argentina.

Methods

As a first step, we performed a bibliometric and lexical analysis of 95,415 globarl scientific articles published between 1999 and 2018 in the highest impact factor journals within HBMS, using the Web of Science database and the CorText platform to proxy the HBMS global research agenda (Testoni et al., 2021). Then, we performed the same to proxy the research agenda of Argentina's Research Council (CONICET) as a prestigious institution from a non-core country (Carrillo et al., 2022). Both proxies were made with network maps. To determine global key actors we assigned nodes to affiliations and to determine the content of the global and CONICET research agendas we assigned nodes to prevalent multi-terms from titles, keywords and abstracts.

Results

About the global research agenda, we found that: (a) the HBMS research agendas of large private firms and leading academic institutions are intertwined, (b) The prevailing HBMS agenda is mostly based on molecular biology, (c) studies on pathogens and biological vectors related to recent epidemics are marginal, and (d) content of the prevailing HBMS research agenda prioritizes research on pharmacological intervention over research on socio-environmental factors influencing disease. And in comparisson with CONICET's agenda, we found (e) simmilarities: terms linked to molecular biology and cancer research hegemonize CONICET's HBMS research agenda, whereas terms connecting HBMS research with socio-environmental cues are marginal; and (f) differences:

CONICET's HBMS agenda shows a marginal presence of terms linked to translational medicine, while terms associated with pathogens, plant research, agrobiotechnology, and food industry are more represented than in the prevailing agenda.

Conclusions

Pharmaceutical corporations contribute to set HBMS's prevailing research agenda, which is mainly focused on a few diseases and research topics. This research agenda shares topics, priorities, and methodologies with CONICET's HBMS research agenda. However, CONICET's HBMS research agenda is internally heterogeneous, appearing to be mostly driven by a combination of elements that not only reflect academic dependency but also local economic determinants. A more balanced research agenda, together with epistemological approaches that consider socio-environmental factors associated with disease spreading, could contribute to being better prepared to prevent and treat more diverse pathologies and to improve overall health outcomes.

17:30 – 18:00

Alahí Bianchini (University of Buenos Aires; Program of Bioethics, FLACSO Argentina) - Ethics and the role of scientific evidence for decision making in a democratic society.

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: In this paper, I will address the duty of States regarding human health research. I will focus on answering the question of what is the most appropriate justification to support this duty and what obligations the state has. Flory and Kitcher (2004) provide a possible answer, stating that biomedical research aims not only to study diseases for which no treatment is available anywhere but also new methods to combat diseases for which the only available therapies cannot be exported to those contexts.

This is a good answer to the question of why all states, even (or perhaps especially) lower-income states, should encourage human health research. However, I believe that in order to ground the duty to research in a general way the model of significant truths proposed by Kitcher can provide an important aspect in grounding the state duty to research for a democratic society. In addition, I will raise two objections to London's model (2022): the objection of the ethical consequences of a scientistic conception of evidence and the objection about the ideal content of theory.

First, the objection about ethical consequences refers to London's notion of evidence, which states that "there is a moral imperative to expeditiously carry out research that will provide the evidence and information necessary" (2022, preface). This view represents a scientistic stance in that it considers that the social aspect only intervenes in the application and not during its production, therefore I intend to analyze the ethical and political implications of the concept of evidence thus used by London and compare it with the concept of scientific evidence and significant truths, proposed by Kitcher (2001), to elucidate in what sense it is relevant for a justification of the state's duty to research.

Second, the ideal theory content that any bioethical theory should have in a non-ideal world is a debate present in ethics (Rivera López, 2013; Rawls, 1999).

My specific purpose is to inquire into the ideal content in the equitable imperative of inquiry proposed by London and to analyze how this approach could be improved by applying Kitcherian theory.

Finally, in the words of Flory and Kitcher (2004), some of the most pressing obligations and most potent contributions to the reduction of suffering belong to members of the biomedical research community. In this paper, I will attempt to define them.

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ROOM 13

17:00 – 17:30

Paul Patton (Institute for the History and Philosophy of Science and Technology, University of Toronto) - Perspectival Perceptual realism.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: There are two traditional positions about the ontological relationship between the external world and perceptual experience. Direct realists maintain that phenomenal experiences are of the external world itself, and indirect realists suppose that our experiences are of an inner intermediary, fashioned by our perceptual systems, and causally linked to the external world. Ecological realists reject indirect realism, and have generally taken their own position to be a form of direct realism (Noë, 2012). Here I argue that a plausible ecological realism has some distinctive features which, when clarified, warrant a different label: perspectival perceptual realism.

Perspectival perceptual realism is derivative of perspectival scientific realism (Giere 2006). In scientific practice, complex systems with multiple levels of organization are typically understood through multiple different but compatible theoretical frameworks picking out different constellations of interrelated features of the system. The ontologies of these different perspectives may be opaque to one another. For example, the functions of the organs of the body are invisible from a cause-and-effect physical perspective, but visible from the organismal perspective typically assumed by biologists, which takes living things to be organisms—organized, adapted systems in which parts sustain the whole by performing functions in relation to it (Walsh, 2015, pp. 186–207). Perspectival realism takes this plurality of perspectives to be a necessary and fruitful feature of modern science.

The direct realist claim that we perceive the external world is implausible from the standpoint of traditional forms of realism that take our physical theories to provide our sole account of the external world. Many features of our phenomenal experience—colors, for example—have no straightforward counterpart in our physical ontology (Thompson, 1995, pp. 104–138). Colors are not visible from the physical perspective. Colors are visible from an ecological perspective that takes perception to be an interaction between a living organism and its environment. Such a perspective takes both the functional properties of the human visual system and the spectral reflective properties of surfaces in the environment to be within its purview. The distinctiveness of colors from one another, and their similarity relationships to one another, can be understood in terms of relationships among and between the functional properties of the human visual system and the spectral reflectance properties of surfaces under ambient illumination characteristic of natural human environments (Thompson, 1995, pp. 137–138, 212–298). Colors, in this sense, are constitutively perspectival. Note that this is not the claim that they are subjective. Living organisms, their functional properties, and the properties of their natural environments are objectively real properties of the world, as understood from the ecological perspective. Colors are properties that things in the world have in relation to the right sort of perceiver.

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17:30 – 18:00

Aaron Glasser (University of Michigan) - Steering Salience.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: Salience pulls an agent's attention. Spontaneously occurring, salience is what recruits attention when content pops into focus. The crack of thunder; an overwhelming odor; a forceful memory. Attention is deployed to each of these salient events, highlighting the variety of features that contribute to salience. Because salience cues attention, it serves as a jumping off point for subsequent cognition, biasing how we interact with the world.

Objects are salient to us (in part) because we need selection tools to navigate an uncertain world, where a number of things could warrant attention. Recently, several articles have argued that this selection mechanism can reflect something evaluable about one's agency. That is, agents can be evaluated on the basis of their salience, what they notice/neglect, and/or their spontaneous cognition in general. Yet, a lingering worry from skeptics creates a tension with this claim: how can we be evaluated with respect to something that spontaneously occurs outside of our control? In this paper, I argue that the tension between our intuitions that 1) agents can be evaluated on the basis of their salience and 2) salience is a passive phenomenon can be dissolved by appreciating how we can change our salience patterns. In other words, I provide an account of attentional control that shows how we can control salience while retaining its passivity, providing a groundwork for evaluability claims, while retaining its phenomenology.

§1 establishes my account of attentional control, which is composed of a probabilistic tendency towards certain thoughts, given one's context, and momentary decisions to assent to/restrain that tendency. §2 introduces the empirical literature on salience and clarifies descriptive claims about the evaluative nature and function of the pre-attentive representations operating in salience—priority maps.

§3 applies my account of attentional control to salience and leverages the empirical literature to articulate the solution to the problem I set out to solve: 1) salience is diachronically controlled by the agent, insofar as it is influenced by an aggregation of past actions of assent/restraint, which function to reinforce/disincentive the evaluative structure of one's priority maps over time. This is because the relationship between one's attending and the evaluative structure of the priority maps that recruits attention is reciprocal. Likewise, this account explains our passive intuition (2), in that a salient event is synchronically passive, insofar as it is determined by a priority map, at a given time, with no contribution from on assent/restraint at that time.

§4 raises objections from intentional and evaluative control. In response to the objection from intentional control, I claim that it leaves us ill-equipped to account for the many of cases we want to explain (e.g. why we can be evaluated for something that spontaneously occurs). With respect to the objection from evaluative control, I highlight the inability to capture passivity and the explicit narrowing of what counts as "salience proper". In conclusion, I discuss the benefits of an account of attentional control that is composed of many micro-decisions that shape how we see.

THURSDAY, JULY 27TH

9:30 – 10:30	INVITED SPEAKER: MARÍA CAAMAÑO

AUDITORIUM 1

INVITED SPEAKER
María Caamaño (Universidad de Valladolid)

Empirical underdetermination: A bigger problem for the social sciences?

Chair: Agnes Bolinska (University of South Carolina)

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: Theoretical underdetermination is a central issue in the philosophy of science, whose discussion has developed from the early 20th century. The so called "Duhem-Quine problem" has been used as an umbrella term to refer to several problematic features emerging from the lack of a biunivocal correspondence between theory and evidence. However, the now familiar idea that the detection of an empirical phenomenon is inferred from a complex collection of data (Bogen & Woodward 1988, Woodward 1989, McAllister 1997, Glymour 2000, Harris 2003, Massimi 2007) entails the recognition that not only theories, but also the description of empirical phenomena are underdetermined by evidence. Empirical underdetermination, understood as the underdetermination of empirical phenomena by data, emerges as a major challenge still to be fully acknowledged and carefully approached in the philosophy of science.

To face this challenge, it is essential to be able to identify the multilevel theoretical assumptions underlying the production of data models and thus the inference to empirical phenomena. Despite the many difficulties, this kind of analysis has already been attempted with some success in the case of the natural sciences (Kaiser 1991, Leonelli 2019, Bokulich 2020, Antoniou 2021), where background knowledge about instruments and empirical procedures is often explicitly available. However, the situation seems quite different in the case of the social sciences, where the opacity of instruments (Borsboom et al. 2009) and the highly conjectural nature of background assumptions, renders the challenge of empirical underdetermination more dramatic.

AUDITORIUM 2

9:30 – 10:00

Justin Tiehen (University of Puget Sound) - Epistemic Credit & Causal Responsibility

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: In recent years, two different camps of philosophers have explored a notion of epistemic credit. Traditional virtue epistemologists have done so while so while arguing that there is a form of epistemic value attached to credit that is distinct from the value of truth (e.g., Sosa, 2003). Formal social epistemologists have done so while arguing that science operates via a credit economy in which science as a field is best served when individual scientists pursue credit rather than truth alone (e.g., Zollman, 2018). In this paper I try to connect these two traditions, offering a way to formalize some of the intuitions that have guided virtue epistemologists, while also providing a way to understand how scientists pursuing credit can be epistemically virtuous.

The key to my proposal is a certain understanding of causation and causal responsibility. Ernest Sosa (2003) proposes that epistemic credit has an essential causal ingredient: an agent earns epistemic credit by virtue of the causal contribution that agent makes to their acquisition of a true belief. In a critical discussion of Sosa's view, Jennifer Lackey (2007) argues that in certain cases of testimony, an agent can acquire true beliefs without it being much to that agent's credit, if the causal contribution the agent makes is not "salient." My proposal is to analyze these and other causal claims advanced by virtue epistemologists in terms of the framework of causal modeling developed by various authors, including especially Joseph Halpern (2016). The guiding idea is that, ceteris paribus, an agent earns a greater degree of epistemic credit for a true belief, the greater the agent's degree of causal responsibility for bringing their true belief about, where degrees of causal responsibility are understood in terms of Halpern's account.

I then bring this proposal to bear on formal social epistemology by connecting it to Philip Kitcher's (1990) classic discussion of the division of cognitive labor. I explain how a group of scientists pursuing epistemic credit, as it is understood on the Halpern-inspired model, would figure to generate intellectual diversity. The key is that there can be competition for causal responsibility, since, for example, the more scientists who join a research project, the less causal responsibility any individual scientist has for the results, ceteris paribus. I also argue that agents aiming to maximize their expected epistemic credit can be understood as epistemically virtuous rather than vicious if we understand epistemic credit as a distinctive kind of epistemic good, in the way virtue epistemologists do.

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10:00 – 10:30

Cailin O'Connor (UC Irvine), James O Weatherall (UC Irvine), Aydin Mohseni (University of Pittsburgh, Center for Philosophy of Science) - The Best Talk You'll Hear Today: Media Biases and the Public Understanding of Science.

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: The total body of evidence available at a time, as created and synthesized by scientific communities, is the best basis for scientific knowledge. But public beliefs about science are rarely formed on the basis of that total body of evidence. Instead, the public gains access to science via curators---individuals, organizations, or, increasingly, algorithms that select research outputs to share, popularize, review, or amplify. Examples of curators include science journalists, museum curators, textbook writers, policy advisors, industrial propagandists, and social media platforms, among others.

Curation of some sort or another is inescapable in the spread and sharing of scientific knowledge. How curators go about this process, though, crucially shapes public belief. Here we consider science journalism in particular. This one of the main processes by which the public learns about science, and it is governed by a set of norms, rules, and incentives which shape public belief. We use computational models to assess whether these curatorial practices should tend to promote good epistemic outcomes.

Our models use probability distributions to represent 1) evidence from the world, 2) reporting on that evidence, and 3) public belief in light of this reporting. We assume that real-world events are sampled from some fixed, unknown distribution. Journalists select some of these events to report, thereby producing a new distribution of reported events. Members of the public update their beliefs in light of this reported evidence. We then compare our agents' posterior beliefs about the world with the actual distribution of events to see how beliefs are shaped by reporting practices. As we will show, modelling of this sort is a useful tool for demonstrating how and when otherwise ideal learners will develop poor beliefs as a result of curation.

We focus on three practices. One is hyperbole where journalists exaggerate claims to garner attention. The second is extremity bias which involves cherry-picking surprising, novel, or extreme events to report. The last is fair reporting---the practice of presenting equally weighted evidence from two sides of some issue irrespective of where the preponderance of evidence lies. In addition, we consider how these practices interact with confirmation bias, the widely documented tendency for individuals to prefer evidence that supports their beliefs.

These models yield a series of take-aways. First, all three biases can lead to distorted beliefs. Second, current misunderstandings in public belief can drive these journalistic distortions, thus creating negative feedback effects. This happens when current, inaccurate beliefs shape what is considered extreme, or fair, and thus drive selection of misleading reporting. Third, in the presence of confirmation bias, both extremity bias and fairness are very harmful to the beliefs of media consumers. This is surprising because both practices involve selecting true events to report, which is often considered relatively innocuous compared to lying or exaggeration. Last, both fair reporting and extremity bias can lead to polarization in the presence of confirmation bias.

ROOM 01

(MTI)
Symposium: Models, Theories, and Idealizations

Chair: Alejandro Cassini

Topic: B.1 Methodology

Abstract: The practices within the normal theoretical sciences do not consist in inventing comprehensive theories, such as general relativity or quantum mechanics, but rather in building models, whose domain of application is restricted to some selected phenomena. There is no consensus among the philosophers of science concerning how to identify either models or theories. In turn, scientists often tend to use both terms indistinctly. Consequently, there is no agreement on how theories and models relate to each other. We do not have at our disposal the necessary and sufficient conditions to identify scientific models. Moreover, the term is polysemic and is employed in different sciences with different meanings. Among the objects called models, we can find concrete physical entities such as prototypes, icons, maps, and scale models, as well as abstract entities such as systems of equations or computer programs and simulations.

We do not intend to address here the issue of the ontology of scientific models; instead, we endorsed the pragmatic or functional approach to the study of models. This consists in analyzing the practices of modeling in the sciences and distinguishing the different functions that models fulfill in definite contexts. More specifically, we will focus on how models are idealized or deidealized according to the needs of solving well-posed problems.

Speakers:
1) Alejandro Cassini: Should models be deidealized?
2) Santiago Ami Diaz Biglia: Idealizations as correlates of the world.
3) Cecilia Hidalgo: Interpreting climate models: Lessons from seasonal forecasting meetings in Argentina.
4) Rodrigo López Orellana: Target systems and the role of surrogative reasoning in the internal process of scientific modeling.
5) Juan Redmond: Modeling in science and surrogative reasoning: An interactive and dynamic perspective on hypothesis generation in the practice of scientific modeling.

9:30 – 10:00
Alejandro Cassini (Universidad de Buenos Aires) - Should models be deidealized?

Topic: B.1 Methodology

Abstract: According to realist-oriented philosophers of science, deidealized models provide better approximations to the phenomena and, consequently, more realistic descriptions, and deeper explanations of them. In this view, scientists should deidealize their models as much as possible, if they aim at obtaining truthlike descriptions of the phenomena. By contrast, those philosophers who endorse a more pragmatic approach to the scientific practice tend to assess the costs and benefits of deidealizing considering the purposes for which the models are built. From this point of view, deidealizing a model may be counterproductive because deidealized models are generally more complex, and sometimes mathematically intractable, than simpler and highly idealized models.

In recent years, there have been several controversies concerning the very possibility of deidealizing models and the costs and benefits of deidealization. It cannot be any doubt that deidealization is possible because we have enough examples of deidealizaed models, for instance, the different models of the physical pendulum (Morrison 2015, Cassini 2021). However, several

philosophers of science -such as Batterman & Rice (2014) and Rice (2018, 2019)- have recently claimed that idealization is a rather holistic procedure. According to them, most idealizations are introduced globally into a model to allow for the application of mathematical modeling techniques that would be otherwise inapplicable. Such global idealizations then cannot be removed without impairing the explanatory power of the model, or even without destroying the model as a whole. In a similar vein, others -such as Knuuttila & Morgan (2019) and Carrillo & Knuuttila (2022)- have supported this view concerning holistic idealization ppointing out that, in many cases, scientific models are not decomposable into independent parts, which could be edited and corrected.

I will argue that several questions must be distinguished. First, whether a given model can be deidealized or not, that is if deidealizing is possible at all. Second, whether we know how to deidealize that model. Third, if different possible ways of deidealizing a model are feasible. And fourth, whether deidealizing that model is convenient or not considering the purposes for which it was built in the first place. I will conclude that these questions are mutually independent and that, in different contexts, they may have different answers.

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10:00 – 10:30

Santiago Ami Diaz Biglia (University of Buenos Aires) - Idealizations as correlates of the world.

Topic: B.1 Methodology

Abstract: The study of idealizations is a particular case of the study of models. Since, perhaps the first important presentation on the subject, Nowak (1979) and the famous classification and study of idealizations by McMullin (1985), those began to be studied with considerable interest. I believe the interest is also based on the fact that they abound in all kinds of models and are disseminated throughout science in such a way that we cannot get rid of them, as Potochnik (2017) has argued. As much as this last statement may seem exaggerated, it is true that idealizations are pervasive in every science and that models cannot be conceived of without them: all models are idealized to some degree.

From the point of view of their ontology, we can quickly summarize that idealizations are either abstractions or distortions of the phenomena of interest (Cassini, 2021). From the methodological point of view, idealizations are studied for their capacity of representation or for their pragmatic qualities, that is, their introduction is determined by the uses and purposes of the modelers.

This is known as the pragmatic approach to modeling. As can easily be seen, there are two positions in dispute: either one is realistic about idealizations, since they represent features of the real world in some way or another, or one is a pragmatist, since the most important thing is what use or purpose they are useful for.

What we will try to sustain in our presentation is that idealizations always are a correlate of "reality", even in the cases in which we consider that idealizing means abstracting properties of the phenomena. This way of understanding idealizations also encompasses pragmatic approaches because regardless of the purposes, they are always linked in some way to the phenomena to be studied. In fact, if we had no knowledge at all about a given phenomenon, how could we idealize anything? Does not idealization mean that knowing the basic features of the real phenomenon is responsible for being able to idealize it? If you did not have that correlate in the world, what could you idealize? Our position is to claim that one only idealizes something about which previously has some notion. Otherwise, the process of idealizing would be impossible. In this way, idealizations have a correlate in the world.

We will take the case of the ideal gas model as an example to explain that despite the distortions or abstractions that this simplified model may have, the idealizations have their raison d'être in real gases.

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Symposium continues in the same room, next time slot.

ROOM 02

9:30 – 10:00

Gabriel Vallejos-Baccelliere (Universidad de Chile), Davide Vecchi (University of Lisbon) - Explanation, causality and perspectives in the protein folding problem

Topic: C.3 Philosophy of the Biological Sciences

Abstract: Proteins are central components in the functioning of all known organisms, carrying out functions such as catalysis, regulation of cell processes, transport, movement signaling, body constitution, etc. These macromolecules are linear sequences of amino acids that are synthesized as random coils inside the cells, but to realize their function they must get folded into a specific compact 3D structure, what is called its “native state”. Despite the vast number of possible arrangements that a protein chain may acquire, during folding only a very restricted set is selected, leading to stable, soluble, and functional 3D structures that are generally acquired in seconds. The general question about how polypeptide chains reach their final native structure so quickly and maintain it in a given medium is called the protein folding problem (PFP), which remains one of the foundational problems of biochemistry since its first formulation in the 50s. Notably, despite all the theoretical and

experimental work that has been done in the field, the problem remains unsolved and disagreements within the scientific community haven't ceased [1,2].

In this work, we intend to provide a philosophical analysis of the PFP focusing our attention on explanatory practices. Among its plurality, two main approaches with different commitments and epistemic aims can be distinguished: A Thermodynamic approach and a Kinetic approach. The first is concerned with the stability of conformational states in terms of free energy differences, while the second is concerned with the temporal development of protein chains and the transient stages leading from one state to another. Although both approaches are tightly intertwined in biochemical practice, there exist important clashes between them, which have had repercussions on the development of the field and still nurtures a vigorous debate within the scientific community.

Both approaches largely agree about which are the parts and activities in which the phenomenon under study must be decomposed but, as we will argue, differ considerably regarding the causal nature of their explanations, the explanatory relevance assigned to different aspects of the phenomena under study, and some underlying metaphysical assumptions concerning the nature of the entities under study. By analysing the historical development of the field and recent debates within it, we will show how each of these three aspects engenders disagreements when interpreting experimental results or seeking explanations of agreed features of protein folding phenomena.

Finally, we will show that, despite these problems, a high explanatory success has been achieved for a vast number of particular cases. But, when pursuing a general theory of protein folding, the manifestation of the clashes between the two approaches has resulted in a proliferation of divergent and difficult-to-integrate perspectives about the phenomenon.

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10:00 – 10:30

Karina Alleva (CEFHIC-UNQ-CONICET, IQUIFIB-UBA), Sergio Barberis (CEFHIC-UNQ-CONICET, UBA, UDESA), Santiago Ginnobili (CEFHIC-UNQ-CONICET, UBA), Ariel Jonathan Roffé (CEFHIC-UNQ-CONICET, UBA) - Functional Attribution in Biochemistry and Molecular Biology.

Topic: C.3 Philosophy of the Biological Sciences

Abstract: The exponential accumulation of sequenced genomes and gene products, and the study of their biological roles, has raised concerns about communication among members of the scientific community. This, in turn, has led to philosophical discussions in the field, many of which have been raised by the same practicing scientists (e.g., Greenspan, 2011). These include the need for a consistent use of functional language and of a proper metatheoretical understanding of functional attribution.

Traditional accounts of biological function have sought to explicitly define the concept of function. Although not everyone agrees that this is possible (e.g., Neander, 1991), explicitly defining the concept implies finding a unified set of necessary, sufficient and operational conditions for an effect of a trait to count as a function. Since defined concepts are eliminable, providing such a definition in terms of non-functional concepts may be tempting if one has metaphysical concerns about teleology.

In recent years, a number of authors have advanced pluralist positions, arguing that different concepts of function are used in different contexts. Some have held that pluralism occurs between disciplines,

while others have argued that even within a single discipline different notions of function are sometimes at stake (e.g., Cusimano & Sterner, 2019).

In this talk we will attempt to reframe the debate about whether a single or multiple concepts of function are used in molecular biology. Our approach will be to treat functional language similarly to the language of any other scientific field. In this sense, we expect to find what the logical empiricists knew from early on: that theoretical concepts are neither explicitly definable nor eliminable (at least by their criteria of determination, see Hempel, 1958). We will leave aside metaphysical concerns about teleology and focus only on the way in which functional attribution takes place.

Following Olmos (2018), who has studied the operationalization criteria for functions in ethology, we will analyze some case studies from molecular biology and biochemistry to show that a heterogeneous collection of evidence is typically used to attribute functions to gene products. We will argue that there is a single concept of function that has many determination/operationalization methods (none of which is sufficient or necessary by itself) that together specify (at least part of) its empirical meaning. Our case analyses will also show that some sources of evidence (e.g. comparative), that are widely used in biological practice, have been ignored, even by the pluralists.

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ROOM 04

9:00 – 9:30

Sebastián Linares (National Research Council Argentina (CONICET, ARGENTINA)) - SCH&E (Symposium): Strategic convergence rationalization of voting rules: a new social choice function meeting the Banks Set

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: Social choice/preference functions are usually rationalized either under the umbrella of Maximum Likelihood Estimation (MLE) approach (Young, 1988, 1995, Conitzer and Sandholm, 2005; Conitzer et al., 2009) and/or under some metric distance from a predefined notion of ideal consensus (Lerer and Nitzan, 1985; Meskanen and Nurmi, 2008; Elkind et al., 2015, Elkind and Slinko, 2016). We argue that there is an important analytical paradigm that can give ground to a third approach to rationalization: whether the social choice/preference function guarantees the choice of the alternative(s) from a solution set to which strategic voters would converge in tournaments games. We explain the basics of the two most important sets that stand for those criteria of strategic convergence of sophisticated voters: the Uncovered Set and the Banks set. We argue that there is nothing wrong or misleading in taking them as normative criteria for evaluating, improving or even creating voting rules. We show that there is no known social choice rule that satisfies the Banks Set and the Ultimate

Uncovered Set. We devise a new social choice rule (the multi-round Majority Support Ratio) that is strongly and weakly Condorcet consistent, meets the Banks Set (and therefore also the Uncovered Set) and is computationally tractable in polynomial time. We conclude by discussing the implications of this new approach for decisiveness, manipulation, computation tractability, and connections with the MLE and consensus-based frameworks.

9:30 – 10:00

Fernando Tohme (Universidad Nacional del Sur and CONICET), Fernando Delbianco (Universidad Nacional del Sur and CONICET) - SCH&E: Epistemic issues in Social Choice Theory.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: The seminal contribution of Robert Aumann generated a great interest in the epistemic aspects of Game Theory. Questions such as how players' knowledge and beliefs determine the feasibility of certain game solutions (such as Nash equilibrium) have been answered, opening the door for the definition of new types of strategic concepts. This approach has not yet been actively incorporated into Social Choice theory despite that results such as Arrow's impossibility theorem or Gibbard-Satterthwaite's clearly point to the fact that, in the absence of a "dictator", all choice schemes with unrestricted dominance are prone to strategic manipulation. The usual approach in the literature is to impose restrictions on the domain to make manipulation impossible. Here, instead, we address the question of specifying in which states of the world, in terms of the knowledge and beliefs of the agents, agents have the incentives to vote honestly. In this presentation, we will review the few contributions to this discussion in the literature to detect the possibilities and limitations of this approach, presenting a modeling based on which the honest vote emerges as an outcome in the RmBR domain (where the agents are rational and their belief in the rationality of others -and that others again believe they are rational- only survives m rounds, where m < n, with n the number of alternatives in the choice domain).

10:00 – 10:30

Marcelo Auday (Universidad Nacional del Sur), Fernando Tohmé (Universidad Nacional del Sur) - SCH&E: A Categorical Representation of Criteria of Aggregation in a Level-Wise Structure.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: Social Choice Theory is concerned with the characterization of social outcomes determined by the choices of the individuals in a society. The usual way in which those choices are expressed is in voting processes. A huge body of literature has covered this problem by assuming that the votes between alternatives reflect the preferences of the agents. Already at the end of the XVIIIth century the Marquis of Condorcet found out that majority voting (the usual procedure in demo- cratic regimes) yields inconsistent outcomes when the number of candidates is more than two. After WWII Kenneth Arrow proved an even more worrisome result, namely that the only aggrega- tion procedure satisfying some seemingly natural conditions is dictatorship, according to which the social preferences have to coincide with those of a certain individual. While different mathematical frameworks have been used to capture aspects of aggregation procedure, Category Theory has been rarely deployed for this purpose. One of the most interesting of those contributions, by Samson Abramsky (2015), is that one of Arrow's conditions, Independence of Irrelevant Alternatives induces the negative result, very much like the independence assumptions that lead to other no-go results, like Bell's Theorem in Quantum Theory.

In this presentation we aim to use Category Theory, and in particular functoriality, to explore other aspects of aggregation procedures. In particular we aim to provide a methodology to detect which criteria may lead to positive results. Functors satisfying those criteria establish specific relations between categories of preference profiles and categories of decisive sets (i.e. groups of agents able to impose their preferences on the entire society). While this is a rather simple extension of a result by Tohme´, Fioravanti and Auday (2019), the real novelty resides in the specification of those functors in the framework of Christian List's system of descriptive levels in which each level is describable in a language, i.e. a set of sentences. As shown by Neil Dewar, Samuel Fletcher and Laurentz Hudetz (2017) the structure of this system is that of a concrete posetal category. This means, in particular, that each aggregation procedure yielding positive results can be expressed by a class of simple sentences that describe the functors satisfying the criteria of aggregation that lead to those results.

ROOM 05

9:30 – 10:00

César De Rosas Ramírez (Universidad Nacional Autónoma de México), Ambrosio Velasco Gómez (Universidad Nacional Autónoma de México) - A political philosophy of science from an Iberian-American perspective

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: The central aim of this work is to analyze and highlight a main stream in philosophy of science in Spain, Portugal and Latin America (Iberian-America) that assumes a critical an political perspective to defend the idea that social and political values (freedom, justice, democracy, plurality) are as important as epistemic values in sciences. Our paper focuses on the contributions of socialist and critical philosophers like Eli de Gortari, Adolfo Sánchez Vázquez, Oscar Varsavsky, Pablo González Casanova, Ricardo Gómez and Boaventura de Sousa Santos to a pluralist and anti-colonialist political philosophy of science that fosters social justice, multiculturalism, epistemic equity, and democratization of science and technology.

10:00 – 10:30

Inmaculada Perdomo (University of La Laguna) - Moral Progress and Epistemic Justice in a Technologically Disrupted World. The role of the Philosophy of Science today.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: The objective of the paper is to present and evaluate Philip Kitcher's proposal for the revitalization of Pragmatism and his commitment to the viability of moral progress in the actual world. This perspective aims to be applicable to the current debate on the consequences and the need for regulation of Artificial Intelligence. In connection with the important philosophical production around the concepts of epistemic injustice and epistemic responsibility.

The relevance of the reorientation of philosophical analysis is argued from the study of cases provided by recent research on the impact of data mining, algorithm policies and the automation of decision-making processes in the field of politics, economics or health and education systems. It was Dewey, Kitcher recalls in his most recent texts, who insisted on the need for each new generation to rethink the philosophical agenda considering the problems and circumstances of each new era. It is obvious that we are facing this urgent task. Climate and energy crises, technological disruptions,

pandemics and increasing inequality and vulnerability of more and more human beings require a greater effort of critical analysis guided by concepts that could generate transformative practices.

The proposal tries to transit on the border between ethics and epistemology with the concepts of "epistemic injustice" of Miranda Fricker and "moral progress" of Philip Kitcher to see fruitful perspectives of critical analysis of these current problems that exponentially increase vulnerability and inequality in contemporary societies hand in hand with the most advanced technologies. The revitalization of Pragmatism proposed by Kitcher is a call for the reorientation of the very role of the philosophical task today. The methodology proposed by Kitcher is at the center of a new democratic contractualism and gives a relevant role to the philosophy of science and technology for the diagnosis of problems, suggestions for solutions and resulting practices through a conversation in which different perspectives are represented and the best information is put into circulation, and in which all the participants are engaged. In line with the theses of Social Epistemology, the Philosophy of Science today aims to offer fruitful ways of analysis and reflection, in connection with ethics and politics, on the viability of participatory and responsible design of a world that must avoids risks, some of them existential, of the current drift of some technoscience developments. It is a call for a responsible philosophy of science.

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ROOM 06

(ENGPHI)
Symposium: Fostering engaged philosophy of science to meet the challenges in an uncertain world
Chair: DRAGANA BOZIN

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: The two years of the pandemic seem to have gathered the multiple challenges facing humanity into an entangled bundle. In the pre-pandemic world various challenges and the debates surrounding them were often kept apart. In the post-pandemic world, it is becoming increasingly difficult to do so. For example: the issues connected to the climate change could be considered a distinct set of challenges; it is questionable, however, whether in addressing them other issues like the European energy crisis or the continuing threat of a global war (or other global challenges) should be kept out of the equation. "Divide and conquer" might no longer be the most effective strategy as we might be approaching something resembling a perfect storm. Even less-bleak outlooks point into a direction that a higher level of social and epistemic integration across scientific disciplines could play a vital role in addressing the future challenges. Equally important is that the science responding to the challenges is both integrative and responsive to social and ethical values.

Engaged philosophy of science, which has gained traction in recent years, offers a good platform for advancement of inter-, and trans-disciplinary approaches that foster collaboration and

knowledge sharing. Moreover, it provides avenues for identifying and deliberating about the social values that are often embedded in scientific practice and that are important for addressing major social challenges in contexts of uncertainty. Plaisance and Elliott (2021) describe broadly engaged philosophy of science as "the formation of connections with people, institutions, or ideas from outside the discipline" (2021, 600). These connections can involve multiple kinds of collaborations between philosophers of science and other scientists, policymakers, community groups, government agencies, and nongovernmental organizations. These connections need not always involve social collaborations, however; Plaisance and Elliott contend that broadly engaged philosophy of science can also involve forms of epistemic integration that bring philosophical perspectives together with epistemic elements from outside the discipline (2021, 600). By fostering these epistemic and/or social connections, philosophers of science have significant opportunities to facilitate research that fosters social and environmental welfare in the face of uncertainty.

With this background, the symposium brings together contributors with a diverse array of career stages (including both senior scholars and PhD students) and geographical locations (including Europe, North America, and South America) to foster deeper understanding and exploration of broadly engaged philosophy of science.

Speakers:
1) KEVIN ELLIOT: Engaged Philosophy of Science to Foster Greater Diversity in the Scientific Community
2) JULIANA GUTIÉRREZ VALDERRAMA: Diversity in Science and the Importance of Place
3) PEDRO BRAVO DE SOUZA: To Group It All or not to Group at All: Strategies for Grouping Per- and Polyfluoroalkyl Substances (PFAS) and Financial Conflicts of Interest
4) CANDICE SHELBY: Engaged Philosophy of Addiction
5) DRAGANA BOZIN: From Engaged to Actionable Philosophy of Science

9:30 – 10:00

Kevin Elliott (Michigan State University) - Engaged Philosophy of Science to Foster Greater Diversity in the Scientific Community.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: There are strong ethical and epistemic reasons to try to foster greater diversity in the scientific community (Intemann 2010; Woolley et al. 2010). However, despite efforts to create a more diverse academic STEM faculty, the scientific community still struggles to improve the representation of marginalized and minoritized groups in science (National Science Board 2020). These problems appear to be caused at least in part by structural and cultural barriers faced by graduate students and postdocs from marginalized and minoritized groups that impede their hiring, retention, and advancement in faculty positions (Settles et al. 2021).

This presentation will describe a collaborative research project that brought scholars from philosophy, history, psychology, sociology, and biology together in an effort to characterize and respond to cultural factors that hinder efforts to foster greater diversity in science. The project surveyed 3,531 scientists from four different scientific disciplines (biology, physics, psychology, and economics) in an effort to characterize the scientists' perceptions of the climate (i.e., the norms, values, and expectations) associated with their research teams, departments, and scholarly disciplines. The survey also characterized the respondents' career attitudes and their intentions to remain in academic STEM. The results of the survey indicated that scientists from marginalized and minoritized groups tended to perceive the climate in their teams, departments, and disciplines more negatively, and those negative perceptions tended to be associated with more negative career

attitudes and intentions to persist in academia. These results suggest strategies for fostering greater diversity in science by improving the climate for underrepresented groups.

In addition to providing information about factors that may detract from or promote diversity in science, this presentation also discusses how philosophers can engage with scholars from other disciplines in an effort to alleviate social challenges. This project displays a high level of epistemic integration across disciplines and social interaction among the collaborators (see Plaisance and Elliott 2021), but there are still ways in which its effectiveness could potentially be enhanced by fostering greater engagement with scholarly societies or other communities that are able to effect change within the scientific community.

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10:00 – 10:30

Juliana Gutierrez Valderrama (Universidad de los Andes) - Diversity in Science and the Importance of Place.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Philosophers of science have argued that diversity in scientific communities can contribute towards dealing with the presence of values in science because it prompts criticism, it helps unveil the presence of biases, and it provides novel standpoints (e.g., Harding, 2015; Longino, 2002).

In this presentation, I criticize the way diversity has been discussed in philosophy of science. In my view, philosophy has neglected the geographical place as an important variable in its discussions, and because of this neglect, it has ignored the geopolitical dimension of the production of scientific knowledge, and the actual hierarchical division of global cognitive labor. This oversight must be amended if we wish philosophy of science to be socially relevant and provide realistic normative tools for producing adequate and fair scientific knowledge at a global level.

To show this, I expose two ways in which place has been ignored. First, I argue that these debates presuppose certain conditions that only seem to apply to the "Global North" (e.g., Longino's venues for criticism are much more accessible for researchers in the "Global North" (Krawczyk & Kulczycki, 2021)). Second, when geography is considered, it is usually limited to the importance of recognizing "non-Western" knowledge systems in former European colonies as legitimately epistemic, as if these knowledges were the ones that are literally situated, while science remains "global" or, ironically, non-situated (e.g., Harding, 2015). This incurs in what I call "epistemic exoticization".

Finally, I offer three reasons philosophy of science must tackle these limitations, including in efforts to develop engaged research projects. First, if objectivity is enhanced by criticism and the encounter of different standpoints, then global scientific knowledge as it is produced today would be

biased, since the problems, concepts, hypotheses, methods, and agendas are still mostly determined by the Global North. Second, if we don't consider where scientific communities are situated geographically in our discussions on diversity, philosophy of science could be promoting the centralization of diversity in certain parts of the globe, at the expense of the scientific institutions in the "Global South". These issues are particularly pressing if we consider problems such as global warming, health crises, and poverty, which concern humanity in general. Third, philosophers of science must evaluate if endorsing the inclusion of scientific communities located in the "Global South" can bring epistemic benefits while, at the same time, promote their epistemic autonomy, i.e., without marginalized regions being "taught" by non-racialized regions how science must be done.

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Symposium continues in the same room, next time slot.

ROOM 07

9:30 – 10:00

George Borg (National Science Foundation/University of Pennsylvania) - What makes the historical sciences tick? Geochronology and the ontology of scientific methods

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: This paper is a contribution to the philosophy of the historical sciences. It concerns the problem of time-measurement in historical geology and the role of technology in solving it. There has been increasing philosophical interest in the role of technological progress in the historical sciences (1). In general, philosophers have construed that role as one of enabling historical scientists to mitigate or even overcome the obstacles created by information-destroying processes. The latter create a situation of what Adrian Currie calls "epistemic scarcity," which distinguishes these sciences from classic experimental sciences. In this literature, technology is generally viewed as a means to this pre-given end of mitigation.

In contrast, my focus here is on certain productive functions of technology. These functions are "productive" in the sense that they shape both the concepts used and the kinds of questions asked, and answered, in the field. In the case of geochronology, these functions arise from the need to apply the concept of time to the deep past, a species of 'metrological extension' (2). Though it is often said that the historical sciences study the deep past, the concept of time deployed in those sciences is rarely problematized. In this paper, I examine the role of technology in geochronology and argue

that it plays an important role in (i) making time into a concept measurable in the deep past, that it does so by (ii) enabling the application of the law of radioactive decay to the geologic domain, and (iii) that it permits the exploration of the possibilities implied by the law.

Geochronology experienced an explosion of its research boundaries in the 20th century. I explain this productivity by analyzing the ontology implicit in geochronological techniques. The immediate object of inquiry of geochronological measurement is the 'apparent age' of a sample. This concept is not intrinsic to the geological domain, but to the measurement method, and its adoption allowed the measurement of geologic time to be detached from specific geologic processes. The application of the concept of 'apparent age' presupposes a mereological decomposition of geologic samples into their constituents. I argue that mereological relations introduce a further dimension in our understanding of the methodology of the historical sciences.

The overall impact of isotope methods was to shatter the spatial, temporal and "parametric" limits of traditional geology. Spatial, by allowing new modes of access to the Earth's interior and the rest of the solar system. Temporal, by reaching beyond the fossil record to all of terrestrial and solar system history. Parametric, by allowing the history of parameters like temperature or polar ice cap volume to be inferred. In conclusion, I argue that the geochronological case illustrates a more general dynamic enabled by modern science's use of technology, and hence a commonality between this historical science and the experimental sciences.

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10:00 – 10:30

Mariona Miyata-Sturm (Oxford University) – Aesthetic factors in the development of plate tectonics

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: This talk shows that aesthetic considerations played a substantial role in the development and acceptance of plate tectonics, the highly successful, unifying theory of the earth sciences. After giving a brief overview of the history of PT I discuss the way that aesthetic factors influenced its development from continental drift in the 1920s to the theory as we know it today. Many of the key scientists involved in the development of continental drift and plate tectonics showed a clear preference for explanations that are simple, elegant, and unifying, and such broadly aesthetic considerations acted as important restrictions on potential explanations and guided the development of these fruitful theories. For example, Alfred Wegener, the developer of continental drift, said that his theory was "producing simplification and coordination in the place of previous complexity and contradiction", and the champion of drift Émile Argand said that "the elegance with which drift theory explains these significant facts … is certainly a strong point in its favour". Scientists responsible for the 'plate tectonic revolution' in the 1960s were similarly enthusiastic about its aesthetic qualities. About the Vine-Matthews-Morley hypothesis, a cornerstone of the theory, Rob Mason said that "it offered an elegant explanation of how the magnetic lineations of the northeast Pacific could have come about", and in many cases (e.g., concerning heat flow values and geomagnetic reversals) the scientists ignored complicating evidence where it apparently contradicted a neat, simple, and streamlined explanation. Today, standard textbook descriptions of plate tectonics typically include

the claim that it is elegant (e.g., Frisch et al. (2011)), suggesting that the aesthetic appreciation of the theory is almost as widespread as the acceptance of the theory, which is near universal.

Both philosophers and scientists commonly view aesthetic factors as either irrelevant to or disrupting scientific research. I briefly present the most plausible versions of these dismissive views before arguing that the historical evidence presented makes it clear that they are inadequate: neither fits the actual development of the central organising theory of the earth sciences. Far from disrupting research or acting merely as a tiebreaker between empirically equivalent hypotheses, aesthetic satisfaction acted as an important and useful restriction on theory development and acceptance, showing that aesthetic considerations have an important part to play in scientific research also outside highly abstract fields like mathematics or theoretical physics. Among the small group of philosophers working on the aesthetics of science, this conclusion is no longer controversial (e.g., McAllister (1996), Schindler (2018), Elgin (2020); but see Todd (2008)), though it is often reached without considering historical cases in detail. To both establish that aesthetic factors influence science and get a realistic idea of how they influence it, it is worth looking in some detail at historical cases. This is rarely done, and never before, to the best of my knowledge, has the earth sciences been the subject of the study of how aesthetic factors influence scientific research.

ROOM 09

(SUMO)
Symposium: Substructural Modal Logics

Chairs: Behounek, Libor; Flaminio, Tommas

Topic: A.1 Mathematical Logic

Abstract: The symposium is devoted to the study of substructural modal logics, a family of logics obtained by combining two independently introduced families of logical systems that expand the basic semantic picture of classical logic: modal logics, which add new non-truth functional, mostly unary, connectives known as modalities to allow reasoning about the "modes of truth" of classical formulas; and substructural logics, which relax certain assumptions about the nature of atomic propositions in order to reason about other interesting objects, such as constructive proofs, resources, degrees of truth, or local contradictions. Both of these families are very populous and contain many particular logics whose importance goes far beyond purely logical or mathematical interests, and which are successfully applied to various problems in mathematics, computer science, philosophy, linguistics, social sciences, game theory, or economics.

The combined family of substructural modal logics comprises those modal logics in which the modalities operate over the background of some substructural logic. This combination makes it possible to connect the application areas of both families of logics, but its exploration is still very underdeveloped. To facilitate the exchange of ideas and stimulate the development, the symposium gathers new contributions on theoretical aspects of substructural modal logics, studying both general frameworks as well as particular logical systems within this family of nonclassical logics. The symposium is a joint activity of the project 101007627 "Modalities in substructural logics: theory, methods and applications" of the program H2020-EU.1.3 Excellent Science - Marie Sklodowska-Curie Actions and the project GA22-01137S "Metamathematics of substructural modal logics" of the Czech Science Foundation.

Speakers:

1) Manuela Busaniche, Penelope Cordero, Miguel A. Marcos, Ricardo O. Rodriguez: Possibilistic n-valued Lukasiewicz logic
2) Tommaso Flaminio, Sandro Preto, Sara Ugolini: On a functional representation for probability modal logics
3) Giuliano Rosella, Sara Ugolini: Algebras of counterfactual conditionals
4) Francesco Dagnino, Fabio Pasquali, Giuseppe Rosolini: Quantitative equality substructural logic, via graded modalities
5) Libor Behounek, Antonin Dvorak: A bilattice-valued free logic with graded gaps and gluts
6) José Luis Castiglioni, Rodolfo C. Ertola-Biraben: On modal aspects of the dual of intuitionistic negation
7) Carlos Olarte, Elaine Pimentel, Camilo Rocha: A rewriting logic approach to specification, proof-search, and meta-proofs in sequent systems
8) Petr Cintula, Carles Noguera: General frames as semantics for weakly implicative modal logics

9:00 – 9:30

Manuela Busaniche (Departamento de Matemática, Facultad de Ingeniería Química, CONICET-UNL. Santa Fe.), Penelope Cordero (Departamento de Matemática, Facultad de Ingeniería Química, UNL. Santa Fe.), Miguel Andrés Marcos (Departamento de Matemática, Facultad de Ingeniería Química, CONICET-UNL. Santa Fe.), Ricardo Oscar Rodríguez (Departamento de Computación, Facultad de Ciencias Exactas y Naturales- UBA.) **- Possibilistic n-valued Lukasiewicz logic.**

Topic: A.1 Mathematical Logic

Abstract: Historically, modal logics and many-valued logics have run by separate roads. One of the main reasons for this separation is that the natural semantics for modal systems is given by frames, while algebraic semantics have proved to be an adequate tool to treat many-valued logics. This barrier should be overcome because of the importance of having a system that combines both, many-valued and modalities. This is why recently some authors have considered the study of many-valued modal logics from an algebraic approach.

We take this course of investigation in the present work, where we focus our attention on a many-valued modal system based on the n-valued Lukasiewicz logic (for each natural number n). This logic has as an algebraic semantics the subvariety of MV-algebras generated by the MV-chain with n elements Ln ([Cignoli et al(2000)]). Our idea is to extend this system to a modal one, by adding a unary operator. The algebraic approach is done by considering complex algebras that arise from possibilistic frames on Ln and defining the quasivariety of many-valued and modal algebras generated by this class. The modal operator in complex algebras is defined by considering a possibilistic function that takes values in Ln, so our presentation is a generalization of the classical possibilistic system. The quasivariety of algebras obtained in this procedure together with the abstract theory of algebraizable logics immediately provide an axiomatization for the possibilistic many-valued system over Ln. So we conclude that the logical system determined by possibilistic frames over Ln has an algebraic semantics based on MV-algebras.

Our investigation also provides a negative answer to a conjecture of P. Hájek posed in his book [HajekBook98]. This conjecture intends to generalize the classical setting, where the possibilistic logic coincides with the modal logic KD45. Hájek states that the logic that can be semantically defined by A-valued possibilistic frames, where A is a BL-algebra, can be axiomatized taking into account the

axioms of the subvariety of BL-algebras generated by A, extending the language by two modal operators and requiring the fuzzy analogs of the classical axioms K, D, 4 and 5.
We show that when the BL-algebra A is the n-elements Lukasiewicz chain, the logic semantically defined by Ln-valued possibilistic frames is not axiomatized by these axioms, which knocks down the conjecture for the general case of an arbitrary BL-algebra.

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9:30 – 10:00

Tommaso Flaminio (IIIA - CSIC), Sandro Preto (Institute of Mathematics and Statistics, University of São Paulo), Sara Ugolini (IIIA - CSIC) **- On a functional representation for probability modal logics.**

Topic: A.1 Mathematical Logic

Abstract: For functional representation in an algebraizable logic we mean a representation of the algebras of formulas of the logic by means of (possibly real-valued) functions. Functional representations have shown to be a key tool for the study of non-classical logics, since they allow to regard formulas as functions and, by means of them, to approach the study of typical proof theoretical properties of the logics by means of their functional semantics. In the realm of (algebraizable) fuzzy logics, possibly the most well-known result in this respect is McNaughton theorem [McN] which shows that formulas of the infinite-valued Lukasiewicz calculus correspond, up to logical equivalence, to continuous and piecewise linear functions from a certain finite dimensional hypercube to the real unit interval. Moreover, as shown by Mundici in [Mun], for every such function one can effectively compute a "canonical" formula in Lukasiewicz language that corresponds to it.

In this contribution, we will provide a functional representation for the probability modal logic FP(L) (see [HEG]) that builds on Lukasiewicz calculus by adding to it a unary operator P that reads "it is probable that". While the logic FP(L) is not algebraizable, at least not in the usual sense due to Blok and Pigozzi, we still can provide a functional representation result for its modal formulas. In order to do so, we adapt the usual universal algebraic methods to this peculiar setting, and moreover we make use of some techniques developed in [FlUg], where a class of purely algebraic models for FP(L) based on de Finetti's coherence criterion have been introduced and studied.
Our contribution will present two ways of providing a functional representation of the algebras of formulas of the modal logic FP(L): a local one, that relies on de Finetti's coherence argument; and a global one that, instead, relies on probability distributions on a finite domain.

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10:00 – 10:30

Giuliano Rosella (University of Turin), Sara Ugolini (IIIA - CSIC) - Algebras of Counterfactual Conditionals

Topic: A.1 Mathematical Logic

Abstract: A counterfactual conditional (or simply a counterfactual) is a conditional statement of the form “If [antecedent] were the case, then [consequent] would be the case”, where the antecedent is usually assumed to be false. Counterfactuals have been studied in different fields, such as linguistics, artificial intelligence, and philosophy. The logical analysis of counterfactuals is rooted in the work of Lewis [4, 3] and Stalnaker [6] who have introduced what has become the standard semantics for counterfactual conditionals based on particular Kripke models equipped with a similarity relation among the possible worlds. In Lewis’ language, a counterfactual is formalized as a formula of the kind “ϕ -> ψ” which is intended to mean that if ϕ were the case, then ψ would be the case. Lewis [4] has introduced different logics of counterfactuals arising from his semantics; these logics have been studied from a proof-theoretic perspective by, for instance, Negri and Sbardolini [5] and Lellman and Pattinson [2].

Although the research on counterfactuals and their logic has been prolific, a deep and coherent algebraic investigation of Lewis’ logic of counterfactuals is still missing. In the present work, we start filling this gap by providing an equivalent algebraic semantics, in the sense of Blok-Pigozzi [1], for the logics of global consequence associated to Lewis’ systems.

The semantics is given by varieties of Boolean algebras equipped with a binary operator "->" that stands for the counterfactual connective. Interestingly, Lewis’ logics of local consequence are the logics preserving the degrees of truth of our class of algebras. We characterize the structure theory of these algebras, observing that, interestingly, it can be reduced to the one of some modal algebras that appear as particular subreducts over an extended language.

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Symposium continues in the same room, next time slot.

ROOM 10

9:00 – 9:30

Diego Fernandes (Universidade Federal da Paraíba) - Discrimination and Projective Definability in Expressiveness Comparisons between Logics

Topic: A.2 Philosophical Logic

Abstract: This talk intends to investigate the relation "the logic L2 is at least as expressive/strong as L1", whose intuitive basis could be said to be
(E) Everything that can be said in L1 can also be said in L2.
Comparisons of logics in terms of E exist at least since Lindström's (1969) famous characterization results for first-order logic. In this work, some formal conditions for E were given, one of them is
(DC) Every L1-definable class of structures is also L2-definable.
Since then, less stringent conditions have also been given to capture E. Makowsky (1980) considers a condition based on the concept of projective definability (PC). For him, PC is a more natural notion for comparing expressiveness than DC. Ebbinghaus (1985), besides the above ones, also considered a condition based on the discrimination of models (EQ). Shapiro (1991) also pointed out the strictness of DC and argued for the reasonableness of PC.

In the above works, the comments on relative expressiveness are brief and the investigation E deserves is not given. Peters and Westerstahl (2006) provided, to the best of our knowledge, the first theory on comparisons of logics in terms of expressiveness. Their basic idea is to understand E as meaning that

(E′) For every L1-sentence, there is a synonymous L2-sentence.

Various notions of synonymy are analyzed and different formal conditions, with increasing levels of strictness, are defined from them.

Though it may fulfill its purpose when intended to model expressiveness comparisons in natural languages, Peters and Westerstahl's theory still falls short of accounting adequately expressiveness comparisons between logics. For example, the formal condition EQ mentioned above does not even fit in their basic understanding of E. Since EQ is common in comparisons of expressiveness, it is of interest to a have a theory of expressiveness that accounts for it. Another limitation their approach is that projective definability is not considered as giving rise to a synonymy relation, so that the condition PC is not included in their framework.

In the talk I will propose another understanding of E, that is arguably more adequate to capture comparisons of logics in terms of expressiveness. It will be shown that under it all the formal conditions mentioned above can be properly accommodated. Finally, Makowsky and Shapiro's reasons in favor of using PC in expressiveness comparisons will be explored, and I will show that using this formal condition for expressiveness involves the acceptance of a sort of hyperintensionality even in purely extensional logics.

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9:30 – 10:00

Aldo Frigerio (Università Cattolica di Milano) - Future tense semantics, assertability, and normal histories

Topic: A.2 Philosophical Logic

Abstract: If we assume that the world is indeterministic, then the semantics
of future tense is complex because several histories stem from the present instant, and p can be true in some of these histories and false in others. In this framework, it is possible to discern two large families of theories concerning operator F. According to the first one, Fp is true if p is true in every future history: M, t |= Fp iff for all h beloging to t Ext' t' > t M, t' |= p If p is true in some histories and false in others, either Fp is false (Todd 2016, 2021) or it is devoid of truth value (Thomason 1970).
Alternatively, one might argue that there is a history of the world that is privileged over the others: it is the history that will actually happen (Øhrstrøm 1981, 2009, Malpass & Wawer 2012). On this view , the truth conditions of Fp depend on what occurs in the actual history (metaphorically called Thin Red Line, TRL): M, t != Fp iff Ext' > t and t' belongs to TRL M, t' != p An argument in favour of this semantics relies on the fact that if future contingents were untrue, they would never be assertable because the norms of assertion prevent us from asserting what is untrue. However, we assert many future contingents with no troubles:
(1) It will rain tomorrow
(2) I will get out tonight
To overcome this problem, I propose a universalist semantics of F, in which F quantifies on “normal” histories. A history is normal with respect to a background of knowledge, scientific theories, and beliefs about the world. It is a normal history if, given this background, it is not surprising that that history occurs. Supposing that Nt is the set of normal histories passing through t, then the semantics of F becomes:
M, t |= Fp iff for all h beloging to Nt Ext' t' > t M, t' |= p

This explains why (1) and (2) are assertable: that it will rain or that I will go out tonight is true in every normal history. A history in which these facts do not hold is somehow unexpected given our background knowledge.

Notice that normal does not necessarily mean probable. Suppose that a lottery draw is an indeterministic event and that there are one million tickets. Then, that ticket n is drawn is an improbable but normal event. We would not be surprised if ticket n were drawn – as we would not be surprised if any other ticket were drawn. Rather, we would be surprised if no ticket were drawn. This accounts for the fact that (3) and (4) are not assertable:
(3) Ticket n will win
(4) Ticket n will not win
(3) is not assertable because there are normal histories in which ticket n does not win.
(4) is not assertable because there are normal histories in which ticket n wins.

10:00 – 10:30

Jean-Yves Beziau (UFRJ) - Two different ways to conceive and define the notion of contradiction

Topic: A.2 Philosophical Logic

Abstract: The notion of contradiction is an important notion in logic, philosophy and mathematics. As odd as it may seem, there is up to now no clear, precise, or univocal definition of this notion upon which everybody agrees. And there are different terminologies more or less synonymous or related to it, such as inconsistency, triviality, paradox.

In this talk we will investigate and compare two approaches/definitions to contradiction: one that we will call negative contradiction, another one that we will call dichotomic contradiction.
Negative contradiction consists in defining contradiction as a pair made of a proposition (sentence, formula) and its negation (considered as a unary connective). It is based on negation that is why we are using such a name. This approach may look simple, direct and clear. But this is a kind of illusory simplicity, because it relies on the notion of negation, which is not obvious at all, unless one claims that negation is classical negation defined by a famous truth-table. And a paradox like Russell's paradox can be formulated without negation, like Curry's paradox. Then the abstraction axiom, according to which any property forms a set, is trivial or inconsistent, even without negative contradiction.

Dichotomic contradiction is based on exhaustivity and exclusivity, and can be represented in a symbolic way with a black and white flag. It is related with Pythagoras table of opposites (probably inspired by Zoroastrianism), and Taoism (which is more interactive). The theory of the square of opposition is based on it, using the dichotomy between truth and falsity to define contradictory propositions without using the connective of negation: two propositions are contradictory if and only if they can neither be true together, nor false together. The dichotomy true and falsity is used not to define only the contradictory notion of opposition, but also two other notions of opposition: contrariety and subcontrariety. These three notions of opposition can be used to define three negations: classical, paracomplete and paraconsistent negation, serving as a basis of a general theory of negation.

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ROOM 11

9:00 – 9:30

Carolina Aguerre (Universidad Catolica del Uruguay) - The human-centric approach to international AI governance

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: While the human-centric approach is referred to within several policy documents and studies (EU AI Act 2021, OECD Trustworthy AI Principles), it has not been explicitly developed and framed. The understanding of a human-centric approach to AI entails two core governance components: ethical values & principles at a higher level; and rules/norms that have legally binding obligations and consequences. This intervention will expand on the human centric approach to AI and its foundations. These can be traced in the Responsible AI and Trustworthy AI technology design adhering to the ALTAI requirements Human Agency and Oversight; Technical Robustness and Safety; Privacy and Data Governance; Transparency; Diversity, Non-discrimination and Fairness; Environmental and Societal well-being; and Accountability) and addressing the specific characteristics of AI risks, such as opacity, complexity, dependency on data and autonomous agency that can adversely affect fundamental rights.

This work will expand on the human-centric approach to AI as a 'humanizing process' which proposes a radically different way to relate to these technologies and their socio-technical systems. Fundamentally, a human - centric approach brings in a new light into the positive and negative consequences of AI systems by distancing from a utilitarian perspective, i.e. one which looks at the maximization of benefits for 'a majority' . This disengagement is increasingly pointing at the insufficiency of utilitarian perspectives on AI as it concentrates on the consequences and outcomes of the applications of these technologies at broader social levels. Approaches stemming from virtue-ethics perspectives that bring into consideration the context that produces these outputs are particularly relevant and specifically where these rules are generated for human development or 'human flourishing'. The approach of virtue ethics underscores the human-centric perspective tied to the responsibility for a more general notion of human welfare, sustainability, and development. This intervention will specifically address the notions of a human-centric approach to AI governance which will mark some of the future horizons for international debates in the near future and its relations, tensions and possibilities with different ethical paradigms.

9:30 – 10:00

Astrid Dzul Hori (Instituto de Investigaciones Filosóficas, UNAM) - Cyberspace and Extinction: digital alternatives in the face of a world in decline.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: In the face of the panorama we are dealing, where wars, scarcity of resources, species extinction, global warming, etc., seem to lead us to more decadent and hostile ways of inhabiting the world, cyberspace is postulated as a potential alternative world to inhabit from virtuality. In this sense, I propose to develop the hypothesis that cyberspace is like a supernature -based on the Orteguian thesis- where human beings can take refuge from the possibility of extinction. The central question I propose to problematize and answer is what role does cyberspace play in the face of the extinction phenomenon.

Conceiving cyberspace as a supernature, that is, as a world constructed by human beings based on their life project, their superfluous needs and their idea of well-being, can provide us with considerations when postulating ethical or cybersecurity principles based on the dynamics that occur there. It can also broaden the discussion around digital identities and the limits and applications of social networks, as well as the role of artificial intelligences with which we cohabit in cyberspace. As well as what happens in cyberspace while the material world is in decay. In short, to take cyberspace seriously, as yet another space where multiple subjectivities coexist and inhabit and where events that have repercussions for humanity take place.

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10:00 – 10:30

Insok Ko (Inha University) - What kind of new knowledge can computer simulations provide?

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: Beisbart and Norton (2012) maintain that Monte Carlo simulations are not experiments but arguments. Beisbart (2012) argues further that simulations can produce new knowledge about the real world as thought experiments do which are also arguments in their essence as John Norton et al. interpret them. But considering that computer simulation(=CS) consists of bundle of calculation which is deductive in essence (Simon 1969; Hartmann 1996), one may estimate that CS will not make genuine contribution to the system of knowledge by adding something genuinely new. Taken these views together, there seems uncertainty in the assessment of epistemic value of CS. In this paper I discuss the epistemic value of CS whereby I will argue that the CS does not directly give new empirical knowledge about the world, instead meta-level knowledge about the truthfulness of the system of scientific knowledge and hypotheses that are engaged in the simulations. By this CS shall contribute to building and modifying of our scientific knowledge.

A major utility of CS is that it enables us to estimate, within the degrees of approximations required in the context, what kind of output will be produced under the given conditions of the real world, by configuring those conditions in the virtual space of computation. The crucial step, from the input data to the output, are accomplished by computation and the rules for this is provided with the scientific knowledge about the relevant parts of the world and interactions among them. It is to note that the term "knowledge" here shall be understood as including empirical generalizations that will not yet be classified as scientific knowledge in the strict sense of the term. Such generalizations with varying degrees of confirmation are on a par with hypotheses in scientific research. Using CS, one expects that the outcome of the CS will correspond to the outcome in reality. It is reasonable practice. But one should at the same time be aware that the trustworthiness of this expectation depends upon the truthfulness of those rules that have been applied for the computation. Validation, a last stage of a CS, gives evaluation of the correspondence and discrepancy between the expectation and the reality (Morrison 2015). If a CS fails validation, it means that there is something wrong in the rules applied for the computation. Further, one can examine which part of the rules is faulty by reiteration of simulations applying variances of hypotheses. It is the core epistemic lesson that one can get from CS.

In the course of the analysis of CS, it will also be recognized that CS have properties that typical thought experiments do not have. These are: 1) CS involve numerical approximations, and 2) CS, engaged for investigating a part of the real world, often deals with complexity introduced by multitude of variables with entangled contributions. CS retains thereby its unique locus within the practice of scientific researches.

ROOM 12

(GEOM)
Symposium: Geometry to Logic and Back: History, Philosophy, and Foundations
Chairs: Chairs: Giovannini, Eduardo; Schiemer, Georg

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: The general idea of this symposium is to foster and explore the interplay between two current lines of research in the history and philosophy of formal sciences. On the one hand, studies on the emergence of abstract (i.e., axiomatic) geometrical methods in the late 19th century and early 20th century and its impact on the development of modern mathematical logic. This line of research includes, among other topics, historical investigations on the geometrical roots of modern logical methods (e.g., model theory), the birth of logical metatheory in modern axiomatic geometry, and reassessments of philosophical views on the role of logic in geometrical reasoning. On the other hand, the application of logical or formal tools in the discussion of central issues in the philosophy of geometry, such as novel formalizations and logical analyses of classical geometrical theories, original vindications of the epistemological significance of diagrammatic reasoning in geometry, as well as problems pertaining to mathematical practice (for instance, the requirement of 'purity of method'). In recent years, these perspectives in the history and philosophy of formal sciences have produced important and original results, and their interaction promises to be fruitful and philosophically stimulating.

The symposium will be divided into two parts. Part I ("History & Philosophy") will survey several contributions to the modern understanding of the axiomatic method in geometry and related philosophical discussions. In particular, the first two papers will concern the foundational work of Peano and his school on the axiomatization of Euclidean geometry. Particular attention will be bestowed on the logical and philosophical analysis of several types and uses of axiomatic definitions. The third paper will provide an original interpretation of the role of logic in Carnap's early theory of space in the monograph Der Raum (1922) and other works from the 1920s. Finally, the last paper of this section will offer a detailed logical explanation of the notion of formal mathematical content, by focusing on formative work on the logical foundations of geometry by Tarski and his school. In turn, Part II (Logic & Foundations) will present recent logical and foundational investigations in the field of classical geometry, with a special emphasis on the geometrical system developed by Euclid in the early books of the Elements. The first two papers of this section will provide critical discussions of the logic and deductive setting of Books I and III of Euclid's Elements. Finally, the last two papers will examine a series of logical and philosophical issues in connection with a central proposition in the theory of plane area, namely the so-called De Zolt's postulate.

Speakers:
1) Joan Bertran-San-Millán: Peano's axiomatization of geometry: From empirical foundations to abstract development.
2) Paola Cantu: Axiomatic definitions in the Peano School.
3) Pierre Wagner: Logic in Carnap's theory of space.
4) Eduardo Giovannini and Georg Schiemer: Formal Content and Meaning in Mathematics.
5) José Gil-Férez, M. Andew Moshier, Alberto Naibo and Marco Panza: Euclid's Logic.
6) John Baldwin and Andreas Mueller: What is a geometric proof? The Dilemma of De Zolt's axiom.
7) Hermann Haeusler and Abel Lasalle Casanave: On De Zolt's Postulate in Three-Dimensional Geometry.

9:00 – 9:30

Joan Bertran-San-Millán (Centre of Philosophy of Sciences of the University of Lisbon) - Peano's axiomatisation of Geometry: From empirical foundations to abstract development

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: In Principii di Geometria [1889] and 'Sui fondamenti della Geometria' [1894] Peano offers axiomatic presentations of projective geometry. While Peano's advocacy of the axiomatic method is well known, his view that the basic components of geometry must be founded on intuition is seldom considered (see, however, [Bottazzini, 2001], [Avellone et al, 2002], [Gandon, 2006] and [Rizza, 2009]).

There seems to be a tension in Peano's construction of geometry in these two works. On the one hand, Peano insists that the fundamental geometrical concepts (i.e., the notion of point and the relation of incidence between points) are acquired by experience and the axioms are determined by direct observation. I shall observe that, in a polemic with the Italian mathematician Segre, Peano rejects an abstract foundation of geometry that is disconnected from any intuitive character of the fundamental concepts. On the other hand, geometry starts from axioms, which cannot be attached to a single interpretation. These basic propositions are the result of a specific analysis of the properties of the basic concepts, but they do not properly define them. As Peano suggests, once the axioms are formulated, the specific nature of these concepts becomes irrelevant. I shall claim that Peano's notion of purity, the focus on the development of a logical apparatus that can regiment geometrical proofs, and his disregard of the specific meaning of the geometrical terms in the demonstration of theorems indicates his endorsement of deductivism.

By studying Peano's axiomatisation of geometry, I shall argue that the tension can be dissolved if these two seemingly contradictory positions are understood as compatible aspects of a single process of construction, rather than competing options. Specifically, I shall explain that each stance corresponds to a specific phase in Peano's construction of geometry. I shall describe these two phases, and charaterise their relationship by referring to a dispute between Peano and Segre.

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9:30 – 10:00

Paola Cantu (Centre Gilles Gaston Granger, Aix-Marseille University and CNRS, Aix-en-Provence)

- Axiomatic definitions in the Peano School.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: The search for mathematical primitives, and more generally the discussion on the role of definitions in mathematics, was the most important objective of the Peano School. At the 1900 Paris International Conferences in Philosophy, Mathematics, and Psychology, the Italian group impressed Russell with clarity of language and reasoning. As a matter of fact, they presented no less than six papers on the topic of definitions. Peano introduced definitions as conventionally chosen equalities that determine the primitive concepts of a theory and simplify its language (Peano 1900). Burali-Forti discussed the difference between definitions by abstraction, definitions by postulates, and nominal definitions (Burali-Forti 1901). Padoa developed a definability criterion to verify whether a system of

primitive symbols is irreducible, and presented two further papers on the principles of geometry, and on the definition of the field of natural numbers (Padoa 1901; Padoa 1902a; Padoa 1902b). Vailati interpreted Brentano's tripartition of mental facts in representations, expectations and volitions as having a logical meaning, corresponding to the distinction between definitions, factual propositions and judgments of value (Padoa 1901; Padoa 1902a; Padoa 1902b).

The paper will explain the complex distinction between implicit and explicit definitions that occur in these writings and that has engendered much confusion in the literature. There are two main notions of 'implicit definitions' in the Peano School. One refers to axioms used as ways to define the primitives of a theory. The other opposes implicit (or indirect) to explicit definitions. Explicit definitions are nominal definitions expressed in a canonical form, i.e., as an equality between definiens and definiendum that satisfies particular conditions. Non-explicit definitions include definitions by operators, by induction, by abstraction, and conditional definitions. Examples will be offered to show how different kinds of definitions, whose distinction is clearly presented by Burali-Forti in the 1894 edition of his Logica Matematica, are used in various editions of the Formulario and possible explanations will be offered.

Based on a detailed analysis of the different types and uses of definitions made by Peano (by axioms, by abstraction, by operators, conditional, ...) and by some of the collaborators to the Formulario (Vailati, Pieri, Burali-Forti, Vacca, Padoa), it will be claimed that the adequacy of definitions is not a question that can be established independently of an analysis of the mathematical practice in which the definitions are used. The definition of a mathematical concept must be analyzed also in light of the definitions of other concepts that might be derived from it, and the adequacy evaluated for all definitions altogether. Based on an original reading of Peano's axiomatics, the paper will provide examples to support the idea that the choice of the most appropriate definition is not only a logical-philosophical question (based on syntactic criteria or metatheoretical criteria) but also a mathematical choice related to the objectives the mathematician has while trying to solve a specific problem and to the consideration of an axiomatic theory as a whole.

10:00 – 10:30

Pierre Wagner (Institut d'histoire et de philosophie des sciences et des techniques) - Logic in Carnap's theory of space.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: This talk focuses on the notion of formal space that Carnap defines and puts at the core of his theory of space in his dissertation Der Raum (1922). Because formal space, as Carnap conceives it, is purely based on logic and its construction excludes any reliance on intuition or experience, this notion of space raises the issue of the interplay between logic and geometry in this context. Starting from the existing work on what formal space is and on what role it plays in Carnap's theory of space (Carus et al., 2019, and other examples of publications from the extensive literature on this topic are mentioned in the bibliography), this talk will present the results of an ongoing project which have several goals. First, a systematic comparison is provided between formal space and what Carnap calls "abstract space" in his earlier 1920 (seldom discussed) dissertation about the foundations of geometry. This helps understanding Carnap's views on the interplay between logic and geometry. Especially valuable in this regards is Friedman (2019), which clarifies a series of issues raised by the very notion of formal space. Second, Carnap's specific conception of logic in the early 1920s is studied, from several viewpoints. This includes an examination of Carnap references to, and uses of, other authors ranging from Dedekind, Frege, and Russell, to Hilbert or Cassirer, and an evaluation of the impact of geometrical methods on this logical conception. This requires a thorough analysis of the literature on the historical sources of Carnap's notion of formal space. The specific role of language in

Carnap's early logical views is clarified too, as well as the comparison between implicit and explicit definitions several years before his later systematic study of general axiomatics in Carnap (1927, 2000). Finally, a retrospective reading of Der Raum is proposed, from the point of view of contemporary investigations. While keeping in mind and avoiding the pitfalls of anachronism, the idea here is to see whether recent logical concepts, issues, and approaches can bring a new light on what Carnap wrote on geometry as related to logic in the early twenties.

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Symposium continues in the same room, next time slot.

ROOM 13

(TATWU)
Symposium: Theories All the Way Up

Chair: Christian Romero-Rodríguez

Topic: A.2 Philosophical Logic

Abstract: Prove facts about logics, typically relating proof-systems with model-theoretic structures. This study of logics is usually called `meta-theory (for the logical theories)'. In this symposium we address among others the following questions:
· Is classical logic unavoidable or even necessary at some point in doing meta-theory?
· Is having different non-classical logics at the theory and the upper levels equally problematic as having classical logic in the meta-theory?
· What is the right meta-theory for empty or trivial logics?
· Is pluralism about meta-theory a sensible option?

Unsurprisingly, most of meta-theory done so far has been carried out using classical logic. For some authors, with Williamson and Burgess as paradigmatic examples, the usual meta-theories for non-classical logics are too liberal, for classical logic is freely and unrestrictedly used in the meta-theoretic proofs, which would seem a betrayal of what originated non-classical logics in the first place. Even more, the use of classical logic to do meta-theory is taken as an essential drawback of non-

classical logic and as a decisive argument for the superiority of classical logic. The demand for a non-classical meta-theory can come in at least two brands:

·Noise avoidance. A classical meta-theory is useful for communicating, in classical terms, facts about a non-classical logic, but at the risk of distorting them. Although the classical presentation is not unintelligible, a more faithful presentation of a non-classical logic must be non-classical itself.
·Classicality is nonsense. If the supporters of non-classical logic consider classical logic as severely flawed, then they cannot use it unrestrictedly to reason about anything.

Appealing to classical meta-theory, whether because it is just fine or because it is needed, is a move that might not be so readily available for some non-classical logicians, though. These are too quick conclusions, though.

All The contributions of this symposium are about the relationship between theory and metatheory.

Speakers:
1) Miguel Álvarez-Lisboa: The constructive meaning of meta-inferential schemes
2) Lucas Rosenblatt : Classical reasoning without classical logic
3) João Marcos: What is `classical' about the metatheory of logic?
4) Julián Valdés-Toro: Metalogic and translations between logics
5) Lourdes González-Huesca: The Metatheory in Programming Languages and Proof Assistants
6) Luis Estrada-González: A non-classical meta-theory for trivialism
7) Christian Romero-Rodríguez : The metatheory for empty logics

9:00 – 9:30

Lucas Rosenblatt (National Scientific and Technical Research Council (CONICET) and University of Buenos Aires (UBA)) - Classical reasoning without classical logic.

Topic: A.2 Philosophical Logic

Abstract: One of the most powerful lines of objection against non-classical logics is that they typically employ classical logic in the metalanguage. Many theorists, classical and non-classical alike, agree that the worry is a serious one. The problem, roughly put, is that a logician who claims to be endorsing some non-classical theory as the correct account of validity cannot in the same breath accept meta-theoretic results pertaining to her favoured theory that are only available if one is allowed to reason classically.

One insightful way of depicting the objection is in the form of a dilemma. Either the non-classical theorist uses classical logic in the metalanguage or she doesn't. If she does, then that is a serious embarrassment because she is overtly availing herself of principles that are only valid in a logic to which she is objecting. If she doesn't, then that is also a serious embarrassment, although the source of the embarrassment is now different. Assuming that the principles she actually employs in the meta-theory don't go beyond the resources of the logic that she endorses, the issue is that she must acknowledge that many standard results accepted by the mathematical community are false---or, at least, that they have no proof. Is there a way out of the dilemma?

On the face of it, the non-classical logician has a very easy argument at her disposal to escape the dilemma. If it is only certain problematic statements that motivate a revision of logic, then there's no need to reject classically valid principles across the board. It is enough to jettison only the instances that cause problems. Therefore, the non-classical logician is warranted in appealing to many instances of the classically valid principles that she rejects. In particular, it is open to her to use the full power of classical logic provided that the region of discourse over which she is reasoning does not

contain the problematic statements under discussion. This strategy has come to be known as classical recapture.

In this talk I intend to do two things. First, I will compare this strategy with two other responses to the dilemma that have been offered in the literature: (i) instrumentalism, i.e. the view that one ought to take an instrumentalist attitude towards the meta-theory, and (ii) full-blown non-classicality, i.e. the view that the non-classical logician must be in a position to develop her meta-theory by only availing herself of the patterns of reasoning that her logic affords. I will argue that both responses are problematic, albeit for different reasons.

My second goal is to discuss how various prominent non-classical theories can best implement the recapture strategy. As a test case I will consider non-classical theories of truth and I will tentatively suggest that a paracomplete account of truth fares better than other accounts, such as those that are based on paraconsistent logic or on some substructural logic.

9:30 – 10:00

Lourdes Del Carmen González Huesca (Departamento de Matemáticas, Facultad de Ciencias, UNAM) - The metatheory in Programming Languages and Proof Assistants.

Topic: A.2 Philosophical Logic

Abstract: The increasing use of proof assistants to formalize theories poses great and diverse challenges for mathematicians and computer scientists. From the philosophical side, concerns point to foundational aspects of the logics behind these proof management systems and the potential applications of these logics to language.

These systems are well established as implementations of dependent-type theories under an intuitionistic/constructive setting.

Such theories correspond to a restricted version of classical logic in the sense that the excluded middle does not hold.

Proof Assistants, as Coq, offer computational environments in which users can formalize the metatheory of programming languages and perform reasonings with respect to software correctness and the verification of specifications.

Hence, there is no room for inconsistency in these frameworks as one of the main applications is to perform verification and in some cases verification of critical software.

In this contribution, we seek to sketch some ways in which a paraconsistent approach could fit into these systems in order to sustain our main thesis:

the logic behind theorem provers and proof assistants is a restricted classical logic and it is enough to formalize any theory even a paraconsistent logic.

First, we will briefly review the state of the art of proof assistants and the logic foundations permitting the formalization of metatheories.

To then analyze it as a framework to formalize paraconsistent theories, as shown by Villadsen and Schlichtkrull in "Formalizing a Paraconsistent Logic in the Isabelle Proof Assistant".

Finally, we discuss the perspectives in which Logics of Formal Inconsistency may contribute to enriching a (modern) type theory.

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10:00 – 10:30

Christian Romero-Rodriguez (Universidad Nacional Autónoma de México) - The metatheory for empty logics.

Topic: A.2 Philosophical Logic

Abstract: In this conference, I argue that the metatheory of an empty logic needs a non-empty logic, but not necessarily the classical one. For simplicity, I will assume that a logic L is empty iff it has no valid arguments. My argument shows that there is an incompatibility between some claims that a proponent of an empty logic should be able to make and the valid arguments of such logics.

At this stage of our logical knowledge, I think that one must be able to assert the following about empty logics:

E1. An empty logic must be used in the metatheory of an empty logic.

E2. The metatheory for an empty logic must be empty.

E3. The use of an empty logic for the metatheory of an empty logic is not possible.

E4. The empty logic [TSω, STω, [({})c,{},{}({})c]] of Pailos (2021) is different from the empty logic TS.

But E1-E4 cannot be expressed in an empty logic. (At any rate, they cannot be validly concluded in an argument using an empty logic.)

This serves me to offer variants on

•Girard-Tanaka's Conjecture: A normativist about logic must use a metalogic that is no stronger than their object logic, on pain of producing bad outcomes.

as well as to a stronger version of this, namely

•Homogeneity Thesis: For a normativist about logic, the logic used for the metatheory of an object logic L must be L itself.

The structure of the conference is as follows. First, I give a presentation of what empty logic is and how we can obtain it. In the second section, I show the incompatibility between B1-B4 with the set of valid arguments that a proponent (normativist) of an empty logic might hold. In the third section, I offer some variants of Girard-Tanaka's Conjecture and Homogeneity Thesis in order to consider these limit cases of a logic.

Symposium continues in the same room, next time slot.

10:30 – 11:00 COFFEE BREAK

11:00 – 12:00 INVITED SPEAKER: MAYA GOLDENBERG

AUDITORIUM 1

INVITED SPEAKER

Maya Goldenberg (University of Guelph)

Myth-Busting or Meaning-Making?
Public Science Communications and the Infodemic

Chair: Atocha Aliseda (Universidad Nacional Autónoma de México, and Universidad Nacional de Educación a Distancia)

Topic: B.7 Educational Aspects of Philosophy of Science

Abstract: A growth area of public-facing science communications during the COVID years has been the counter-offence against misinformation. Since the start of the pandemic, legions of well-intended healthcare practitioners, scientists, and concerned citizens have taken to social media platforms to debunk myths and provide corrective facts (e.g., Chowdhury 2019; Dockterman 2021). These efforts were buoyed by the urgency of the so-called "infodemic"—a catch-phrase that's been spelled out using martial metaphors in the fast-growing body of misinformation studies research—as well as emerging cognitive and social psychology research into strategies for addressing misinformation, such as debunking, pre-emptive inoculation, and nudging. The heroics of these self-styled arbiters of truth have been captured in emotional news stories recounting on-line harassment and doxing by their critics, and their brave persistence despite these threats (e.g., Hotez 2021).

Yet this concentrated focus on the epistemic status of propositional claims has serious limits. While communications research has enthusiastically undertaken research into misinformation (van der Meer and Jin 2020), the field also offers important insights that undermine the soundness of "myth-versus-fact" message frames as communications practice. Serious consideration of communication as meaning-making (Horst and Davies 2021), especially in the fraught social context in which the infodemic has flourished, points to difficulties with the interpretive story line (or "master narrative") that the myth-busting message frame conveys. These considerations support an alternative focus on trust-building for science communications to the publics (e.g., Flew and Jiang 2021).

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12:00 – 13:00 INVITED SPEAKER: PETER VICKERS

AUDITORIUM 1

INVITED SPEAKER
Peter Vickers (Durham University)

Identifying future-proof science (in astrobiology)

Chair: Francisco Álvarez (Universidad Nacional de Educación a Distancia)

Topic: B.1 Methodology

Abstract: Is science getting at the truth? The sceptics—those who spread doubt about science—often employ a simple argument: scientists were ‘sure’ in the past, and then they ended up being wrong. They ask: given the history of science, wouldn’t it be naïve to think that current scientific theories reveal ‘the truth’, and will never be discarded in favour of other theories? Through a combination of historical investigation and philosophical-sociological analysis, Identifying Future-Proof Science (2022) defends science against such potentially dangerous scepticism. It is argued that we can confidently identify many scientific claims that are future-proof: they will last forever, so long as science continues. How do we identify future-proof claims? This appears to be a new question for science scholars, and not an unimportant one. It is argued that the best way to identify future-proof science is to avoid any attempt to analyse the relevant first-order scientific evidence, instead focusing purely on second-order evidence. Specifically, a claim is future-proof when the relevant scientific community is large, international, and diverse, and at least 95 per cent of that community would describe the claim as a ‘scientific fact’. In the entire history of science, no claim meeting these criteria has ever been overturned, despite enormous opportunity. Finally the theory is put to use: I examine whether or not there are any future-proof claims in the field of astrobiology.

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11:00 – 13:00

AUDITORIUM 2

11:00 – 11:30

Christopher Bottomley (Productivity Commission), Timothy Williamson (Global Priorities Institute, Faculty of Philosophy, University of Oxford) - Rational Risk-Aversion: Good Things Come To Those Who Weight.

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: There has been much discussion about how to go beyond orthodoxy in dealing with risk. One popular approach is to replace the orthodox Expected Utility Theory (EU) with Risk-Weighted Expected Utility Theory (REU, defended in Buchak 2013). This theory has two important features: (i) It allows for a range of reasonable preferences that EU problematically prohibits, and (ii) It is backed up by a plausible folk-psychological interpretation of risk-attitudes. Our goal here is to argue against REU, motivate an alternative risk-sensitive theory, and show that this alternative offers a better framework for assessing catastrophic risks than do EU and REU.

First, we show that REU rests on shaky axiomatic grounds. In particular, REU requires that rational risk-averse agents violate the Betweenness axiom, which says that if you are indifferent between two acts, you must be indifferent between those acts and any lottery over them. So, according to REU, risk-sensitivity entails randomization-sensitivity. But risk-sensitivity without randomization-sensitivity is reasonable—indeed, randomization-sensitivity cannot be motivated in the same intuitive way that risk-sensitivity can. So, we should look elsewhere for an account of rational risk-aversion.

Second, we sketch a novel version of Weighted-Linear Utility Theory (WLU, first introduced by Chew 1983). Like REU, WLU is compatible with the reasonable preferences that EU prohibits and admits a plausible folk-psychological interpretation. Unlike REU, WLU respects the Betweenness axiom and so does not require objectionable randomization-sensitivity. So, WLU gives us everything that we want from a risk-sensitive decision theory, without REU's drawbacks.

Finally, we outline one key benefit of our approach over Buchak's. According to REU, risk-attitudes are stakes-insensitive—your avoidance of (or proclivity towards) risk is settled independently of the magnitude of potential losses and gains you face. Our approach, however, is stakes-sensitive.

This benefit is clearest when we consider policy implications. To that end, we sketch Buchak's (2019) approximation of the Precautionary Principle (PP) and show that its verdicts depart significantly from standard versions of that principle. For example, Buchak's principle recommends caution when there is no chance of serious harm. An REU-inspired version of the PP therefore requires that we bear the significant costs of caution in more cases than do other versions of the PP. This underweights the value of venturesomeness and is at odds with standard good practice in public policy. Because our preferred WLU is stakes-sensitive, however, it vindicates a version of the PP that requires caution is only when making decisions that might inflict catastrophic harms. WLU also therefore vindicates plausible precautionary reasoning that gives due weight to the importance of avoiding catastrophes, while rationalizing and respecting many standard verdicts in policy.

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11:30 – 12:00

Sander Beckers (University of Amsterdam), Joseph Halpern (Cornell University), Christopher Hitchcock (California Institute of Technology) - Causal Models with Non-causal Constraints.

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: Structural Equation Models (SEMs) are widely used in the sciences to represent causal systems and facilitate inferences about them. (Pearl 2009, Spirtes and Zhang 2016) SEMs have also been used to analyze philosophical concepts such as actual causation (Hitchcock 2001, Halpern and Pearl 2005, Halpern 2016) and rational decision (Meek and Glymour 1994, Hitchcock 2016, Stern 2017).

A standard feature of SEMs is that it is possible to intervene simultaneously on every combination of variables in the model. This means that standard SEMs cannot include variables that stand in non-causal relations with one another. For example, a model that included variables for temperature in Fahrenheit and for temperature in Celsius would allow us to represent meaningless interventions that set these variables to incompatible values. Moreover, such a model might lead us to absurd conclusions: Controlling for temperature in Fahrenheit, no other variable makes a difference for temperature in Celsius, and vice versa; thus, each variable has no other causes (!). Nonetheless, the are scientific contexts where it may be useful to include variables that are subject to non-causal constraints. For example, total cholesterol is the sum of high density, low density, and very low density cholesterol. We may wish to include each subtype of cholesterol in a model, since heart disease risk responds differently to each. However, we may also wish to include total cholesterol, since it is easier to measure. There may also be philosophical problems where it would be useful include variables subject to non-causal constraints in a causal model. For example, if one's mental state supervenes on the physical state of one's brain, the variables representing mental state and physical state will be subject to non-causal constraints. One might nonetheless wish to include both variables in a causal model to address issues concerning mental causation. (See e.g., Gebharter 2017)

We will present an amendment to the standard formalism for causal models that permits the inclusion of variables subject to non-causal constraints. The resulting formalism can be given a sound and complete axiomatization. The formalism also has a couple of additional interesting features: First, it permits us to draw inferences from incomplete information about interventions. Second, it allows us to represent different types of intervention on the same variable.

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12:00 – 12:30

Kevin Zollman (Carnegie Mellon University) - Is “progress through bias” a good idea?

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: In Science as a Process, David Hull makes the provocative claim that science progresses “through bias and commitment” (Hull 1988, 32) The idea that individual-level biases might scale up to create social-level epistemic goods in science has been echoed by others (e.g. Solomon 1992; 2001; Kitcher 1993). Central to these claims is that bias creates cognitive diversity which benefits science as a whole while also harming the individual scientists. If people have biases, these philosophers claim, it will lead them to distribute themselves among scientific projects more effectively than if they were unbiased.

This strong claim is difficult to test. Historical scientists have been biased in some ways. Indeed, science has progressed. We have no comparison class, with perfectly unbaised scientists, against which to judge Hull’s claim. In this paper, I employ network epistemology models determine if it is possible for science to progress through bias. In particular, I modify the framework developed by Zollman (2007; 2010) and Weatherall, O’Connor, and Bruner (2020) to model the value of cognitive diversity in science.

Through an extensive analysis of the computational model, I confirm that bias is one way of achieving cognitive diversity. It is, however, a fragile one. If designed in just the right way, balanced biases can be the most effective method for preserving optimal amounts of cognitive diversity. However, in the wrong type of social networks, it can be catastrophic. If there is the wrong kind of correlation between bias and social location – in the extreme case – science would be totally unproductive.

Comparing this model to the work of Weatherall, O’Connor, and Bruner (2020), I argue that this represents a significant concern for the social epistemology of science. Outside influence can potentially alter network structure in harmful ways. This paper illustrates a novel manipulation: finding biased scientists and making them socially central. I compare this possibility to distinct mechanisms suggested by (Holman and Bruner 2017; Weatherall, O’Connor, and Bruner 2020)

The paper concludes that Hull’s paradoxical claim is plausible, science may be benefited by bias. However, it would require special circumstances. The fragility of this mechanism makes it unreliable. Efforts to confront scientist’s biases are likely to be epistemically productive.

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12:30 – 13:00

Jingyi Wu (Department of Logic and Philosophy of Science, University of California, Irvine) - Better than Best: Epistemic Landscapes and Diversity of Practice in Science

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: When solving a complex problem in a group, should we always choose the best available solution? In this paper, I build simulation models to show that, surprisingly, a group of agents who randomly follow a better available solution than their own can end up outperforming a group of agents who follow the best available solution. The reason for this relates to the concept of transient diversity in science (Zollman 2010). In my models, the "better" strategy preserves a diversity of practice for some time, so agents can sufficiently try out a range of solutions before settling down. The "best" strategy, in contrast, may lock the group in a suboptimal position that prevents further exploration. In a slogan, "better" beats "best."

My models are adapted from Lazer and Friedman (2007)'s model where a network of agents is tasked to solve an NK landscape problem. Here, agents search in a solution space with multiple "peaks." They only have knowledge of their neighbor's solutions, as well as (sometimes) the results of limited local exploration, so they may fail to ever discover the global optimal solution(s). The NK landscape model can be fruitfully applied to cultural innovation and problem solving, especially to complex problems where optimal solutions are not readily accessible from all starting points. Moreover, NK landscape models are more general and realistic than other epistemic landscape models (e.g. Weisberg and Muldoon (2009)), due to their ability to represent multi-dimensional and interconnected solutions (Alexander et al. 2015).

My result of "better" beating "best" has several implications in social epistemology. First, this is another instance of the Independence Thesis, which states that individual and group decision-making can come apart (Mayo-Wilson et al. 2011). In my models, every round, an agent's epistemic gain when they follow the "better" strategy is no greater than when they follow the "best" strategy, yet, they have greater long-term gain in a social setting.

Second, Zollman (2007, 2010) and Lazer and Friedman (2007) previously showed that a less connected community is more likely to arrive at superior beliefs or solutions, due to the transient diversity present. But limiting connectivity for the gain of diversity of practice may be too costly or impractical (Rosenstock et al. 2015). My result suggests that we can achieve comparable benefits if instead people choose "better." Indeed, a completely connected group that follows the "better" strategy can outperform a very sparsely connected group that follows the "best" strategy.

Finally, insofar as some approaches to a problem are associated with particular social groups (Longino 1990; Fehr 2011), the "better" strategy also makes it more likely to preserve solutions arising from marginalized perspectives. These solutions may not be the most optimal at a given time, perhaps due to a historical lack of resources, but may nevertheless become promising after further explorations.

ROOM 01

(MTI) From previous time slot, same room.
Symposium: Models, Theories, and Idealizations

11:00 – 11:30

Cecilia Hidalgo (Universidad de Buenos Aires) - Interpreting climate models: Lessons from seasonal forecasting meetings in Argentina

Topic: B.1 Methodology

Abstract: Climate sciences, especially climate models, have recently been the focus of intense philosophical and epistemological analysis, whose main outcomes are presented and summarized in the books by Winsberg (2018) and Lloyd & Winsberg (2018). In this contribution, I want to address the issue from the point of view of the working climate scientist, according to my experience as a member of a large interdisciplinary team devoted to producing seasonal forecasts.

The role and meaning attributed to climate models are discussed through the analysis of the experience of scientists and professionals working at operational meteorological and hydrological institutions in Argentina, who meet monthly to provide a seasonal forecast.

Because climate services depend critically on diagnostics of recent conditions and predictions/projections of regional climate, climate models clearly constitute an important focus of research and debates. Nevertheless, as the information produced is aimed at assisting decision making in climate-sensitive sectors (e.g., agriculture, water resources, human health), progress in climate knowledge must be matched by a commensurate understanding of how natural and social sciences can inform and support climate-resilient decisions and policy. This requires the active involvement of a broad disciplinary spectrum of scientists and practitioners able to work effectively at the interface between research and decisions, coproducing actionable knowledge with actors from climate-sensitive social sectors. Thus, the scope of the backgrounds and vision of those who attend the meeting tends to broaden.

It is claimed that in this context, although climate models are seen at first glance as a huge advancement able to help avoiding subjective assessments and interpretations of such a wide spectrum of participants, their still low systematic skills make models´ outputs unreliable and sometimes even useless to inform action per se. Distrusted as representations of the target system, the role of the variety of climate models considered in each meeting becomes mainly that of an input allowing collective reasoning and inferences.

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11:30 – 12:00

Rodrigo Lopez-Orellana (Universidad de Valparaíso) - Target systems and the role of surrogative reasoning in the internal process of scientific modeling

Topic: B.1 Methodology

Abstract: Based on the study of the use of models in empirical sciences, mainly from biology, I present in this talk a new pragmatic epistemological approach to target systems as products of scientific modeling, but complex and independent. As Cassini (2018) points out, target systems should not be identified with selected phenomena nor with selected portions or aspects of phenomena. Thus, the interactive role played by target systems is discussed here in their relationship with the respective

model and within the framework of the inferential dynamics proper to modeling practice, i.e., surrogate reasoning. In this way, an epistemic turn is proposed: we set the focus on target systems in order to 1) understand more clearly the type of relationship between models and phenomena; 2) specify the scientific process by which the target systems are produced. Overall, this turn would justify the ontological distinction between target systems and phenomena as an immediate consequence.

In this regard, the motivation of this talk is thus to open and discuss a new perspective on models (i.e., their functions and uses) in such a way that it would allow us to limit the representation's domain, the exaggerated emphasis on scientific explanation and the imposed connection between laws and theoretical explanation (Cooper 1996; Nersessian 1999; Lopez-Orellana et al. 2019). More specifically, this proposal attempts to properly define a target system along with its function in the modeling process. In the last two decades, non-representational and inferentialist approaches have been developed as very suggestive answers to the perspectives that insist on the formal and representationalist characterizations of modeling (MacLeod and Nersessian 2015; Knuuttila 2011). These approaches have been mainly focused on the notions of "model and representation", but they have not been able to address the issue by further reviewing what the target systems consist of or how the latter is selected. In short, the aim is to contribute to the philosophical discussion and enrich it by including new features on the relationship between models, target systems, and phenomena understanding this relationship as inferential dynamics inherent to scientific modeling and in terms of surrogative reasoning (Suárez 2004).

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12:00 – 12:30

Juan Redmond (Universidad de Valparaíso) - Modeling in science and surrogative reasoning: An interactive and dynamic perspective on hypothesis generation in the practice of scientific modeling.

Topic: B.1 Methodology

Abstract: It is widely agreed among philosophers of science that scientific models allow for surrogative reasoning concerning their target systems (Frigg & Nguyen 2020). The aim of our talk is to defend the idea that surrogative reasoning in modeling practice corresponds to the setting of an inferential agreement between the model and its target system. Indeed, according to Swoyer (1991: 449), surrogative reasoning is understood as the generation of hypotheses from the model and about its target system. Our point is that these hypotheses are not conclusions statically obtained in the

model and then transposed or assumed in the target system but are themselves the inferential and dynamic agreement established between the model and the target system as actors in an interactive game. Our proposal must be considered as feedback to Contessa's statement about surrogative reasoning: "an activity as mysterious and unfathomable as soothsaying or divination" (2007: 61). In this quotation Contessa refers to the 'obscure' relationship between epistemic representation and valid surrogative reasoning. However, in the present contribution we distance ourselves from the notion of representation and fill this gap pointed out by Contessa with a proposal that relates surrogative reasoning to a logical foundation. In summary, the perspective we defend, on the one hand, opposes the idea that surrogative reasoning should be understood as a type of representation-based thinking; on the other hand, we argue that surrogative reasoning should find its foundations exclusively in logic. To support the latter idea, we give the logical foundations of surrogative reasoning from the approach of dialogical pragmatism which we consider a suitable framework for this purpose. Indeed, Dialogic with its playful and dynamic semantics, allows us to capture interactive relationships and in particular, according to our proposal, the generation of hypotheses as an agreement established between the model and its target system.

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ROOM 02

11:00 – 11:30

Mateusz Chwastyk (Institute of Physics, Polish Academy of Sciences, Warsaw, Poland), Michal Oleksowicz (Nicolaus Copernicus University in Toruń, Poland) - Idealization and understanding. The case of molecular dynamics simulations.

Topic: C.3 Philosophy of the Biological Sciences

Abstract: Various trade-offs in scientific modelling reflect limitations of our theory and phenomena understanding, but also, they have to deal with the diversity of approaches and models. Our knowledge limitations, together with world's complexity, make idealizations much more permanent, but at the same valuable in the scientific practice. In order to argue for the crucial role of idealization in biological structures understanding, we focus on the case of molecular dynamics (MD) simulations.

First of all, we present the theoretical methods which allow for description of main features of pathogenesis-related proteins of class 10 which are among the most curious plant proteins. To fully understand protein dynamics, it is necessary to describe their creation process inside the ribosome which is a biomolecular nanomachine that performs protein synthesis. Secondly, we discuss some recent studies on the nascent behaviour of three model coarse-grained proteins in six rigid all-atom structures representing ribosomes that come from three domains of life (Chwastyk and Cieplak 2021). The synthesis of the proteins is implemented as a growth process. One of the studied structures is the bacterial YibK which is knotted in its native state. A fraction of the trajectories results in knotting and the probability of doing so is largest for the bacterial ribosomes. We point out that relaxing the

idealized condition of the rigidness of the ribosomes should result in a better avoidance of trapping, better proper folding and finally, for better understanding of the protein folding phenomenon. Thirdly, we show how the molecular dynamics simulations are useful in description and understanding of mechanical stability of SARS-CoV-2 virus spike protein and its impact on the increasing spread of COVID-19.

The idealizations present in the above-mentioned models of the MD simulations do not represent explanandum despite their incompleteness or falsehoods, but in virtue of being employed. We argue that the idealizations add positive representational content and promote other desirable theoretical virtues. One of the most common distortions of MD models is decreasing of the number of considered details. For example, within coarse-grained models, the protein is not considered as a structure composed of atoms, but composed of amino-acids represented by beads. Such solution allows for decreasing the complexity, time and cost of simulations. In consequence, we can reach much longer time scales and we can describe much larger conformational changes, which are crucial for proper protein behaviour. Our case study nicely shows that the MD models start as hypothetical concepts in a series of models with increasing complexity enabling for more general theoretical claims. If it is so, it means that idealizations are working not only for building models but also, they guide our experiments allowing for verification of models. Thus, idealizations are flexible tools for developing scientific understanding of the explanandum.

References

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11:30 – 12:00

Alan Love (University of Minnesota) - The place of functional morphology in 21st century evolutionary biology.

Topic: C.3 Philosophy of the Biological Sciences

Abstract: Toward the end of the 20th century, a cutting-edge area in organismal biology was functional morphology (Dullemeijer 1981; Galis 1996; Lauder 1990). It largely steered clear of adaptationist reasoning (Amundson and Lauder 1994), while maintaining an integration of form and function that was framed by the inferential capacities of phylogenetic systematics. However, the place of functional morphology within evolutionary biology remains ambiguous. It is absent from recent discussions of an extended evolutionary synthesis—despite its centrality to the emergence of evo-devo—and is excluded from most standard textbook treatments. To what degree is functional morphology a necessary element in the structure of evolutionary biology?

In this paper I argue that functional morphology does and should hold a distinctive place in 21st century evolutionary biology. Descriptively, there are numerous ways in which existing work in functional morphology, especially in concert with biomechanics and paleontology, already plays a special role in evolutionary biology. This can be observed from history and in contemporary analyses, such as taxon specific explorations (e.g., Wake 2009) and studies of ecologically relevant dimensions of morphology (e.g., Ferry-Graham et al. 2002). Normatively, functional morphology brings a set of methodologies and models that provide necessary resources for adequately explaining the evolutionary trajectories of different traits, such as the concept of performance, which links morphology and habitat use to fitness (Arnold 1983; Irschick 2002).

I conclude by indicating how functional morphology can link arms with a different interdisciplinary ally—developmental biology—to help establish a sound, theoretical basis for the

character concept assumed in evolutionary analyses (Wagner 2001). Recent work on the mechanistic basis of characters in development using the notion of Character Identity Mechanisms (e.g., DiFrisco et al. 2020) provides resources for generating more projectable categories in functional morphological analyses, which—in turn—can yield more precise and explanatory evolutionary generalizations.

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12:00 – 12:30

Daniel Nicholson (George Mason University) – The Ghost of the Machine: Obstacles in the Path of a Theory of Organismic Agency.

Topic: C.3 Philosophy of the Biological Sciences

Abstract: The layperson would almost certainly be surprised to discover that biology lacks a theory of organismic agency. After all, biology is the science of life, life comes in the form of organisms, and anyone who has observed any organism knows they are agential beings. Organisms are not merely passive or reactive; they are active. They affect, and in turn are affected by, their environment. And they behave in ways that allow them to preserve their existence over time. So why doesn't biology already have a well-developed theoretical understanding of organismic agency? I will suggest in my talk that the reason for this is that the recognition of organismic agency conflicts with the general metaphysical framework that gave rise to modern science. This framework—often referred to as mechanicism—conceptualizes nature as a giant piece of clockwork that operates deterministically, that can be described mathematically, and that can be explained reductionistically. Only by conceiving of the world (and everything in it) in such stark mechanical terms did it become amenable to scientific explanation. Ironically, the success of this view in physics gradually led to its own demise, as it became progressively apparent to physicists that nature is not in fact fundamentally mechanical or deterministic or even explainable reductionistically. But biology, unlike physics, never abandoned mechanicism. The Cartesian idea of the bête-machine survived the Darwinian revolution (despite it originally presupposing a Divine Creator) and was actually strengthened by the spectacular success of molecular biology during the latter half of the past century. To think of an organism, or even a single cell, as a complex piece of machinery seems natural and unproblematic to most biologists. And that

is precisely the problem, for machines are instruments of agents—they lack agency of their own almost by definition. Once we understand this, it no longer comes as a surprise that we lack a well-developed theory of agency. To recognize the agency of organisms is to reject the machine conception of the organism. By emancipating ourselves from this historically influential yet theoretically pernicious notion, it becomes possible to lay the foundations of a theory of organismic agency. I will discuss how non-equilibrium thermodynamics already provides us with a rigorous foundation upon which to develop such a theory, and I will outline what such a theory might look like.

12:30 – 13:00

Lavinia Ferrone (Department of Biomedical Sciences, University of Padua), Luca San Mauro (Institute of Discrete Mathematics and Geometry, Vienna University of Technology) – Buridan's Cell.

Topic: C.3 Philosophy of the Biological Sciences

Abstract: The story of Buridan's ass (BA) refers to the following thought experiment: a donkey D, placed between two equidistant and identical piles of hay, would not be able to choose between the two — and thus, it would paradoxically starve to death. The paradox poses a challenge to the proponents of hard determinism (among others). That is, assume that D always moves to whichever pile is closer. Then, in order to escape the unwelcome conclusion that D would die, one must acknowledge that some nondeterministic mechanism (e.g., randomness or free will) is in action. Another common take is that BA strictly concerns rational behavior, by undermining the principle that (rational) choice implies (rational) preference. Indeed, if such a principle would hold unrestrictedly, then nonpreference would imply nonchoice — leaving the donkey with no reason to move.

In this work, we'll discuss a microscopic analogous to Buridan's paradox, labeled BC, by replacing the donkey with a biological cell. Although our variant of the paradox won't concern rationality, we'll argue that BC is at least as hard to dispel than BA, as any possible solution would require to support a strong, and maybe unpleasant, biological assumption. The basic design of our thought experiment will closely resemble that of BA:

Setting: A mammalian cell C, plated under starving conditions in a culture well, is chemoattracted by two equidistant and identical sources of nutrients. Question: How would C behave in such a scenario?

We'll refer to the literature on cellular motility to carefully discuss the main possible alternatives on the behavior of C. We'll pay special attention to counter hasty attempts of putting the paradox on the corner. We'll discuss, in particular, the theoretical cost and the biological plausibility of the following alternatives:

(1) C won't move — in fact, there is no paradox at all;
(2) The behavior of C depends on its genetic makeup;
(3) The behavior of C depends on some nondeterministic mechanism.

ROOM 03

(FEYER)
Symposium: Symposium Paul K. Feyerabend (Second part)

11:00 – 11:30

Matthew J. Brown (Southern Illinois University) – Science and Imagination in an Abundant World: Feyerabend's Epistemological Anarchism as Philosophy of Creativity.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: In this talk, I provide an interpretation and defense of Paul Feyerabend's philosophy of science on the background of his late metaphysical writings. I argue that Feyerabend provides a compelling critique of mainstream epistemology and philosophy of science as squelching the creativity and imagination necessary for scientific progress. Imagination and creativity are crucial elements of the scientific process, for Feyerabend, due to both the nature of the reality science seeks to explain and control, as well as to the limits of human thinking. This background picture (developed chronologically last in Feyerabend's thinking, in *Conquest of Abundance*) best explains Feyerabend's continued insistence on scientific imagination, his early attack on "conceptual conservatism," his epistemological anarchism (the argument against method), his "principles" of proliferation and tenacity, and his complex struggles with realism and relativism.

Feyerabend's metaphysics is ontologically pluralistic and antiessentialist. He claims that nature is abundant, ambiguous, incomplete, not structureless but rich with complex, overlapping, conflicting structures, a complex mix of determinacy and indeterminacy, safety and hazard for human life and thought (Brown 2016). Nature is both pliable, admitting of multiple possible successful descriptions and manipulations, as well as resistant, in that not all descriptions and manipulations are equally successful (Tambolo 2014). Human perception and cognition must abstract away most of the complexity of the world around us, in order to be able to manage using limited resources. Science is a further development of our basic cognitive capacity to manage the abundance and complexity of the world. But abstraction is a vexed gift; the limits of any single perspective or framework tend to remain out of view, giving us a tendency towards closed-mindedness.

The limited pliability of the world, along with the human tendencies towards abstraction and closed-mindedness, require a philosophy of science grounded in an epistemology of creativity. Feyerabend worked throughout his career to defend such a view. Scientists must have the freedom to exercise their imagination to help us successfully manage the abundant world. They must also learn how to exercise that imagination responsibly to meet the challenges of our contemporary world. However, Feyerabend also warns us against an overly individualistic interpretation of creativity as inexplicable acts of inspired genius. We require a social epistemology of creativity to inform our philosophy of science.

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11:30 -12:00

Paloma Santos (Graduate Program in the Arts, State University of Rio de Janeiro (PPGARTES / UERJ)), Virginia Chaitin (Independent Researcher), Paulo Picciani (universidade federal do rio

de 347eyerab), José Helayël-Neto (Brazilian Center for Physics Research (COSMO – CBPF/MCTI)) – Other epistemologies: the relevance of the arts in 347eyerabendian thought.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: We have based our paper on Feyerabend's 1967 article on Ionesco's theater where the author of "Against Method" recognizes that in the XXth century the Arts provoked a radical rupture on methods and habitual associations of thinking. This is in tune with the current aesthetic assumption that, since modernism, artistic production is philosophical and, to some extent, epistemological, in inaugurating an original system of thought and practical operations in life. However, despite the great cultural impact of these ideas, the scientific community remains mostly dogmatic, protecting itself from its influence. The scientific notion of "basic principles" is not yet overthrown, despite the various 'revolutions' of the twentieth century. Fayerabend argues that it was only in the arts that criticism was taken, deliberately and radically, to the point of dissolving the very elements of representation and expression: Cubism and Dadaism are invoked to describe an anarchistic epistemology in which no absolute methods or rules are accepted, and procedures as inversions and disruptions prevailed over established ideas of "order" in the quest for understanding. We also recognize a strongly emphatic Fayerabend on language, employing argumentative strategies that characterize his pamphletary argumentative style, comparable to the absurd and the nonsensical in the theater of Ionesco, Brecht and Peter Weiss. Ionesco's dramaturgy is in fact considered by Feyerabend to be a method and, since Dadaism and Cubism were so highly quoted by Feyerabend as methodological references for the reevaluation in ways of thinking, in this paper we bring together renowned art critics and philosophers for a deeper understanding of this modernist legacy. In effect, these radical semantics were reevaluated by the 1960s neovanguards. Since Dadaism and Cubism worked as models, mostly regarding their linguistic procedures and expressions of irreverence and humor, and also agreeing with Ionesco that "like any system of government, an established form of expression is also a form of oppression" (Ionesco apud Feyerabend, 2008, p.303). Our aim is, therefore, to inquire the extent of this contagion and if it is possible to correlate theories, methodologies, procedures, inspirations, strategies, practices and in the final analysis ethics in both artistic and 347eyerabendian realms. In conclusion we emphasize that the 347eyerabendian concept of "epistemological anarchism" is less akin to political theories, resonating more with the arts.

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12:00 – 12:30

Virginia Chaitin (Independent Researcher), José Helayël-Neto (Brazilian Center for Physics Research (COSMO – CBPF/MCTI)), Paloma Santos (Graduate Program in the Arts, State University of Rio de Janeiro (PPGARTES / UERJ)), Paulo Picciani (Professor Eloisa Mano Macromolecules Institute, Technology Center, Federal University of Rio de Janeiro (IMA/CT/UFRJ)) – Transgressive Sciences: Imagining dialogues between Feyerabend and Dirac.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: We are approaching two important centennials, Paul Feyerabend's birth in 2024 and the first two seminal works on quantum mechanics by Paul Dirac and Werner Heisenberg in 2025. Motivated by both occasions, we propose this interdisciplinary research involving epistemology, philosophy of science, art, aesthetics, and physics to discuss the contrast between Feyerabend's and Dirac's ideas, bearing in mind that both men were admirable transgressors, each one in his own domain. To cover this discussion, we present their views about science and scientific methodology, with their common purpose of attempting to embolden the scientific community. Paul Feyerabend was initially known as a philosopher of quantum physics, but extended his critique towards science in general, becoming the most striking voice in favor of theoretical, methodological, epistemological, and finally ontological pluralism. He was an ardent defender of skepticism in science and diversity in forms of knowledge and worldviews. In dialogue with Popper, Kuhn and Lakatos, Feyerabend was a fundamental voice for what today is known as the effort for the decolonization of knowledge, thanks to his radical epistemological criticism to the unity and pervasiveness of a rational method for science, diverging from the traditional criteria that support "scientism". Arguing that scientists' creativity should not be – and in practice is not – constrained by prescriptive methodological rules, Feyerabend did not believe in an evolutionary picture of scientific knowledge, given the incommensurability of scientific theories, especially when they are conceptually framed and entail intrinsically different ontological pictures. As for Paul Dirac, one of the founders of Quantum Mechanics, he was the first to predict new forms of matter on purely theoretical grounds, through so-called symmetry principles. Dirac advocates that aesthetics and minimalism of principles must be the basis for a good theory, claiming the unification of mathematics and physics in the future, so that a physical law must possess "mathematical beauty". When defending ideas of harmony, Dirac was inspired by the correspondence between the universe and mathematics, although he doesn't have a dogmatic point of view of pre-existing "laws of nature"; as his cosmology attests, those laws would continually change with epoch. Dirac thought in terms of an evolutionary picture of science, where eventual inconsistencies would be resolved by new, mathematically formulated theories, considering that "transformations" play an important role in modern physical theory. In the course of this research, it became clear to us that, in spite of holding very distinct positions, both thinkers were defenders of creativity and intellectual freedom, bold and eventually controversial proposals in science, which might contradict contemporary well accepted theories and empirical evidence, in favor of the scientist's liberty and self-determination to follow his own insight.

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12:30 – 13:00

Lília F.S. Queiroz (Federal University of Bahia), Deivide G. S. Oliveira (Federal University of Reconcavo of Bahia) – Scientific Errors in Feyerabend's Phylosophy.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: The aim of this article is to understand the fundamental role of scientific errors for the progress of scientific knowledge according to Feyerabend's pluralism. When Feyerabend states in his work Against Method that "errors are preconditions of progress" (1993, p. 158) the author highlights,

on the one hand, the positive aspect of scientific errors in science, and, on the other hand, the role that errors perform in advancing knowledge. Which leads us to the following question: Why, Feyerabend's view of errors are fundamental to the progress of scientific knowledge? To answer this question, it is important to understand what progress means in Feyerabend's philosophy as much as its relation with his pluralism. As argued by Oliveira (2021), progress is directly related with cosmological divergent proliferation in Feyerabend's pluralism, based on two fundamental principles, namely: proliferation and tenacity (Oliveira, 2021). In this sense, the foundation for progress of knowledge occurs when alternative theories of a cosmological dimension are introduced, that is, by "promoting a rich proliferation in a divergent and critically sharp way" (Oliveira, 2021, p. 424), followed by a fruitful attempt to improve the alternatives in dispute, that is, the tenacity of theories. Thus, errors are defined within the debate between theories as "deviations from the accepted point of view" (1970, p. 38–9), in other words, errors need a point of view for their existence. Based on this understanding of what an error is and its relation to progress, we argue in favour of a relationship between the principles of proliferation and tenacity with errors. The proliferation of theories allows us to have multiple forms and kinds of errors, as much as a competition and comparison between them. This increases debate, criticism, arguments and might promote progress followed by change. Since our knowledge contains elements that can only be revealed by other theories, not by facts, on many occasions our best theories offer "partial" or "plausible" explanations for the complexity of nature. Similarly, there are errors only revealed by pluralism and other errors. In the history of science, theories considered "wrong" may return as "correct", and we do not know whether a theory that is now correct may prove to be "wrong" in the future. The retention of theories is another aspect of the principle of tenacity. Thus, errors are part of what leads us to explore new alternatives and, consequently, push tests, criticisms and changes in knowledge, therefore, knowledge progress.

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ROOM 04

11:00 – 11:30

Fermín Marconi (Universidad de Buenos Aires) – Drawing the Line in Poverty Measurement Debates

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: How do economists determine someone is poor? How many poor people are there? Neither the definitions nor the attempts to measure poverty have historically been without controversy, but in recent decades, coinciding with a growing interest in the word, the debate has witnessed a proliferation of proposed classes of poverty measures (be they absolute or relative, global or national, multidimensional or monetary, to name but a few common labels), as well as arguments for and against them. How do experts argue on these matters, reaching agreements (if they do) and considering some estimation procedures sound while ruling others out? What values – epistemic or

extra-epistemic – guide this process? Poverty, with its complex semantics, simultaneously embedded in social discourse, in axiomatically grounded mathematical descriptions, in the practice of government, in normative presuppositions, and in the conventions of researchers and statistics bureaus, provides a case study to bridge model-based accounts of measurement with social approaches to quantification.

The construction of a poverty index involves different types of assumptions, whether methodological (e.g. the reliability of data collection), theoretical (e.g. related to the market provision and valuation of a consumption set), or normative (e.g. who determines the weights in the formula). However, the correspondence between indices and sets of assumptions is not biunivocal. Rather, economic and ethical theories have co-evolved with the practice of measuring and governing poverty. This co-evolution happens precisely because of the theory-ladenness of measurement. Therefore, understanding the logic of measurement is necessary to elucidate the way economists argue about poverty, the dynamic relationship between measurement and theory, and ultimately the social dimensions of this practice of quantification.

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11:30 – 12:00

Ruth Pustilnik (Universidad de Buenos Aires – Facultad Ciencias Económicas -CIECE) – The evaluative dimension of economics: systematic reconstruction of the link between economy and values in the work of Adam Smith.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: This paper shows how Adam Smith's economic theory influences the formation of virtues or values that in turn legitimize economic theory itself.

We will carry out a rigorous and detailed reconstruction of how the sixth and final edition of The Theory of Moral Sentiments (TSM) of 1790 is modified. Especially in section VI that was added in full in this edition. We will show that many of these changes can be understood as a consequence of the publication of The Wealth of Nations (RN) in 1776.

We will focus on the virtue of prudence that appears developed in the VI part of TSM and we will connect it with the notion of frugality that appears developed in book II of RN, explainingin detail the strong influence that economic frugality has on prudence. As Grislow (1999:203) states, “Prudence is the bridge between the two books because it is both an economic and moral virtue.”

In RN Smith states: “Sobriety or parsimony and not industriousness is the immediate cause of the increase of capital” (201 2:306) and in TSM he argues that “In his incessant sacrifice of peace and present enjoyment for the sake of the probable expectation of greater slack and joy in a more distant period of time...” (2013:375). Such enjoyments will be greater” because present enjoyment is sacrificed to form a productive capital, the fruit of which will enable us to obtain more of it, than if we had consumed it without allowing the process of productive work to develop. So the virtue of prudence in TSM does not refer only to moderation or continence, but implies a productive investment in the sense of RN. On the other hand, productive investment thus becomes a virtuous action.

On the other hand, we will compare the prudence to which he alludes in book II of RN with the selfishness to which he alludes in book I, when he affirms “It is not the benevolence of the butcher ... The one who provides us with our food, are their own interest. We do not invoke their humanitarian feelings but their selfishness” (2012:17). Explaining how the author manages to reconcile a selfish action with a result not only convenient but virtuous. And so we will see how according to Smith the market through competition generates as much wealth as possible and also generates a virtuous situation.

We will emphasize that this is explained precisely because the virtues of the Smithian system are modeled from the characteristics that the author discovers and details of the market in RN.

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12:00 – 12:30

Zhicong Shang (University of Chinese Academy of Sciences), Wenyu Yan (University of Chinese Academy of Sciences), Xiteng Tian (Xinxiang Medical University) – **New Civic Epistemology of Data Method: A Case Study of Knowledge Disputes in the Making of China’s Fertility Policy.**

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: Abstract: In the making of China’s fertility policy, various knowledge disputes have emerged, and data method has gradually been confirmed in this process, being the core epistemological element of policy decision-making. This article argues that in the1980s, when the Chinese government initiated its fertility policy, data method begun to be a crucial consideration in the national policy-making and used Jian Song’s population cybernetics and centennial projection of Chinese population growth as the decisive knowledge support. Later in 2011, Chinese government was planning to initiate a new fertility policy. During this process, there immerged a fierce competition between two knowledge claims respectively represented by Zhenwu Zhai and Guangzhou Wang, who had great differences in respect of the accurate measurement of fertility rate and the child-bearing willingness of women. During this process, the accuracy of data method has gradually recognized by

the government and the public. Drawing on a coproductionist analysis of the interactions of the stakeholders, epistemology, nation's agenda, this article concludes that in the making of the two public policies, a new civic epistemology of data method for public policy-making has formulated, transforming not only knowledge production but also political institutions, identities, and representations.

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12:30 – 13:00

Petri Ylikoski (University of Helsinki) – Getting lost with levels: the sociological micro-macro problem.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: The intuitive notion of level is often employed by social scientists and philosophers of social science to conceptualize tricky theoretical challenges. While it serves as an organizing metaphor for thinking, its assumptions and implications are never fully articulated. Consequently, unacknowledged and unhelpful conceptual commitments may be introduced to the debate. In this paper, I will show how this happens in the case of the sociological micro-macro problem.

Sociology deals with phenomena in a wide variety of temporal and spatial scales, from an individual's cognitive and emotional processes to long-term changes in territorial societies. Connecting the data and theories of phenomena at these various scales is an important but thorny theoretical challenge. When combined with competing explanatory ambitions of different research traditions, fears (or fantasies) of reductionism, and general conceptual ambiguity, it is easy to

understand why thinking in terms of levels has felt tempting to many. However, we should avoid the temptation for three sorts of reasons.

First, conceptualizing the micro-macro problem in terms of levels misses crucial features of the problem. The levels mindset often abstracts away from the heterogeneity of micro and macro properties, making the discussion sterile and difficult to challenge. Similarly, it misses the contrastive nature of the micro-macro distinction: the social scientists use the distinction flexibly, and the same phenomenon can be either micro or macro depending on its contrasts. Finally, the focus on levels perspective makes it difficult to see that the relevant sociological questions are more about causation, dynamics, and history than about constitution or realization.

Second, the levels conceptualization introduces assumptions that are both unnecessary and unhelpful. For example, philosophers often automatically assume that the levels in the social sciences are both comprehensive and unique. However, neither of these assumptions has ever been demonstrated. On the contrary, there exist substantial challenges to such presumptions. Even the less assuming question: "how many levels are there in the social sciences?" might not have a meaningful answer. Furthermore, the levels mindset invites poorly justified causal assumptions. For example, the beliefs that there is some explanatorily privileged level or that causes and effects must be at the "same level" or of the same granularity lack independent justification.

Third, thinking about the micro-macro problem in terms of levels suggests solutions that are distractions from the point of view of the development of substantial social scientific theories. The conceptualization of the micro-macro problem has invited philosophers of social science to import conceptual tools from philosophy of mind. There has been a hope that concepts like supervenience, realization, and downward causation could help make sense of the micro-macro problem or the issues related to methodological individualism. However, this has been entirely unhelpful. The relation between micro and macro is not analogical to the relation between mind and brain. Furthermore, the debate has turned a substantial theoretical challenge into a philosophical puzzle that does not need any concrete social scientific concepts.

ROOM 05

11:00 – 11:30

Lada Shipovalova (St. Petersburg University) – The problem of post-normal science and scientific knowledge-how.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: The author starts with the concept of "post-normal science", which implies openness of science to social interactions, during which knowledge of actual problem situations is produced (Funtowicz, Ravetz, 1993). The idea of post-normal science is considered as a normative basis for the scientists' demand for the politicization of science (D. Easton); as a conceptual condition for grasping contemporary crises and the role of scientific expertise in resolving them; as a description of a contemporary science with the problematic status of a scientist-expert.

The report highlights the doubts that exist in contemporary philosophy of science on the extent to which the requirements of post-normal science are actually realized, as well as on the fundamental feasibility of these requirements. The author of the report believes that the work on these doubts is connected with the possibility of overcoming the contradiction between scientific validity and political relevance of research in relation to those sciences, the results of which have an

obvious social impact (climate sciences, social and political sciences, medical sciences during epidemics etc.). The report provides concretization of this issue. The problem is revealed through 1) the danger of science being included in political confrontations, 2) the violation of scientific objectivity, and 3) the inability to demarcate scientific and non-scientific knowledge. The author demonstrates that the solution of the problem turns out to be possible if the political relevance of science is interpreted and practiced as the interaction of scientists, the public and authorities, and scientific validity is revealed through attention to the concept of "knowledge-how".

The report pays special attention to the concept of "knowledge-how", which does not have an unambiguous definition. The first meaning presents the context of analytical philosophy (G. Ryle). The second meaning refers to the "performative turn" in science studies (A. Pickering). The third meaning specifies contemporary scientific expert knowledge included in the actual discussions of scientists with the public and authorities. (Bammer et al, 2020). The fourth meaning represents the reference to the intersubjective nature of experience at the positivist's studies of science (M. Schlick). The fifth meaning belongs to the authors of the concept of post-normal science, for whom knowledge-how characterizes the production of a scientific result and therefore includes, in contrast to knowledge-what, the imperfection of computing technologies, uncertainties, gaps, areas of lack of data, etc. (Funtowich, Ravetz, 1990). The author of the report shows how different ways of interpreting this concept can complement each other so that it is included in the solution of the problem of post-normal science.

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11:30 – 12:00

Alysha Kassam (California State University Fullerton) – Diagnosing the Accuracy Fairness Tradeoff in Machine Learning Algorithms.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Machine learning systems have been increasingly utilized in human decision making in both the public and private sector. For instance, machine learning algorithms are often used to produce predictions in various domains including job candidates' outcomes, susceptibility to loan payment, likelihood of recidivism, etc. Due to their ability to track and use massive amounts of personal data, machine learning algorithms have generated novel ethical concerns about fairness, privacy, and the control of information. More recently, scholars have noted that the outcomes associated with machine learning systems are often worse for racialized people, women, and other marginalized minorities.

In response to the ubiquitous application of machine-learning algorithms in decision procedures that directly impact peoples' lives, many modelers have developed an interest in algorithmic fairness, and a common view in the machine learning literature is that there is an inherent trade-off between accuracy and fairness. For example, in the criminal justice context, the accuracy of a decision is defined by how it best maximizes public safety, whereas, the fairness constraints aim to reduce racial disparities in decision outcomes (Corbett-Davies et al., 2017). The pre-existing machine

learning literature presents strategies for dealing with this inherent tension between accuracy and fairness by specifying the conditions under which the trade-off dissolves, arguing for why fairness should be scarified in favor of accuracy, or something in between (Dutta et al. 2020; Chen, Johansson, and Sontag 2018; Bakker et al. 2019; Menon and Williamson 2018). However, very few scholars have actually challenged the assumptions that casts fairness at odds with accuracy.

In this paper, I examine how the way accuracy and fairness are defined and operationalized results in the inherent trade-off between them. I refer to the current debate in the values in science literature concerning how epistemic and non-epistemic values should be distinguished in scientific reasoning to better understand why accuracy and fairness are considered to be at odds with one another. There is no reason to assume that fairness and accuracy must be in tension with one another. Instead, modelers choose to incorporate assumptions in their models that cast fairness in direct opposition to accuracy and what guides these choices are oftentimes non-epistemic values. More specifically, I focus on the way accuracy is defined in the literature and argue that although accuracy is meant to be a purely epistemic notion that is conducive to truth and rational belief, in this context, it incorporates non-epistemic considerations.

12:00 – 12:30

Samuel Maia (Federal University of Minas Gerais) – Normative validity: the case of poverty measures.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Here, I elaborate on Alexandrova's notion of normative validity (2017: 151): the property of a measure that adequately reflects its targeted concept's normative aspects (moral and political). The sense of validity with which I work here is one of the social sciences and public policy: the ability of a measure to represent a concept adequately. Normative validity (NV) is aimed to deal with concepts that express descriptive and normative judgments. If we assume that these normative elements cannot be eliminated, we must ensure that our measurements adequately reflect them. In measurement construction, this is what the notion of NV seeks to address.

NV comes with two special requirements. First, scientists should be transparent regarding the normative choices involved and the contingency of the descriptions based on their measures. Second, it urges us to decide who should make these choices: Only experts or non-experts too? The adequate answers to these questions are contextual: they depend on what concept a measure is based on, and for what purpose it is being developed.

To illustrate NV, I take as an example the concept of poverty (Müller & Neuhäuser 2011; Dupré 2012; Schweiger 2020). It is a valuable concept insofar as social scientists have developed several methods to make the normative aspects involved in its measures transparent (Sen 1976; Foster et al. 1984; Atkinson 1987; Deaton 1998).

NV is only one of the different desirable properties of measures. Often, it will conflict with other possible desiderata, such as fitness to causal analysis (Woodward 2016). A measure could end up being more normative valid, but less adequate for causal analysis. For instance, it may satisfy normative judgments (e.g., it may be compatible with a given theory of justice), but be suboptimal for causal analysis (e.g., it mixes different types of deprivations in the same measure, not paying attention to their causal relationships with one another, and not relating this to an independent variable). This measure could end up being more normative valid, but at the same time less adequate for causal analysis and interventions. In fact, this was one of the criticisms leveled against the Multidimensional Poverty Index for Latin America (MPI-LA), a measure designed, inter alia, to satisfy NV (Catalán & Gordon 2020; Santos & Villatoro 2020; Gordon & Catalán 2020).

This does not mean we should give up a measure like MPI-LA, as it would give us knowledge about valuable features of our societies from a descriptive and normative standpoint. But the conflict would remain. What to do about it? We may find out that the best we can do with our normative valid measure is to establish correlations between certain interventions and certain desired outcomes. Alternatively, we might look for new concepts and new measures, each more capable of tracking the causal pathways of different deprivations. This would entail abandoning the concept, and turning it into different subconcepts, each with a specific measure. The drawback is that we run the risk of moving away from normative adequacy, and being more revisionary.

12:30 – 13:00

Solfrid Nordrum (University of Oslo) – Managing Avian Influenza: between the care of everyday wellbeing and preventing the next pandemic.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Through ethnographic fieldwork at the Norwegian Food Safety Authority (NFSA), my research will investigate how national regulators comprehend and manage a new pathogen with zoonotic potential. Avian influenza is an ongoing epizootic, infecting wild birds, domestic birds and occasionally humans and other animals. WHO identifies it among the biggest threats for a new pandemic, while simultaneously new outbreaks are becoming everyday business in European poultry industry. Norway had its first and second outbreak in industrial poultry in the 2021 and 2022 together with several registered outbreaks in wild bird populations. The outbreaks in industry where eradicated, but new outbreaks are expected to come. In wild bird populations new outbreaks continues to occur and are more often highly pathogenic. Avian influenza is a newcomer to the Norwegian society, and the poultry industry, domestic chicken owners and general population must find a way of living with it. National regulators like NFSA will evaluate what scientific understanding shall predominate, and affect which interest shall get priority.

The NFSA is in charge of the day to day management of avian influenza and coordinate the prevent and act on outbreaks within the country. In prevention they map national and international outbreaks, take sample tests, collect scientific studies, evaluate the situation and update national regulations accordingly. They have ordered curfew for poultry during certain months of the year to prevent wild birds from infecting domestic birds. This has been criticked by animal rights activists who claims the measure has little preventative effects, but big negative impacts on animal welfare. There seem to be continuous evaluation and often disagreements on how to weight precautions and security on one hand and general well being and health on the other. This also shows in the case of an outbreak, however with more focus on the emotional well being of the farmer. Here, the NFSA take charge of culling and destruction of the flock. Representatives are physically present on farm, they arrange the details and they provide economical compensation for the farmer. They also enhance quarantine zones which affect surrounding farms within different radiuses depending on how serious they perceive the outbreak to be. I am interested in the process of learning to live with this pathogen from the point of view of regulators who weight security from threats that are potentially disastrous like the case of a pandemic, with care for the wellbeing of animals and humans. How do the past and present experiences of NFSA employees interact with their knowledge from scientific studies and outbreak mapping when they evaluate measures, regulations and routines?

The Ph.D. project is based at the Department of Social Anthropology and Center for Development and the Environment at the University of Oslo. It is part of the project Pandemic Entanglements: The Political Ecology of Industrial Meat Production in the “Pandemic Era” which investigates the relations between avian influenza and industrial poultry production in Norway and Denmark through an interdisciplinary approach.

ROOM 06

(ENGPHI) From previous time slot, same room.

Symposium: Fostering engaged philosophy of science to meet the challenges in an uncertain world

11:00 – 11:30

Pedro Bravo de Souza (University of São Paulo) - To Group It All or not to Group at All: Strategies for Grouping Per- and Polyfluoroalkyl Substances (PFAS) and Financial Conflicts of Interest.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Per- and polyfluoroalkyl substances (PFAS) are a large class of chemicals. The Organization for Economic Cooperation and Development, for example, published in 2018 a list with 4730 PFAS. PFAS' carbon-fluorine bonds allow a wide range of industrial applications but also make them highly persistent. Since there is evidence about only a few of them and their properties may vary, one of the pressing issues regarding PFAS is how to group them for different purposes. Cousins et al. (2020) list nine grouping approaches to PFAS which can be ranked in a precautionary scale based on two criteria: how many PFAS are grouped and data requirements. In this communication, I aim to investigate how financial conflicts of interest (FCOI) impact the grouping discussion in a way that favor less precautionary approaches.

In order to do that, I will rely on the values in science literature and on scientific papers and articles dealing with PFAS' grouping strategies. As we shall see, texts with FCOI impact the grouping discussion in three ways. First, they are more likely to favor less precautionary approaches than public-funded texts both explicitly or implicitly (e.g., Anderson et al., 2022). Second, they often hide value judgments and FCOI in a way that portrays their position as neutral (e.g., "approaches driven by data") in opposition to "subjective" or "at odds with mainstream science" positions. Third, the way they frame the concept of "essentiality" links it to PFAS in general instead of to PFAS uses, a nuanced difference that makes it difficult to talk about PFAS elimination.

Since my present focus is to highlight the three socially relevant worries above in a commentary in a scientific journal and I am integrating knowledge claims of philosophy and environmental science, this work can be understood as an instance of broadly engaged philosophy of science (Plaisance and Elliott, 2021). Although it involves relatively low levels of social integration, it incorporates important forms of epistemic integration and illustrates how engaged philosophy of science can help to address uncertainty about societal challenges in socially and environmentally beneficial ways.

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11:30 – 12:00

Candice Shelby (University of Colorado Denver) - Engaged Philosophy of Addiction.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: As uncertainty with respect to health, work, finances, and even freedom grew from early in 2020, so did drug and alcohol use. An estimated 100,306 individuals died of opiate overdose in the U.S. in the 12 months ending in April 2021 , making death by overdose the #1 cause of death of Americans between the ages of 18 and 49. The majority of those deaths has come at the hands of the drug fentanyl. Since 2019, death from fentanyl overdose in the U.S. has risen 94%. Along with the deaths, uncertainty among users of all types of opiates who are forced to buy them on the streets has risen as drug usage continues, both because of and driving the uncertainty in our communities.

Decades of research in psychology and neuroscience has revealed in substantial detail what happens in the nucleus accumbens, ventromedial tegmentum, and anterior cingulate portions of the brain when an organism becomes addicted to a psychoactive substance. But none of that science can tell us what we most need to know about the phenomenon of addiction as it is lived out in our communities. Philosophical models have done no better at helping us to understand what is happening in our world, or how we might best engage to address the drug and death epidemics. Abstract debates about whether addiction is a disease or a choice has driven both research and policy astray. It has become abundantly clear over the past couple of decades that addiction is not a disorder that can be alleviated on a large scale by continuing to focus on individuals, although the physical dependence, the lack of control, and the resulting physical, psychological, and social debilitation do undoubtedly fall upon sufferers first. The truth is that addiction is an emergent phenomenon, arising from complex dynamics within self-aware individuals acting within larger complex dynamics systems, starting at the genetic and epigenetic levels, and involving cellular as well as psychological dynamics, in addition to trauma and systemic interactions, in both individuals' physiology and psychology, and in larger, social systems. This means that scientists, clinicians, social scientists, economists, policy makers, and philosophers must work together to understand the many aspects of the epidemic of addiction that confronts us today. In addition to improved address by governmental agencies of those who distribute opiods, and fentanyl in particular, philosophers can engage with experts from numerous areas of the complex dynamic system from which this epidemic has emerged, to develop a clearer picture of trigger points that together could turn the tide of this individual and collective catastrophe. For just one instance, a variety factors are known to alleviate the effects of uncertainty—tangible, identifiable and accessible food, housing, health care, well-advertised and supported places of gathering and ritual, including churches, recreational centers, yoga centers, group support centers, together with readily available life-saving substances as naloxone and buphrenorphine.

12:00 – 12:30

Dragana Bozin (University of Oslo) - From engaged to actionable philosophy of science.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Philosophy of science is highly engaged with many pressing matters in the world: climate change, vaccine hesitancy, skepticism towards science, Covid pandemic to mention a few.

Engaged philosophy of science grew out of a broader movement to bring values to the forefront sparked by similar efforts in feminist philosophy [REF]. Even when not actively engaging, many philosophers favor more engaged approaches often out of concern for social and environmental welfare (Plaisance and Elliott, 2021). Within broadly engaged philosophy of science we find diverse forms of collaborations between philosophers of science and other scientists, policymakers, community groups, government agencies, and nongovernmental organizations (ibid). More often than not however - and despite the increasing interdisciplinary work - the knowledge and the insights in philosophy remain within its borders.

In this paper I suggest an alternative way to increase engagement in philosophy of science (also applicable to other areas of philosophy) by making philosophical expertise actionable.
The main idea is to extend the usual trajectory in practicing our research as outlined below.

Mercier and Sperber (2017) offer an evolutionary argument that the capacity to reason evolved for social purposes (to persuade, negotiate, and assess) rather than for the purposes of "solitary, conscious deliberation". They argue that individual reasoning is full of biases and inaccuracies, and that it is through our engagement with others that the biases and inaccuracies are resolved and balanced. If Mercier and Sperber are right that shortcomings of individual reasoning are reduced through public reasoning, then, rather than informing the public about science we could find formats for reasoning together about them. In my current research on the problem of public trust in science, I build on Mercier and Sperber's arguments and explore the possibility that a form of social reasoning can mitigate some of the problems related to distrust or skepticism towards science. The usual trajectory in philosophical research would be to write a paper arguing for the claim. I intend to extend this trajectory first by working on a prototype of such reasoning then teaming up with social scientists to design empirical studies to test whether social reasoning affects trust as my arguments claim it could. This trajectory could be extended through engaging governmental or NGO organizations who might benefit from this work.

Embedding our research in this manner in a larger context could have many positive outcomes in addition to a published article: it embodies high level of social and epistemic engagement by creating conditions for cross-disciplinary theory development and has the potential to inform/enlighten/solve an actual challenge. I suggest that making philosophy actionable in this manner could be valuable where it is plausible to do so, and that this perspective, if possible, should be integral part of the way we approach our research.

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ROOM 07

11:00 – 11:30

Michael Miller (University of Toronto) - On the common structure of perturbative and axiomatic field theory in Borel summable models.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Interpreting a physical theory involves associating physical content with the mathematical structure of the theory. This project presupposes that one has a well-articulated characterization of the mathematical structures constitutive of the theory. Novel challenges for interpreters arise in quantum field theory because there is not one single mathematical articulation of the theory. Rather, distinct formalisms, employing different mathematical structures, have developed for expressing the theory.

The landscape of formalisms for quantum field theory can be partitioned into two groups. The first consists of the structures used by working physicists, and the methodologies that they use to manipulate those structures. This group is sometimes referred to as conventional quantum field theory. The second group consists of axiomatic articulations of the content of the theory which have been developed by mathematical physicists.

Interpreters of perturbative and axiomatic field theory have typically been thought to face distinct sets of obstacles. Perturbative field theory, while empirically successful, employs approximation schemes which stand in tension with standard approaches to theory interpretation. Axiomatic field theory, while admitting of exact models, does not enjoy the same empirical success. Or at least, so the standard story goes. In this talk, I will problematize this understanding of the situation by considering a collection of results which establish that perturbative and axiomatic field theory share a common structure for a restricted class of models, and as a result, present similar interpretive challenges.

Conventional field theory proceeds by articulating a perturbative expansion to determine the Green's functions of a model. The individual terms in this expansion are divergent in both the ultraviolet and the infrared. The process of renormalization renders the individual terms finite, and the perturbative expansion a well-defined formal power series. However, this formal power series diverges. In some models, the series can be Borel summed to exactly and uniquely recover the Green's functions of the model. Moreover, the Green's functions that one recovers in this way agree with the construction of the Green's functions in the corresponding model of axiomatic field theory. This is the sense in which perturbative and axiomatic field theory share a common structure in a restricted class of models.

Interestingly, the empirical success of perturbative field theory stems from the truncation of perturbative expansions for models that do not belong to this restricted class. In this case there is no unique exact model lying behind the success of the truncated expansion. Recently, the resources to treat models perturbatively have also been incorporated into axiomatic field theory. This opens the possibility of treating the empirical content of axiomatic field theory in a manner directly analogous to how it is handled in conventional field theory: the perturbative expansions of axiomatic field theory can be truncated at low orders of perturbation theory in order to provide approximations to measurable physical quantities. Moreover, the status of these approximations is the same as it is in conventional field theory in the sense that there is no exact model lying behind the empirical success of the truncated expansion.

11:30 – 12:00

Mauro Dorato (Department of Philosophy, University of Roma 3) - Einstein, Meyerson and the distinction between principle and constructive theories

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: In 1928 Einstein wrote a very appreciative review of Meyerson's [1]: "Le livre de M. Meyerson est. . . un des plus remarquables qui aient été écrits sur la théorie de la Relativité" [2, p.166]. My paper focuses on Einstein's [2] in light of the former's famous distinction between principle theories and constructive theories by arguing that at least in this text the distinction is blurred. In his review, Einstein correctly identified two threads in Meyerson's work that closely correspond to the distinction above. He reads Meyerson as supporting the claim that the "ultimate end of all physical theorizing is the deduction of all experimental laws from a few principles" ([2, p. 165). This formulation corresponds to Einstein's definition of principles theories as based on the analytic method, i.e., on an axiomatic structure capable of capturing reality in purely rationalistic or mathematical terms. However, Einstein also claimed that our understanding of physical phenomena presupposes a constructive, causal theory.

To the extent that understanding suffices for explaining, according to Meyerson [3] understanding for humans is the art of finding the identical in whatlooks different. The history of atomism is the most important instance of this strive toward unification: the different qualities of the macroscopic objects are identified with their microscopic components. It is not surprising that Einstein's example of a constructive theory refers to statistical mechanics. A strive for the unification of different concepts, stressed by Meyerson's work well before the contemporary theories of explanation as unification, marks Einstein's thought throughout his carrier: space and time, energy and mass in
STR, inertial and gravitational mass, spacetime and matter in GTR. Even if his failed attempt to construe a unified field theory may belong to the category of the theory of principle (Ryckman [4]), not all of the unifications above are of this type. Like Meyerson, Einstein thought that, insofar as they reduce the number of independent postulates, also mathematically formulated, principle theories can explain the physical world and they can do so also by capturing the causal structure of the world. In their explanatory struggle toward unification, principle and constructive theories can coexist. A letter to Metz expresses this view in a clear way: ".. the true theoretical physicists strive for nothing but a logical construction that corresponds to the causal reality" [kausalen Wirklichkeit]" [5] Wirklichkeit, as in Hegel's philosophy, is not Realität, but stands for `reality' in its strongest possible sense.

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12:00 – 12:30

Martin King (Ludwigs-Maximilian University Munich) - Model Independence and Underdetermination.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: We may be at the end of an era in particle physics. The last fifty years of research has served to confirm the Standard Model of particle physics (SM) to unprecedented precision, but given no strong indications of where new physics may lie. Despite the fact that physicists are confident that there is new physics beyond the Standard Model (BSM), there is a widespread underdetermination of models of new physics. This underdetermination brought on by the lack of new physics discoveries at

the LHC has had a dramatic effect on the efforts of the particle physics community. It has resulted in the creative experimental exploration of the low-energy frontier, the re-evaluation of longstanding guiding principles, such as naturalness, and even of the foundations of quantum field theory, and has led to an increase in model-independent search methods. In this paper, I focus on the latter shift in scientific methodology, drawing on empirical source material in the form of interviews with senior physicists.

A philosophical approach to empirical underdetermination is to turn to non-empirical means of evaluating confirmation, pursuitworthiness, and as guides in theory development. This kind of approach has been championed by Richard Dawid, who has argued in favour of non-empirical theory confirmation. The approach taken by scientists however, is to find new ways to extract guidance from available data. As the predictions of model-based searches have failed to reveal any new physics, physicists have increasingly turned to model-independent approaches. These model-independent approaches may consist of precision measurements of SM observables to narrow down potential deviations from SM predictions; using effective field theories to parameterise deviations; and the use of artificial intelligence searches, in particular deep neural nets and unsupervised learning, to examine existing data with minimal modelling biases.

This marks a shift from more top-down approaches, driven by theoretical ideas and modelling assumptions, to a more bottom-up approach driven by data and experimentation. The terms `bottom-up' and `top-down' are relatively recent ones, but correspond well to an old and lasting debate between inductivist and hypothetical approaches to science. Since physicists have been questioning their modelling assumptions and their understandings of the foundations of theory their confidence in the promise of hypothesis testing is decreasing. However, the bottom-up approach has severe limitations in that it may only point the way towards new physics, but not get us there. If successful, it will reveal in which processes new physics can be observed, but the bottom-up approach still requires a way `up and out'-physicists will want to know what is the explanation for the deviation, i.e. what is the new physics? Without the ability to produce new heavy particles, we may be stuck in a mode of research where we are unable to move beyond inductive descriptions of phenomena and towards testing and confirming hypotheses about real new physics. This shift towards model independence and the bottom-up approach may not be transient and may de facto settle the debate on methodology (at least in particle physics), for better or for worse.

12:30 – 13:00

Arezoo Islami (San Francisco State University) - Missed Opportunities: Wigner, Steiner and the Applicability of Mathematics.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: The Applicability Problem is the problem of explaining why mathematics is applicable to the empirical sciences. This problem is revived and reformulated by the physicist Eugene Wigner under the striking title “The Unreasonable Effectiveness of Mathematics in the Natural Sciences” ([10], [2]). In this seminal work, Wigner argues that the applicability of mathematics is a miracle, “a wonderful gift which we neither understand nor deserve.” ([10], [11], [9])

Responses proposed to this problem range from metaphysical claims about the mathematical structure of our universe to epistemic claims about the structure of our cognition and formalist claims about the nature of mathematics as a language. (See e.g. [6], [5], [1], [8], [4], [7])

In his 1989 book, the philosopher of mathematics, Mark Steiner, offered a solution to the applicability problem.([6]) According to Steiner, we live in a user-friendly universe, a universe which is not

indifferent to the goals of humanity. On this account, we need to reject naturalism and accept anthropocentrism.

My goal in this paper is twofold. First, I will show that while Steiner offered one of the most careful readings of Wigner's applicability problem, his account missed Wigner's original formulation of the problem and his proposed solution. Moreover, I will argue that, contrary to Steiner, we can explain the applicability of mathematics in formulating laws of quantum mechanics without appealing to anthropocentrism.

By paying attention to the details of these case studies, we are led to a sharpened version of the applicability problem. More fundamental than the why-question (why is mathematics applicable in the natural sciences) is the how-question (how is mathematics applicable in the natural sciences)([3]). By studying how mathematics is used in different eras and areas of natural sciences we begin to assess responses to the applicability problem.

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ROOM 09

(SUMO) From previous time slot, same room.

Symposium: Substructural Modal Logics

11:00 – 11:30

Fabio Pasquali (University of Genoa), Francesco Dagnino (University of Genoa), Pino Rosolini (University of Genoa) - Quantitative equality in substructural logic, via graded modalities.

Topic: A.1 Mathematical Logic

Abstract: Equality in predicate First Order Logic is fairly well understood: from a syntactic point of view it can be characterised as a binary predicate forced to be reflexive and substitutive, and from a categorical perspective it can be described in terms of left adjoints. This story can be easily rephrased in the context of predicate Linear Logic, however, this smooth approach has an unexpected consequence: equality can be used an arbitrary number of times. This fact is not desirable in a linear setting where one aims at controlling the use of resources. Moreover it does not allow a quantitative interpretation of equality, for instance, as a distance, despite quantitative semantics is a natural interpretation for substructural formulas.

In this talk, we explore a novel approach to equality in predicate Linear Logic based on graded modalities. These modalities allow us to explicitly model resources inside the language, describing how much a formula con be used. In this way we manage to control the use of equality, thus enabling its quantitative interpretation.

We develop this approach using the categorical language of Lawvere's hyperdoctrines and having as main example metric spaces with Lipschitz maps. We also present a deductive calculus for (fragments of) predicate Linear Logic with quantitative equality and its categorical semantics. Finally, we describe a universal construction generating models of quantitative equality starting from models of (fragments of) Linear Logic with graded modalities.

11:30 – 12:00

Libor Behounek (Ostrava University), Antonin Dvorak (University of Ostrava, NSC IT4Innovations, IRAFM) - A bilattice-valued free logic with graded gaps and gluts.

Topic: A.1 Mathematical Logic

Abstract: Building a system of predicate modal logic with varying domains usually requires dealing with terms that do denote in some worlds but may not denote in other worlds, and so needs some form of free quantification. Naturally, the same applies to predicate modal logic in a graded setting, for which some kind of free fuzzy logic is a prerequisite. A system of free fuzzy logic with (crisp) truth-value gaps has already been sketched [1]. Motivated by the occasional need to also deal with contradictory objects and impossible worlds, in this contribution we generalize free fuzzy logic to also accommodate (graded) truth-value gluts besides (graded) truth-value gaps.

As a starting point, we use the four-valued framework of Dunn-Belnap logic and its expansion by a suitable truth-functional implication. We extend the latter four-valued logic into an infinite bilattice-valued (square) fuzzy logic based on the Lukasiewicz connectives and compare the resulting logic with two square fuzzy logics known from the literature [4,3]. Along the lines of [1,2], we introduce free quantifiers over the bilattice-valued fuzzy logic and present some initial observations about the resulting free fuzzy logic with graded gaps and gluts.

The truth-functionality of the underlying bilattice-valued logic, however, makes the resulting free logic susceptible to lottery-style paradoxes. Consequently, the logic should rather be viewed as a toy model of graded free quantification than a fully fledged free fuzzy logic suitable for semantic modelling. To remedy this shortcoming, we discuss the option of using two-level syntax with a non-truth-functional bilattice-valued modality and defining free quantifiers over this more complex framework.

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12:00 – 12:30

José Luis Castglioni (UNLP), Rodolfo C. Ertola-Biraben (UNICAMP) - On modal aspects of the dual of intuitionistic negation.

Topic: A.1 Mathematical Logic

Abstract: From an algebraic point of view, in 1919 Skolem introduced the dual of the (meet) pseudocomplement (see [4]). Since then, many authors have considered the join pseudocomplement, sometimes from a logical point of view. For example, in 2009 [2] and 2011 [3], Graham Priest introduced propositional and first-order da Costa logic, respectively. Propositional da Costa logic may be defined as positive propositional logic expanded with a unary connective D that may be seen as a negation satisfying tertium non datur and modus tollendo ponens for derivable disjunctions, that is, the logical connective associated to the join pseudocomplement. As a result, intuitionistic negation is definable. It is easy to see that D behaves as a paraconsistent negation. In 2013 [1], paying attention to an observation due to Urbas (see Example E1 in [5, p. 345]), we proved that propositional da Costa logic is strictly paraconsistent.

On this occasion, we study the fact that in the mentioned expansion there exist operations that behave as necessity and possibility, respectively, satisfying usual modal axiom (K), (T), (B), (D), and the usual necessitation rule. Moreover, we consider the different extensions that result by the addition of the Stone schema, its dual, and, algebraically motivated, what we call weak regularity, that is, the axiom schema stating that from a D-contradiction tertium non datur follows.

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12:30 – 13:00

Carlos Olarte (LIPN, Université Sorbonne Paris Nord), Elaine Pimentel (UCL), Camilo Rocha (Department of Electronics and Computer Science, Pontificia Universidad Javeriana Cali) - A Rewriting Logic Approach to Specification, Proof-search, and Meta-proofs in Sequent Systems.

Topic: A.1 Mathematical Logic

Abstract: We present an algorithmic-based approach for proving inductive properties of propositional sequent systems such as admissibility, invertibility, cut-admissibility, and identity expansion. Although undecidable in general, these structural properties are crucial in proof theory because they can reduce the proof-search effort and further be used as scaffolding for obtaining other meta-results such as consistency. The algorithms –which take advantage of the rewriting logic meta-logical framework– are explained in detail and illustrated with examples throughout the paper. They have been fully mechanized in the L-Framework, thus offering both a formal specification language and off-the-shelf mechanization of the proof-search algorithms coming together with semi-decision procedures for proving theorems and meta-theorems of the object system. As illustrated with case studies in the paper, the L-Framework achieves a great degree of automation when used on several propositional sequent systems, including single conclusion and multi-conclusion intuitionistic logic, classical logic, classical linear logic and its dyadic system, intuitionistic linear logic, and normal modal logics.

ROOM 10

11:00 – 11:30

Haorui Chen (Department of Mathematics, Sichuan University), Jixin Liu (Department of Philosophy, Sichuan University) - Unary modal logics over Abelian groups.

Topic: A.2 Philosophical Logic

Abstract: Algebraic structures have a close connection with modal logic. Instead of directly using algebraic semantics for modal logic, people also consider modal logic over algebraic structures via relational semantics: [3, 2] for the Medvedev frame and [1, 5] for lattices. The basic idea here is that some algebraic structures can be directly viewed as relational ones: lattices or Boolean algebras can be regarded as partial orders. On the other hand, if we regard n-ary functions as n+1-ary relations, algebraic structures can be transformed into relational ones. Recently, [4] introduces a modal logic for groups via this transformation method. Their logic uses a binary modal operator and is based on a ternary relational frame since the group operator is binary.

Here raises a natural question: If we only use unary modalities, what is the modal logic over groups? The key point is how to “reduce” a ternary relation into binary ones. In this paper, we first consider cyclic groups, which are generated by one element. There is a natural binary relational representation for their group operators. We define the binary relation R as follows: for any elements x and y in the group, Rxy iff gx=y, where g is the generator. Then we get binary relational frames from cyclic groups. Since this binary relation is a bijection, we can express the whole group structure by introducing an inverse modality and a nominal. This is also inspired by those works for lattices since they use the same language. We give an axiom system CGA in this language and prove soundness and

strong completeness with respect to all frames of cyclic groups by constructing a quasi-canonical model via normal forms. Secondly, we extend our idea to Abelian groups. We use a set of unary modal operators, which corresponds to the set of generators and get a strongly complete system AGA in multi-modal tense language with a nominal. The reason why we only need one nominal is that the group structure is highly symmetric: any element in the group can generate (in the modal sense) the same relational subframes. From this, we come to the final part of our paper: if we consider group action, this logic framework can be further generalized. We define relational frames for arbitrary sets via Abelian group actions and observe that AGA is still strongly complete with respect to those frames.

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11:30 – 12:00

Vladimir Lobovikov (Institute of Philosophy and Law of the Ural Branch of Academy of Sciences) - Approximating to Universal Logic by Combining Different Kinds of Modalities in One Formal Axiomatic Theory Φ.

Topic: A.2 Philosophical Logic

Abstract: The paper presents moving towards the universal logic (Béziau 2012) by *combining* qualitatively different kinds of modalities in one *consistent* formal axiomatic theory. The attempts coherently to *combine* plenty of various kinds of modal logics have resulted in a consistent *multimodal formal philosophy* system Φ made up by adding the following schemes of *proper (epistemology-and-axiology) axioms* of Φ to the schemes of axioms and inference-rules of classical propositional logic. The axiom schemes of Φ are the following eleven ones.

AX-1: A ( ).
AX-2: A (( ) ( )).
AX-3: A (K & (◊ & ◊S & ( ))).
AX-4: E (K & (◊ ◊S ( ))).
AX-5: ◊.
AX-6: (&) .
AX-7: (t_i=+=t_k) (G[t_i] G[t_k]).
AX-8: (t_i=+=g) G[t_i].
AX-9: (t_i=+=b) W[t_i].
AX-10: (G W).
AX-11: (W G).
Definition DF-1: ◊ is a *name* of/for (where ω is a formula of Φ).

The symbols t_i and t_k (belonging to the meta-language) stand for any terms of Φ. The symbol (belonging to the meta-language) stands for any element of the set = {, K, T, F, P, D, C, Y, G, O, B, U, J}. Elements of are called "*perfection*-modalities" or simply "perfections". The set of *perfection*-modalities is a subset of the set of the modalities combined Φ by, namely, = {, , K, A, E, S, T, F, P, D, C, Y, G, W, O, B, U, J}.

Symbols and stand for the modalities “possible” and “necessary”, respectively. Symbols K, A, E, S, T, F, P, D, respectively, stand for modalities “agent *Knows* that…”, “agent *A-priori knows* that…”, “agent *Empirically knows* that…”, “under some conditions in some space-and-time a person (immediately or by means of some tools) has *Sensual verification* that…”, “it is *True* that…”, “person has *Faith* that…”, “it is *Provable* that…”, “there is *an algorithm* (a machine could be constructed) *for Deciding* that…”.

Symbols C, Y, G, W, O, B, U, J, respectively, stand for modalities “it is *Consistent* that…”, “it is *Complete* that…”, “it is *Good* that…”, “it is *Wicked* that…”, “it is *Obligatory* that …”, “it is *Beautiful* that …”, “it is *Useful* that …”, “it *is Joyful, pleasant* that…”.

Precise definitions of “alphabet of object-language of Φ”, “term of Φ”, and “formula of Φ” are provided. A definition of semantics of object-language of Φ is given. The theory Φ is a result of significant changes of the theories and Σ+C (Lobovikov 2021). A proof of Φ's consistency (to be submitted while the presentation) is realized by inventing a *model* of/for Φ, i.e. by precise defining such an *interpretation* in which all the axioms are true statements and the rules of inference conserve truthfulness.

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ROOM 11

11:00 – 11:30

Sara Blanco (Eberhard Karls Universität Tübingen, Tübingen) - The Normative Need for Trust in AI

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: Trust is often considered the glue of a healthy society. We need others and others need us. Trusting puts the one who trusts in a vulnerable place. Because of this, trust is generally placed only in those to whom we believe we can delegate something. Both the general public and a part of academia (HLEG 2019) often talk about trust and distrust in artificial intelligence (AI). However, it is unclear whether the concept of trust can suitably be extended to non-human entities. I argue that trust relationships imply moral responsibility and it is precisely this implication that makes trust a normative goal for human-AI relationships.

AI systems are not technical artifacts like any other. AI is a novel technology able to achieve results without being explicitly programmed on how to reach such results. Instead, AI ‘learns’ from big volumes of data and comes out with its own paths towards outcomes. Thus, how we use and relate to AI differs from previous technology. At the moment, AI models are used in a variety of domains. Due to its potential to affect people’s lives, AI is widely considered a socio-technical tool. This means that its successful implementation concerns the interaction of social and technical factors. Then, conceptualizing the kind of relationship that we, as a society, aim to have with AI is crucial for the successful implementation of the latter.

It is often argued that technology cannot be trusted but only relied on (Ryan 2020). This view puts the focus on technical success to determine whether a system oughts to be implemented; that is, the main criterion would be how accurate the system's predictions are. However, in domains such as medical diagnosis, a successful outcome is not just a technical solution to a technical problem. Moral responsibility should be taken into account, being an important fact to consider in the use and

implementation of AI. Because of this, I claim that aiming for reliance overlooks the role of AI in society, failing to capture the relationship that humans ought to have with AI.

I understand trust as a relational concept that implies moral responsibility. Trust refers to relationships in which a trustor willingly makes themselves vulnerable towards a trustee and accepts the risk of being betrayed. I argue that willingly making oneself vulnerable towards someone implies placing moral responsibility on that someone. From the trustee's side, committing to not abuse others' vulnerability implies assuming moral responsibility. Because of the contexts in which AI can be used, this kind of responsibility attribution becomes normatively necessary. Thus, rather than a drawback, I propose the moral implications of trust as the reason to normatively aim for trust in human-AI relationships.

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11:30 – 12:00

Antonio Oraldi (Centre of Philosophy, University of Lisbon) - Cyber-physical Environments and Political Subjects: From 'Smart' to 'Cyber-physical' Citizenship.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: The growing expansion of digital networks into physical infrastructures calls for reflection on the political nature of digital technologies. As digital networks and devices increasingly access and shape both public and intimate life, how are we to understand the political subject vis-à-vis such a technical mediation? How might we conceptualize the relation between the agency of "smart environments" and human political agency? With the development of cyber-physical environments – which blur the line between cybernetic, physical, and social – how is citizenship to be understood? This talk will present the theoretical basis to conceptualize citizenship in the digital age, specifically in connection with the recent transformation of digital technologies generally known as the "Internet of Things". The premise of the presentation is that citizenship is not just a legal relation or a set of rights and duties, but it also refers to practices that we engage in daily in relation to other persons, the social and physical environment, and ourselves. Thus, technical conditions can stimulate or suppress particular forms, habits, and practices of citizenship.

The first part will argue that the post-phenomenological understanding of the human-technology relation with "smart" environments as an "immersion relation" in "active technological environments" (Aydin et. al. 2019) requires expansion so as to account for broader political dynamics. Further, it will show how Feenberg's notion of "technical code" (1999) and Latour's concept of "program of action" (1994) could establish the basis for thinking about technical normativity. So, technologies are neither neutral nor deterministic, but they possess norms and prescriptions for action inscribed in the design which "invite" the user to behave in particular ways. Sometimes these norms are explicitly political (Winner, 1980) and could thus mediate political subjectivity.

The second part of the presentation will argue that the popular term "smart citizenship" is misleading, and ask whether we can think of a "cyber-physical citizenship". Drawing on Stiegler's concepts of "tertiary retentions" and "retentional devices" (2011), through which memory is inscribed and preserved in technical artifacts, I will suggest that cyber-physical retentional devices have the potential to reshape (I) the space of citizenship – private and public become intertwined to a new degree in cyber-physical environments and space becomes an area of possible recording; and (II) the time of citizenship – recording and profiling allow for the distribution of 'punishments' and 'rewards'

based on previous actions. Both the space and the time of citizenship, through digital footprints and personalization algorithms, allow for an individualistic and performative model of citizenship. The concluding remarks will emphasize the relevance of the concept of "cyber-physical citizenship" in comparison to 'smart' and traditional concepts of citizenship.

12:00 – 12:30

Sara Eloy (Instituto Universitário de Lisboa (ISCTE-IUL), ISTAR), Pieter E. Vermaas (Delft University of Technology) - Social validation of multidisciplinary design in ICT and Architecture.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: This paper brings the case of research centres operating at the crossing of the fields of architecture and ICT (Information and Communication Technologies). These centres aim at innovative multidisciplinary research on, for instance, smart buildings, for producing design projects that address societal issues. Yet they lack proper methods for validating these projects for their social impact. We discuss validation practices in ICT and architecture, demonstrate their insufficiency for social validation, and explore methods that can provide this validation.

In software development, it is common to do validation tests of developed products. These include performance testing where applications are tested for their stability and response time, and user acceptance testing where client/customer test applications with real-time scenarios. Assessing how the application may impact society beyond the primary users is rarely done. Examples of social failures in ICT are loss of privacy and bias in AI algorithms.

In architecture validation is mandatory by law for some parts of the design, such as load-bearing structures, safety against fire and energy efficiency. While design projects are assessed against such construction regulation, assessment of acceptance of buildings by future users is only taking place for a minority of designs. Assessment of how architecture can impact society in the future is seldom done. The strongest example of societal failures is social housing after World War II, such as on the outskirt of French cities.

So, for multidisciplinary research that combines ICT and architecture for addressing societal issues, one has to look beyond the existing validation practices.

Firstly, in architecture there are a few instruments for forecasting likely effects or assessing the impact of architecture on users (e.g. post-occupancy evaluation [3], and space syntax [2] that analyses how people move through buildings). Architects and urban planners rarely use these instruments and, if they do, apply them after construction, which might lead to substantive costs (if reconstruction or demolishing is needed, as for, e.g., post-war social housing). A step forward would be to use these instruments before construction.

Secondly, the European Commission has recently introduced new requirements in research project proposals to explain the potential impact of technological development when AI is involved (see, e.g. [1]). This is a step towards identifying potential social negative impact, but it is still not enough since there are no clear instruments available for giving these explanations.

A third route towards finding validation methods is to look at current developments in engineering and design to realise moral and social values in the design of technology and products (e.g. [4]). This development includes finding methods for validating these values, which may be transposed when the values involved in multidisciplinary ICT-architecture design projects are explicitly articulated.

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12:30 – 13:00

Aznavur Dustmamatov (Independent Scholar) - The Role of Artifacts in Value-Formation: From Affordance to Exposure.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: In recent years, the concept of 'affordance' has been used to explain how artifacts may embody or promote certain values (Klenk; Tollon). An artifact can be said to promote an activity by providing, through its features and design, a stronger "force" of affordance (Tollon 2022), e.g. a car with its internal combustion engine affords speedier transportation than a horse-buggy.

I argue that the current articulation of 'affordance' can only explain how artifacts amplify the expression or satisfaction of pre-existing values and needs, but it cannot explain how artifacts contribute to value-formation. This is because, in this form, the notion of 'affordance' presupposes an average, idealized use-context that is independent from the presence of the artifact itself. This supposition precludes the possibility of understanding the reflexivity exhibited by artifacts: their exploitation at scale transforms the very context in which they are embedded.

I re-conceptualize affordances as something that artifacts possess only as embedded in the definite context of a "sociotechnical system" (van de Poel). An artifact's affordance is relative to a context of instrumentation (e.g., in some terrains a car might be slow), while the "force" of this affordance is relative to a context of evaluation that defines the value of a given outcome.

First, I consider how artifacts, when made available at scale, transform their contexts of instrumentation. Artifacts generate and sustain new sociotechnical systems such as the upstream ecosystems of production and distribution, and the downstream ecosystems that rely on exploitation of the artifact. These ecosystems can in a circular fashion affect the original affordance, such as when the proliferation of drive-thrus and suburban sprawl in some areas transforms the car from a speedier alternative to a basic necessity of life.

Second, I consider how artifacts transform their contexts of evaluation. Evaluation relies on a set of criteria for selecting actions from among the afforded possibilities. The selection is based on the differentials that are salient to a specific possibility-space. Artifacts enable new possibilities, or they alter the cost-reward trade-offs within a given possibility-space. Changing the make-up of the possibility-space may lead to a shift in salient differentials: if none of the previous possibilities had feature F, then F could not serve as a differential, yet it could become a differential if a new possibility with feature F were introduced. Since evaluation ranges over the exposed possibilities only, values may not change until full exposure to the possibility takes place, e.g., although asbestos had been toxic all along, there was no change in policy or attitude until its hidden costs were revealed to the public. By introducing new exposures, artifacts can shift differentials.

(GEOM) From previous time slot, same room.
Symposium: Geometry to Logic and Back: History, Philosophy, and Foundations

11:00 – 11:30

Eduardo Giovannini (CONICET and Universidad Nacional del Litoral), Georg Schiemer (Department of Philosophy, University of Vienna) - Formal Content and Meaning in Mathematics.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Philosophers of mathematics have long been concerned with the notion of the content of a mathematical statement (viz., theorem). The idea of mathematical content has figured prominently in the debates on the epistemology of mathematical proofs, the nature of mathematical explanations, and the semantic understanding of mathematical languages, among others. Despite this philosophical relevance, a clear explanation of the notion of mathematical content is still elusive. The aim of this talk is to contribute to clarifying this central concept by focusing on the specific notion of formal mathematical content.

In recent years, the notion of content has been the focus of important philosophical work. It is possible to identify two competing accounts of formal mathematical content in the specialized literature. On the one hand, Arana & Mancosu (2012)---who also coined the term 'formal content'---provided a syntactic or ``proof-theoretic'' characterization, which equates the formal content of a proposition (e.g., a theorem) with the inferential role that this statement plays within an axiomatic theory. On the other hand, Baldwin (2018) puts forward a semantic or ``model-theoretic'' account, according to which the formal content of a mathematical statement is the collection of all its models, that is, all the structures that make the statement true. It should be noted that in the case of first-order mathematical theories, in which the completeness theorem holds, these two perspectives on formal content are coextensive from a logical point of view. Building on previous philosophical work, in this talk we will outline a novel logical explanation of the notion of formal content in mathematics, which incorporates both syntactic and systematic perspectives systematically.

Moreover, this logical analysis will be conducted by paying close attention to important results on the formalization of geometry achieved by Tarski and his collaborators (Schwabhäuser, Szmielew & Tarski 1983). Briefly, these results concern the logical relations and metatheoretical properties of alternative axiomatizations of geometrical theories (viz., projective, affine, and Euclidean), and provide concrete mathematical examples of equivalence of formal theories. Thus, we will argue that modern mathematical investigations into the logical foundations of geometry give valuable insights into the systematic understanding of formal content in mathematics. A welcome upshot of our investigation will be to draw attention to the philosophical significance of these important results on the logical foundations of geometry.

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11:30 – 12:00

José Gil-Férez (Chapman University), M. Andrew Moshier (Chapman University), Alberto Naibo (Université Paris 1 Panthéon-Sorbonne, IHPST), Marco Panza (University Paris 1 Panthéon-Sorbonne, IHPST) - Euclid's Logic.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Euclid's Elements are usually portrayed as a model of a well-founded logical approach to mathematics. According to this received view, the Elements state a (finite) number of liminal assumptions (definitions, postulates, and common notions) and logically draw from them a large corpus of mathematical results. The use of the term 'logic' and cognates in the presentation of this view is rarely questioned, and, when it is, it is very often so by wondering which modern logical setting is at work in Euclid's deductions. In our talk, we'll set forth a work-in-progress approach to this question, whose goal is to reconstruct Euclid's deductive setting as a suis generis setting. Two of the four authors (A. Naibo and M. Panza) have already presented the project in previous occasions. Still, their discussion with the other two authors (D. Moshier and J. Gil-Férez) led them to change their views on some local but critical aspects of their earlier work. The final aim is to provide a complete reconstruction of Euclid's first book, essentially (and crucially) different from any modern one, because of deep structural features, limiting as far as possible (without eliminating it tout-court) the intervention of diagrammatic evidence in the deductions, and in agreement to a (very) minimal logical setting. The final conclusion that should be drawn from this work is not only that Euclid was working in a very peculiar logical setting, but also that his deductions involve much more mathematics than logic (understood as a common framework of reasoning), by limiting the latter to provide the general layout of a number of mathematical rules.

12:00 – 12:30

John Baldwin (Professor Emeritus U of Il Chicago), Andreas Mueller (none) - What is a geometric proof? the dilemma of De Zolt's axiom.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: We explore the notion of geometric proof by distinguishing between two approaches: a) giving (showing the existence of) a formal proof of a first order statement from geometric axioms and b) the usual mathematical approach: proving a geometric result in a base theory such as ZFC. De Zolt's axiom attempts to provide a rigorous base for Euclid's proof that polygons can be linearly ordered by area. It relies on Euclid's definition of equal area which is formalized in infinitary logic with countable conjunctions. Hilbert proves De Zolt's axiom from his first order axioms for geometry using a measure of area function. After Goedel and Tarski, we can see that this result uses approach b). In the process he proved the first order interdefinability of Euclidean geometries with the theory of fields. But Euclid's definition is not first order. Refining Hilbert's claim that his argument is geometric (e.g. see Hilbert and Hartshorne's geometry) asks whether there is a geometric proof that avoids `measure of area'. We explore approach b) by embedding Hartshorne's question about the comparison of area in first order Euclidean plane geometry into the problem of `comparing magnitudes' in a more general context including non-Archimedean geometries, higher dimensions, and non-Euclidean geometries. In this more general context, we are able to sharpen
Hartshorne's objection and examine Hilbert's implicit use of number in a way that was anathema to Euclid.

12:30 – 13:00

Hermann Haeusler (PUC-Rio), Abel Lasalle Casanave (UFBA Universidade Federal da Bahia, departamento de Filosofia) - On De Zolt´s Postulate in three dimensions.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: In this paper, we consider from an abstract point of view the "fundamental theorem" of the theory of plane area (De Zolt, 1881): "If a polygon is decomposed into polygonal parts in any given way, then the union of all but one of these parts is not equivalent to the given polygon." This proposition, known as De Zolt's postulate, was conceived as a strictly geometrical expression of the general principle of magnitudes "the whole is greater than the part." At the end of the nineteenth century, the common standpoint in elementary geometry was to include De Zolt's proposition as a new geometric axiom, but Hilbert provided a proof of it in Foundations of Geometry (1899), avoiding numerical concepts but also general magnitudes.

The alleged "strictly geometrical" formulation of De Zolt's postulate raised a second problem, which was connected to the modern axiomatic investigations of the concept of magnitude, such as Stolz (1885) and Hölder (1901), among others. These early axiomatic works conceived magnitude as a combination of an ordered structure and an additive structure. Then, a relevant issue was whether these abstract characterizations of the concept of magnitude could feature a precise formulation of the above geometrical
postulate in strictly algebraic terms; moreover, one also could demand that the resulting "algebraic" version of De Zolt's be derived as a theorem of an (axiomatic) theory of magnitudes. In a previous work, we presented an abstract approach to Zolt's postulate proof for plane polygons. We proved De Zolt's postulate under the following utterance:

Postulate (De Zolt). Given a polygon P and a decomposition T = {t1,...,tk} of P into k polygons. Let ti ∈ T, then T − {ti} is not equivalent to T in the theory of equivalence of plane polygons.

Decompositions are taken as special lists of polygons, which are in their turns, lists of segments. The abstract approach then compares the original decomposition with the reduced one using operations for constructing and deconstructing in an algebraic setting. A natural question is to which extent we can adapt the abstract approach to produce a proof of De Zolt's postulate for three dimensions. The well-known ball paradoxes, namely, Hausdorff and the two versions of the Banach-Tarski paradoxes (1924) teach us that De Zolt's postulate cannot be proved inside ZFC. Our paper has a twofold goal: first, to discuss to what extent the known proofs of De Zolt's Postulate can be extended to the case of three dimensions; second, to provide an alternative and basic proof of this proposition for three dimensions in a quite weak sub-theory of
Zermelo-Fraenkel set theory.

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(TATWU) From previous time slot, same room.
Symposium: Theories All the Way Up

11:00 – 11:30
Miguel Alvarez Lisboa (IIF-SADAF-CONICET) - Using Constructive Type Theory as a Metalogic.

Topic: A.2 Philosophical Logic

Abstract: In the first of the Padua lectures Martin-Löf distinguishes between three senses of mathematical logic:

1. mathematical logic as symbolic logic, or logic using mathematical symbolism;
2. mathematical logic as foundations (or philosophy) of mathematics;
3. mathematical logic as logic studied by mathematical methods, as a branch of mathematics.

He then goes on to clarify that he is "interested in mathematical logic in the second sense [...] also mathematical logic in the first sense, but certainly not in the third" (Martin-Löf, 1984, p. 1).

The main topic of these lectures is Constructive (Intuitionistic) Type Theory (CTT), a formal system created and being developed by him as a tool for making the reasoning in constructive mathematics explicit.

In this talk I want to explore the possibilities of CTT to be used in the third sense mentioned above. In particular, I want to reconstruct the metatheory of the logics of the Strong Kleene family as developed by Cobreros et al. (2012); Pailos (2019); Barrio, Pailos and Szmuc (2020, 2021). This literature has two characteristic features: first, they work with mixed consequences relations, in the sense that they consider logics in which the designated value for the premises is different than the designated value for the conclusions; and second, they introduce hierarchies of metainferences, that is, logics that can be defined not only as a set of inferences but as ordered collections of inferences between inferences of growing complexity. These features have been proved enlightening from a philosophical point of view, since they allow for the development of pretty solid truth theories (Cobreros et al., 2013; Pailos, 2020).

The philosophical insight to be drawn after the reconstruction I propose is a threefold way to understand metalogic: you can have a classical logic at the level of sequent calculus (understood as the metalogic of a decision method for the bottom level), various non-classical logics at the upper levels (as inferences and metainferences), and yet be working on a fully intuitionistic framework.

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11:30 – 12:00

Joao Marcos (UFRN) - What is `classical' about the metatheory of logic?

Topic: A.2 Philosophical Logic

Abstract: The present contribution aims at discussing some bewilderment that might arise concerning the claim that `most of metatheory for the
logical theories is carried out using classical logic'.

On the one hand, fixed any specific sufficiently expressive propositional language, the consequence relation characterizing classical logic is just one among non-denumerably many inhabitants of the Tarskian land of logical consequence. Such logic may be presented by way of proof systems manipulating appropriate kinds of sequents, and it may be determined through a boolean-valued semantics. In constrast, logics that dispute the meaning of connectives in classical logic will typically be characterized by other collections of proof rules or by other classes of algebraic structures.

On the other hand, the verification of basic meta-theoretical results concerning propositional logics, classical or not, such as consistency, completeness, or decidability, often involve, say, some form of mathematical induction, some assertion concerning the existence of certain choice functions, or some classes of computable functions. Clearly, none of the latter mathematical devices may be even formulated within a propositional language.

In moving into the domain of first-order logic, whose syntax is oftentimes (but not by way of necessity) interpreted in set-theoretic terms, the situation does not really seem to improve. For instance, over countable languages, Lindenbaum's Lemma, customarily used to construct maximal consistent extension of non-trivial logical theories, may be shown, from the viewpoint of Bishop's Constructive Mathematics (a fragment of second-order arithmetic), to be equivalent to the weak K\"onig lemma. However, the statement of the latter lemma, according to which every infinite subtree of the full binary tree has an infinite path, could hardly be claimed to belong to pure first-order logic, classical or otherwise. Further, the move into higher-order domains is well-known to make metatheoretical investigations even more involved.

The above grievances would seem to suggest that the choice of a certain (arbitrary) object logic may be (coherently) made quite independently from the choice of a certain mathematical system to be used for investigating the metatheory of the said logic. It might be added that, from a logical viewpoint, the manoeuver according to which a mathematical system is rendered simply as a collection of expressions in a formal language whose interpretation may be changed at will only makes it unclear, to say the least, that one had really fixed a specific mathematical background to start with. Using the same sentences while changing the meaning of the words that build them up is an artifice whose legitimacy should invite theoretical defence.

Finally, as time permits, I will also defend, in the present contribution, that the metalogical principles that justify the `classical' notion of logical consequence may be revised in a number of different ways. Several illustrations will follow, bringing us into a very `non-classical' territory.

12:00 – 12:30

Luis Estrada-González (Institute for Philosophical Research, National Autonomous University of Mexico (UNAM)) - A non-classical meta-theory for trivialism

Topic: A.2 Philosophical Logic

Abstract: It is common wisdom that, in a language where all the formulas are true, the following come into the bargain as ready consequences of that fact:
(CT1) Every argument is logically valid
(CT2) Every formula is a logical truth
(CT3) All formulas are equivalent to each other
(CT4) All formulas are false (if only because 'is false' is a notational variant of 'is true')

All these CT's are by-products of specific semantic choices; my main thesis here is that one can have trivialism properly, that is, the truth of all the formulas in the language, without having thereby all these CT's. (In fact, none of them.) Certainly, they would hold good for a trivialist, but they would also hold good for a classicalist trying to make sense of trivialism. This means that, if one is neither a trivialist nor a classicalist, the CT's might get validated for the wrong reasons.

In "Models of possibilism and trivialism", I offered a semantics where trivialism and all the CT's hold. (Such semantics is clearly inspired by the category-theoretic degenerate topos analyzed in "Prospects for trivialism".) I think one can do better, though, and I do better on this talk. I first present a semantics where all formulas can be true, as required by trivialism, but some of them can be false as well, without 'is false' being a notational variant of 'is true', invalidating (CT4). With falsity playing a non-redundant role in the semantics, different notions of logical consequence enter the scene in the second part of the talk, and then one can lose (CT1) or (CT2). Moreover, and this constitutes the third part of the talk, the connectives can be defined in a way that not all formulas are equivalent, losing thereby (CT3).

The semantics to be presented here has a rather surprising consequence: all what Weber, Badia and Girard said for inconsistent truth tables can be mimicked, mutatis mutandis, for trivial truth tables. In short, trivial truth tables might look exactly like the classical ones. I will show this in the fourth and final part of the talk.

12:30 – 13:00

Julian Mauricio Valdes-Toro (Universidad de Salamanca, Universidad Icesi) - Metalogic and translations between logics.

Topic: A.2 Philosophical Logic

Abstract: The metatheory or metalogic can be considered as the set of problems, (meta)theorems and proofs that are carried out, no longer (simply) in a logic, but on it. Translations between logics are some of the investigations developed in metatheory; these translations can be understood as functions that convert formulae from an object logic into formulae in a frame logic. It is important to emphasize that the researcher uses strategies supported by a logical system (usually classical first-order logic) when demonstrating that the translation preserves certain characteristics of the object logic. It is as if, when doing metatheory (and translations), the object logic(s) were studied from the perspective of classical logic.

Now, since non-classical logics were born as a challenge to the validity of the classical one, then, when doing metalogic, it is strange that the researcher decides to take as a point of view that theory that non-classical logics challenge. The question of what logic should be used in metatheory when translating has not been widely studied; however, the broader question of what logic should be used in metatheory, in general, has been. For example, Williamson 1994, Tye 1994, Field 2000, Burguess 2005 and Weber, Badía & Girard 2015 insist that this practice is methodologically and philosophically inconsistent. Besides this, Girard & Weber 2015, Badia & Girard 2015, Kreisel 1962, McCarty 2002, and Fjellstad 2021 show how the use of classical logic in metatheory can influence the characteristics of the object logic. In this way, some researchers, such as Bacon 2013 and Weber, Badia

& Girard 2015 propose that the logic of metatheory should be the object logic itself. This position leaves translations in serious trouble.

On the other hand, authors such as Field 2008 conceive the metatheoretical use of classical logic as a mere explanatory device suitable for metatheory as it requires precise handling without contradictions. An answer compatible with Field's is that of Priest 2006, who states that metatheory is a contradiction-free context; as such, metatheoretical results from classical logic are perfectly acceptable. However, these positions do not answer counterpart's complaints. In addition, in the center of this spectrum, Vasyukov 2015 proposes a metalogical pluralism inspired by the logical pluralism of Beall and Restall.

Concerning this discussion, this presentation explores its implications for translations between logics: what logic should researchers use to demonstrate that a translation is well done? To answer this question, a development of Vasyukov's pluralism is proposed by combining it with logical contextualism from Caret 2015. The result is the proposal to consider metalogical research (translations included) as a contextual phenomenon; thus, the validity of using a logic in a metatheoretical investigation would depend on contextual factors (presuppositions, values, etc.) of the community of researchers.

13:00 – 14:30	LUNCH

14.30 - 16.00	PLENARY SPEAKER: PHILIP KITCHER

AUDITORIUM 1

PLENARY SPEAKER

Philip Kitcher
(John Dewey Professor of Philosophy, Emeritus, Columbia University)

Why is Climate Action so Hard?

Abstract: For the better part of four decades, national leaders and their citizens have been warned that human activities are causing our planet to heat up – and that, if we do not change our ways, our descendants will have to cope with a harsh – possibly uninhabitable – environment. Despite repeated messages, very little has been done. Even when there are apparent successes, as with the 2015 Paris agreement, the targets set for reduction in emission of greenhouse gases have been inadequate. Since then, very few of the signatories are pursuing trajectories that will allow them to come close to attaining the goals to which they have committed themselves.

Climate action has been sporadic, and far too slow. Why? The obvious answer: distrust of the science. Yet, even in places where the scientific findings have been accepted, and even as skepticism is waning, the response remains sluggish. I suggest two main causes. First, current inequalities, within

and between nations, generate a four-sided dilemma (or quadrilemma). Besides the impact on future generations, many nations and many people reasonably fear that their own futures will be devastated by the kinds of action proposed, unless serious efforts are made to protect and aid them – and they do not expect those efforts to be made. Second, the probabilistic character of the decision problem, coupled to our ignorance of the crucial probabilities (both now and in the foreseeable future), fosters the illusion that the safest course is not to modify the status quo.

The lecture will present the predicament, explain the two main causes of inaction, and offer some proposals for making progress. The best hope for a remedy would be to organize a world-wide venture in deliberative democracy, in which the quadrilemma was systematically confronted, and attempts were made to satisfy all constituencies. It is almost certain that any solution will not only have to revive democracy at the most fundamental level, and also mitigate the character of contemporary global capitalism.

Background Readings:

Philip Kitcher, "Can we sustain democracy and the planet, too?", in Janet Kourany and Martin Carrier (eds), Science and the production of Ignorance, MIT Press, 2020, 89-120.

Philip Kitcher, "How to play Russian Roulette", Los Angeles Review of Books, https://blog.lareviewofbooks.org/essays/play-russian-roulette/

Philip Kitcher, The Seasons Alter: How to Save the Human Future in Six Acts, (co-authored with Evelyn Fox Keller), W.W. Norton (Liveright): April 2017

16:00 – 16:30 COFFEE BREAK

AUDITORIUM 1

16:30 – 18:30 GENERAL ASSEMBLY DLMPST

FRIDAY, JULY 28TH

09:00 - 10:30

AUDITORIUM 2

(LTF)
Symposium: Scientific Evidence and Uncertainty about the Long-Term Future (LTF)

Chairs: Jäntgen, Ina; Wilkinson, Hayden

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Humanity's future might be very long--perhaps millions of years--and the number of future people potentially vast. Some moral philosophers have argued that it is therefore extremely important, morally speaking, to make the long-term future better for those who inhabit it, at least if we can do so predictably (e.g., Greaves & MacAskill 2021; MacAskill 2022). But can we do so predictably? If so, how? The answers to these questions depend on fundamental issues in philosophy of science, and indeed such issues have enormous implications for policy-making, philanthropy, and individual decision-making. This symposium seeks to address these questions, bringing together 12 scholars from a diversity of countries, career stages and subfields to do so.

The first section of the symposium is introductory. Wilkinson's talk discusses the basic moral case for placing great value on beneficial long-term effects. Steel's talk then offers a concrete case study of scientific inquiry into important long-term effects: the long-term risks of catastrophe due to climate change.

The second section covers challenges for scientific inquiry aimed at informing long-term decision-making. To begin, Jäntgen discusses problems with providing sufficient evidence for an effect being persistent over time. Harris then addresses a widespread methodological issue raised by severe uncertainty about the future: scientists' tendency to assign numbers to phenomena beyond what the evidence justifies. Next, Dethier focuses on the challenge of evidence being ambiguous--as it often is when studying long-term effects--for which he proposes a statistical solution. Closing this section, Kosonen raises challenges unique to the prediction of a phenomenon whose long-term effects otherwise seem especially predictable: human extinction.

The third section addresses the possibility that predicting very long-term effects is simply impossible--that, in this setting, we are unavoidably unaware of relevant possibilities. Roussos makes the case for this and argues that, as a result, decision-makers should instead focus on improving the near future. Similarly, Neth argues that, given such unawareness, the best ways to improve the long term differ little from the best ways to improve the near term. Williamson responds to such concerns about unawareness, arguing that solutions to the so-called problem of cluelessness (known in ethics and decision theory) solve these problems too. This section then closes with Thorstad's talk, on a decision-theoretic proposal for responding to unawareness about long-term effects.

The final section concerns the future of science itself. Can we predict that our current scientific understanding will stand the test of time? Vickers argues that at least some scientific claims are indeed 'future-proof'. Crüwell continues the discussion, drawing on lessons from the replication crisis.

To date, concerns about long-term prediction have been largely neglected within philosophy of science. Through this symposium, we seek to attract more philosophers of science to engage with such concerns. And this congress is the perfect setting to host such a discussion: One of the greatest challenges of our time--and perhaps the challenge most beset by uncertainty--is that of safeguarding the future. Scientific inquiry is a crucial part of accomplishing this and so too, we think, is philosophy of science.

Speakers:
1) Hayden Wilkinson: The Value of Long-Term Prediction
2) Daniel Steel: Studying Intermediate Collapse Risks Linked to Anthropogenic Climate Change
3) Ina Jäntgen: Can we provide scientific evidence for the persistence of causal effects?
4) Margherita Harris: The ubiquity of quantifauxcation and why it must stop
5) Corey Dethier: What makes Statistics Valuable? Ambiguity, Higher-order Evidence, and the Methods of Data Analysis
6) Petra Konosen: The Optimistic Meta-Induction
7) Joe Roussos: Our ignorance about the long-term future
8) Sven Neth: Myopia and Discounting
9) Thimothy Williamson: Answering Cluelessness
10) David Thorstad: General-purpose institutional decisionmaking heuristics: The case of decisionmaking under deep uncertainty
11) Peter Vickers: Using history to gauge a consensus threshold for future-proof science
12) Sophia Crüwell: The future of the social and biomedical sciences in light of replication and inference issues

9:30 – 10:00

Hayden Wilkinson (University of Oxford) - The Value of Long-Term Prediction.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Policy-makers, philanthropists and many other decision-makers are at least sometimes interested in using their resources as effectively as possible: to use those resources to benefit as many people as possible, as much as possible. With this aim, how should they spend their resources?

One prima facie plausible answer is that they should often focus on improving lives in the far future. After all, there are potentially far more people in the future than in the present--if humanity survives as long as other mammalian species (0.5-6 million years), then future people will likely outnumber us 1,000 to 1. If there are interventions that can predictably make (many of) those lives better, then such interventions have enormous moral impact. This possibility has led some moral philosophers to endorse longtermism: the view that, in at least some of the most important decisions faced by agents today, the morally best options available are those that most benefit the long-term future (Greaves & MacAskill 2021; MacAskill 2022).

But this answer to how decision-makers should spend their resources depends on a crucial question: can we predictably affect the long-term future? Can our evidence, particularly our scientific evidence, ever justify predictions of an intervention's effects over extremely long timespans? These are questions for philosophy of science, albeit ones that have received little explicit attention in the field. They are also questions where foundational issues in philosophy of science bear heavily on practical moral decision-making.

This talk introduces a prima facie case for longtermism and details various open questions in philosophy of science that bear on it, many of which will be discussed in the remainder of this symposium. Such questions include: whether we can ever obtain evidence of persistent causal effects, and what sort of persistence we should seek; whether past failures of scientific understanding and of prediction undermine all attempts to predict future effects; and whether we face true unawareness (in the decision-theoretic sense) when making decisions concerning the far future, and how to respond to such unawareness. Other such questions include: whether we can empirically test and understand long-term phenomena when experimental science (and a fortiori, any given experiment) has existed for such a short period of time so far; whether scientific predictions of long-term phenomena are unavoidably coloured by our current values and biases; and how we should compare,

evaluate, and integrate the divergent forms of evidence we have for many long-term effects (ranging from experimental evidence to philosophical speculation).

In short, this brief talk makes a moral case that many questions within philosophy of science are of great importance. If we can identify methods to reliably predict the long-term effects of present-day interventions, we may empower decision-makers to do far more good, morally speaking. And if we can show that long-term prediction is in principle infeasible, then we may prevent decision-makers from wasting their resources on a fool's errand.

10:00 – 10:30

Daniel Steel (University of British Columbia) - Studying Intermediate Collapse Risks Linked to Anthropogenic Climate Change.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: A number of authors have suggested mechanisms by which anthropogenic climate change could risk societal collapse on a global scale. However, these mechanisms are typically presented at high levels of abstraction that make them difficult to study empirically and that leave their implications for collapse risks largely speculative. In some ways, this situation can be attributed to the inherent difficulty of the topic. While there are many instances of societal collapse in the historical and archeological records, global collapse of human society has never occurred. And the massively larger and more technologically complex scale of contemporary societies along with unprecedented climatic conditions likely to confront humanity in the not-too-distant future create significant uncertainties for efforts to make inferences about future collapse risks from past cases. Such reflections raise doubts as to whether risks of societal collapse linked to anthropogenic climate change (in brief, climate collapse) can ever be a topic of serious scientific inquiry.

This presentation suggests an approach for making the study of climate collapse more empirically tractable driven by the following three premises:

1. If climate collapse were to occur, it would unfold over an extended period of time.
2. Climate collapse at limited geographical scales is plausibly in process in some places.
3. Climate collapse would involve loss of adaptive capacity in multiple sectors of society due in part to accumulated impacts of climate change.

These premises have a number of implications. Most fundamentally, they suggest a change of perspective. Instead of beginning with a future global collapse scenario and asking how it might happen, our approach starts with current localized collapse risks and asks how far they might extend. Consequently, our three premises suggest research on processes that are currently ongoing in concrete locations and political or economic sectors, and which are thus amenable to empirical study.

One motive for our approach is methodological. In some cases, the best way to learn about a large, complex process is to identify and observe current smaller-scale mechanisms that could drive it. By analogy, one might study the diversification of species through a detailed examination of natural selection acting on finches in the Galápagos Islands. Such an approach is appealing when direct study of the full process is infeasible. A second motive is epistemic. Climate collapse might occur at localized or regional scales but not globally, while global collapse entails collapse in all locations and regions on Earth. Consequently, localized and regional collapses are more probable than global collapse, making them a less speculative starting point for inquiry. A third motive is ethical. Places that are at greatest risk of climate collapse in coming decades often possess limited financial resources and have very low historical emissions, so equity suggests prioritizing them. However, our approach avoids the trap of assuming that climate collapse is only a concern for lower-to-mid-income countries. It also systematically asks about collapse risks more broadly, and how collapses in some places might impair the functioning of others that managed to avoid collapse.

Symposium continues in the same room, next time slot.

ROOM 01

9:00 -9:30

Lewis Ross (LSE) - The Truth about Better Understanding?

Topic: B.1 Methodology

Abstract: The notion of understanding has come to occupy an increasingly prominent place in contemporary epistemology, philosophy of science, and moral theory. A central and ongoing debate about the nature of understanding is how it relates to the truth. While truth—or knowledge, which entails it—has long been thought to be the primary epistemic goal, some theorists now think a proper appreciation of the importance of understanding calls for a less exacting preoccupation with factivity.[1]

The recent work of Catherine Elgin exemplifies the idea that we should 'dethrone' the centrality of truth when theorising about understanding and the goals of intellectual disciplines like the sciences more generally.[2] Key to her position is the thought that a strictly factive conception of understanding is empirically inadequate. Elgin argues that it cannot account for the manifest success of scientific theorising, including the widespread role of idealisations in successful research and the role of false theories in the upwards trajectory of scientific understanding. While these considerations have long been discussed by philosophers of science engaged in the realism/antirealism debate, what is notable about their appearance in this context is how they are used to make a bold claim about the nature of an epistemic state—namely the claim that understanding is not factive.

Using Elgin's view as a foil, this paper shows that a strictly factive theory of understanding has resources with which to explain the essential role of false theories and idealisations in science. While the role of idealisations has been increasingly discussed in recent work[3], this paper builds on this work by offering a unified response to both the problem of idealisations and the role of false theories in the upwards trajectory of scientific understanding. By showing how subjects can recover true beliefs from false or partially inaccurate inputs, I argue that strictly factive conceptions of understanding can capture the epistemic improvements made by inquirers even if they happen to be unaware of the falsity of the view in question or the idealised status of the model or law being employed. The strategy outlined also holds promise in explaining why a factive account of understanding is compatible with the role of non-propositional (and hence not truth-apt) representations in the acquisition of understanding.

[1] For discussion of the relationship between understanding and knowledge, see: Paulina Sliwa, 'Moral Understanding as Knowing Right from Wrong', Ethics 127, no. 3 (April 2017): 521–52, https://doi.org/10.1086/690011; Alison Hills, 'Understanding Why', Noûs 50, no. 4 (2016): 661–88, https://doi.org/10/gg434s; Lewis D. Ross, 'Is Understanding Reducible?', Inquiry 63, no. 2 (7 February 2020): 117–35, https://doi.org/10.1080/0020174X.2018.1562379.

[2] Catherine Z. Elgin, 'True Enough', Philosophical Issues 14, no. 1 (2004): 113–31, https://doi.org/10.1111/j.1533-6077.2004.00023.x; Catherine Elgin, 'Understanding and the Facts', Philosophical Studies 132, no. 1 (19 January 2007): 33–42,

https://doi.org/10.1007/s11098-006-9054-z; Catherine Z. Elgin, True Enough, 1st edition (Cambridge, MA: MIT Press, 2017).

[3] For example, see Emily Sullivan and Kareem Khalifa, 'Idealizations and Understanding: Much Ado About Nothing?', Australasian Journal of Philosophy 97, no. 4 (2 October 2019): 673–89, https://doi.org/10/gk3938.

9:30 – 10:00

Mwin-Mâalou Frédéric Dabire (Université Paris 1 Panthéon-Sorbonne, IHPST) - The problem of demarcation in the light of Covid-19: How to define science while being uncertain?

Topic: B.1 Methodology

Abstract: The problem of the demarcation in epistemology or the question of the frontier(s) between science and non-science, whose first explicit formulation can be found in Popper , remains topical; topicality even more evident and more questioning during the health crisis of Covid-19. In fact, the political, journalistic and especially scientific and philosophical circles have been shaken in their certainty of knowing what science is and what the criteria of scientificity would refer to. The truth is that we found ourselves in an impasse where the word of the expert competed with the opinion of the conspiracy theorist; worse, experts were labelled as conspiracy theorists by their peers. Nevertheless, Covid-19 has, among other things, put back on the table of the debate the question of what can be said and considered truly as scientific theory and practice.

This paper explores the strength of the "uncertain attitude", that attitude of doubt, in solving the problem of demarcation. The paper will first argue the obsolescence of the search for a single, directly applicable criterion. From there, it will argue, in a second step, that the solution of the multi-criteria of demarcation is also inoperative. The position defended here will underline the limits of this second strategy because it always apprehends science in a fixist and essentialist perspective. If these two solutions (single criterion and multi-criteria) do not allow for a clear demarcation between science and non-science, in the context of Covid, the borders seem to have become more blurred even if the constant effort of demarcation is maintained. And this is where the "uncertain attitude" can be of undeniable use. In fact, this attitude, which we will define as a situation, a state of mind in which the most solid certainty is shaken, constitutes an issue in the resolution of the demarcation problem. Indeed, abandoning the fixist and essentialist perspective of definition of science, the "uncertain attitude" can start from all presumed scientific practices to outline indicators of scientificity, understood as coefficients of scientificity. The stake of this communication is, in the end, to propose a methodology based on the "uncertain attitude" in order to outline several regimes of scientificity starting from the scientific practice itself or presumed as such.

10:00 – 10:30

Alberto Cordero (CUNY Graduate Center & Queens College CUNY (City University of New York)) - A Functional Turn for Selective Realism.

Topic: B.1 Methodology

Abstract: Selective realist approaches confine commitment to just some theoretical parts, but the selection criteria employed generally let in regrettable choices. Part of the trouble is that the projects leave unclear the ontology invoked by parts approved for commitment. Historical cases and scientific practice gesture toward a functional resolution of this problem, but the clues could be more explicit and elaborate. This paper clarifies the road for pluralist realist commitment toward functional and

effective theoretical content. The proposed turn is checked against two plausible objections: (a) Like today's scientists, past scientists too thought highly of their epistemic success, inferring wrongly that their leading theories were highly correct. (b) Ontological overcommitment: under the proposed approach would overcommit in fatal ways. These objections are found wanting.

The specific version of realism proposed in this paper reorients selective commitment. It drops the standard, traditional emphasis (centered on fundamental theoretical entities and behaviors). Instead, the proposed turn focuses on functional/effective theory parts. The focus is on functional theoretical descriptions and claims of reality grounded in discovered causal efficacy at any ontological level (not just the fundamental level). This reformulation helps the selective realist project in two ways. First, it clarifies the structure and content of taking a realist stance towards just part of a theory and expecting substantive retention of that part in successor explanations. Secondly, it spells out some relevant differences between the realist stances that long prevailed in most modern science and the selective pluralist approaches available today.

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ROOM 02

9:00 – 9:30

Dj Arends (University of Colorado, Boulder) - The Generalized Mentaculus Account of Counterfactuals.

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: Recently, Barry Loewer has argued for an account of counterfactual conditionals which makes use of his proposed best system of laws, 'the Mentaculus'. Though Loewer's approach does solve a number of issues which plague other accounts, it falls short of being able to appropriately evaluate all the relevant conditional statements. In particular, it is unable to capture the truth conditions of statements which describe cause-and-effect relations that are separated across large temporal intervals. In the present work, I offer an alternative semantics for counterfactual conditionals that implements the Mentaculus system in a manner capable of capturing these problematic cases. I then demonstrate that Loewer's approach can be recovered as a special case of this 'Generalized Mentaculus Account' with a narrower range of applicability. My account thus retains all the benefits incurred from the use of the Mentaculus system while avoiding the pitfalls of the more restrictive approach.

9:30 – 10:00

Valter Alnis Bezerra (Universidade de Sao Paulo), Lígia Lopes Gomes (Universidade Federal do ABC) - Value outlooks in scientific knowledge from a structuralist point of view.

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: In this work, values in science are analyzed from a structuralist standpoint. The main objetive is to arrive at a general framework for describing value outlooks as a new component within the scope of the metaheoretical apparatus of the structuralist view of scientific knowledge. Structuralist metatheory describes scientific knowledge in terms of theory-elements, theory-nets and theory-holons. The notion of a value outlook within a restriction/selection strategy, from H. Lacey's and P. Mariconda's model of science-values interaction, is taken as a general starting point. Thanks to the structuralist approach, the constitution and structure of a value outlook may be seen under a formal, "microscopic" light. The general framework is developed in a stepwise fashion, from a general characterization of value up to the notion of a value judgement, and then from the individual to the collective level of value structures. The temporal evolution of a value outlook is described, as well as the process of eventual convergence to a provisionally stable configuration. Once the notion of a value outook is formulated precisely in structural terms, its place as an element within a structuralist theory-holon is made clear. It is then shown how value outlooks are applied by scientists in order to formulate value judgements in scientific practice. It is argued that the notion, so developed, might illuminate various aspects of value kinematics, dynamics, and rationality in scientific knowledge. A few general structural features of scientific axiology, such the interconnected and holistic nature of value outlooks, due to the existence of relations of both affinity and tension distributed along the structure, are discussed. The network-oriented nature of the proposal is also highlighted. It is suggested that the view presented here could provide more substantial grounds for the so-called "pragmatic turn" in structuralist metatheory than has been the case until now. Some open problems for the view presented are pointed out, such as the conditions of convergence towards an equilibrium configuration of a value outlook, the mechanisms for resolution of tensions between values, and how the view developed here might be judged as regards its adequacy in historiographical terms.

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10:00 – 10:30

Iman Foroutan Jahromi (University of Isfahan) - Canguilhem and the double-aspect epistemological obstacles.

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: Gaston Bachelard, French epistemologist and philosopher of science was the first to introduce the concept of epistemological obstacle in philosophy of science. By epistemological obstacles he meant commonsense ideas and values, residues of previous successful science which, he believed, obstruct the path of modern science progressive development. To pave the way for development, he thought, the best way was to eliminate or overcome these obstacles. Georges Canguilhem, philosopher and historian of science, who was Bachelard's successor and pupil agreed with him on the negative role of epistemological obstacles in development of science, so why included them in his own historiography of science and contrary to his mentor's opinion gave them an epistemological value? This is the main question of current paper. To answer it Canguilhem's major concerns in history of science, that were medicine and biology, have been pursued in order to reveal other aspects of these obstacles. For example, vitalism which is a pre-scientific outdated mentality and an obstacle to the development of many mechanical theories about the physiology of involuntary movement is historiographically and epistemologically accredited by Canguilhem, because the genealogy of the concept of reflex can be found in it. Moreover, studying Canguilhem's adventurous and normative conceptions of history of science shows that epistemological obstacles are the central notion of Canguilhem's epistemology and not merely an impediment in scientific works, however, they can provide the conditions for instituting and developing sciences in a different way. Hence, taking for granted a double aspect role for scientific works, a critical aspect and a creative one, the paper shows that scientific developments occur in both ways: theoretically, or denying any pre-scientific mind, tackling epistemological obstacles and criticizing scientific ideologies; and conceptually, or creating continuities through which past concepts be legitimately assimilated to today's once. It is maintained that, considering the second aspect, epistemological obstacles can play a facilitating role and provide a more continuous notion of history of science by making scientific developments more visible.

ROOM 03

(PROOF)
Symposium: Proofs and styles of reasoning across history and cultures

Chair: Rodin, Andre

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Proof plays a central role in mathematics. However, there is considerable discussion among mathematicians, logicians, historians and philosophers of mathematics and logic on what proof is and what it has been in history and across cultures.

Historians of mathematics and logic face in their research concepts, ideas and informal demonstrations expressed in a blend of natural language with a notation specific to a historical period or the author of the past, which often is no longer used or even hardly intelligible today. Historical proofs involve informal components, a kind of rigour independent of complete formalisation and some kind of "meaning" or semantic content transmitted through a "text" and call its reader for understanding and verification. Moreover, proofs are often conducted under different (local) logics and formulated in distinct styles of reasoning by using diverse mediums and codes of communication in different cultures in history. If we assume that proof is part of logic, then the problem is ultimately

reducible to the question, “what is logic?” However, there is no consensus either on the question of what logic is. Furthermore, proofs can be carried out within different logics, thereby establishing different kinds of truth, for instance, classical, constructive, probabilistic (statistical), modal, paraconsistent truths, and others, which might be understood and accepted only by the community, who reason within the corresponding logic. On the other hand, proofs can be codified and communicated in different styles: Hilbert-style proofs, natural-deduction proofs, sequent-calculus proofs, informal and meta-mathematical proofs, and philosophical argumentation written up in a blend of natural and sign languages. The same proof can be exposed in different formal or informal ways, but even in a single formalism, the same proof can take different forms. Then how can we identify proofs and distinguish between proofs carried out in different logics at different times within distinct cultures? Are they comparable? Can the identification of logic proofs be used to identify real mathematical proofs?

The symposium will focus on the process of discovery of proofs, the ways of reasoning used in proving propositions and solving problems, the styles used in conveying semantic information and exposing purported proofs, how they are understood by the members of the relevant communities in various cultures, and how mathematical and logical texts and stylistic traditions are interpreted across historical times and varied cultural contexts.

Speakers:

1) Palomäki, Jari. On Uuno Saarnio’s Attempted Proof of the Continuum Hypothesis
2) Rodin, Andrei. Proofs and Solutions, according to Kolmogorov
3) Stern, Julio. Symmetry and Proof in Physics and Statistics: The Meaning of Nöther and de Finetti Theorems.
4) Vandoulakis, Ioannis. Analysing proving discourse: a dialogical perspective.
5) Centrone, Stefania. Conceptions of proofs from Aristotle to Gentzen.
6) Mainzer, Klaus. Proof and Computation in Logic, Mathematics, and Artificial Intelligence.
7) Friend, Michele. The Transcendental Truth-Value in Some Buddhist Logic.
8) Gan-Krzywoszyńska, Katarzyna; Leśniewski, Piotr. On Dialogical Style of Experimental Proofs.

9:00 – 9:30

Jari Palomäki (Tampere University) - On Uuno Saarnio´s Attempted Proof of the Continuum Hypothesis

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: In 1953, the Finnish mathematician and philosopher Uuno Saarnio (1896-1977) got acquainted with German mathematician Heinrich Behmann (1890-1970) at the XIth International Congress of Philosophy in Brussells, Belgium. Before that, Saarnio had already made research on transfinite ordinal numbers as well as twice attempted to show by means of them the correctness of the continuum hypothesis, but without success, [1][2]. However, now he had found a collaborator, an adviser, a referee, and a friend for his research, which culminated in a book Das System und die Darstellung der transfiniten Ordnungszahlen mit Hilfe der höheren Rechenoperationen. Mit Einführung von Prof. Dr. Heinrich Behmann by Saarnio in 1958, [3]. Based on that research, the main focus of it being higher-order counting laws for transfinite ordinal numbers, Saarnio published several articles in the 1960s on transfinite ordinal numbers especially in Mathematische Annalen, including his third and last attempt to prove the correctness of the continuum hypothesis in 1968: “Eine konstruktive Darstellung für die Richtigkeit der Kontinuumhypothese,” [4]. Thus, it took almost ten years of intensive study, criticism, meetings and correspondence between Behmann and Saarnio before Behmann, at last, was convinced of its correctness. Since when Behmann first heard Saarnio’s new attempted proof of the continuum hypothesis, he was very skeptical of it, mostly because of the

independence proofs by Gödel and Cohen. When analysing Behmann's struggle of Saarnio's proof, I shall follow Joseph Coguen's (1941-2006) idea of proof–events, e.g. [5], which presuppose at least two types of agents: prover, i.e. Saarnio, and interpreter, i.e. Behmann.

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9:30 – 10:00

Andrei Rodin (University of Lorraine) - Proofs and Solutions, according to Kolmogorov.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: The popular BHK-semantics (after the names of Brouwer, Heyting and Kolmogorov) aka proof-interpretation of intuitionistic logic was first introduced under this name by Troelstra and van Dalen in the 1980s [1]. It deliberately combined a number of more specific interpretations of the same formal calculus earlier proposed by the aforementioned and some other people (including G. Kreisel). This synthesis was realized by Troelstra and van Dalen on the assumption that the differences between these more specific interpretations, in their analysis, were superficial and in any event not logical. Andrei N. Kolmogorov, however, held a different opinion, and considered his interpretation of the intuitionistic propositional logic as the "calculus of problems" to be essentially different from Arend Heyting's original interpretation of this calculus as a variety of propositional logic [2]. In Kolmogorov's view this difference had important epistemological implications, which Kolmogorov stressed at many occasions, in particular, in his Preface to Russian translation of Heyting's 1934 monograph, which appeared in 1936. [3,4]

A key point where the two mathematicians disagreed was whether every problem reduces to a proposition and, by consequence, whether every solution reduces to a proof. While Heyting understood the concept of proposition (Germ. Aussage) after Brouwer so broadly that he could call by this name every mathematical problem, Kolmogorov insisted that problems and propositions were two related but nevertheless sharply distinct notions.

In this talk I explain the differences between Kolmogorov's and Heyting's conceptions of the intuitionistic logic and show that Kolmogorov's conception can be combined with Heyting's only at the price of a very significant simplification or even a trivialisation of the former. Further, I defend Kolmogorov's view on problems and propositions (resp. solutions and proofs) using some historical and some recent mathematical examples including insights from Homotopy Type theory.

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10:00 – 10:30

Julio Stern (USP - Universidade de Sao Paulo) - Symmetry and Proof in Physics and Statistics: The Meaning of Nöther and deFinetti Theorems.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: The Han glyph or character xiang (Mandarin) or katachi (Japanese) is used as a translation to the western word symmetry (i.e., equal-measure). The Han glyph depicts the same basic idea, in a slightly more elaborate form: It displays two tree trunks of the same size, followed by three strands of hair, that convey the idea of an external manifestation of an internal power or property. This idea of external manifestation of an internal power or property raises the question: Internal to what or to whom? Internal to the observed object, or internal to the observing subject? Physics and Statistics offer answers to this question in the form of Nöther and deFinetti theorems, relating symmetry conditions of a system to its invariant quantities and parameters. Yet, conflicting objective/ subjective interpretations for the source of the symmetry condition remain possible. In this paper we present very simple but detailed versions of these theorems, and discuss their conflicting interpretations.

Symposium continues in the same room, next time slot.

ROOM 04

9:00 – 9:30

Sara Vekony (Florida State University) - Belief, Acceptance and Values in Science.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: My paper connects recent debates in epistemology with the debate over the value-free ideal of science. There is widespread disagreement among epistemologists over whether the rational conditions for belief are subject to pragmatic encroachment (PE), that is, whether non-epistemic concerns like practical stakes can affect whether an agent has a justified belief. While not their only tactic, proponents of PE offer a wide array of intuitively compelling cases that point in their favor. Evidentialists, on the contrary, argue that only epistemic factors can rationally justify an agent’s beliefs. The challenge for evidentialists is to ‘explain away’ the intuitive force of cases suggesting PE. Many evidentialists, most notably Jackson (2019), Ganson (2008), and Ross and Schroeder (2011), utilize theories of cognitive dualism to argue that belief is not subject to PE. Their ‘dualist strategy’ follows a general structure: they posit we have an additional cognitive attitude besides ‘traditional belief,’ and argue that while belief is not subject to PE, the level of stakes in the surrounding context affect the rationality of relying on belief or relying on another cognitive attitude.

There is a distinct but heavily interrelated debate over whether the constraints on knowledge are also subject to PE. If PE on belief is true, then by extension, under the widely received view that knowledge is true belief with adequate justification, the conditions for knowledge are subject to PE as well. This, importantly, includes our scientific knowledge, as emphasized in Miller (2014). Miller argues further that if PE is true, then the 'value-free ideal' (VFI) view of science is false. That is, if we find that the conditions of knowledge are sensitive to practical stakes, we cannot hold on to the idea that scientific knowledge is free from influence from our values.

It would be intuitive then, to think that evidentialism would support the VFI of science. However, I argue that this is false: even if evidentialism is true, it does not immediately follow that what we want to call scientific knowledge is free from PE. One must do more than argue for evidentialism if one is to defend VFI. My paper proceeds as follows. First, I bolster the evidentialist position by offering a compelling way to 'explain away' PE by using Cohen's (1989) cognitive dualism that avoids the pitfalls found in existing evidentialist responses. Cohen's distinction between belief and acceptance allows the evidentialist to hold that it is the conditions on acceptance that admit of PE, but not so for belief. I name this position "Cohenian Evidentialism." Second, I explore the consequences of adopting this view on the case for VFI, and argue that not only does it fail to imply VFI, it actually suggests PE on knowledge. If we are to understand 'acceptance' as the epistemically important cognitive attitude in science, as Cohen himself and many prominent philosophers of science such as van Fraassen hold, and acceptance is subject to PE, then the knowledge produced by science is as well.

9:30 – 10:00

Yanai Sened (Fordham University) - Believing What you Will: A Pragmatist Epistemology of Wishful Thinking.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Worries about integrating values in scientific thought have often focused on the problem of wishful thinking; a form of thinking that somehow proceeds from what one wants (informed by their values) to what one believes. Most accounts of wishful thinking view it as an epistemic failure. In this paper I suggest a model that represents wishful thinking properly functioning process that achieves rational goal for the agent.

To do so, I begin by surveying existing literature on wishful thinking. Such contemporary literature in the philosophy of science tends to be hostile to the idea of wishful thinking. To to give an account of wishful thinking that highlights its usefulness, I rely on the early works of the pragmatist tradition. I start with William James' concept of truth, which I use to explain how wishful thinking can be seen as achieving the same goals as those typically filled by true beliefs. I will then explore John Dewey's ideas about inquiry to develop a model of how one practically engages in wishful thinking without an epistemic failing. Finally, I explore how wishful thinking can be counteracted, using the concept of epistemic resistance developed by José Medina, and relying on theoretical and empirical study on forms of epistemic resistance to suggest a model for intervening in another agent's wishful belief, without relying on the assumption that merely convincing them that they hold wishful beliefs provides them with sufficient reasons to abandon them.

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10:00 – 10:30

Marisa Alvarez (Universidad Nacional de Tucumán), Celia Medina (Universidad Nacional de Tucumán) - Political and social aspects of the Vienna Circle Manifesto.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: In recent decades, a number of authors, such as Reich (2009), Stadler (2010), and Gómez (2011) have addressed the study of logical empiricism considering the historical and institutional aspects in which it was developed. Although no philosophy can be understood without knowing its context, this is more pertinent in the case of the Vienna Circle because, to a large extent, their positions are a response to it.

The interwar period is characterized by social and political instability, economic debacle, left-right polarization, and growing anti-Semitism. All of this produced a deep mistrust of traditional political regimes, a return to irrational, anti-scientific positions, and strong pessimism in both daily and academic life. Given this, logical empiricism assumed an anti-fascist and anti-Nazi stance, defending science and enlightened rationality, technological scientific progress, and modernism (Edmonds, 2020). In this paper, we will try to show how these aspects, which were the most neglected in the study of the Vienna Circle, are present in his Manifesto of 1929.

Consequently, we will focus our analysis on the social and political aspects of the text The Scientific World Conception: The Vienna Circle, also known as the Vienna Circle Manifesto (Hahn, Neurath and Carnap, 1929) because, in our opinion, it is the document that best expresses the common positions of the group.

Prepared by members of the Vienna Circle linked to austromarxism and the Austrian Social Democratic Party, we believe that in this text there is a clear link between emancipatory and socialist ideals with the scientific conception of the world. Furthermore, it was written in a non-technical language because it was intended to popularize and win adherents to a philosophical and political position.

With this objective, first of all, we will make a historical and institutional contextualization showing why the position of the Vienna Circle is not only epistemic but also an ideological and political struggle. Secondly, we will analyze the 1929 Manifesto to make explicit the links between the scientific conception of the world and the role that its authors considered they should play in the ideological, political and social arena of their time. Finally, we will highlight the importance that you raise how these have in a context like the current one plagued by irrationalist currents such as flat earthers or anti-vaccine movements.

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ROOM 06

(IASCUD-CD)
Symposium: The Significance of Cultural Diversity in Biomedical Science

Chair: Atanasova, Nina

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: The need for representation of diverse groups in biomedical research has long been recognized. Actions have been taken for adequate inclusion of women and members of ethnic and racial minorities in clinical trials and biomedical databases. However, focusing on categories such as race, ethnicity, and biological sex runs the risk of overlooking relevant differences which do not align with these categories. This in turn may lead to harmful stereotypes rather than more precise medicine. Cultural diversity has recently been recognized as a relevant aspect of conceptualizing health, illness, wellbeing, and correspondingly health and illness behaviors.

However, Zanting et al. (2020) warn that current Western medical curricula may be misrepresenting cultural diversity by constructing what amounts to an 'exotic other' since they overfocus on categories such as religion, nationality, and ethnicity. Intersectional approaches to conceptualizing diversity may fare better. Yet, Zanting et al. argue, they still treat some relevant factors as relatively stable categories, which may lead to treating underrepresented groups as deviant.

Instead, Zanting et al. point out, culture is dynamic and its influence on health may shift over time. Thus, conceptualizing diversity in medicine should focus on biological differences and contextual factors.

Conceptualizing illness as a form of deviance and otherness inevitably leads to paternalistic attitudes of well-meaning advocates and medical professionals. Washington (2018) argues that contextualism, which focuses on personal values in determining an individual's wellbeing, provides a means for minimizing harmful paternalism in psychiatric practice.

With the growing acceptance of the biopsychosocial model of disease, contextualism naturally extends to the larger context of biomedical research and clinical practice. This model has brought about the recognition that lifestyle and social environment are instrumental for disease treatment and prevention as well as maintenance of good health. It follows then, that culture and personal values are integral in shaping health and illness behaviors.

The purpose of this symposium is to gather together scholars whose research focuses on the representation of marginalized groups (neurodiverse, indigenous, and migrant, among others) and provide a platform to explore the role of cultural diversity and contextualism in medical practice and biomedical research.

Speakers:
1) Yassmin Haddad: The value-ladenness of population descriptors
2) Janella Baxter: Biomedical Colonialism
3) Joanna Malinowska: The invisible colours of racism: on the need to decolonise the concept of racism in biomedical research
4) Bennett Knox: Hermeneutical Pluralism: The Neurodiversity Movement and Psychiatry
5) Sarah Arnaud: First-person perspectives and scientific inquiry of autism: towards an integrative approach
6) Nina Atanasova: The Promise of Big Data to Psychiatry: Precision and Prediction
7) Marianne Broeker, Matthew Broome: Can an algorithm become delusional? Evaluating ontological commitments and methodology of computational psychiatry

9:00 – 9:30

Yasmin Haddad (McGill University) - The value-ladenness of population descriptors.

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: Clustering humans according to genetic similarities is a common and widespread practice in population genetics. Genetic populations can be seen as statistical modeling constructs that allow geneticists to group samples according to similarities between group members. The notion of 'genetic ancestry' is at the core of an important discussion to both scientists and philosophers. On the one hand, some argue that it is an important category that facilitates research by grouping humans into sub-populations and sub-samples. As such, the use of population descriptors - such as genetic ancestry - is essential to modelling practices in population genetics. On the other hand, some argue that genetic ancestry carries ethical risks in its usage as it may lead to the reification of ethnicity and race by reducing such complex constructs to DNA information. A core question in the discussion is therefore whether to use population descriptors in human population genetics. Here, I show that there is an alternative perspective through which philosophers of science can contribute to the debate. Specifically, I draw from the philosophical literature on values in science to argue that a specific population descriptor - genetic ancestry - is a value-laden concept. I apply the framework of constructive empiricism to a new study-case: the use of population descriptors in human population genetics. Adopting a constructive empiricist approach is a key step in assessing the value-ladenness

'genetic ancestry'. This work can contribute to the debate about the use of population descriptors in at least two ways. First, it can assess the role of values in the methods currently used in studies about human populations. Second, it may be an essential step in promoting more transparent scientific communications, especially when conveying results that appeal to 'intrinsic' genetic differences to the general public.

9:30 – 10:00

Janella Baxter (Sam Houston State University) - Biomedical Colonialism.

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: The legal dispute between the Arizona State University and the Havasupai Tribe (2010) is an illustrative example of biomedical colonialism – a process whereby colonialist relationships are perpetuated and reinforced (Garrison 2013). In the case against Arizona State University, indigenous DNA was collected and studied for the purpose of advancing precision medicine. However, authors like Reardon and Tallbear (2012), and Fox (2022) argue that such efforts are characterized by scientists and scientific institutions treating indigenous genomic information as the property of researchers – property that may be shared and used however scientists wish without the tribal consent or approval. A consequence of biomedical colonialism is that all too often scientific institutions benefit from researcher ownership of indigenous DNA, while the conditions of Native communities are left unimproved, if not worsened.

Indigenous scholars have recently called for indigenous ownership of Native DNA samples and knowledge (Reardon and Tallbear 2012). This would involve the construction of indigenous scientific institutions, the training of indigenous genomicists, and the development of technologies that do not extract from indigenous people but restore their sovereignty.

In this paper, I'll argue for a further dimension of biomedical colonialism. Mainstream genomics research perpetuates biomedical colonialism in the way it conceptualizes complex diseases. It conceptualizes complex diseases as being primarily genetic and best managed through direct intervention on gene expression (Kaplan 2000). Yet, genomics has seen only moderate success. Intensive genomics analysis has failed to reveal significant genetic causes of diseases like type 2 diabetes (Tuchman 2020). Despite much failure, scientific institutions continue to conceptualize the important causes of complex diseases as intrinsic properties of individuals. As indigenous leaders have observesd previously, by defining complex diseases in this way scientific institutions occlude, distort, and disregard how colonialist policies may be important causes of poor health outcomes in Native communities (Akwesasne Notes, vol. 12, no. 4 (1980); Akwesasne Notes vol. 13, no.1 (1981)).

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10:00 – 10:30

Joanna Malinowska (Adam Mickiewicz University, Poznań, Poland) - On the need to decolonise the concepts of race and racism in biomedical research.

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: In recent years, calls for increased recognition of the impact of racism and discrimination on human health have become increasingly prevalent. Still, most scientists miss one fact: they usually discuss this issue using dominant folk beliefs about racism and racialisation. For example, the recent series of articles on the relationship between racism and health in The Lancet defined racism as "an organised system that affords power and privilege according to an established hierarchy based on racial categories" (Selvarajah et al. 2022). But what are these racial categories and hierarchies? In most cases, the default way to divide people into races and ethnicities in science is the US ethnoracial classification (as proposed by the Office of Management and Budget). That classification is based on the US folk racial beliefs and refers to their social, historical, economic, and other contexts. It also puts the criterion of people's skin colour at the centre of ethnoracial divisions.

I will argue for the need to decolonise the concept of racism in biomedical research and healthcare. I will focus on the impact of US ethnoracial beliefs and classifications on European research on racism and racialisation. First, I will demonstrate that most discussions on racism in biomedical research and healthcare refer to the US race talk. This conceptual perspective, to a large extent, affects research and diagnostic practices all over the world. For instance, European researchers often align their studies with the requirements of institutions like the American National Institutes of Health or the Food and Drug Administration (Mulinari et al. 2021). I will then argue that racism in Europe may not always be based on the criterion of skin colour – some "white" residents of Europe (especially Eastern Europe) may experience racialisation and racism based on their nationality, social class, religion, or accent, with negative impacts on their health (Krivonos 2020; Tereshchenko et al. 2019). Such situations do not fit into the prevailing understanding of racism. Therefore, there is a high possibility that various processes of racialisation affecting people's physical and psychological wellbeing are currently invisible to science. To properly notice and investigate these processes, it is crucial to broaden our understanding of racism and racialisation beyond the US conceptual framework.

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Symposium continues in the same room, next time slot.

ROOM 07

9:30 – 10:00

Marco Forgione (University of Milan) - Group Field Theory and Phase Transitions Realism.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: The recent research on a plausible theory of quantum gravity points at a conceptual difficulty that requires the attention of the philosophy community: how to justify a theory that explains the emergence of spacetime from entities that are fundamentally non-spatiotemporal. With the present contribution I will clarify the abovementioned difficulty, I will review some relevant positions in literature, and I will then suggest that the Group Field Theory Approach (GFT) can offer an interesting way out.

In this paper I argue that the problem of spacetime emergence in quantum gravity is twofold: on the one hand we want to justify the process of emergence of spacetime, while, on the other hand, we are interested in providing an account, possibly endowed with a physical interpretation, of such fundamental non-spatiotemporal entities.

A great advantage of the Group Field Theory (GFT) approach (Oriti 2011) is that one can use the methods of quantum field theory to treat many (infinite) degrees of freedom, that is: instead of having N-particles states, one can study the collective behavior of the fundamental entities. The approach makes use of the analogy with condensed matter physics (and more precisely with the Bose-Einstein condensate) to study the emergence of spacetime in terms of phase transitions from a pre-geometric phase to a geometric one (see: Gielen et. al. 2013). By relying on the works on phase transitions and inter-theoretic reduction (see: Palacios 2019), I will emphasize the autonomy of the collective behavior of the atoms of space from their individual dynamics. Such autonomy allows us to separate the problem of accounting for the nature of non-spatiotemporal entities from that of explaining a phase transition from a pre-geometric to geometric phase.

The main problem, then, becomes that phase transitions assume the system to be infinite, while physical systems are finite and have finite degrees of freedom. However, while the continuum limit is indispensable for the emergence of new and robust phenomena (Butterfield 2011), it is the behavior of the many entities as a collective that is real, and not the limit –which is only representative of how our mathematical structures describe such systems.

Therefore, a realist account of phase transitions would provide a physical interpretation of how spacetime emerges in the context of GFT in analogy with Bose-Einstein condensates. In addition, the argument divides the problem of emergence of spacetime from that of having non-spatiotemporal fundamental entities because of the independence of the collective behavior of the atoms of space from their individual dynamics.

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10:00 – 10:30

Guido J.M. Verstraeten (Satakunta University of Applied Sciences (Pori, Finland)) - Concealed Mass and Gravitation within Whitehead´s conception of observability in space and time suggest a Big Bounce Universe.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Verlinde's conception of quantum gravitation (2017) within Whitehead's conception of observability involves new insight in the creation of space and time, Contrary to the widely accepted theoretical approach involving dark matter. Matter is deeply connected to pressure-less fluid revealing the emergent nature of gravitation as the intrinsic elastic response of space-time to excitations of the meta-stable micro-groundstate of the de Sitter Space. Since Verlinde does not put a substratum status on mass, and since he does not make curvature of space equivalent with gravitation, he rather reformulates cosmology in a Whitehead's concept of nature.

However, according to Whitehead, nature is disclosed to mind by an ensemble of events characterized by unobservable hidden intrinsic factors (e.g., mass, gravitation) and observable extrinsic factors (e.g., motion, density). Mass is not the substratum of dynamics. It implies spatial extension and temporal duration, which are both necessary conditions of observable natural phenomena. Whitehead's claims on mass, space, and time corroborate Verlinde's alternative conception of quantum gravitation. Within the de Sitter space-time, this conception starts from the competition of the short distance degrees of freedom of the Ryn-Takanayagi tensor with long-distance thermalized excitations.

A nonlocally stored thermodynamic entropy St(V) emerges besides the Bekenstein-Hawking area law entropy, proportional to the cosmological horizon . The area law due to the short-distance entanglement of neighbouring degrees of freedom of the Ryu-Takanayagi tensor formulation of emergent space-time generates the entanglement entropy S(V) , which is well-known as the area law for entanglement entropy. However, the entanglement entropy is the entropy of the non-observable according to the Ryu-Takanayagi conjecture about contributing short-range and long-range areas. Consequently, this entropy is out of the range of Whitehead´s observable ensemble of events. The extensive thermal entropy St(V), on the contrary, implies extension and duration, and consequently, St(V) implies observability of the involved events. A long-time scale creates eigenstate thermalisation accompanied by a thermal volume law contribution of entropy S(V) that competes with the BekensteinHawking entanglement entropy SBH.This enables the creation of a baryonic mass and a decrease in de Sitter entropy. The memory effect of the original baryon creation leads to gravitation and the production of extensive thermodynamic entropy. The creation of this appropriate gravitational environment by mass excitation escape settles down energy and momentum in the web of space- and time-like events.

However, the baryon production shrinks, and the dissipating space-time transforms into a space-timeless cold sink with an accompanying strong contracting memory effect. This is equivalent to the alternate motion of a giant Carnot engine, where the heat source and sink energy exchange produce the eternal periodic dynamics of the Universe. This suggests that the Universe did not start from Big Bang but oscillated eternally as a Big Bounce.

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ROOM 08

9:00 – 9:30

Tatiana Sokolova (Russian Society for the History and Philosophy of Science) - The Great Tide Experiment and its Issues for the Philosophy of Science.

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: The talk focuses on the analysis of citizen science and its role in the professionalization of scientific knowledge. As an illustration I take the Great Tide Experiment organized and conducted by William Whewell – British scientist and philosopher. The problem of explanation and, first of all, prediction of tides was one of the most significant scientific problems for the XIXth century as well as for previous and subsequent eras. Precise predictions of the tides in each individual port were of fundamental importance for military and commercial navigation; building construction in coastal cities where flooding was a frequent problem, and public safety in general. Therefore, the groups of interest in question include, but are not limited to: (1) government officials, (2) the military, (3) merchants transporting goods by sea, (4) citizens of coastal areas. These circumstances led to the fact that tide studies were supported by both scientific communities and various kinds of state institutions.

The XIXth century appears as a century of scientific progress, embodied in the industrialization and professionalization of scientific knowledge, new discoveries and inventions. The number of scientific disciplines increases, new technologies actively develop, and the symbiosis of science and technology brings economic benefits and radically changes the entire structure of society. At the same time, against the background of scientific professionalization, the phenomenon of citizen science emerged – the participation of non-professionals in scientific research. The case study of the Great Tide Experiment shows that explaining the phenomenon of citizen science solely by economic factors is incomplete. The organization of scientific research within the framework of citizen science repeats the internal conflicts of scientific institutions associated with the hierarchical division of disciplines.

In the study I define the following criteria by which a professional scientist and a citizen scientist differ from each other. A professional scientist: (1) produces theoretical knowledge; (2) develops standards and guidelines for conducting research; (3) interprets the received data; (4) receives an award for his contribution. The citizen scientist, in turn: (1) may not have any idea about the theoretical part of the research; (2) follows instructions; (3) collects data without analyzing or interpreting it; (4) as a rule, does not receive any remuneration for his work. It follows from this picture that despite the involvement of a wide range of people in scientific research, the status quo in the relationship of forces between professional and civil scientists remains: if the former belongs to the elite, then the latter remains a useful tool. Nevertheless, this did not lead to a change in his social status. Citizen science, thus, repeats in its development the general trends that existed within the social structure of science: theory (albeit based on experimental data) is the concern of professionals and the scientific elite; the collection of data in accordance with instructions is the business of artisans. At the same time, the Great Tidal Experiment demonstrated the possibility of using the potential of non-professionals to develop scientific theories.

9:30 – 10:00

Myron A Penner (Trinity Western University / University of British Columbia), Amanda J Nichols (Oklahoma Christian University) - Science, Truth, and Understanding: An Empirical and Philosophical Analysis.

Topic: B.3 Empirical and Experimental Philosophy of Science

Abstract: Our paper examines survey data from the Work and Well-Being in Science Study, a global survey of nearly 3500 scientists (physicists and biologists) conducted by sociologist Brandon Vaidyanathan et al. In addition to questions about personal meaning and identity in work, and the personal and professional impact of the COVID-19 pandemic, scientists were asked several questions about the role of aesthetic judgment in science, and the overall connection between science and truth. A very interesting result from qualitative interviews of 215 survey participants is how, when asked about the connection between science and truth, many of the interviewees preferred to discuss the ways in which scientific practices generate understanding. Our paper seeks to do two things. First, we identify several themes from the qualitative survey data of the scientists' comments about understanding, truth, and scientific practice. Second, we apply these themes to a philosophical debate between Kareem Khalifa and Henk de Regt concerning the nature of scientific understanding.

One can think of "knowledge," "understanding," and "explanation" as epistemic success terms that reflect some sort of cognitive achievement. These epistemic concepts intersect with science when philosophers of science analyze scientific practices and results in order to determine how science achieves knowledge, yields understanding, and provides explanations. For example, according to Kareem Khalifa, scientific understanding amounts to scientific knowledge of an approximately true explanation. For Khalifa, "scientific knowledge" involves being able to compare and evaluate competing explanations using scientific criteria. Thus, Khalifa's account of understanding is distinctly factive.

Alternatively, Henk de Regt centers his account of understanding on epistemic practices and contexts of scientific communities. For de Regt, understanding arises from scientists being able to connect explanations of phenomena with intelligible theories in ways that preserve empirical adequacy and internal consistency. De Regt's account is distinctly contextual, as operationalizing the "intelligibility" of theories will vary across sciences and experimental contexts. Moreover, de Regt's account is non-factive, as he does not reduce understanding to knowledge of true explanations–mere empirical adequacy will do.

There are two distinct themes that emerge from the qualitative data gleaned from the scientists interviewed in the Work and Well-Being in Science project. First, there was a strong hesitancy to equate science with truth; for many of the participants, connecting science with truth had the negative connotation that scientific statements were immune to possible revision. Second, and perhaps paradoxically given the previous statement, there was a strong implicit, and occasionally explicit, endorsement of scientific realism, in that science was deemed to be aimed at describing "reality," or mapping "the way things really are." We argue that these two themes from the qualitative data connect with the philosophical debate on understanding in the following ways. It appears that, with Khalifa, these scientists tended to endorse a factive account of understanding. Moreover, it appears that, with de Regt, these scientists emphasized the utility of scientific theories in generating understanding. We conclude our paper by noting the prospects for, and limitations of, surveying scientists on philosophical topics related to their work.

10:30 – 11:00

Luna De Souter (University of Bergen) - Contrapositive evaluation measures for Boolean relationships in CCMs.

Topic: B.3 Empirical and Experimental Philosophy of Science

Abstract: Configurational Comparative Methods (CCMs) aim to learn causal structures from datasets and are used for causal discovery in a range of research disciplines including political science, health sciences, and psychology. These methods infer causal structures according to the INUS theory of causation (Mackie 1974) complemented by additional non-redundancy requirements introduced by Graßhoff and May (2001) and Baumgartner and Falk (2018). CCMs aim to derive causally interpretable models from data by exploiting Boolean sufficiency and necessity relationships. One important challenge for achieving this goal is that, because real-life datasets usually contain noise, these Boolean relationships are often not strictly satisfied. Hence, CCMs infer models that only approximately fit the data. This introduces a risk of inferring incorrect or incomplete causal models, especially when data is also fragmented. In order to minimize this risk as much as possible, evaluation measures for sufficiency and necessity should capture all relevant evidence: they should reward all evidence in favour of sufficiency and necessity and penalize all counterevidence. Charles Ragin (2000, 109; 2006) introduced consistency and coverage to evaluate sufficiency and necessity in noisy and fragmented data.

Consistency and coverage are currently the standard evaluation measures in CCMs. They have been accepted on common sense grounds without explicit argumentation by Ragin or others, and only limited research has been conducted on how well-suited they are for measuring sufficiency and necessity. When evaluating the sufficiency of A for B, consistency only takes into account cases in which A is present. Based on Hempel's (1945) equivalence criterion and on the law of contraposition, I argue that some cases in which A is absent also constitute relevant evidence for evaluating A's sufficiency for B. Analogously, coverage neglects certain evidence that is relevant for evaluating necessity. I introduce two new evaluation measures that do capture this neglected evidence and that should be used to complement consistency and coverage as measures for Boolean sufficiency and necessity in CCMs. A simulation experiment demonstrates that these new measures indeed improve CCMs' ability to derive correct causal models from noisy and fragmented data, for datasets in which the consequent of the Boolean relationship has a relative frequency above 0.5. So, applying Hempel's equivalence criterion leads to an improvement of the CCMs research method. The finding that this improvement depends on the relative frequency of the consequent is in line with Bayesian solutions to Hempel's raven paradox.

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ROOM 11

(COPA)
Symposium: Conceptions of Paradoxicality

Chairs: Rosenblatt, Lucas; Szmuc, Damian

Topic: A.2 Philosophical Logic

Abstract: Traditionally, a paradox is characterized as an argument that starts from seemingly true premises, proceeds via seemingly valid rules and reaches a seemingly unacceptable conclusion. Paradoxes come in many varieties and affect a number of different concepts of great philosophical significance: truth, vagueness, membership, conditionality, etc.

We can distinguish two ways of dealing with a paradox: either one revises the paradox-generating concept or one maintains it at the cost of revising classical logic. Both paths require an understanding of the nature of the statements that are responsible for the paradoxes. It has been suggested that these statements are indeterminate (Field, 2008), dialetheias (Priest, 1979), ungrounded (Kripke, 1975) and unhealthy (Bacon, 2015), among other things. Some of these theorists offer a meta-linguistic diagnosis, that is, they recognize that a characterization of the problematic statements is important in the metalanguage, but they don't make it explicit in the object language. Other theorists don't settle for a metalinguistic diagnosis but also introduce a statement-classifying operator to the object language, designed for semantically categorizing these statements.

The importance of these sentence-classifying concepts can't be overstated. By understanding them we put ourselves in a better position to address some of the following questions:

• Is it possible to provide a unified solution to paradoxes involving different concepts?
• If only a specific collection of problematic statements motivates a revision of logic, is it necessary for the non-classical theorist to reject classical logic across the board? Is it possible to offer a delimitation of the collection of statements for which it is permissible to reason classically?
• What's the best way to understand the notions attributed to paradox-generating statements, such as indeterminacy, etc.? Should we understand them model-theoretically or proof-theoretically?
• Should the paradoxes move us to reject standard mathematical theories such as ZFC or is this an unpayable cost?

The goal of the symposium is to make progress on some of these issues by bringing together researchers working on these and related questions.

Speakers:
1) MARIELA RUBIN: Paradoxes of indicative conditionals: avoiding triviality and avoiding asymmetry
2) LUCA CASTALDO: Saving Logic from paradox vía nonclassical recapture
3) XINHE WU: Boolean Mereology
4) SOFIA ABELHA MEIRELLES: Beyond Pluralism and Monism
5) CAMILA GALLOVICH: Towards a Dependence Theory of Paradoxicality
6) SHAY LOGAN: Paradox, Possibility, and Permission
7) DAVE RIPLEY: Liar, curry, sorites: how many paradoxes?
8) AYLÉN BAYLOSA CASTRO: AGM model for paradoxical new logical information

9:00 – 9:30

Mariela Rubin (IIF-CONICET/University of Buenos Aires) - Paradoxes of indicative conditionals: avoiding triviality and avoiding asymmetry.

Topic: A.2 Philosophical Logic

Abstract: Stalnaker's thesis states that the probability of an indicative conditional, "If A, then C", equals the conditional probability of C given A. Unfortunately, we know- thanks to Lewis (1976) and the robust literature that follows it- that this thesis is untenable under some basic and very minimal assumptions because it leads to triviality. This family of results is usually referred to as The Bombshell. In (2016), Russell and Hawthorne showed a different way of trivializing Stalnaker´s thesis when restated in terms of ruling out sentences from reasonable epistemic states in the context of updating information. The authors also extend this result to some epistemic modals and probability operators. This proof is only similar in its surface to The Bombshell. The authors conclude that statements containing these operators fail to express propositions and that one should handle them as epistemic modals using a non-commutative semantics where conjunction works in an asymmetric way when some of these operators are involved.

Ten years before Lewis´ Bombshell came to light, Adams (1965) defended the idea that conditionals cannot be evaluated in terms of truth and falsity, rather they express some degree of justified assertion, and that the degree of assertion of "If A, then C" is tantamount to the conditional probability of C given A. Adams' Thesis avoids Lewis´ triviality result by restricting the syntax to sentences that can only hold conditionals as their main connective. Russell and Hawthorne claim that while Adams' stance can avoid Bombshells, it still falls prey of their triviality result.

In this talk, I want to do three different things: first, I will argue that what is leading the authors to triviality is that they are conflating the attitude of not accepting a proposition with the attitude of rejecting it. I will argue that accepting the conjunction of two sentences (even if they involve any of these epistemic operators) is always symmetric. There is an asymmetric relation, but it affects what one should reject and what one can neither accept nor reject when certain propositions are accepted. Second, I will argue that the authors are underestimating Adams´ thesis and that it avoids their derivation of triviality. And lastly, I want to sketch a semantics for indicative conditionals that is consistent with Adams' thesis, yet it allows one to evaluate nested conditionals while also keeping the symmetry of the conjunction untouched.

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9:30 – 10:00

Luca Castaldo (University of Warsaw) - Saving logic from paradox via nonclassical recapture.

Topic: A.2 Philosophical Logic

Abstract: Can we reason correctly about truth within a truth theory formulated in classical logic? The Liar paradox seems to suggest a negative answer: the existence of liar sentences (claiming their own untruth) reveals a fundamental incompatibility between classical reasoning and the "transparency of truth" -- the property that every sentence A is equivalent to the statement that A is true. Indeed, especially after Kripke's landmark (1975), in order to embody the transparency of truth there has been an extensive use of nonclassical logics within truth theories.

Notwithstanding the importance of a transparent truth predicate, many theorists consider classical reasoning to be a property which is just as desirable for a theory of truth. Defenders of classical logic have in more than one contexts pointed out that weakening classical logic comes with

too high a cost: the impact of nonclassical reasoning goes beyond paradoxes, crippling our mathematical and scientific reasoning as well (see, e.g., Halbach and Nicolai, 2018).

It then seems that we are faced with a dilemma: we either adopt a nonclassical logic and give up important parts of mathematical reasoning, or we keep classical logic and give up the prospect of reasoning correctly about truth.

The goal of this talk is to pave a way out of this dilemma. It will be argued that, even if truth is governed by nonclassical logic, we can keep classical logic *and* reason correctly about truth. Or, to put it more compellingly, the goal is to save logic from paradox (with apologies to Hartry Field). To this end, we will articulate an instrumentalist justification for the use classical logic in the spirit of Reinhardt (1986): it will be argued that classical reasoning is a *useful but dispensable instrument*.

The instrumentalism will be developed in analogy with Hilbert's foundational program for classical mathematics. Distinguishing between real and ideal truth-theoretic inferences, as well as between real and ideal truth-theoretic reasoning, we argue that ideal, classical reasoning should be conservative over real, nonclassical reasoning *as far as real truth-theoretic inferences are concerned*.

We give this idea formal expression, showing that there is a precise sense in which our instrumetalism yields a novel and, we believe, innovative nonclassical recapture strategy: within classical truth theories, we can recapture real, nonclassical reasoning whenever needed, that is, whenever we are talking about real truth-theoretic inferences.

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10:00 – 10:30

Sofia Meirelles (University of Campinas) - Beyond Pluralism and Monism in Logic.

Topic: A.2 Philosophical Logic

Abstract: The dispute between logical pluralism and logical monism has so far ruled the debate over the varieties of logic − the fact that there are many logical systems −, but in my presentation I shall argue this is only an apparent dichotomy. The questions they are trying to answer include: is there more than one correct logic? How can they validate incompatible arguments? Is logic universal? In light of so many diverse approaches on how to reason about the world, how is the status of classical logic and normativity? During the first part of my talk I shall clarify how logical pluralism and monism are umbrella ideas for families of different theses, making explicit some of the main formulations of each, viz Beall & Restall case-based pluralism (2006), Shapiro's eclectic orientation (2014) and Priest's monism (2005). Briefly stated, logical pluralism is a family of views united under the thesis that there are many different correct (good, legitimate, adequate or even true) logics. Alternatively, logical monism asserts that there is only One True Logic, classical or not. However, there are perspectives that do not fit those two labels, such as instrumentalism, nihilism, universalism and relativism about logic, of which the latter will be given special attention in my presentation. The panorama on pluralism and monism is given to help us recognize what is generally understood by the concepts and how it easily becomes a thorny discussion. Along with that I will offer some conceptual tools to guide us, such as the distinction between local and global pluralism given by Haack (1978), the distinction on pure and applied logics and about a canonical application, as well as the most popular problems that

logical pluralists face: the Meaning-variance Thesis, the Collapse Argument and the pursuit for a Substantial Logical Pluralism.

In the second part of my talk I shall focus on the historically old concept of relativism from a fresh perspective, putting forward a framework for logical variety inspired and adapted from Kusch's model of (epistemic) relativism (2020). The main goal is to use this model to identify, organize and evaluate the different theories about logical variety within a unified basis, encompassing perspectives beyond pluralism and monism. The framework is composed of five key assumptions: dependence, plurality, conversion, conflict and comparability. They are not individually necessary and sufficient conditions to determine a relativistic stance, and sometimes they may be redundant, as I shall present. Finally, I shall argue that this framework should be used in order to identify disagreement between the different theories presented in the first part of my talk.

The discussion around logical pluralism is currently abundant and prosperous, and it is connected with important concerns about the role of logic: if it should be normative, how can we apply it for different contexts, what is its methodology and subject matter and so on. In accordance to the symposium's theme we are questioning traditional values associated with logic and, furthermore, revisiting controversial concepts such as relativism.

Symposium continues in the same room, next time slot.

ROOM 13

(COPHITES-ML)
Symposium: Commission on the Philosophy of Technology and Engineering Sciences (CoPhiTES): Philosophy of science for Machine Learning

Chair: Juan M. Durán

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: This symposium explores the burgeoning field of philosophy of machine learning. Of particular interest will be to analyze machine learning technology designed for, and applied in diverse scientific fields (medicine, forensics, physics, climate change). To this end, this symposium brings together scholars working in the intersection between classical topics in the philosophy of science and epistemology (e.g., scientific explanation, justification, understanding) and normative and social issues in the sciences (e.g., scientific values, inductive risk), on the one hand, with these new methodologies on the other.

The current state of the philosophical analysis of machine learning is, one could argue, transitional. Some philosophers are portraying a new field in scientific methodology and, as such, demanding for novel philosophical assessment. Others, prefer old topics and categories for analysing machine learning. For instance, whereas Buijsman argues that explanation in machine learning can be approached with known philosophical frameworks stemming from explanation in mathematics, Bueno and Páez have a more radical stand. To these latter authors, explanation in machine learning cannot be addressed by standard scientific explanation. Instead, a new approach tailored-made to these technologies is required. This and other topics addressed in this symposium create rich and thriving debates among the community of philosophers of science and epistemologists working with machine learning.

The contributors to this symposium address topics of central importance for the advancement of the philosophy of machine learning. These include, but are not limited to, (1) the displacement of humans from the center of production of knowledge; (2) (new) perspectives on inductive risk in machine learning and its implications for scientific progress; (3) justification that output of machine learning have scientific value; (4) the specification of validity criteria for the instances of experimentation in machine learning; (5), (6), and (7) current logic of explanations for machine learning and the value of understanding; (8) issues of causality and epistemic injustice in machine learning-mediated medical practices.

It is worth mentioning that all the presentation are part of the forthcoming book "Philosophy of Science for Machine Learning: Core Issues and New Perspectives," to be published in Synthese Library. The book aims to offer a comprehensive and systematic debate on the key concepts and areas of application of the philosophy of science for machine learning. All contributors to this symposium are accepted authors in the book.

Speakers:
1) KORAY KARACA: Values, Inductive Risk and Epistemic-Ethical Coupledness in Machine Learning Models
2) JUAN M. DURÁN: Computational reliabilism and transparency: shortcomings and prospects
3) GIUSEPPE PRIMIERO: Validity Criteria for Machine Learning Models
4) STEFAN BUISMAN: Machine Learning models as Mathematics non-causal scientific explanations
5) GIORGIA POZZI: Epistemic injustice and the social dimension of disease causation in ML-mediated medical practices
6) ANDRÉS PÁEZ: Axe the X in XAI A Plea for Understandable AI
7) LUIS LOPEZ: Genuine Understanding or Mere Rationalizations? Approximations and Idealizations in Science and XAI

9:00 – 9:30

Koray Karaca (University of Twente) - Values, Inductive Risk and Epistemic-Ethical Coupledness in Machine Learning Models.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: In this talk, we will outline a novel perspective on how to manage inductive risk (Douglas 2000) in the context of machine learning (ML) models. ML is a modelling activity that is based on inductive inference, with the goal of estimating the mapping relationship between a given set of inputs and their corresponding outputs (Bucker 2019). These models may lead to false positives and false negatives in their outcomes. For any given model, one must find an appropriate balance between these two types of errors. Therefore, whether or not to accept a model requires taking account of inductive risks associated with these two kinds of errors. Deciding which levels and types of inductive risks are acceptable in ML models is a value-laden activity. Any ML-model can produce a wrong (i.e., epistemically incorrect) outcome, with unwanted consequences following from that outcome. What serves as sufficiently optimal in the performance of the model can be determined on epistemic as well as non-epistemic grounds. As such, we are forced to move beyond the value-free ideal of neutral knowledge production when engaging with ML model-practices. Giving that ML-models are increasingly used for societal purposes, their non-epistemic goals and associated value-judgements become more strongly intertwined with their epistemic purposes. This renders the strict distinction between epistemic and non-epistemic value-judgements debatable in the context of ML models. In this talk, we will suggest that value-ladenness entails epistemic and ethical value-considerations that should not be seen as two separate kinds of factors in the assessment of ML models. Rather, we will

argue that the epistemic and the ethical value-considerations should be understood as coupled, before, during and after model-construction. Coupled ethical-epistemic analysis has already been applied in several social contexts by social scientists. We will thereby demonstrate its extended applicability to ML modelling practices, based on an analysis of use-cases applied in the City of Amsterdam. Going beyond a strict epistemic/non-epistemic value-distinction will provide new insights to discuss the status we attribute to ML-models as knowledge-producers in society. It would therefore be useful to conceptualize the epistemic and the non-epistemic value influences on models and the outcomes they produce as being coupled, rather than as being two distinct factors that independently shape the model's knowledge production. The optimal performance of a ML system is then ultimately bounded by its fit with society, rather than solely by its fit to data. We shall conclude that finding the right balance of acceptable inductive risk is a collective quest in the context of ML models, as this risk is prioritized and interpreted differently by relevant stakeholders.

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9:30 – 10:00

Juan Duran (TUDelft) - Computational reliabilism and transparency: shortcomings and prospects.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: The use of Machine Learning (ML) for scientific purposes is delivering remarkable results. A few examples suffice to show this. In molecular biology, AlphaFold can predict protein structures with atomic accuracy for cases in which no similar structure is known. In medicine, BenevolentAI has combined structured with unstructured biomedical data sources to identify rheumatoid arthritis drugs like baricitinib as therapeutics for COVID-19 symptoms. ML can successfully extend the class of tractable chemistry, biology, physics, and medicine, broadening the range of modeling and experimental capabilities of researchers.

Despite this success, ML are epistemically opaque. That is, no human(s) agent(s) can know at any given time the epistemically relevant components of the algorithm (functions, variables, etc.) that justify the belief that the output has scientific value. Currently, two emerging epistemologies are dealing with the opacity of algorithms for justificatory purposes. One is transparency, a family of methods aiming to make the algorithm survaillable to humans (or to other algorithms). Transparency achieves this by showing the inner functions and properties of an algorithm that lead to a given output. The alternative is computational reliabilism (CR), which strategy for justification is to credit an algorithmic method (in our case, ML) as reliable. One is justified, therefore, if the algorithm is reliable. To credit an algorithm as reliable, we need to identify the proper reliability indicators.

The specialized literature has discussed the benefits of each justificatory framework. This presentation focuses on their shortcomings and, when suitable, lays out promising solutions. Regarding transparency, a first interest is to review cases of *algorithmic regress* that come in connection with transparency functions. It will be shown that either transparency entails an algorithmic regress or that we are limited in what we are justified to believe. The second interest is the *justificatory circularity* of transparency. The problem here is that the internal functions and properties of the algorithm cannot justify the output produced by said functions and properties.

As for computational reliabilism, two critical points are raised. First is that statistically insignificant but serious errors can undermine the reliability of ML. This happens in cases where quantitative success needs to be balanced with how serious the errors are. Secondly is the problem

that CR, being a reliabilist epistemology, requires a high frequency of success, which can ultimately be cast as an issue of high predictive accuracy. CR is, therefore, superfluous.

This presentation finalizes by arguing that, despite its shortcomings, computational reliabilism is a superior epistemology for ML than transparency. The reason is that justification does not depend on the quality of our insight (e.g., how much we are able to show) nor on the properties of the algorithm and the data used. Instead, justification is independent of the algorithm and our cognitive access to it.

10:00 – 10:30

Giuseppe Primiero (University of Milan) - Validity Criteria for Machine Learning Models.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: The epistemological debate on validity criteria for computational experiments and simulations goes back to [Humphreys 1990]. According to this analysis, computer simulations are instances of experiments (identity thesis), and they provide sufficient guarantee for their believability (dependence thesis). This position has been investigated in the following decades, with validity criteria being spelled out, see e.g. [Guala 2002], [Humphreys 2004] and [Duran 2018]. The general requirement that relations hold between the mathematical model underlying the target system and the computational model subsumed by the simulation, have been considered in terms of formal counterparts of weak and strong simulation relations in [Primiero 2019, 2019b]. With Machine Learning models entering the debate, these considerations need reviewing. First, the Target System is no longer an available system object of investigation, rather often a prediction on a system to-be. Second, a mathematical model can often be abstracted or approximated from the behaviour of the system, but is certainly not always given beforehand. Third, the computational model can be considered stable only after training and evaluation on test data set (what is properly called validation), while its inner structure may remain only partially accessible through complex layers of variables and parameters. Thus, while a classification may result loosely isomorphic to a given trained and validated Machine Learning model, its ability to represent correctly reality -- and thus to be worth of being considered epsitemologically valid -- is still debated. We argue that the underlying relations establishing validity criteria for Machine Learning Models need to be reconsidered in the light of probabilistic analyses of simulation relations, and that validation and verification processes for relevant stochastic properties are necessary to this aim, see [Baier et al. 2006]. The task is therefore to verify whether ideal properties of probabilistic simulation relations hold for these models in terms of: 1. full isomorphism between the approximated mathematical models and intended the target system (modulo undesirable differences with the prediction); 2. correct implementation of stable computational models by their simulative ML-based programs; and 3. bisimulation relations (or simulation relations) between approximated mathematical function and abstracted, transparent counterparts of computational models. If these relations hold, simulative programs generated by ML models should be able to map onto intended target systems providing adequate predictions of their behaviours, thereby granting validity.

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Symposium continues in the same room, next time slot.

ROOM 14

(METSC)
Symposium: Perspectives on the Metaphysics and Epistemology of Science

Chairs: Bruno Borge, Cristian López

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: Metaphysics is concerned with what is fundamental. But science (in particular, the physical sciences) too. Epistemology is concerned with various routes to get knowledge; for instance, the processes of reasoning that metaphysicians and scientists follow to get knowledge of reality. But these processes seem to be so complex that a single, uniform route is hardly conceivable. The relation among these three fields has thus been at least complex. The rivalry between science and metaphysics as genuine and tutored sources of knowledge is well known. The multifaceted nature of science has also puzzled epistemologists as the monolithic uniformity of the scientific method growingly started looking like an illusion. For the worse, the emergence of a new mixed field of research as the metaphysics of science has just increased perplexity and confusion.

Notwithstanding this bewildering panorama, the advantages of mixed approaches to metaphysical and scientific problems begin to pay off. Epistemology and metaphysics help science to open various paths of investigation, at the same time that bring clarity and accuracy in the scientific knowledge and methodology. Science has also helped metaphysicians and epistemologists to approach their issues from new, empirically grounded perspectives, which has shed light on long-standing issues, such as the modal features of laws and extra-nomic elements, or the role of disagreements in science and philosophy. Simultaneously, the sciences have posed new epistemic and metaphysical problems that deserve serious attention, fostering philosophical thinking, such as the role of causal explanations, or the existence of fundamental levels of reality. Nowadays, it is natural to find traditional philosophical issues addressed from a science-based perspective, even though the relation among metaphysics, epistemology and science is far from clear. It is also natural to believe that our knowledge of reality is best approached from multiple perspectives, even though their boundaries and scopes are far from clear.

This symposium aims to show scopes and limits of the interaction among metaphysics, epistemology and the sciences. It features eleven presentations that address three philosophical and scientific problems that have greatly benefited from the development of metaphysics of science as an

independent field of inquiry: what are the criteria for good, comprehensive explanations in science and metaphysics (Kistler, Filomeno, Menares and Tahko), what is the metaphysical status of scientific laws, scientific properties, and symmetries that scientific theories posit (Esfeld and Lopez, Madroñal and Herrera, Meyer, and Bigaj), and what are the epistemic traits that lie on the borders among metaphysics, science, and the public sphere (Serebrinsky and Borge, Mettini, da Cunha, and Sardi and Oliveira Silva). The variety of perspectives and topics to be presented at the symposium along these topics will be an illustration of the multifaceted and prolific terrain for philosophical inquiry that lies among the sciences, metaphysics, and epistemology.

Speakers:
1) Max Kistler: Constitution and Causation in Mechanisms
2) Michael Esfeld and Cristian López: Humean Time-Reversal Symmetry
3) Aldo Filomeno: Non-causal explanations of lawful behavior from constraints
4) Dalila Serebrinsky and Bruno Borge: Disagreement in the Metaphysics of Science
5) Ivan Ferreira da Cunha: Values between Science and Technology: Otto Neurath against metaphysics in modern architecture
6) Ignacio Madroñal and Manuel Herrera: The Interplay between the Nature of Space-Time and the Ontology of Scientific Laws
7) Guadalupe Mettini: Where the Epistemic magic happens. The role of imagination in Scientific Thought Experiments
8) Tuomas Tahko: Making Reductionism True
9) Franco Menares: Structural and Inferential Approaches to the Science–World Relation.
10) Gabriel Chiarotti Sardi and Débora de Oliveira: Scientific realism, theoretical continuity and the chemical revolution in the 18th century
11) Ulrich Meyer: Best Systems in Lawless Worlds

9:00 – 9:30
Max Kistler (Université Paris 1 Panthéon-Sorbonne) - Constitution and Causation in Mechanisms.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: According to Craver (2007), knowledge of constitutive relevance can be obtained through mutual manipulation of mechanisms and their constituents by interventions (Woodward 2003). However, the requirements on interventions make such mutual manipulation impossible (Baumgartner & Gebharter 2016).

Craver, Glennan & Povich's (2021) (CGP) analysis of constitutive relevance does not require mutual manipulability. According to CGP, interlevel experiments (bottom-up and top-down) warrant the construction of causal models in which the constituents of a mechanism X appear as causal intermediaries between X's input and output conditions. The "relation of causal betweenness" is "the ontological truthmaker for claims of constitutive relevance" (CGP 2021, p. 8825). Such models contain neither any representation of the whole mechanism and its activity nor of (non-causal) constitution relations.

CGP's account cannot account for mechanisms with more than one level of constituents (in the mereological sense of "level") where some constituents themselves have constituents.

For each variable Xi of the causal chain of variables representing the constituents of X that is itself a mechanism, the model may be elaborated by replacing Xi by another causal chain of variables. This operation can be repeated until a fundamental level has been reached, containing only fundamental variables that cannot be analyzed as mechanisms.

This raises three problems:

1. There may be no bottom level (Schaffer 2003)

2. If the bottom level belongs to fundamental physics, it can be doubted whether the concept of causation is applicable (Norton 2003).

3. A fully developed model contains only variables at the fundamental level. This entails mechanistic nominalism and mechanistic nihilism. According to the former, all variables that do not lie at the fundamental level are artifacts of our description; they designate parts of models, not constituents of mechanisms. Mechanistic nihilism is analogous to compositional nihilism, which takes only fundamental entities to exist, but no composite entity. It is ontologically parsimonious but fits neither scientific practice nor scientific models.

I sketch, illustrating with the mechanism of touch perception, how models of mechanisms can be constructed that contain variables at different levels, related by both causal and non-causal constitution relations.

1. A multi-level mechanism is experimentally explored at different levels. For each level, activities characterizing it are studied by techniques specific for that level, stimulating, inhibiting and observing their constituents, yielding a causal model for each level.

2. The causal models elaborated at the first step are merged under constraints such as spatio-temporal inclusion. The resulting multi-level model explicitly contains variables at different levels, and relations of two types: causality and (non-causal) constitution.

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9:30 – 10:00

Michael Esfeld (Université de Lausanne), Cristian López (University of Lausanne / University of BuenosAires) **- Humean Time-Reversal Symmetry**

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: The problem of the direction of time is the problem of whether the direction of time is primitive or not. There are then two possible views – primitivism and reductionism. Primitivists believe that the directionality of time is a necessary posit in one's ontology in virtue of its explanatory advantages. It is therefore an irreducible, fundamental feature of the natural world that explains many temporally asymmetric phenomena. Reductionists rather believe that the seeming directionality of time requires an explanation in terms of some non-temporal physical asymmetry to which it can be reduced. In this way, the direction of time is the explanandum, whereas the non-temporal physical asymmetry is the explanans. Reductionism can be seen as either conservative or eliminativist. According to the former, the direction of time is non-fundamental, but real; according to the latter, the direction of time is unreal. The metaphysical map of the different philosophical attitudes towards the direction of time then looks as follows: primitivism holds that the direction of time is real and fundamental; conservative reductionism maintains that it is real, though reducible to a non-temporal physical basis; eliminativist reductionism claims that it is unreal tout court.

There is a popular argument in the literature that undermines primitivism about the direction of time – the 'Time-Reversal Argument', as we call it (TRA henceforth). Because the laws of physics (or most of them) have the property of being invariant under time reversal, a primitive direction of time is unnecessary. Since we ought not to be committed to unnecessary properties, entities or relations, the direction of time is not fundamental (or is unreal). The argument is an instance of a common inference in the field, which takes symmetries to be guides to ontology. In this particular case, time-reversal symmetry as a property of the structure of physical theories entitles us to draw conclusions about time in the ontology. If the inference works and is adopted, then primitivism would indeed be unwarranted.

In this presentation, we put forward a Humean construal of time-reversal symmetry, which aims to deflate the relevance of the TRA for the debate on the direction of time. According to our Humean approach, time-reversal symmetry is better to be viewed as a heuristic, epistemic second-order law (or metalaw) in the best system, striving for higher systematicity, unification and simplicity of first-order generalizations. If time-reversal symmetry is so regarded, the TRA loses much of its persuasive force: it becomes an epistemic virtue of physical theories by contrast to a property of the Humean mosaic. If our construal succeeds, it will clear the way to primitivism about the direction of time.

10:00 – 10:30

Aldo Filomeno (Instituto de Filosofía, Universidad Católica de Valparaíso) - Non-causal explanations of lawful behavior from constraints.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: I would like to assess whether and how mathematical facts, statistical facts, and kinematical assumptions can constrain the space of what is physically (or `naturally') possible. If any of these constitutes a non-causal explanation, the explanans does not contain the explanandum. Thus, for this reason, I would like to assess non-causal explanations of lawful behavior from (i) distinctively mathematical, (ii) statistical, and (iii) kinematical constraints.

Regarding distinctively mathematical explanations, the idea, well-known but puzzling, is that logical or mathematical necessity constrains the physical world by constraining the space of physical possibilities. It is usually considered that physical possibilities are a proper subset of logical space, but the source of physical modality is usually thought to be different, sui generis. Still, empiricists have considered such notion of physical modality elusive and mysterious, and it could be said that today it remains a mystery. Now, in the history of physics --- notably in the history of mechanics since the XVI century to this day --- we find disputed attempts to maintain that physical necessity just is mathematical necessity, which would solve the mystery. Along this line, today in the philosophy of science some of the primitivist account of laws seem to expect some sort of "mathematical inevitability" of the final laws of a theory of everything, more so when stated by physicists (cf. Maudlin)

How to make sense of the thesis that physical necessity just is mathematical necessity? This task has turned out hard to spell out, and has even been ignored in the literature in philosophy of science, metaphysics, and philosophy of mathematics. The alleged distinctively non-causal explanations of physical phenomena might contribute to ground the plausibility of such approach. Thus, first I focus on a variety of examples of alleged distinctively mathematical explanations of physical phenomena. *If* there really are distinctively mathematical explanations of physical phenomena, in which the underlying causal network is irrelevant and need not exist, as Marc Lange argues (Lange 2017), this could help us to understand how certain physical events cannot occur, thus constraining what is physically possible, and thus delimiting a state space.

A second type of candidate non-causal explanations concerns kinematical explanations. The notion of kinematics can be understood in several ways, which will be surveyed. One pertinent to us

is that of the parameters of the theory that are \textit{independent of the dynamics}. See (Janssen). A paradigmatic case is in Special Relativity, in the debated arrow of explanation between Minkowski space-time and the Lorentz invariance of the laws. Endorsing the orthodox geometrical interpretation of special relativity, Minkowski space-time kinematically explains the Lorentz invariance of the laws.

A third type is the statistical explanation of physical phenomena. This refers to statistical explanations (a la 2nd law of thermodynamics) of emergent patterns (see e.g. \citep{FilomenoStudies, FilomenoTypicality} and references therein), which are *also non-causal*. Then, in the resulting view, the only law-like assumptions are the general constraints that are usually imposed in the study of physical systems; for instance, the kinematical conditions.

Symposium continues in the same room, next time slot.

10:30 - 11:00	COFFEE BREAK

11:00 – 12:00	INVITED SPEAKER: JOSEFA TORIBIO

AUDITORIUM 1

INVITED SPEAKER
Josefa Toribio (University of Barcelona)

Seeing wrongness

Chair: Diana Pérez (University of Buenos Aires)

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: According to moral perceptualism, at least some moral properties, such as the property of an action being wrong, are part of the content of perceptual experience. In an attempt to avoid standard objections against this content-based view, the idea that we can perceive moral properties has recently been characterized as consisting in a special sensitivity to morally salient features that is reflected, not in the content of perception, but in perceptual-attentional patterns. This paper examines the empirical and philosophical plausibility of this attention-based version of moral perceptualism. I argue, first, that the empirical evidence offered to support attention-based moral perceptualism is better explained as involving cognitive rather than perceptual phenomena. Second, if attention does not lead to changes in content, then attention-based moral perceptualism will have to resort to some specific attentional phenomenology. Yet, the very nature of such an attentional phenomenology is, I contend, very difficult to pin down, and, at least on an intentionalist interpretation, the notion leads to very counterintuitive consequences. More positively, and with a focus on our failing to see the wrongness of actions that result from implicit biases, I finally suggest an account of our (in)sensitivity to wrongness that acknowledges the important role of attention without a commitment to there being either perceptual representations of moral properties or perceptual-attentional mechanisms that are specifically responsive to morality.

12:00 – 13:00 INVITED SPEAKER: DAVID DANKS

AUDITORIUM 1

INVITED SPEAKER
David Danks (University of California, San Diego)

AI as scientific methodology, not just a science

Chair: Kevin Elliott (Michigan State University)

Topic: C.9 Philosophy of Emerging and Interdisciplinary Sciences

Abstract: The fields of artificial intelligence (AI), machine learning, and data science have surged over the past two decades, leading to numerous successes and failures. The rhetoric around AI often implies that it is a science in its own right, or at least, an important sub-science within computer science. In this talk, I will argue that much of what people have in mind as "AI" is actually not part of a distinct science, but rather is the application of a novel set of scientific methods in other scientific domains. That is, I contend that the most prominent instances of AI are better understood as scientific methodology, and not as a separate scientific field. At the same time, there is a "science of AI," but it is rather different from the usual examples and case studies that are widely discussed. I will describe this science of AI, and distinguish it from the scientific methodology version. I close with observations about the value of distinguish between these two different types of inquiry that are both labeled as "AI."

11:00 – 13:00

AUDITORIUM 2

(LTF) From previous time slot, same room.
Symposium: Scientific Evidence and Uncertainty about the Long-Term Future

Chairs: Jäntgen, Ina; Wilkinson, Hayden

11.00 – 11:30
Ina Jäntgen (University of Cambridge) - Can we provide scientific evidence for the persistence of causal effects?

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Moral philosophers have suggested that benefitting people in the very long run future may be of great moral importance, and has major implications in policymaking and philanthropic decisions (see, e.g., Greaves & MacAskill). This talk concerns whether long-term-oriented decisions can be based on scientific evidence. In particular, to benefit anyone in the long-run future, interventions (such as designing new institutions) should have particularly persistent effects – they should causally influence the long-run future. But can we provide scientific evidence for the persistence of causal effects? This is a question so far neglected by philosophers of science.

A promising place to look for an answer is a scientific field that specifically aims to provide evidence for persistent effects: persistence studies (see, e.g., Voth, 2021). This field applies econometric tools to historical data to infer causal relationships between events in the long-distance past (e.g., institutional design in colonized countries), and current phenomena (e.g., comparative differences in economic growth – see Acemoglu et al, 2001). Persistence studies seems to thereby provide us with decision-relevant knowledge about persistent causal effects. In this talk, I caution against this conclusion. Once we consider different ways in which causal relationships can be persistent, we can see that persistence studies fails to provide sufficient evidence for persistence. More specifically, I proceed as follows.

First, I introduce three ways in which causal relationships can be persistent to varying degrees:

1. Causing a persistent state of affairs: A cause C causes a persistent effect E.
2. Causing the persistence of a state of affairs: C causes E to be persistent.
3. Persistent causal influence: C's causal influence on E is persistent.

Each of these three notions tracks a different kind of control we can exploit to bring about desired effects. Thus, understood as any or all of those notions, persistence also differs from more familiar time-related causal properties such as stability or irreversibility (e.g., Ross & Woodward, 2022; Woodward, 2010).

Second, I distinguish between two kinds of persistence studies and argue against both. One kind relates a past potential cause to a present phenomenon of interest. The second kind relates a past potential cause to the development of a phenomenon over time. As I argue, persistence studies of the first kind fails to provide any evidence for action-relevant notions of persistence. Moreover, persistence studies of the second kind at best leaves underdetermined which kind of persistence operates in the causal relationships at stake. Such underdetermination is problematic insofar as different notions of persistence are relevant for different kinds of control that decision-makers may need. The upshot is that the field of persistence studies does not provide sufficient evidence for persistence, at least not in an action-relevant form. This conclusion holds even if we bracket methodological concerns about such studies (e.g., Kelly, 2019), or worries about relying on past causal relationships for present decision-making. I conclude by considering how we might instead use qualitative historical analysis to provide evidence for causal persistence.

11:30 – 12:00

Margherita Harris (London School of Economics an Political Science) - The ubiquity of quantifauxcation and why it must stop.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: If benefiting people in the long-term future is really a key moral priority of our time, then in order to evaluate what actions we should take today, we must have a sufficient understanding of the long-term consequences of potential interventions. We often assume that scientists are the people most able to help us gain a sufficient understanding of those consequences. And yet, in this talk I will argue that all too often scientists' uncertainty estimates about the future rely on quantifauxcation, i.e. the "common practice of assigning a meaningless number, then concluding that because the result is

quantitative, it must mean something" (Stark 2022, 2). In particular, I will argue that a vast range of methods that are currently used by climate scientists to assign probabilities to claims concerning the future climate rely on quantifauxcation. I will further argue that the current Intergovernmental Panel on Climate Change (IPCC) uncertainty framework encourages this practice and that this has worrying implications for the quality of the information provided in IPCC reports. I will then respond to two possible objections to my argument. The first is that as long as those probabilities can be interpreted as credences, then there is an important disanalogy between assigning probabilities and other cases of quantifauxcation (e.g. assigning numbers when measuring well-being). The second is that the common IPCC practice of assigning a broad range of probabilities to a claim is an adequate strategy to address possible worries about the widespread reliance on quantifauxcation. I will go on to argue that a vast range of current methods for quantifying existential risk also relies on quantifauxcation; and that the fact that researchers who "call for a more critical approach to methodology and the use of quantified claims by people aiming to contribute research to the management of Existential Risk" (Beard et al. 2020, 1) suggest that a "good example is set by the IPCC who make use of a clear uncertainty framework in their reports" (ibid., 12) is clear evidence that the real culprit is hiding all too well. Only once scientists and researchers stop indulging in quantifauxcation can we hope to turn to them for a sufficient understanding of the long-run effects of potential interventions.

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12:00 – 12:30

Corey Dethier (Leibniz University Hannover) - What makes Statistics Valuable? Ambiguity, Higher-order Evidence, and the Methods of Data Analysis.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: The future is uncertain and in many cases radically so. Particularly when considering the distant future, we often lack grounds to even assign precise probabilities to interesting events. In some cases, radical uncertainty arises because we simply lack any kind of concrete evidence. In other cases, it arises because the evidence that we do have is ambiguous in the sense that we don't know how to interpret it.

This talk is about the latter kind of case: how can we improve our epistemic lot when faced with ambiguous evidence? I'll argue that the answer lies in inferential statistics. More precisely, I'll argue that the methods of inferential statistics decrease the degree of ambiguity; the results of a statistical test are less ambiguous than the data that comprise the sample.

The intuitive idea is simple. We can think of a sample as providing two pieces of information. First, there's "first-order" information contained in the sample's "best guess" about the nature of the target system, which is usually the mean or average. Second, there's "higher-order" information contained in the higher modes of the distribution—the variance, skewness, etc.—that we can think of as capturing how accurate or precise the sample expects its own best guess to be. Essentially, the methods of inferential statistics treat this latter piece of information as definitive evidence for how accurate or precise we should expect the sample's best guess to be. Doing so yields a preferred likelihood function and thus perfectly unambiguous evidence. So we shouldn't actually expect the sample's own opinion to be definitive in this way, however, it's better to interpret statistical tests as yielding results that we can expect to be approximately correct (at least in the good cases). In other

words, on the proper interpretation the methods of statistics don't eliminate ambiguity, but they leave us with less ambiguity than we started out with.

In the talk, I'll fill out the details of this intuitive picture and then discuss the broader implications of the account for the twin questions of when we should use the methods of inferential statistics and when we should expect them to help. On the first front, the account yields a clear answer for when we should prefer inferential statistics to what we might call "pooling" approaches: the former are preferable if and only if the higher modes of the sample distribution are sufficiently trustworthy. Where they aren't, we should expect that pooling approaches will offer a more reliable means of analyzing the data.

On the second front, the picture that emerges is one in which statistical methods have a "sweet spot": if you really don't know anything about the probabilistic relationship between the hypotheses and the sample, you can't justify trusting their conclusions; if you know too much about this relationship, then the methods of statistics won't do anything for you.

12:30 – 13:00

Petra Kosonen (Population Wellbeing Initiative, University of Texas at Austin) - The Optimistic Meta-Induction.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Predictably influencing the very long-run future may seem beyond the abilities of present-day decision-makers. After all, the empirical findings of science are very rarely robust and reliable enough that we can confidently say how an intervention will turn out thousands (or millions or billions) of years from now. But there is one sort of intervention whose long-term effects do seem relatively predictable: preventing, or causing, human extinction. If humanity ceases to exist today, we will remain extinct permanently—even in millions of years, we can be confident that the Earth will be devoid of anything resembling human civilization. But it turns out that there are prediction challenges even for extinction prevention.

In particular, our estimates for the probabilities of extinction scenarios might be undermined by the Optimistic Meta-Induction: The history of humanity is full of doomsday predictions that turned out to be wrong, so we have no reason to believe that our current doomsday predictions are approximately right. Past doomsday predictions were wrong because 1.) humanity has not gone extinct, which would be very unlikely if the past predictions were right about the magnitude of the risk and 2.) we now have better data about those risks, and in fact, those risks are less likely than people thought in the past.

It can be objected that people who made doomsday predictions in the past did not attempt to study the risks rigorously and instead relied on, for example, religious stories. Therefore, the class of past doomsday predictions is not the right reference class for reasoning about our current doomsday predictions. However, the prevalence of past doomsday predictions might be taken to show that we have a psychological tendency to exaggerate extinction risks. Given that people have always made such predictions regardless of whether they were justified, we should expect us to make such predictions whether or not they are justified. In light of this, we should penalize our credences in current doomsday predictions.

However, it seems less plausible that we should penalize our credences in extinction risks when we know what their objective chances are. For example, we can estimate the frequency of asteroid collisions based on historical data, so we have less reason to believe that our tendency to exaggerate extinction risks influences our estimates in this case. Moreover, Ćirković et al. (2010) argue that using historical data to estimate extinction risks tends to underestimate their probabilities due to the presence of observation selection effects. Nevertheless, it might still be warranted to penalize

our credences in extinction risks when these estimates are not based on historical data. For example, this may be warranted in the case of the extinction risk posed by artificial general intelligence.

References

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Symposium continues in the same room, next time slot.

ROOM 01

(MODEL)
Symposium: The Many Faces of Scientific Model Building: Methodological and Epistemological Issues

Chairs: García, Pío; Ilcic, Andres A

Topic: B.1 Methodology

Abstract: The philosophical turn toward a more accurate depiction and understanding of scientific practice has highlighted the importance of scientific modeling (i.e. the creation, evaluation, and use of scientific models) as a core epistemic activity. Thus, during the last decades, many classical conceptual issues in science have been reframed in terms of models as first-class citizens, while also poising philosophers to tackle new issues in light of the more contingent and bounded views surrounding epistemic activities and their epistemological appraisals.

In a very general sense, models can be said to perform or constitute a simulation of a target system, the former becoming a proxy by means of which the latter can be studied, therefore becoming a means or tool to solve epistemic problems an individual or a community might have. In many cases, even the target system for a particular model might be another model. Therefore, an important question that arises for philosophers is that of how models are epistemically and methodologically related to each other in various contexts and inquiry domains.

The complexity and evolving nature of contemporary scientific modeling practices constitute a technical challenge for philosophers, insofar as they might need to study intricate details of research areas, and ever more often particular models, instruments, large-scale experiments, and scientific communities as a whole.

The papers presented at this symposium deal mostly with methodological and epistemological issues regarding scientific models in different fields of contemporary science. Specifically, they tackle the issue of the different kinds of constraints that can be found behind epistemic claims supported by a variety of activities that use and produce scientific models. While acknowledging that models might be of very different ontological kinds (e.g. a mathematical equation, a physical device, computer software, a colony of E. coli bacteria, etc.), the issue of the ontology of models itself is not considered directly, rather they are taken as aids for solving scientific problems in general (many of which overlap with other areas of epistemological inquiry).

Speakers:

1) Ignacio Heredia and Martina Schilling: Idealization practices in modeling: The methodological relevance of material possibilities and constraints
2) Sofía Mondaca and Julián Reynoso:: Is there an expert in the room? Scientific expertise in modeling practices
3) Bárbara Paez Sueldo and Ignacio Heredia: The plurality of model based reasoning: Cases in physics and biology
4) Víctor Rodríguez: On Numbers and Algebraic Models in Quantum Theory
5) Andrés Ilcic, Marisa Velazco, Pío García: Is that robust enough? The reliability of computer simulations through a methodological lens
6) Maximiliano Bozzoli, Xavier Huvelle, Dante Paz: Validation of Observational and Simulation Models in Astronomy
7) Juan Rocha, Francisco Moreno and Bárbara Paez Sueldo: Exploring the notion of state variables through machine learning models
8) María Silvia Polzella, Andrés Ilcic, Penélope Lodeyro: Has the protein folding problem been solved with artificial intelligence? An epistemological survey of novel simulation techniques in structural bioinformatics

11:00 -11:30

Ignacio Heredia (Universidad Nacional de Córdoba), Martina Schilling (Universidad Nacional de Córdoba), Pío García (Universidad Nacional de Córdoba (UNC)) - **Idealization strategies in modeling: the methodological relevance of material possibilities and constraints.**

Topic: B.1 Methodology

Abstract: When building models, scientists usually "leave out" (abstract) and/or "distort" (idealize) some aspects of the target system. This activity might hinder the epistemic claims of models and their credentials as valid tools for scientific knowledge. Generally, the philosophical discussion about these topics is concerned with how it is possible to trust a representation that explicitly misconstrues the world (Frigg & Hartmann, 2020). In this context, idealization processes are discussed as a debate about realism (Cartwright, 1983) or about truth (Wimsatt, 1987).

In this paper, we are interested in idealization and de-idealization strategies often used to build concrete models, and what is called “material idealization” (McMullin, 1985). However, instead of focusing our account on the realism discussion, we intend to analyze the development of these model-building strategies. In our proposal, this displacement implies that the justification of idealization strategies should be sought where the methodological decisions have been generated and established.

According to McMullin (1985), “material idealization” is the process by which a modeler omits some non-relevant aspects and the de-idealization process is carried out by "constructive imagination", justified by a realist assumption. Against this, we contend that the concept of material idealization allows us to highlight the material agency involved in the construction and use of models. De-idealization processes, we argue, are usually guided by methodological strategies, often linked to technologies, which account for the material possibilities and constraints of the model construction space. The justification of such strategies and the evaluation of these restrictions rests on the confidence generated by the accumulation and testing of techniques, technological devices and methodological strategies.

This approach will allow us to highlight some aspects of the idealization processes which are not linked to the issues discussed by the representation literature. We rather focus on the material constraints that some models have for their construction, as well as the possibilities for which they

allow. Thus, we will be able to feature some aspects of the often overlooked material dimensions of scientific practices surrounding idealization in model building.

To argue for this case, we will analyze cases of in vitro and in vivo experimental systems, like biomimetic devices and model organisms. Following Weisberg (2007), instead of a general notion of idealization, we claim it would be wiser to hold multiple definitions differentiated by their epistemic goals and scientific disciplines in which they are employed.

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11:30 – 12:00

Sofía Mondaca (Instituto de Humanidades-Conicet / Universidad Nacional de Córdoba), Julián Reynoso (Instituto de Humanidades-Conicet / Universidad Nacional de Córdoba) - Is there an expert in the room? Scientific expertise in modeling practices.

Topic: B.1 Methodology

Abstract: Scientists devote a large portion of their working careers to testing, comparing, and revising models as they have become paramount for producing knowledge. In this vein, it has been argued that models perform different epistemic functions ranging from understanding (de Regt et al., 2013) and explanation, (not only of their target systems but also about models themselves and instruments) to concept creation and formation in different contexts, such as pedagogical or as training devices. Yet the construction of these models is not without issues. Idealizations, parametrization, and several other tools are used to tailor the model's behavior to observed data, rightfully bringing forward questions as to exactly how reliable models are and to what extent we can trust in their outputs. George Box famously summarized these issues: “all models are wrong, but some are useful”.

We gain knowledge about models by interacting with them. Thus, attending to the general practice of scientific modeling is a promising direction to approach the question of the capacity of models to provide knowledge. Studies on human expertise provide a fertile ground for analyzing such practices and with them, some important aspects that allow us to understand our confidence in the epistemic power of the models we use. This relationship has been scarcely studied in the literature

In this paper, we set out to argue that a pragmatic view of models as put forward by Boon & Knuuttila (2009) provides a better understanding of the role that models take when dealing with trust-assessment issues. From this perspective, models are dynamic epistemic tools rather than static representations of systems. This perspective might offer a better view of actual scientific practice, in which the scientist's expertise is considered a crucial dimension product of socialization into a community of experts (Collins & Evans, 2018)

As inquiry moves forward, new elements appear that allow us to analyze and evaluate scientific knowledge. We do not focus anymore on the ability of models to represent as accurately as possible the represented world, but rather on our epistemic goals and the practical ability to develop them through models (Elgin, 2017).

Thus, analyzing models from a pragmatic perspective allows us to understand scientific knowledge from a practical dimension, emphasizing its close relation with scientific expertise. It is not only about acquiring precise information but also about developing abilities that allow constructing, ordering, and directing such information in function of epistemic objectives determined by scientific communities or specific contexts, such as policy, decision-making, or risk assessment.

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12:00 – 12:30

Barbara Paez Sueldo (Universidad Nacional de Córdoba), Ignacio Heredia (Universidad Nacional de Córdoba) - The plurality of model based reasoning: cases in physics and biology.

Topic: B.1 Methodology

Abstract: An important philosophical question emerging from the analysis of the practices surrounding scientific models is how it is possible to gain knowledge about a phenomenon through the study of another system, a model. This has been characterized as a particular form of reasoning: model-based reasoning (MBR). Unlike conventional inferential forms, MBR does not involve explicit rule-guided modification of propositions (Giere, 2006). Manipulation of and exploration with models seem to be central to describe how models help us reason (Nersessian, 2002).

In this article we explore particular cases of MBR in physics and biology, to shed light on how MBR has manifested itself throughout different scientific practices, giving insight into what a pluralistic analysis can teach us.

In the 19th century most scientists centered their attention on accounting for electrical and magnetic phenomena within the mechanistic framework (Nersessian, 1984). Maxwell repeatedly resorted to the use of models, situating his scientific practice between mathematical analysis and speculative hypotheses. Similarly, Boltzmann placed great emphasis on the visualization of phenomena, considering that the physical representation of the latter preceded its mathematical formulation. Both physicists highlighted that the analogical relationship between mechanism and model sheds light on our understanding of natural phenomena. This scenario allows us to probe their use of models under the MBR umbrella.

In contemporary pharmacology, model organisms are employed to research pathologies and treatments in humans. Inferences between species are often justified on phylogenetic grounds (Levy & Currie, 2015). Nonetheless, most model organisms are phylogenetically distant from humans. As a result, some hold that extrapolations are justified through other reasoning strategies, adducing genetic conservation, which grants some similarity in mechanisms (Weber, 2004), or robustness analysis using a model family (Baetu, 2016). Others point to the use of model organisms as heuristic tools, deployed for the generation -not the justification- of hypotheses (Levy & Currie, 2015).

These cases show models are used to reason via different strategies, which often challenge the orthodox MBR account, justified on structural isomorphism or relevant similarity. To account for this phenomenon, we propose an approach to actual scientific practice, which will reveal an eye-

opening variety. Thus, we incline towards an epistemological analysis which illustrates the plasticity of MBR, against a general and univocal diagnosis that may impose limits to the imagination of new practices surrounding the uses of scientific models.

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12:30 – 13:00

Víctor Rodríguez (National University of Cordoba) - On Numbers and Algebraic Models in Quantum Theory.

Topic: B.1 Methodology

Abstract: Numbers and algebraic systems associated with the standard quantum theory (QT) are analyzed here as models for conjectures and heuristics in it. It is argued that the dynamics of the mathematical models in QT exhibit a level interdependence in the structures involved. In this sense, QT is a prolific source of mathematical models. These constructions increase the difficulties of interpreting QT. There is a complex relationship between mathematical aspects and empirical sides of the theory. It is argued here that the concept of model, with all its conceptual vagueness, is useful to analyze this rich interaction, even when it has been applied in different contexts. The history of QT is eloquent in this sense: from the Copenhagen interpretation to the levels of abstraction and generalization of the mathematical expressions used there. This theoretical dynamic with peculiar crossings of levels conditions the global representation. In particular, a question that specialists have considered for a long time is the place of real and complex numbers in the structure of the theory [1]. Interpretation of some recent experiments has given priority to complex numbers in orthodox QT [2]. This point has sometimes been read as reminiscent of the old tension between continuous and discrete images of nature. Various algebraic approaches to QT have been motivated by this. Even Einstein in his last days expressed: "This does not seem in accordance with a continuum theory, and must lead to an attempt to find a purely algebraic theory for the description of reality. But nobody knows how to obtain the basis of such a theory" [3].

An additional element came from some discontent with the heavy reliance on matrices. The work of Jordan, von Neumann and Wigner [4] was partially related to that. Investigation of the mathematical structure of QT has led from real numbers to complex numbers, quaternions, octonions, division algebras, and even unified models, as possible candidates for an adequate language of the theory. The price has been the loss of properties: e.g., commutative, associative. This is observed in standard number systems, in Jordan algebras, in Clifford algebras, etc.

Even though this paper is focused on algebraic approaches to QT, it is estimated that some other areas of mathematical representation play similar roles here as tools to improve the fit between linguistic

and experimental aspects of the field. It seems that what happens with the language of algebra can be extended to other domains.

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Symposium continues in the same room, next time slot.

ROOM 02

11:00 – 11:30

Michal Gajda (Migamake Pte Ltd) - Computational philosophy of science.

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: Many scientists call for distinguishing computational science as a new kind of science. It is extremely important to provide a sensible philosophical definition of computational science since the discipline is rooted in disciplines of data science and empirical modelling of nature.

The search for a satisfactory definition leads us to a new approach to the philosophy of science. It suggests that computational science may not be a new formal method of program construction but also a new approach to the philosophy of science itself.

And indeed allows us to generalization of philosophy of science in a much more satisfactory way than many efforts to date. It has been argued that the development of computational capability was a significant force in human history. One can start with ancient Egypt, where mathematics and engineering were reserved to priests, through geographic discoveries, when accessible astronomy and precise computation allowed for daily course corrections, til now, when the availability of personal computing allows nearly all scientists tackle much greater challenges through bioinformatics, galaxy simulations, or mass analysis of social networks [@social-networks].

In the current philosophy of science, it is argued that the mass of empirical data allow us quicker to falsify less useful scientific theories, and thus that overall quality of our base theories has risen exponentially.

However, at the same time, it is argued that despite more advanced methodologies, basic facts published by scientific journals have a higher and higher probability of being false. Indeed it seems that philosophers of science have up to now failed to reconcile our feeling of growth of scientific knowledge, with the statistical measures proposed to quantify it.

11:30 – 12:00

Bele Wollesen (London School of Economics and Political Science) - The Condorcet Jury Theorem in an Ambiguous World.

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: The Condorcet Jury Theorem (CJT) provides powerful evidence of the merits of the majority rule for epistemic purposes. The CJT is well-known beyond its field and has, for instance, been applied to juries (Penrod & Hastie, 1979), crowd-sourced peer review (Arvan, Bright, & Heesen, 2021), and generally serves as one of the arguments for democratic decision-making (Goodin & Spiekermann, 2018).

The classical theorem assumes voter competence, i.e., that every voter is more likely than a coin flip to vote for the correct option (see List & Spiekermann, 2016). While this seems like a straightforward assumption, this paper reevaluates if and how we can presuppose voter competence in light of ambiguity. Surprisingly, voter competence can fail if voters' beliefs are imprecise (i.e., beliefs can be described by imprecise probabilities), even if we assume seemingly epistemically advantageous conditions such as rationality, honesty, and minimal fidelity of beliefs. In other words, voters can fail to be better than a coin flip at voting for the correct option if their beliefs reflect ambiguity. Moreover, this result holds even if we assume away trivial cases of failure such as lying, misunderstanding voting procedures, or widespread false information. These results seem particularly troubling because many vital areas of collective decision-making are prone to severe uncertainty and ambiguous evidence (e.g., climate science).

However, the upshot of the paper is not that voting for epistemic purposes in light of ambiguity is misplaced. Instead, the results urge caution when applying the CJT. The results show that assumptions that we prima facie judge should suffice for voter competence do not. Furthermore, the paper shows that voter competence cannot be reduced to the correct articulation of one of the assumptions. The results are driven by how rationality, honesty, and minimal fidelity are jointly spelled out. As one solution to these results, this paper advocates extending the voting options, such as including abstention, and shows that including abstention can retrieve similar results to the CJT.

Thus, the paper has two conclusions. First, voter competence is not a trivial assumption in case of ambiguity. Thus, thorough inspection of whether voter competence is satisfied is warranted before justifying the implementation of majority rule for epistemic purposes. Second, collective decision-making rules that perform well under risky prospects might not coextend to collective decision-making under ambiguous prospects. Hence, if we assume ambiguity is the norm rather than the exception, we must go back to the drawing board, which rules for collective decision-making are performing well epistemically.

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12:00 – 12:30

João Miranda (University of Lisbon) - Probabilistically Constraining Contrastivism.

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: Contrastivism about epistemic reasons is the claim that reasons to believe are relative to sets of alternatives. Sets of alternatives are the content of questions (Cariani, 2013; Hamblin, 1973). So, reasons to believe are relative to questions. Contrastivism about epistemic reasons is motivated by puzzles that generate inconsistencies when a non-contrastive account of epistemic reasons is assumed. There is, however, a deep issue with contrastivism. By relativizing reasons to sets of alternatives, it runs the risk of losing the power to allow inferences that we take to be perfectly fine. Too much relativity won't allow for inferences across different sets of alternatives and, at least some of those, seem to be valid. If that's right, then not allowing those inferences greatly impoverishes the model's explanatory power. In this talk, I'll discuss Snedegar (2017)'s solution to the problem and argue that it fails. Snedegar appeals to a notion of promotion – x is an epistemic reason to believe that p if and only if believing that p on the basis of x promotes the acquisition of knowledge. Snedegar's solution is able to provide the constraints we want. However, it faces two challenges. The first, is that it is not illuminating enough: the notion of 'promotion' is not less obscure than the notion of 'reason', and so explaining one at the expense of the other won't get us very far. The second problem is that the reader is left with a feeling of ad hocness: promotion is said to have the right formal properties and that it does have those properties is a "minimal assumption about promotion" (Snedegar, 2017: 71). That, however, is something that the opponent of contrastivism just can't accept lightheartedly. Those formal properties must be better motivated. I'll then present an account that, while compatible with promotion, offers a solution to the problem of relativity that does not need to appeal to promotion. It appeals, rather, to conditional probability: x is a reason to believe that p if and only if the conditional probability of p given x is greater than some threshold τ. The account does get us the constraints on contrastivism that we want, and avoids the issues that afflicted Snedegar's proposal. I'll conclude the talk by discussing a problem for this probabilistic account. The proofs of the principles come extremely easily if we assume that the probabilities remain the same across different sets of alternatives. But is that assumption warranted in a contrastivist framework? If it is, we retain the simplicity of the proofs, but are left with the task of coming up with a story about how these fixed probabilities relate to reasons that are question-sensitive. If not, and we think that sets of alternatives determine probability spaces, then we seem to be more consistent with the whole contrastivist approach, but we are left with a more complex mathematical model – and the task of arguing that this complex model is actually a good model for how real epistemic agents use and think about reasons.

12:30 – 13:00

Aydin Mohseni (University of Pittsburgh, Center for Philosophy of Science) - HARKing: From Misdiagnosis to Misprescription

Topic: B.2 Formal Philosophy of Science and Formal Epistemology

Abstract: In a 2019 article in Nature, the author, psychologist Dorothy Bishop, describes HARKing as one of "the four horsemen of the reproducibility apocalypse," along with publication bias, low statistical power, and p-hacking (Bishop, 2019, p. 435). The practice of HARKing---hypothesizing after results are known---is commonly maligned as undermining the reliability of scientific findings. There are several accounts in the literature as to why HARKing undermines the reliability of findings. Scholars have argued that HARKing undermines frequentist guarantees of long-run error control, (Rubin, 2017) that it violates a broadly Popperian picture of science, (Mayo, 2019) and misrepresents hypotheses formulated ex post to observing the data as those formulated ex ante (Kerr, 1998). I argue that none of these accounts correctly identify why HARKing can undermine the reliability of findings, and that the correct account is a Bayesian one. Further, I show how misdiagnosis of HARKing can lead to misprescription in the context of the replication crisis in the social and biomedical sciences.

I will show that HARKing can indeed decrease the reliability of scientific findings, but that there are conditions under which HARKing can actually increase the reliability of findings. In both cases, the effect of HARKing on the reliability of findings is determined by the difference of the prior odds of hypotheses characteristically selected ex ante and ex post to observing data. To make this precise, I employ a standard model of null hypothesis significance testing in which I provide necessary and sufficient conditions for HARKing to decrease the reliability of scientific findings.

Understanding HARKing is important on at least two counts. Historically, HARKing is closely tied to questions regarding the relationship between prediction and accommodation. These questions have engaged philosophers at least as early as Mill (1843), were made central in the philosophy of science by Popper (2005) and continue to be of concern in contemporary discussions in scientific epistemology (cf. Hitchcock & Sober (2004), Douglas & Magnus (2013), and Worrall (2014)). HARKing is also imputed to be among the questionable research practices contributing to the crisis of replication in the social and biomedical sciences. A better understanding of HARKing sheds light on both these issues.

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ROOM 03

(PROOF) From previous time slot, same room.

Symposium: Proofs and styles of reasoning across history and cultures

11:00 – 11:30

Ioannis Vandoulakis (The Hellenic Open University) - Analysing proving discourse: a dialogical perspective.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Alongside the traditional concept of proof, as establishing facts corresponding to truth, we adopt the meta-methodological concept of proof-event (or proof-instance or inference-instance) conceived to cover all types of proving. Proof events are initiated by the statement of a fixed problem (specified by certain conditions) and form sequences evolving in space and time, representing the proof's history. They are viewed as the interaction of at least two types of agents:

a) A prover, which can be a human or a machine or a combination of them (in the case of hybrid proving), and

b) an interpreter, which generally can be a human (or group of humans) or a machine (or group of machines) or a combination of them. [1].

Thus, proof events have a dialogical nature and generate proof narratives exposed in different styles that characterise individual provers, the schools they belong or the culture of which they are bearers.

The structure of proof narratives is organised in a complex hierarchical order. At the first level, expressions such as "definition" are used to introduce the contents (intentions) of a prover's mathematical thinking that direct the reader's (interpreter's) mind toward particular objects that possess "ontological status". At the second level, "assertions" represent states of affairs which possess "truth status". At the meta-linguistic level, expressions that do not refer to objects but linguistic entities used within the discourse are used. The combination of propositions into a proof step is made by using logical connectives. Furthermore, proof steps are combined to build proof represented in various styles that perform certain communicational functions.

Communication takes place between a prover and an (at least, potential) interpreter, who both participate in a (sequence of) proof-event(s), although they may be remote in space and time. By communicating a proof narrative, a prover addresses a (potential) "reader" (interpreter), expecting that he will read the information encoded in his proving outcome, understand (decode) it, and become persuaded that it is valid proof. The communicational and stylistic functions of (contemporary or past) proof narratives can be examined using the six functions associated with the Jacobson communication model modified for proof events.

An interpreter's understanding of a prover's outcome is an active, dialogic process; an interpreter enters a "dialogue" with the prover, in which the interpreter may alter the initial proof by refining concepts, adding new concepts (definitions) or revealing and formalising implicit assumptions, filling possible gaps in the proof by proving auxiliary lemmas, theorems, etc. Thus, in some sense, the interpreter's activity is a reconstruction of meaning or conscious reproduction of the information content conveyed by the prover's outcome. In this context, we will reconsider the relevance of the hermeneutic legacy (Gadamer) and Russian formalism (Bakhtin's concept of dialogic imagination (chronotope)) for the discourse analysis of proving narratives.

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11:30 – 12:00

Stefania Centrone (Fern-Uni Hagen) - Conceptions of Proof from Aristotle to Gentzen's Calculi.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: The talk aims to show how some key ideas at the basis of the normalization results in proof theory have their deep grounds in a number of fundamental questions that are posed always anew within the philosophical reflection on mathematics. Two different paradigms of proofs, synthetic and analytic, are contrasted and their origin is traced back to Aristotle as well as to Bernard Bolzano's idea of a better grounded presentation of mathematics at the beginnings of the 19th century.

12:00 – 12:30

Klaus Mainzer (Technical University of Munich) - Proof and Computation in Logic, Mathematics, and Artificial Intelligence.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Proof assistants seem to open new avenues of research combining foundations of logic and mathematics with highly topical challenges of IT- and AI-technology. At first, we consider the development from the Curry-Howard correspondence of proofs and computer programs to the proof assistant Coq. Coq is a platform for the verification of mathematical proofs as well as for the verification of computer programs in the calculus of inductive constructions (CiC). Finally, homotopy type theory (HoTT) allows mathematical proofs to be translated into a computer programming language of proof assistants even for advanced mathematical categories. The question arises whether, besides the verification of advanced mathematical proofs, advanced computer programs of (statistical) machine learning in AI can also be verified by proof assistants. The talk concludes with philosophical perspectives, practical challenges, and societal impact from verification to certification and responsibility of AI-programs.

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12:30 – 13:00

Michele Friend (George Washington University, Université de Lille Nord-Europe) - The Transcendental Truth-Value in Some Buddhist Logic.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: In the Buddhist text: Meditation and the Concept of Insight by Kamalasila, we are told that there are five truth values: true, false, neither, both and transcendental. In modern Western logic, we are familiar with the first four. I want to discuss the fifth.

The first four apply to propositions, statements or facts. The last ties individual meta-statements to the whole doctrine or theory. In fact, it takes us beyond the exercise of careful logical argumentation to leave the exercise in its place: behind us. There are two important lessons I have learned: one is that truth-values do not have to apply only to propositions, or sets of propositions. The second is that we can use logic, or it was thought in this text that we can use logic to go beyond logic. Logic transcends itself.

To shed some light on this mysterious truth-value, let us distinguish the object-level discourse, the meta-level and the whole within a wider context.

A transcendental truth is one that occupies the object-level argumentative discourse implicitly or latently and applies in the meta-discourse as a critique of the object-level arguments. The meta-discourse is not an end. In the text, logic and careful object-level argument is about metaphysics. The questions at issue include realism and deception, our relationship to objects (so that we can let-go), our place in the universe, and our identity. The careful arguments have a purpose – to exhaust

themselves. Once exhausted, an (in this respect) enlightened person can leave the object and meta-discourses behind and just be otherwise. That person is somehow released from the eros of logical reasoning, and this is the experience of coming to appreciate a transcendental truth.

References
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ROOM 04

11:00 – 11:30

Isabella Kim (Academy of the Holy Angels) - The Evolution of Cognitive Dissonance.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Cognitive dissonance has been one of the most enduring and successful theories in the history of social psychology. This paper examines the origins of the theory as well as the controversies it created. The paper also examines the evolution of cognitive dissonance as it emerged as a theory focused on the perception of dissonance and changed overtime to accommodate decades of research. It expands upon what I refer to as the "Roadway to Dissonance," which is an analysis of the processes that lead to an unpleasant arousal state of dissonance, and ways to engage in behavioral changes to regulate that arousal. The paper then considers the transition that occurred within dissonance research, from its focus on the individual to one that envisions the individual in the context of a social group. This perspective allows us to consider how people can empathically feel dissonance with their fellow group members. The paper concludes with an appeal for the approach of dissonance research in the coming decades, in which we continue to make progress in the laboratory while also working on ways to alleviate problems dissonance may cause in everyday life.

11:30 – 12:00

Guihong Zhang (University of Science and Technology of China) - What Kind of Ethical Rationality Artificial Agents Need.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: The purpose of this article is to discuss the concept of ethical rationality with the development of AI. Humans are agents with ethical rationality, which is the key for them to being moral agents. Ethicists want to enable AI to have ethical rationality similar to human, and to have the same moral status. For machine, its ethical rationality can be obtained by logical reason. The first we must ensure its ethical explainability by improving the transparency of their algorithm, which can avoid the black box problem. But its behavior cannot meets human needs. Therefore, AI should obtained the rationality which can react to human ethical issues; that is, by introducing some form of rational rules, it can think ethically and intents to do the right thing at the right time. However, there are still two more questions to consider: Whether human morality is the proper rationality required by machine, and how to promote the progress of human morality with AI.

Regarding the first question, from the view of non-anthropocentrism, the machine does not need to have the ethical rationality from human beings. They should develop its own, similar to animal and environmental ethics, and they should have their specific moral status; In other words, agents themselves are ends, not means. Of course, to human beings, machine needs ethical rationality similar to humans. Even so, the second problem has not been resolved. There are still debates in the ethical theory of human beings, so human ethical rationality is incomplete. Artificial agents are different from humans, their ethical rationality can be different from humans. Machine should become their own moral agent, which can guide the moral progress of human beings. Our moral theory should follow the development of AI, so far our current moral thinking limits the progress of ethical rationality, and AI in the future should explore advanced rationality for our society.

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12:00 – 12:30

Stuart Gluck (U.S. Department of Energy), Karin Saoub (U.S. Department of Energy and Roanoke College) - Scientific Reliability and Trustworthiness.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: There has been growing interest, amongst scholars and policymakers, in an interrelated collection of issues related to the reliability and trustworthiness of scientific research. For example, the U.S. White House Office of Science and Technology Policy (OSTP) has recently been developing a definition of scientific integrity (NSTC 2022). Likewise, a burgeoning academic literature explores values for proper statistical analysis as they relate to the replication crisis (National Academies 2019). The discussions of these issues have been marred by inconsistent terminology and confusion about how the issues relate to one another. Inevitably, this situation leads researchers to argue past each other. The science and technology policy community would benefit from developing a taxonomy of the issues and agreed-upon terminology for unambiguously referring to them.

We begin doing just that: sketching out a tentative map of the landscape and suggestions for a lexicon. Where possible we draw from previously proposed terms and definitions, as well as from

existing literatures, both academic and gray. We give deference to definitions developed by government committees and scientific-community-based policy organizations, such as the National Academies of Science, Engineering, and Medicine, since they have incorporated perspectives and feedback from numerous experts. Our primary goal, though, is to provide a normative framework for fostering clear and productive debates about these concerns.

The top-level concepts seem to be reliability and trustworthiness. Philosophers of science sometimes use "scientific reliability" to refer broadly to a set of issues related to whether and to what extent we should have confidence in the results of scientific research. There is a literature (see Richardson 2015) on "trustworthy science" in philosophy of science and STS studies. The term is typically used to describe the relationship between science and society, and particularly whether society has the basis to trust that (Scheman 2015) "scientists do in practice what they are supposed to do in theory: ground knowledge claims that are acceptable to all of us, not just to those of us with certain forms of privilege, who see the world through certain lenses, from certain biased perspectives." These concepts overlap but serve to highlight the epistemic (reliability) and social, political, and ethical (trustworthiness) ends of the spectrum of scientific values, respectively. Further, reliability describes largely concerns internal to scientific research, while trustworthiness emphasizes the relationship between scientific research communities and the rest of society.

We provide tentative definitions for more than fifteen concepts influencing reliability and trustworthiness, draw distinctions between them, and develop intersecting dimensions for understanding the relationships amongst them. This taxonomy provides a starting point for disambiguating important debates about scientific values.

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12:00 – 13:00

Shaokai Du (Tsinghua University) - The relation between group Epistemic structure and operative members in Non-Summative Social Knowledge

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Some kinds of non-supervenient, non-summative accounts of group knowledge have become popular in the discussion among social epistemologists who focus on the epistemic statues of groups. By non-supervenient, non-summative, those scholars claim that a group G can know that p even if none of its members knows or even aware of that p. As a result, the epistemic statues of G aren't the mere summary of the mental states of the members of G, nor supervene the mental states of its members. This paper thinks that the recent advocator of such view, Avram Hiller and R. Wolfe Randall, is right in emphasizing the role of group epistemic structure in the production of group knowledge, however, they underestimate the role of operative members within groups. By analyzing relevant debates on this topic, this paper argues a non-supervenient, non-summative view which focus on the idea of accessibility, suggesting that a proper relation between the epistemic structure and the

operative members of the same group is perquisite when a group is able to generate knowledge. Such a relation requires the structural information of a group should be known and thus be accessed by its operative members in the production of group knowledge. This view can also provide a consistent understanding of the distribution of both knowledge and responsibility for such knowledge within a group.

ROOM 06

(IASCUD-CD) From previous time slot, same room.
Symposium: The Significance of Cultural Diversity in Biomedical Science

11:00 – 11:30
Bennett Knox (University of Utah) - Hermeneutical Pluralism: The Neurodiversity Movement and Psychiatry

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: Recent work in the philosophy of psychiatry has renewed calls for meaningful inclusion of those diagnosed with mental disorders in scientific processes including psychiatric research and the revision of the DSM. At the same time, social movements emerging from some of these same communities (such as the Neurodiversity, Mad Pride, and Psychiatric Survivor Movements) have developed interpretations of their experiences which explicitly resist or reject psychiatric interpretations. The question naturally arises: how should psychiatric science relate to the interpretations of purportedly psychiatric phenomena from these social movements?

In this presentation, I will begin to answer this question by developing an account of what I call hermeneutical pluralism in psychiatry, focusing primarily on the relationship between psychiatric science and the Neurodiversity Movement. On this view, though psychiatric and alternative interpretations ought to have some forms of productive engagement, the alternative hermeneutical framework of the Neurodiversity Movement also ought to be able to continue to exist somewhat independently of psychiatric science. That is, we should aim to avoid psychiatric science assimilating or fully integrating Neurodiversity interpretations, even as we insist that psychiatry respond productively to input from this community.

I will begin by surveying some views of pluralism about psychiatric science, and specifying what kind of pluralism I mean to advocate for. The pluralism I endorse is both descriptive and prescriptive: it argues both that there are multiple interpretations of the domain that psychiatry concerns itself with, and that this plurality of interpretations is a good thing—it is a "healthy pluralism." Further, my pluralism is not merely temporary, but rather is thoroughgoing: I assert that this pluralism of interpretations is not just a valuable state of affairs right now, but ought to be maintained indefinitely into the future.

Having specified my version of pluralism, I will explain why I think Neurodiversity (and other similar) interpretations should be preserved externally to psychiatric science. I will focus on two major concerns: 1) the political and sociocultural value of the extra-scientific aspects of the Neurodiversity movement, and 2) the danger of shallow uptake of Neurodiversity critiques by psychiatric science.

Finally, I will provide a few methods by which psychiatry can engage productively with Neurodiversity critiques, without problematically assimilating the Movement. First, I will discuss the role of neurodivergent scientists, and how their insider-outsider status can contribute to psychiatric science. Next, I will argue that Neurodiversity advocates have an essential role to play in evaluating

and critiquing the role of values in psychiatric research. For example, given their first-hand experience of the impact of various psychiatric research programs on their lives, autistic people themselves (including, though not limited to, Neurodiversity advocates) have special authority to determine what research programs on autism are "pursuit-worthy" and which are not. Further, these same considerations mean that autistic Neurodiversity advocates should have a role to play in other aspects of scientific processes which involve value judgments, such as choices between competing theories that rely on normative background assumptions, as well as considerations of inductive risk.

11:30 – 12:00

Sarah Arnaud (Rotman Insitute of Philosophy, Western University) - First-person perspectives and scientific inquiry of autism: towards an integrative approach.

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: There has been increasing interest on the role and importance of first-person perspectives in advances in psychiatry. This is illustrated by the inclusion of psychiatrized people in the scientific reflections surrounding their diagnoses and also manifest through the role of activism in psychiatry, notably the role of movements that aim at fostering the inclusion and recognition of patients and contest the acts of "pathologizing". This relates to the more general question of whether activism and science are in competition for the understanding of psychiatric categories.

I propose to consider it through the example of autism, and more precisely through the following questions: (I) what are the roles of autistics' perspectives in the characterization of autism?, (II) how does activism contribute to that characterization? (III) How do they interact with scientific inquiry about autism?

My goal is to underline the importance of first-person perspectives in advancing scientific research on autism. I show how it has already considerately increased the validity of the category of autism. I argue that the inclusion of first-person perspectives in research on autism represents a necessary step towards more accurate and scientific knowledge on autism.

To do so, I first consider a debate between Hacking (2014) and Kendler (2014) about the idea that the concept of autism would have been "shaped" by people "personally connected to an autistic person (p-c-a)", rather than science. I consider inherent problems in this debate by pointing a confusion in the term "p-c-a" that reflects an example of epistemic injustice; and an ambiguity in the term "shaping".

I then show how activist movements have been contributing to the current understanding of autism. I evaluate the epistemic impact on autism research of three influential activist movements – the anti-psychiatry movement, the Neurodiversity movement, and Critical Autism Studies. I argue that activism and science have been intertwined in the shaping of our understanding of autism.

Finally, I apply Haslam's (2013) definition of validity in psychiatry on the case of autism. I give examples of advancement in autism research that are directly the results of first-person perspectives. Each of these examples have improved validity in one of its dimensions as identified by Haslam: (1) Content validity, (2) criterion-related validity, and (3) construct validity.

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12:00 – 12:30

Nina Atanasova (The University of Toledo) - The Promise of Big Data to Psychiatry: Precision and Prediction.

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: Big data enthusiasm has recently made its way to psychiatry. Some see its promise for increased diagnostic precision (Barron, 2021). Others in prediction and ultimately prevention of mental health crises, including psychosis and suicide (Jiang et al., 2021). In this talk, I evaluate the evidence accumulated in support of the success of both endeavors.

Big data, in the form of digital phenotyping, promise to bring more objective measures to psychiatry which has traditionally relied on relatively subjective ways to gather relevant diagnostic information (Barron, 2021). In addition to self-reports, psychiatrists can now use data generated by personal devices (smartphones, wearables, etc.) as well as social media use to identify relevant correlations. This enables a more efficient and precise (personalized) diagnostic process.

Predictive psychiatry, on the other hand, turns to big data in hopes of articulating generalizable patterns of behavior that precede the onset of acute mental health crises. The goal is then to monitor at risk individuals and develop preventive interventions. Data are often gathered through publicly available sources such as social media activity (Thorstad & Wolff, 2019; Jiang et al., 2021).

While the goal of diagnostic precision based on big data analytics lives up to its promise, I will argue that the promise of prediction may be exaggerated. Apart from ethically questionable methods used for gathering data through surveilling social media activity without the users' consent, there are rather questionable epistemic decisions in the preprocessing of data as well.

For example, Thorstad & Wolff (2019) removed "highly unusual characters, such as foreign alphabets, that the algorithm would have difficulty understanding (p. 1588)." This decision clearly narrows down the validity of the study to the context of an (American) English- speaking community and restricts its generalizability. It is also rather puzzling that the algorithm is expected to "understand" anything.

Jiang et al. (2021), on the other hand, used a period of social media inactivity as a proxy for hospitalization and, presumably, an acute mental health crisis. Here too, I find the stipulation that social media inactivity would likely indicate hospitalization as rather questionable. It also indicates a research perspective from within a culture that presupposes regular use of social media.

In conclusion, the promise of big data to be a useful tool for predicting acute mental health crises may be effective in the context of an individual's prognosis based on established patterns of behavior. Its generalizability as a predictive tool is, at best, promising for highly contextualized culturally homogenous communities.

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Thorstad & Wolff (2019). Predicting future mental illness from social media: A big-data Approach. Behavior Research Methods, 51:158

12:30 – 13:00

Marianne Broeker (University of Oxford), Matthew Broome (University of Birmingham) - Can an algorithm become delusional? Evaluating ontological commitments and methodology of computational psychiatry.

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: The computational approach to psychiatric disorders, including delusions, promises explanation and treatment. Here, we argue that an information processing approach might be misleading to understand psychopathology and requires further refinement. We explore the claim of computational psychiatry being a bridge between phenomenology and physiology while focussing on the ontological commitments and corresponding methodology computational psychiatry is based on. Interconnecting ontological claims and methodological practices, the paper illustrates the structure of theory-building and testing in computational psychiatry.

First, we will explain the ontological commitments computational psychiatry is grounded in, the Bayesian Brain hypothesis (BBH) of unconscious inference, paired with normative deontic approaches applied to gauge psychopathology. We then turn to the steps taken in empirical paradigms, from definitions, which are used as starting points, to the operationalisation and isolation of cognitive processes and hypothesis testing on the basis of algorithmic models, to consecutive interpretations regarding the aetiology of psychiatric disorders. We outline how experimental paradigms in computational psychiatry are specifically designed to confirm aberrations in assumed inferential processes, which are thought of as being the underlying core invariant features.

We will illustrate a gap between the ontological commitments of computational psychiatry and the operationalisation and testing of the cognition assumed to be relevant for psychopathology. This conceptual gap is of utmost importance when designing computational paradigms and may impede a crisp understanding of the approach. Lastly, in evaluating the conceptual gap, it becomes apparent that the information processing formalism used in computational psychiatry is still grounded in rational cognitive psychology.

ROOM 07

(SYMPISPC)
Symposium the International Society for the Philosophy of Chemistry

Chairs: Banchetti-Robino, Marina; Headley, Clevi

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: For much of 20th century philosophy of science, physics was assumed as the 'fundamental' science that describes reality in its deepest aspects, while chemistry was considered a 'phenomenological' discipline that only describes the phenomena as they appear to us. As a consequence, philosophers of science considered that the philosophical problems of chemistry were actually problems within the philosophy of physics.

Given these flawed assumptions, it is not surprising that the complex relation between chemistry and physics has been a major concern for the philosophy of chemistry since its inception in the 1990's. The autonomy of chemistry has been defended by calling into question the ontological, epistemological, theoretical, and explanatory reducibility of chemistry to physics.

More recently, philosophical interest regarding the relation of chemistry to other scientific disciplines expanded to include methodological questions, particularly the methodological specificity of chemistry. Whereas the concepts of scientific law and scientific theory occupy a central position in traditional philosophy of science, it is not clear whether chemistry as a scientific discipline is structured on the basis of laws and theories.

This symposium is organized in two parts, with a total of eight presentations examining some of the most current and relevant issues in the philosophy of chemistry.

Part 1: Ontology and methodology of chemistry (talks 1 to 4)
Ontological and methodological concerns have always been central to the philosophy of chemistry and include the definition of 'element', the nature of chemical bonds given quantum mechanics, the relationality and experimental dependence of chemical processes and substances, and the use of computational history of chemistry to better understand pre-modern chemical practices.

Part 2: Chemistry as a source of new perspectives for the philosophy of science (talks 5 to 8)
The philosophy of science of the 20th century was largely modeled on the image of theoretical physics. However, once the foundations of biology and now of chemistry began to be analyzed, the limitations of the traditional view of science became increasingly evident. In this regard, the philosophy of chemistry is an invaluable source of new perspectives that call us to reconsider the very concept of a scientific discipline.

Speakers:
1) Robin Hendry: The Metaphysics in Chemistry
2) Chérif Matta: Causal Mapping: Some Observations and Questions by a Chemist
3) Farzad Mahootian: A Digital Humanities Approach to the History of Alchemy and Early Chemistry
4) Marabel Riesmier: Towards a Relational Ontology of Chemistry
5) Jean-Pierre Llored: On the Context-Dependency of Chemicals and Its Philosophical Consequences
6) Pieter Thyssen: Natural Kind Pluralism
7) Juan Camilo Martínez González and Hernán Accorinti: Magnitudes Without Units: Quantifying Electronegativity in Quantum Chemistry
8) Jesús Jaimes Arriaga and Martín Pérgola: Quantum Theory of Atoms in Molecules as a Case of Two-Step Emergence Between Quantum Mechanics and Molecular Chemistry

11:00 – 11:30
Robin Hendry (Durham University) - The Metaphysics in Chemistry.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Can chemistry provide answers to big metaphysical questions? Modern chemists do not usually think of their science in that way, preferring to see it as a practical science, with modest and practical ambitions. Modern philosophers tend to agree with them, either because they think that the project of deriving metaphysical truths from empirical science is hopeless, or because they think that only such fundamental sciences as physics can answer questions of sufficient generality and abstractness to count as metaphysical. In this paper I argue that these kinds of views seriously underestimate what chemistry can contribute to metaphysics.

Chemistry's unmetaphysical view of itself probably predated the nineteenth century, but it was surely strengthened and entrenched by the debates over the acceptability and significance of the atomic theory. Nevertheless, at the very same time chemistry seems to have developed answers to some rather 'big questions.' They include the following:

1. Is the great diversity of chemical substances we see around us composed of a finite stock of chemical elements, combined in a myriad of different ways?

2. Is there a unique kind of atom for every chemical element? Is that what makes a chemical element the element that it is, and not another one?

3. Does every chemical substance have a structure at the molecular scale, which determines its chemical behaviour? Is that what makes a chemical substance the element that it is, and not another one?

One might quibble over whether answers to these questions count as metaphysical, and also whether they are really known to be true today. I argue that these quibbles derive from arbitrary and confused limits on what counts, respectively, as metaphysics and as knowledge. I also argue that these questions would have been regarded as metaphysical before the nineteenth century.

11:30 – 12:00

Chérif F. Matta (Mount Saint Vincent University) - Causal mapping: Some observations and questions by a chemist.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Causality in a restricted sense is related to a temporal order of events, whereby the cause-event precedes the effect-event.1 Since the concept of temporal order is invoked, special relativity restricts causally-linked events to remain within the light cone,2,3 but World-lines within this cone are insensitive to direction. The Second Law provides this necessary temporal ordering.4 Is causality, in this sense, applicable in chemistry? Is it a classical deterministic concept reminiscent to Laplace's demon?5 Do statement such as "the system is stable because it forms a hydrogen bond" are meaningful or is the hydrogen bond a manifestation of stability rather than its cause? Is chemical bonds the cause of the stability of a molecular structure?

In biochemistry texbook we read, for instance, that the cooperative effect of hydrogen bonding stabilizes protein structures. Such statements imply a causal link, whereby the cause is hydrogen bonding and the effect is stability (lowering of the system's total energy). It is proposed that this sort of causal chain is devoid of sense being a "chicken or egg fallacy" (petitio principii). Instead, chemical bonding, whether identified by a distance criterion or by the existence of a Bader's bond path,6,7 emerge from the quantum mechanical calculations at an optimized geometry. One cannot say that the bonding exists first then the energy is lowered second or vice versa. Both stability and bonding are different facets of one and the same phenomenon, they co-exist, they are associated, but are neither is the cause nor the effect of the other.

Finally, the first Hohenberg-Kohn theorem (HK-1)8 has been generalized whereby it has been shown that, not only the entire ground state non-degenerate electron density determines the ground state energy, but that every arbitrary element of the density does as well.9-11 Given that Bader's Quantum Theory of Atoms in Molecules (QTAIM) delivers bounded atomic regions of space12 and bond paths linking them,6,7 we wonder whether the bond path structure (which I call "augmented topology" because it is more than just connectivity as these lines have local electron densities, curvatures, integrated lengths, etc.) takes the extended HK-1 theorem to its limit, i.e., is sufficient to map-back the full density field?

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12:00 – 12:30

Farzad Mahootian (New York University) - A Digital Humanities Approach to the History of Alchemy and Early Chemistry.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: I discuss a digital humanities (DH) application for sorting untranslated alchemy texts via natural language processing (NLP). The long-term goal is to use language-agnostic NLP methods of semi-supervised machine learning (ML) algorithms to investigate trends in the history of alchemy and early chemistry, in a cross-cultural context. Sarah Lang's* "machine reasoning" treatment of the corpus of alchemist Michael Maier has demonstrated the efficacy and fruitfulness of using such methods. My use of ML is similar but diverges from standard historical methods in that it doesn't limit the corpus of text to that of a single author, nor a well-defined time period or cultural region. Rather, I take my cue from environmental genomics, an approach to information processing that accelerates discovery and identification of species, patterns and trends. Broadly speaking, the approach indiscriminately samples vast arrays of genetic material collectively, in situ (Craig Ventner-style, for example), from a liter of ocean water, or any other microenvironment. In my case, this involves temporally vast collections of alchemical texts by multiple authors over a span of centuries.

My initial investigation of alchemy and early chemistry involves electronic texts in English that satisfy just two requirements: they are machine-readable, and contain the alchemical terms mercury and sulfur (and their cognates). The key benefit of later phases of this project would be an accurate sorting and tagging of large volumes of text to serve research planning prior to labor-intensive translation efforts. The ML approach makes possible the production of evidence-based answers to questions like, "How does the overall proportion of "operational" to "spiritual" alchemical texts vary across cultures and historical periods? Are there correlations between knowledge production and plagues, wars, or famine?" Jurgen Jost and Guillermo Restrepo** have demonstrated that by applying DH approaches to the Reaxys chemical database, one can derive answers to the latter question for chemical knowledge production from the late-18th century to the present. Currently under development*** language-agnostic DH and ML treatments of historical texts could offer empirical grounds for answering similar questions about earlier periods and non-European language cultures. This approach may also offer empirical grounds for reexamining the useful limits of categorial binaries such as operational/spiritual and practical/theoretical.

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***This work is supported by a New York University Digital Humanities Seed Grant.

12:30 – 13:00

Marabel Riesmeier (University of Cambridge) - Towards a relational ontology of chemistry.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: In recent years, process philosophy has received increasing attention as a metaphysical framework in philosophy of science. Its commitment to occurrence and becoming as the fundamental units of reality, as opposed to static substances, has been fruitfully applied to the philosophy of biology, from ecosystems to cells to molecular biology, as well as the philosophy of physics, particularly to quantum mechanics. Many apparent inconsistencies in theories and practices can be resolved by posing entities as fundamentally relational, emerging from processes. Chemistry has been conspicuously absent from these debates. Thus far, attempts to move towards a process ontology of chemistry have focused on biochemistry (Guttinger 2018; Stein 2004), with some reference to quantum chemistry, omitting most of organic, inorganic, and physical chemistry – core subdisciplines of the field.

It is my aim to sketch out a relational ontology of chemistry that can account for molecular structures, reactions, and potential energies. An ontology of chemistry must be able to make sense not only of existing processes and entities, but also hypothetical ones, so as to render activities of chemical inquiry meaningful.

Molecular structures are relational along multidimensional potential energy surfaces, exhibiting only conditional stability. Potential energy surfaces are not strictly temporal, as they lack directionality. Nevertheless, they map out potential and actualised processes. Thus, they must be understood as fundamentally relational. The relational nature of chemical substances is not limited to a microscopic, seemingly independent realm. Humans are part of contingencies and substance-generating assemblages by virtue of existing. As chemists, they make themselves part of chemical assemblages in the laboratory, intentionally modifying conditions to bring about substance processes. Compounds once considered 'impossible', like cubane, are a testament to the generative potential of intervention.

While potential energy surfaces are a continuum, chemical substances are usually seen as discrete. Depending on the experiment and research question, transition states are similarly singled out, despite being mere 'snap shots' along a process. In the words of Barad (2007), an agential cut is made: the apparatus, which includes the experimental setup and the human interaction, enacts a 'boundary-making practice'. Using the pyrolytic ring opening of cubane, I show that boundary-making practice is an apt description of the interplay of reaction and intervention. A broader, discipline-wide agential cut is enacted to pose nuclei and, to an extent, electrons as stable relata in chemical reasoning and practice, bypassing certain quantum mechanical contingencies.

Overall, a relational ontology of chemistry not only reconciles the field with broader process philosophy, but constitutes an important step towards rethinking material boundaries in chemical practice.

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Symposium continues in the same room, next time slot.

ROOM 08

(KUHN1)
Symposium: Incommensurability, World Change and Metaphysics in Scientific Dynamics

Chairs: Fuentes, Miguel; Miguel, Hernán

Topic: B.3 Empirical and Experimental Philosophy of Science

Abstract: The contribution to the philosophy of science made by Thomas S. Kuhn is extensive in scope and depth. Some of the issues he addressed throughout his work have contributed to a turn in the conception of the dynamics of scientific knowledge.

This dynamics refers to the inevitable change of theories and the process by which a constellation of concepts is abandoned to embrace a new articulated set of concepts. At the same time, it is not possible to find a neutral conceptual platform to state correspondence between notions and words before and after the change. These strands compounded a thought trend from the beginning of Kuhn's proposals (Kuhn 1962, 1990, 2000) until his last contributions (Thalheimer Lectures, 1984/2017; Notre Dame Lectures, 1980/in press). Scientific communities' metaphysical and epistemic commitments gave rise to the conception of revolutionary change not only as a change of worldview but also as a change of the world itself. Consequently, this approach stroked like lightning into the calm green of rationality. Throughout the work deployed to highlight this point, we explicitly find the clues to recognize common experimental procedures and, in general, decide whether the scientists are talking about the same parcel of nature. Facing these two avenues opened to research, it still appears as a fascinating field to continue exploring how to combine both, trying to make sense of the continuity in some parts of the use of language referred to procedures and delimitate some parts of the world to be understood, in the middle of the more hardcore change in the conceptual network.

In this symposium, we address this central tension in the scientific dynamics outlined in Kuhn's terms, including a new inspection of the structure of scientific knowledge and practice. We hope to discuss the different aspects to explore how this Kuhnian legacy can be a firm platform to build new possible articulations between continuities and ruptures.

Speakers:
1) Eric Oberheim: Incommensurability and Scientific Progress
2) Hakob Barseghyan: The Mechanics of Kuhn-Loss

3) Daian Flóres: Semantic Changes in Technology”
4) Ángel Rivera: Incommensurability without untranslatability
5) Carlos Garzón: Epistemic diversity as methodological incommensurability
6) Paula Atencia: Thomas Kuhn: A promiscuous realist?
7) Alex Levine: Kuhn on Translation
8) Hernán Miguel and Miguel Fuentes: Complexity Measures and the restore of scientific dynamics rationality

11:00 – 11:30

Eric Oberheim (Humboldt-Universität zu Berlin) - Incommensurability and scientific progress: Making the impossible possible.

Topic: B.3 Empirical and Experimental Philosophy of Science

Abstract: This talk will develop some aspects of Kuhn’s account of scientific progress. We begin with Kuhn’s claim: “An experimental subject who puts on goggles with inverting lenses initially sees the entire world upside down. . . the result is extreme disorientation, an acute personal crisis. But after the subject has begun to learn to deal with his new world, his entire field of vision flips over . . . Literally as well as metaphorically, the man accustomed to inverting lenses has undergone a revolutionary transition” (SSR, p. 112). I will attempt to show how observation statements are theory-laden according to the no-overlap principle, and then consider the consequences this has for comparing incommensurable theories. First, I will emphasize that Kuhn’s claim is simply bogus. The visual field does not flip back when a subject wears goggles that invert their field of vision. Kuhn cites Stratton (1897) and Carr (1935), but both sources explicitly report that experiments show that the visual field does not flip back over; that things are not seen again as they had been before. Ironically, Kuhn seems to have been confused by Stratton’s terminology. Stratton calls the inverted visual field he saw with his monocular goggle 'upright vision’ — on the logic that the image projected on the retina is normally upside-down because of the refraction through the lens. Kuhn also cites Carr (1935), but Carr also says that the field of vision never flips back to normal: “The visual field was not reinverted” (Carr 1935, p. 53). Kuhn's account about flipping fields of vision appears to have substantially contributed to the propagation of an urban legend with respect to flipping fields of vision.

Nonetheless, I will attempt to show how Kuhn’s ‘no-overlap principle’ can be used to explain how revolutionary scientific progress can make the impossible possible (Kuhn 2000, pp. 92–96). According to Kuhn’s account, revisionary reclassification of kinds allows new incommensurable theories to act as new synthetic a priori principles, so that facts are only facts relative to the theories that predict them, and what counts as the facts may change as better explanations of what is happening become available. I will argue that it follows from Kuhn’s ‘no-overlap principle’ that the logic of scientific justification during revolutionary progress is not best explained as a series of conjectures and confirmations (inductivism), nor a series of conjectures and refutations (falsificationism). It is better described as a competition to provide the most fruitful realistic explanation of experience as manifested historically in a consilience of corroborations that changes what communities experience as real.

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11:30 – 12:00

Hakob Barseghyan (Victoria University, University of Toronto), Aayu Pandey (University of Toronto) - The Mechanics of Kuhn-Loss.

Topic: B.3 Empirical and Experimental Philosophy of Science

Abstract: While the importance of Kuhn-loss in the process of scientific change is recognized by many scholars (Post 1971, Fuller 2000, Bird 2004, Gattei 2008, Votsis 2010, Kuipers 2011, Chang 2012), the precise mechanics of the process is unclear. To shed light on its mechanism, we focus on the acceptance and rejection of individual questions and answers in commonly discussed episodes of Kuhn-loss. Our analysis reveals two distinct scenarios.

In the first scenario, the original theory is being replaced by a theory that answers a different question. One such case is the replacement of the Cartesian 'All planets in the same solar system revolve unidirectionally because they are part of the same vortex' with the Newtonian 'Celestial vortices do not exist'. Another similar case is the replacement of 'Metals are more alike than their ores because all metals contain phlogiston that produces common properties' with 'Phlogiston does not exist' towards the end of the eighteenth century.

In the second scenario, the original theory is being rejected because of the rejection of the question it attempts to answer. Such is the case of the rejection of the Cartesian 'Gravity is caused by the inward pressure due to the condensation of finer matter at the periphery of a vortex', which was eventually rejected by mid-18th century Newtonians because the question it attempted to answer, 'What is the cause of gravity?', was itself rejected. The question was rejected because one of its presuppositions, 'Gravity has a cause', was replaced by the Newtonian 'Gravity has no cause'.

In both scenarios, we find it inadequate to interpret these episodes as involving rejection without replacement. In Kuhn-loss, rejected elements are being pushed out of the agent's belief system by new elements accepted by the agent. Cases of Kuhn-loss are qualitatively distinct from cases of rejection without replacement.

This clarification of the mechanics of Kuhn-loss has important repercussions to philosophical discussions of the phenomenon. Specifically, it highlights that not all familiar cases of Kuhn-loss can be characterized as exhibiting a genuine loss of explanatory content. In the first scenario, where the old question is being preserved but no new direct answer is being provided, there is clearly a loss of explanatory content. In the second scenario, however, where the old question itself is being rejected, no explanatory content is being lost. This suggests that perhaps lumping such distinct scenarios in the same box labeled 'Kuhn-loss' might not be the wisest strategy moving forward. This has direct implications for our historical research: instead of searching for instances of Kuhn-loss, it seems more productive to focus our historical research on the dynamics of questions and answers and clarifying whether the episode under study involves (a) a replacement by a theory that answers a different question, (b) a rejection due to the rejection of the original question, or (c) a rejection without any replacement.

12:00 – 12:30

Daian Flórez (Universidad de Caldas-Universidad Nacional de Colombia) - Semantic Changes in Technology.

Topic: B.3 Empirical and Experimental Philosophy of Science

Abstract: As is well known, Kuhn argued that there is no common language to enable the translation of scientific terms. Kuhn did not extend the scope of incommensurability to include the language of

technology, although he did analyze some technological cases in order to examine the nature of this semantic phenomenon. In this lecture, I shall show that the history of technology provides strong evidence for the thesis that there are profound semantic changes in the language of technology, or, in other words, that there is technological incommensurability.

The incommensurability thesis in the domain of technology is not radically different from the inter-theoretical incommensurability in the empirical sciences. Both can be identified with lack of translation among the terms used to describe the functioning of artifacts. In other words, there is incommensurability among the proper terms of technology that engineers use to refer to artifacts or to describe their functioning. An explicit formulation of this thesis could go like this:

There is incommensurability in technology iff some of the terms/concepts used to refer to or describe the functioning of A1 and A2 (where A stands by artifact) are not inter-translatable. In addition the terms cannot overlap –even if they are homonymous.

In the historical argument over the design of the steam engine there are two theories in conflict: the material theory of heat by Black-Watt vs. thermodynamics. By comparing both theories it turns out that the meanings of the shared term "latent heat" are diametrically opposed, as we learn from Miller's explanation of the theoretic underpinnings of the term:

We are accustomed to thinking of Black as 'the discoverer of latent heat', and by this we usually mean the discoverer of what we understand by the term 'latent heat'. But this is quite wrong. Our concept of latent heat is underwritten by a kinetic theory of heat; Black's was based on a material (chemical) one in which latent heat was intrinsic to chemical reactions and was compounded with ordinary matter.

While by the term "latent heat" nowadays we refer to the quantity of energy required to cause a change of state in matter, e.g., passing from the solid state to the liquid or gas state, Black and Watt understood latent heat as a chemical property inherent to ordinary matter.

This is not the only reason for which the term "latent heat" in the material theory of heat is not semantically equivalent to the corresponding term in thermodynamics. While latent heat is –in light of thermodynamics– a physical magnitude that indicates the quantity of thermic energy that a mass has either to lose or to gain in order to change its physical status; latent heat, in Black-Watt's theory, is a chemical reaction. By the same token, although latent heat is the causal agent that explains the changes of status in both theories, their respective properties are radically different: while in the material theory of heat, latent heat is a property of the matter, in thermodynamics latent heat is energy that becomes transformed.

12:30 – 13:00

Angel Rivera-Novoa (Universidad de Antioquia) - Incommensurabiity and Untranslatability

Topic: B.3 Empirical and Experimental Philosophy of Science

Abstract: In this paper, Kuhn's last two argumentative strategies for defending incommensurability are analyzed. These strategies are, on one hand, the strong separation between interpretation and translation, and, on the other hand, the Kuhn's claim for taking into account the intensional aspects of translation. It is argued that both strategies rest on methodological mistakes in the process of radical interpretation. Drawing the difference between interpretation and translations would imply establishing a criterion to determine the meaning of sentences that is based on interpretation but not on translation. However, Kuhn did not provide this criterion and criticism on this point would be alive. Regarding the intensional aspects of translation, Kuhn seems to be unaware of methodological requirement involved in a process of translation. If "translation" is an intensional notion, then no intensional aspect could be presupposed in an explanation about translation process. Hence, claiming that the intentional aspects of translation must be present in the explanation of that process turns out to be somewhat misleading. Instead, truth conditions could be established as a non-

intensional criterion for determining the meaning of a sentence, just as a davisonian approach would claim it. Further, is argued that thinking of incommensurability in terms of untranslatability is wrong from start, since this claim presupposes that at least two theoretical "languages" are involved in the comparison. Nonetheless, Kuhn only gave clues about "vocabularies" or "taxonomies", but not about "languages". It is argued that we can understand incommensurability without appealing to any notion of "untranslatability", and that this is consistent with the Kuhn's first approach to the incommensurability thesis in The Structure of Scientific Revolutions.

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Symposium continues in the same room, next time slot.

ROOM 09

(CSE)
Symposium: Ethico-political dimensions in contemporary social epistemology: disagreements, epistemic communities, scientific denialism, post-truth
Chairs: Penelas, Federico

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: In the framework of the tradition of analytic philosophy, an area of research in theory of knowledge has developed in the last 30 years tending to address a series of epistemic phenomena that involve a reference to social or intersubjective factors. Social epistemology has become one of the most conceptually fertile areas of the last decades, constituting in particular an ineludible theoretical input for the development of contemporary philosophy of science. Indeed, the central themes of research in the area form a central corpus for thinking about scientific communities as agents in the constitution of justification or knowledge. The epistemology of testimony (and that of expert

testimony in particular), the debate on the rationality of disagreements, the very characterization of the idea of groups as epistemic and assertional subjects, are crucial areas of research for the understanding of contemporary scientific activity.

These developments of social epistemology in turn gave rise to the consideration of ethical-political factors in order to think about a series of epistemic distortions that affect not only the production of knowledge, but also its diffusion and adoption by various social sectors, institutions or groups with influence on public opinion. The notions of "testimonial injustice", "hermeneutic injustice", "active ignorance", "scientific denialism", "group lies", "group bullshit", "epistemic bubbles", "epistemic echo chambers", "deep disagreements", etc., demand a hybrid analysis, i.e., ethical-political-epistemic, and have become central to the understanding of the contemporary epistemic crisis often referred to as the "post-truth era", which especially affects scientific discourse and its capacity to influence social transformation at all levels. In this symposium we will address a series of discussions that will have as a central focus the discussion of many of these notions.

Speakers:
1) PEDRO MARTÍNEZ ROMAGOSA: On hermeneutical injustice: a pragmatist approach
2) MAURO SANTELLI: About Conjectures, Selfless Asertions and Bullshit
3) FEDERICO PENELAS: What is group bullshit?
4) BRUNO MUNTAABSKI: Post-truth, scientific denialism and echo chambers
5) DANIEL PARED: Towards a possible computational model of echo chambers
6) CLAUDIO CORMICK & VALERIA EDELSZTEIN: Know your enemy: a characterization of scientific denialism
7) BLAS RADI: A non-ideal approach to group deep disagreement
8) VICTORIA LABOREIRO: Deep Scientific Disagreements? A new model for thinking of deep disagreements in science

11:00 – 11:30

Pedro Martínez Romagosa (UBA/CONICET/IIF-SADAF) - On hermeneutical injustice: a pragmatist approach.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Miranda Fricker's initial characterization of hermeneutical injustice as an intelligibility deficit in understanding social experience owing to a gap in the collective hermeneutical resources led to several criticisms (Fricker, 2007, 2017; Beverley, 2020). Epistemologists of ignorance argued that Fricker's understanding of hermeneutic injustice was too restrictive: it could not explain cases where the victims had the interpretative resources to understand their experience of racial oppression, but white ignorance impeded their social circulation, and thus prevented the victims from communicating or publicly denouncing the injustices in question (Dotson, 2011; Mason, 2011; Pohlhaus, 2012; Medina, 2013). Instead, they proposed different labels to offer a broader notion of hermeneutical injustice with greater explanatory scope (Dotson, 2011; Pohlhaus, 2012; Medina, 2013).

Conversely, feminist philosophers from different central branches in the analytic tradition argued that Fricker's initial characterization of hermeneutic injustice failed to offer an adequate definition: it was too permissive, and its adoption would force us to acknowledge that there are several cases of hermeneutical injustices which we would not intuitively count them as injustices (Beeby, 2011; Romdenh-Romluc, 2016). And therefore, they developed different alternatives of conceptual analysis of hermeneutical injustice -in terms of individually necessary and conjointly sufficient conditions for its application-(Maitra, 2018; Beverley, 2020; Simion, 2020; Mason, 2021).

In this paper, I propose a pragmatist understanding of hermeneutic injustice. First, I agree with Fricker that her initial characterization can make room for cases that involve white ignorance. The explanatory notion based on paradigmatic discriminatory cases of hermeneutical injustices offers a set of open criteria to account for incidental injustices derived from the central.

Secondly, I argue that the same original explanatory notion offers sufficient criteria to distinguish genuine hermeneutical injustices from accidental intelligibility deficits. And then, it avoids being too permissive to include accidental non-discriminatory cases.

Finally, against Fricker and other proposals of analysis of the concept, I argue that the challenge of either offering a too-exclusionary or a too-permissive understanding of hermeneutical injustice stems from trying to establish a definition and understanding the criteria set up in explaining the central cases as individually necessary and jointly sufficient conditions for application.

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11:30 – 12:00

Mauro Santelli (Universidad de Buenos Aires / IIF-SADAF (CONICET)) - About Conjectures, Selfless Assertions and Bullshit. Some Comments on the Pragmatics of Scientific Disinformation.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: From the standpoint of the classical Speech Act Theory (Searle, 1970; Searle & Vanderveken, 1985), assertives are the primary category involved in cognitive discourse. Assertives put forward a proposition as true to the hearer(s) in various degrees of commitment by the speaker. While an assertion has as its sincerity condition that the speaker believe in the content that she is expressing (she is undertaking a sincere commitment to its truth); a guess is putting forward a proposition as truth with little commitment. In the family of the assertives, hypotheticals stand as limit case. A proposition put forward as an hypothesis is not required to be believed, at all, by the speaker for the act to be unimpeachable. When an assertion is made insincerely, it can be rightly be condemned as faulty. In contrast, there is no fault in not believing a hypothesis put forward for consideration. For this reason, some have challenged the inclusion of a belief sincerity condition in assertives (Siebel, 2002). If hypothetical statements are assertives at all, the belief requirement is hardly applicable (McKaughan, 2012). Their role is not to express commitment, but to elicit a consideration of the

proposition as if it were true and what it would imply. Hypotheses are tested through inference and experimentation against others for multiple reasons.

Arguably, the role of conjectures in contemporary advanced scientific research is one of the most difficult to understand by the public (Anderson, 2011; Oreskes & Conway, 2011). The need for urgent action aggravates this. The stakes that a given scientist would be willing to place on a statement could vary greatly depending on the situation. As Oreskes (2011) has argued, the central role that considering statements that are not wholly believed (if believed at all) has in contemporary scientific practice, puts scientists and public officials at a disadvantage of science denialists.

In this presentation I will argue, partly with McKaughan (2012), that the classical accounts of the relationship between assertions and conjectures are unsatisfactory in favor of a different theoretical outlook. I will contrast the problem of understanding conjectures as assertives with Lackey's "selfless assertions" (2008), and Harry Frankfurt's essay On Bullshit (2009). I will argue that Searle's psychological model should be cast aside in favor of a unifying classification that can accommodate these phenomena. These three examples (conjectures, selfless assertions, and bullshit statements) share a structure in which a proposition p is put forward by a speaker S but is not (necessarily) believed by S. I will further defend that they can be successfully understood in an inferentialist framework (Brandom, 1994/1998; Sellars, 1956/1997) where the concept of "belief" plays an unessential role.

12:00 – 12:30

Federico Penelas (UBA/UNMdP/IIF-SADAF-CONICET) - What is group bullshit?

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: In a recent book, Jennifer Lackey has contested much of the development in group epistemology on the grounds that they have not paid attention to the phenomenon of group bullshit and lies (Lackey, 2021). Lackey's idea is that the rejection of (or the difficulty to characterize) the possibility of group liars or bullshiters involves a dangerous ethical-legal-political deficit.

Paying attention to lies and bullshit by groups implies thinking about the concepts of group testimony and group assertion. Lackey develops a conception according to which the testimony of a group is reducible to that of one or more individuals, although not necessarily to that of a member of the group in question. This position demands a clear approach to the notion assertion by a group through the behavior of spokespersons.

Lackey defines Group Assertion in these terms:

"A group G asserts that p in the authority-based way if and only if that p belongs to a domain d, and a spokesperson(s) S

(i) reasonably intends to convey the information that p in virtue of the communicable content of an individual act (or individual acts) of communication,

(ii) has the authority to convey the information in d,

and

(iii) acts in this way in virtue of S's authority as a representative of G" (149-150).

With that definition and the one of of Group Belief (48-49), she can offer her definition of Group Lie:

"A group, G, lies to B if and only if

(1) G states that p to B,

(2) G believes that p is false,

and

(3) G intends to be deceptive to B with respect to whether p in stating that p" (30).

Lackey does not offer a precise definition of group bullshit, but she extracts the possibility of being able to incorporate this category from precisely the same case that she uses to justify that spokespersons must function with autonomy authorized by the group. The case is one in which a tobacco company´s spokesperson is asked about the link between tobacco consumption and a disease recently identified by the scientific field. The spokesperson responds, exercising clause (ii) of the definition of group assertion, that there is no relationship between smoking and the disease in question. In this case, it is not possible to describe the situation as a group lie, since condition 2 of the definition of that notion is not met, since all the members of the group ignore the content of the proposition that they assert through their spokesperson. It is, therefore, a case of group bullshit.

In this presentation I will deal, on the one hand, with trying to offer an adequate characterization of the idea of Group Bullshit and, on the other, I will attend to the feasibility of an idea that Lackey herself seems to imply in her text: that it is possible to acquire knowledge through group bullshit.

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12:30 – 13:00

Bruno Muntaabski (University of Buenos Aires), Jonathan Erenfryd (University of Buenos Aires)

- Post-truth, scientific denialism and echo chambers.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: The advancement of both natural and social science has enabled the development of innovative technology and of public policies which are meant to improve people's lives. These innovations and policies have implied numerous debates on how to best apply scientific knowledge to a complex and changing world. Nevertheless, a considerable wave of scientific denialism has stood as a formidable front against the credibility of such knowledge. Empirical research has shown just how widespread this kind of denialism is (Björnberg, Karlsson, Gilek, Hansson 2017). Recently, scientific denialism has been studied alongside a growing interest in the "post-truth" phenomenon (Diethelm and McKee 2009). Although the thought has been that these two are closely related, there is neither a general agreement on what their relation is, or more importantly, on what "post-truth" is. While the term is commonly use in philosophical or socio-political circles, and there is a tendency to assimilate it to the spreading of mass media and fake news (McIntyre 2018), a unified model of what counts as post-truth, and how it relates to other socially relevant phenomena, is still wanting.

The present work intends to argue that said model could be use to explain key features of scientific denialism, and to deliver the general scheme for such a model. The background thought is that several difficulties facing contemporary accounts of post-truth could be overcomed by paying close attention to recent work on the epistemology of groups. Specifically, we propose to develop Nguyen's analysis of "echo chambers" (Nguyen 2018) articulating it as the central phenomenon involved in post-truth. This way, a different account on the relation of post-truth with scientific denialism is offered, one that rejects McIntyre's thesis that the latter enabled the development of the former (McIntyre 2018: cap 2). On the contrary, this kind of denialism is a consequence of the growing number of echo chambers in current societies. Lastly, the advantages of this epistemological explanation of scientific denialism through a post-truth model are shown by relating it with Elizabeth Anderson's reflections on lay assessment of scientific testimony (Anderson 2011). We believe that our account can help make sense of Anderson's insightful recognition of how easy it is for lay judgment to be informed of scientific credentials and how difficult it seems for public opinion to give due credit to

scientific knowledge. The work aspires to contribute in this way to the clarification of scientific denialism and to develop helpful tools in public policies that address it.

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Symposium continues in the same room, next time slot.

ROOM 10

(PARAF)
Symposium: Paraconsistent Reasoning and other Forms of Flexible Reasoning

Chairs: Carnielli, Walter; Coniglio, Marcelo Esteban

Topic: A.2 Philosophical Logic

Abstract: Flexible and contradictory-tolerant reasoning is a form of reasoning that allows for the possibility of multiple, possibly conflicting perspectives on reasoning and information. This approach recognizes that the reason is often complex, uncertain, possibly contradictory, and that a rigid, all-or-nothing approach to reasoning may not always be appropriate.

Flexible reasoning involves the ability to adjust one's reasoning strategies based on the context and available information, and to consider multiple possibilities before reaching a conclusion. This may involve taking into account the degree of uncertainty or ambiguity in the situation, and being open to revising one's beliefs in light of new evidence.

Contradictory-tolerant reasoning, on the other hand, involves the ability to accommodate contradictory or inconsistent information without necessarily rejecting it outright. This approach acknowledges that apparent contradictions may arise due to incomplete information or differences in perspective, and that it may be possible to reconcile apparently conflicting viewpoints with a more nuanced understanding of the underlying issues emphasizing openness, adaptability, and a willingness to engage with complexity and ambiguity.

This interdisciplinary workshop aims to provide a forum for philosophers, logicians, computer scientists, probabilistic experts, and other researchers who are interested in exploring the nuances of flexible and contradictory-tolerant reasoning. The topics covered encompass several related issues, including, but not limited to, the following:
-Inconsistency- and Contradictory-Tolerant Reasoning: benefits and difficulties of reasoning in the presence of inconsistencies and contradictions.

-Inductive Reasoning in Science and Philosophy: The role of inductive reasoning in scientific and philosophical contexts, including the relationship between induction and deduction.
-Probabilistic and Possibilistic Reasoning and their Generalizations: Probability theory and possibility theory and their applications in modeling uncertainty and making predictions.
-Philosophical Aspects of Reasoning: Philosophical foundations of reasoning, including the nature of reasoning and its relationship to knowledge, truth, evidence,
and justification.
-Novel Semantic Frameworks for Non-Classical Logic: The latest developments in the field of non-classical logic, with a particular focus on the emergence of new semantic frameworks.

Speakers:
1) Julio M. Stern, Carlos A. de Braganca Pereira, Marcelo Lauretto, Rafael Bassi Stern and Rafael Izbicki: The e-value and the Full Bayesian Significance Test: Logical Properties and Philosophical Consequences
2) Daniel Skurt: RNMatrices for FDE-based Modal Logics
3) Marcelo E. Coniglio: Combining swap and twist structures: the case of paraconsistent Ivlev-like modal logics
4) Mahan Vaz and Marcelo E. Coniglio: Swap structures for deontic logics
5) Abilio Rodrigues: What do 'evidence' and 'truth' mean in the logics of evidence and truth
6) Hitoshi Omori and Jonas Becker Arenhart: Do we need paraconsistent logic for paraconsistent reasoning?
7) Walter Carnielli: Evidence and probability in paraconsistent logics as novel reasoning tools.
8) Juliana Bueno-Soler: Paraconsistent and paracomplete Popperian probabilities

11:00 – 11:30
Julio Michael Stern (USP - Universidade de Sao Paulo), Carlos Alberto de Braganca Pereira (USP - Universidade de Sao Paulo), Marcelo Lauretto (USP - Universidade de Sao Paulo), Rafael Bassi Stern (USP - Universidade de Sao Paulo), Rafael Izbicki (UFSCAR) - The e-value and the Full Bayesian Significance Test: Logical Properties and Philosophical Consequences.

Topic: A.2 Philosophical Logic

Abstract: This article gives a conceptual review of the e-value, ev(H|X) -- the epistemic value of hypothesis H given observations X. This statistical significance measure was developed in order to allow logically coherent and consistent tests of hypotheses, including sharp or precise hypotheses, via the Full Bayesian Significance Test (FBST).

Arguments of analysis allow a full characterization of this statistical test by its logical or compositional properties, showing a mutual complementarity between results of mathematical statistics and the logical desiderata lying at the foundations of this theory.

11:30 – 12:00
Daniel Skurt (Ruhr University Bochum) - RNMatrices for FDE-based Modal Logics.

Topic: A.2 Philosophical Logic

Abstract: Our investigation starts with a very weak FDE-based modal logic, which we refer to as PM. The logic PM will be formalized over a propositional language consisting of conjunction, disjunction, strong negation, weak implication and a non-specified modal operator. Semantically, PM will be

expressed in terms of swap structures, cf. [1], in which each truth-value is a triple (or snapshot) z=(z1,z2,z3), where each coordinate is either 0 or 1. The intended meaning of z1, z2 and z3 is then the following: z1 gives information, whether a sentence is true or not, z2 whether a sentence is false or not, and z3 whether a sentence has modal flavor or not. This produces 8 different values. The snapshots of the operators will then be computed for the first two coordinates of the non-modal operators as in the case of the well-known twist-structures, cf. [2], while the last coordinate ranges freely over 0 and 1. For the modal operator, the first coordinate takes the value z3, while the other two coordinates range freely over 0 and 1.

Based on that we will employ the technique of restricted non-deterministic matrices (RNmatrices), cf. [3], in order to model certain modal behavior of the modal operator. In short, w.r.t. RNmatrices the set of valuations for modal formulas will be restricted by a set of conditions, in order to validate certain modal axioms, while keeping the interpretation of the operators the same. This is in sharp contrast to the usual approach to non-deterministic semantics for modal logics, cf. [4], where changes of the truth-tables for the operators, reflect the modal properties.

We will then investigate the restrictions of the set of valuations that are sufficient to validate certain well-known modal axioms like the K-axiom and others, but also modal rules like the rule of necessitation and, thus realizing yet another semantic characterization of FDE-based modal logics. In particular, we aim at characterizing such well-known logics like KFDE, BK or MBL, cf. [5] , and show in passing, once more, the versatility of RNmatrices.

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12:00 – 12:30

Marcelo Esteban Coniglio (Centre for Logic, Epistemology and the History of Science – CLE) -
Combining swap and twist structures: the case of paraconsistent Ivlev-like modal logics.

Topic: A.2 Philosophical Logic

Abstract: In a series of works started in the 1970's, Ivlev proposes a novel approach to non-normal modal logics in which the semantics is given by finite non-deterministic matrices (a.k.a. Nmatrices). In [4] this semantics was extended to a class of Nmatrices called swap structures such that each truth-value is a triple z=(z1,z2,z3) (called snapshot), where each coordinate zi (with values in a given Boolean algebra) represents a truth-value for formulas A, []A and []~A, respectively (here [] is the necessity operator and ~ is classical negation) . Each operation between snapshots is computed pointwise by means of Boolean operations between all the coordinates of the given snapshots. However since in some coordinates the values cannot be uniquely determined because of the properties of the logic, it produces a multioperation. By taking snapshots over {0,1} the original 4-valued Nmatrices of Ivlev's non-normal version of KT (and the ones for some other Ivlev-like modal logics introduced in [3]) are

recovered. Carnielli & Coniglio's swap structures (introduced in [1]) generalize Fidel & Vakarelov's twist structures, since the former are multiagebras formed by snapshots while the latter are algebras of snapshots. In [2] it was introduced a paradefinite Ivlev-like modal logic obtained by combining 4-valued swap structures (with 3-dimensional snapshots) for the modal logics with 4-valued twist structures for FDE (with 2-dimensional snapshots representing the truth-values of A and -A, where - is the the paradefinite negation of FDE), obtaning 6-valued swap structures formed by 4-dimensional snapshots representing the truth-values of A, []A, []~A and A. In this talk we apply this technique by combining swap structures for 4-valued Ivlev-like modal logics with 3-valued swap structures and 3-valued twist structures (with 2-dimensional snapshots representing the truth-values of A and -A, where - is the the paraconsistent negation) for several Logics of Formal Inconsistency studied in [1]. The snapshots are, again, 4-dimensional, with an interpretation analogous to the FDE case. The obtained modal logics are decidable, and can be axiomatized in a natural way, suggesting potential applications to logics of information and to the analysis of modal paradoxes. Moreover, the systems proposed here show that the combination of swap and twist structures provides a powerful and conceptually interesting tool for combining non-classical logics.

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12:30 – 13:00

Mahan Vaz (State University of Campinas), Marcelo Coniglio (State University of Campinas) -
Swap structures for deontic logics.

Topic: A.2 Philosophical Logic

Abstract: Although moral conflicts appear throughout philosophy and literature, our standard formulation of deontic logic, SDL, does not accept such conflicts. SDl accepts the principle of explosion, hence moral conflicts trivialize the system. One way out of this problem is to assume a form of deontic paraconsistent logic, so the principle of explosion does not end up trivializing the system. One of the formulations for such logics are the LDIs given by Coniglio [4], which are adaptations of the LFIs [1], which uses the operator O for formalizing obligation. Examples of moral conflict are Chisholm's Paradox [5] and ones from the Mahabharata, as seen on [6]. In the latter, there is a presentation of Priest's Logic of Paradox LP extended with axiom D which, as LDIs, can deal with moral conflicts. In this last work, the authors argue for a context-dependent semantics, which would be reasonable to apply for the cases where moral conflicts need a solution. Although Kripke's models are useful to define a semantics to such logics, they are deterministic, and hence do not deal with situations where a conflict can be solved in many ways. A novel treatment to such cases is to use swap structures [3], which are multialgebras whose constituents are, in this case, quadruples z = (z1 , z2 , z3 , z4), with each of its coordinates corresponding to the truth value of the assertion, respectively, of a formula A , its paraconsistent negation ¬A, its consistency ◦A, and its obligation OA. Following the formalization of LDIs presented in [4] and the algebraization by swap structures presented in [2], we

give a swap structure semantics for deontic logics and show how this novel approach gives new insights to the moral conflict scenarios mentioned above.

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Symposium continues in the same room, next time slot.

ROOM 11

(COPA) From previous slot, same room.
Symposium: Conceptions of Paradoxicality

11:00 – 11:30

Camila Gallovich (University of Buenos Aires and IFF-SADAF-CONICET) **- Towards a Dependence Theory of Paradoxicality.**

Topic: A.2 Philosophical Logic

Abstract: The thought that our attributions of truth and falsity must be grounded in non-semantic facts constitutes an important semantic intuition. According to Yablo in "Grounding, Dependence, and Paradox", this intuition is two-sided. Its first aspect---inheritance---draws on the way in which a complex statement inherits its meaning from certain simpler statements. Its second aspect---dependence---shows the way in which the meaning of a complex statement depends on simpler statements. Paradigmatically, the fixed-point construction given by Kripke in his "Outline of a Theory of Truth" provides an inheritance-style characterization of grounding, whereas the dependence-based construction introduced by Yablo (1982) provides a dependence-style characterization of it. Yablo's article states a further result: "any collection with an inheritance-style characterization admits a canonically related dependence-style characterization" (Id. p.119). That is to say that the characterizations of the notion of grounding provided by these approaches are coextensive. The guiding question of this talk is if it is possible to maintain Yablo's result for languages enriched by

means of additional semantic predicates other than Tr(x). The talk will run as follows. First, I will show how to set up a dependence-based construction for a language extended with a paradoxicality predicate, Par(x). Then, I will state that the resulting dependence-style characterization of truth and paradoxicality is coextensive with the inheritance-style characterization recently provided by Rosenblatt (2021) and by Rosenblatt and Gallovich (2022) in the context of the fixed-point conception. Hopefully, this will settle the question affirmatively.

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11:30 – 12:00

Shay Logan (Kansas State University) - Paradox, Possibility, and Permission.

Topic: A.2 Philosophical Logic

Abstract: Paradoxes are weird. That's not what makes them problematic; we can learn to live with weirdness. But we can't learn to live with everything all at once. And the problem with paradoxes is that that's exactly what they ask us to do---live with everything all at once.

Typically---though not universally---they do this because they lack verifiers. So the problem is roughly that there is a mismatch between the permissiveness of language and the impermissiveness of the verification relation. This leaves us with three different ways to deal with a given paradox. First, we can restrict language. Second, we can change the verification relation. Third, we can add in more verifiers.

Philosophically, the second and third options are in fact available. And their availability leads to problems for certain philosophical stories about logic itself. To say more than this, I'll need to first narrow the scope of my investigation a bit and, second, introduce a bit of vocabulary.

On the first front: I'm only interested in thinking about formal logics and, more restrictedly, in formal logics as models. I'm also going to understand both "logic" and "model" in very particular ways. A "logic" as I'll be using the word, will always be an interpreted formal language. I understand this to require first, a specification of the vocabulary and the grammar of a given formal language and second, a class of objects usually called models and a verification relation that specifies which formulas are verified in which models. But we're already overloading the word "model." So the things usually called "models" we'll call "verifiers" instead. In short, logics have four parts: vocabulary and grammar (the syntactic components) and verifiers and verification (the semantic components).

A "philosophy of logic" as I'll use the phrase is a description of a modeling relation holding between a given logic and a domain being investigated. Concretely this requires a specification of a (not necessarily proper) fragment of natural language that we take the syntax of the logic to model and a class of real-world (though perhaps abstract) entities that we take the verifiers to be models of and a specification of a relation that holds between the entities the verifiers model and the natural-language formulas we take the syntax to model that we take the verification relation to model.

Recall the setup: paradoxes are problematic when there's a mismatch between the permissiveness of our formal language and the impermissiveness of the verification relation. When this happens, one can respond by adding new verifiers or by modifying the verification relation. The problem I want to point out is this: the availability of these options leaves folks who take verifiers to model (possibly partial) ways things can be and who take the verification relation to model the truth

relation can neither maintain nor change their philosophy of logic in an epistemically responsible way once paradoxes arise. So one simply cannot do logic in an epistemically responsible way while taking one's logic to model (things like) ways things can be.

12:00 – 12:30

Dave Ripley (Monash University) - Liar, curry, sorites: how many paradoxes?

Topic: A.2 Philosophical Logic

Abstract: Priest's "Principle of Uniform Solution" says that we should not give two different solutions to two formulations of the same paradox. The principle itself is uncontroversial, but applying it can be difficult, because it is not always obvious when we have two different paradoxes and when we have two formulations of a single paradox.

For example, the principle has been used to argue against certain kinds of dialetheism that treat the liar paradox very differently from the curry paradox, by arguing that the liar and curry paradoxes are really just a single paradox. A usual dialetheist response is to argue that the liar and curry paradoxes really are two separate phenomena. Sorites paradoxes also get into the mix here, with at least some dialetheists arguing that the sorites and the liar are at their root a single paradox, despite the different forms of argument usually used to present them.

It is everyone's goal in these discussions to try to get to the cause of the paradoxes: what really explains the paradoxical results? If the liar and curry paradoxes have the same explanation as each other, then they are the same paradox; different explanations, and they are different. The same goes for the liar and sorites. So the issue is one of finding the explanations for these paradoxes.

Here, though, there is a possible difficulty. All these paradoxes rely at least in part, and sometimes fully, on logical and conceptual resources for their formulations. Explaining a paradox does not seem to be a lot like giving an everyday physical explanation. Here I think some recent philosophical work on explanation in mathematics can be of use. Like the sought-after explanations for the paradoxes, mathematical explanations too do not seem to be a lot like everyday physical explanations. And yet mathematical explanations can be sought and found.

In particular, I will draw here on work that takes interventionist accounts of explanation, originally formulated just for physical systems, and extends these accounts to mathematical explanations. By using this approach to explanation, I will argue that we can make headway on seeing the explanations for the paradoxes, in a way that allows us to determine just how many paradoxes we're looking at among the liar, curry, and sorites. It's two.

12:30 – 13:00

Aylén Melisa Bavosa Castro (UBA-SADAF) - AGM model for paradoxical new logical information.

Topic: A.2 Philosophical Logic

Abstract: Paradoxes are often regarded as good enough evidence for revision among logical theories. This type of arguments, or sentences, frequently make agents adjust their beliefs, but not just any type of beliefs are revisited through this discovery process. Oftentimes it is those linked to logic. For this presentation, I claim that interpreted logical theories are sometimes hit with new information that makes agents revise them, and this operation can be modeled with an AGM framework in a novel way.

In the literature so far, the AGM tradition has produced different formal representations of belief change. The difference between them is put forward in the logic that shapes the operations. For example, defeasible reasoning is well represented by non-monotonic frameworks. Agents dealing

with inconsistent, but non-trivial, belief sets are every so often matched with paraconsistent operators of belief change. For every model, nevertheless, the logic governing the framework remains fixed throughout.

Recent work from McAllister and Girard (2021) has shown that is possible to present a revision operator based on an AGM model that can envisage what happens when rational agents choose to change the closure relation of their belief sets. They represent the maxims of minimal change and loss of information, non-trivialization, and compatibility among the new belief set and the chosen logic. Their work characterizes what happens to non-logical beliefs once an ideal agent has modified their logic. However, they do not elucidate what happens when that agent revises their logic itself, i.e. what occurs within their web of beliefs, which also comprises logical theories.

My main goal is, then, to clarify that operation. I will introduce an AGM model of revision that challenges an agent's logical and non-logical beliefs, taking into consideration that the information that triggers this adjustment is a paradox. I will present the postulates that govern the revision function for this specific scenario. Among these lines, I acknowledge that such a model is normative since it puts forward the parameters and obligations of a rational agent that revises their logical theories, but is likewise descriptive since it accommodates different classical and non-classical revisionist projects in an anti-exceptionalist manner.

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ROOM 12

(NDPCT)
Symposium: New Directions in Philosophy of Computability Theory

Chair: San Mauro, Luca

Topic: A.1 Mathematical Logic

Abstract: Many philosophers acknowledge the importance of the notion of computability, perhaps even sharing Sieg's opinion [Sie09] that "computability is the most significant and distinctive notion modern logic has introduced". Yet, a lot of theoretical research in computability theory is often off the philosophers' radar to the point that computable structure theory — a prominent area of contemporary research — is almost philosophically untouched. This is in sharp contrast with the fact

that, e.g., philosophy of set theory is well established and philosophy of model theory is rapidly emerging.

The present symposium aims to challenge this lack of interest by gathering formally inclined philosophers and computability theorists with philosophical interests to discuss how their fields interact and how their tools can align.

Some talks will revisit fundamental themes of classical computability theory through novel philosophical lenses. For instance, we will discuss to which extent the notion of computability shall be regarded as part of intensional mathematics [Res15]. Moreover, we will critically examine the view that the theory of Turing degrees abounds with counterpossibles, i.e., counterfactuals with impossible antecedents [Jen18].

Other talks will engage with latest developments in computable structure theory which lack a philosophical interpretation. A couple of talks will unveil connections between computable structures and Shapiro's notations [Sha82], the latter so vividly discussed in the philosophical debate on the Church-Turing Thesis. Another talk will develop an innovative response to a widely debated question in the philosophy of mathematics: i.e., how do we manage to single out the standard model of the natural numbers from nonstandard ones? [HH05] We will also discuss how to broaden the scope of mathematical structuralism, by reconsidering what should count as a structural property [KS18] and defusing the apparent tension between structure and computation.

All in all, the symposium aims to promote further cooperation between computability theorists and philosophers, hopefully leading to a shared agenda of new problems.

Speakers:
1) Paula Quinon: Philosophy of notations
2) Dariusz Kalociński: Connecting computable structure theory and structuralism: a case study of $(\omega,<)$
3) Michał Tomasz Godziszewski: Mathematical structuralism and philosophy of computability: insights from computable model theory
4) Luca San Mauro: Learning the intended model of arithmetic
5) Marta Fiori Carones: Where lies intensionality in computability?
6) Matteo Plebani: Counterpossibles in computability theory: reconsidering the oracle objection
7) Maxim Zubkov: Group representations over locally negative equivalences
8) Tomasz Stefier: Statistical learning and computability

11:00 – 11:30

Paula Quinon (Warsaw University of Technology) - Philosophy of Notation.

Topic: A.1 Mathematical Logic

Abstract: This paper presents one possible development of the reasoning introduced by Stewart Shapiro in "Acceptable Notation" (S82). As I see it, problems in the philosophy of notation, initiated in Shapiro's paper, cover but not exclusively, the following topics:
• acceptable notation
• intended notation (intended model; intended semantics or representation)
• deviant notation/encoding (deviant semantics; unacceptable denotation functions)
• degenerate permutation
• cognitively privileged notation
In my talk, I refer to most of the topics mentioned above, but I deliberately avoid talking about cognitively privileged notations, as this would require a lot of additional introductory material.

First, I relate the ideas in (S82) to a philosophical position called computational structuralism (D02, HH05, QZ07, D13). which correlates two philosophical/mathematical intuitions about the foundations of arithmetic:

• Natural numbers serve to enumerate and compute.

• Natural numbers are amenable to treatment as abstract entities forming a mathematical structure, in the sense of model theory.

These intuitions are confirmed by a formal result: according to Tennenbaum's theorem, if addition or multiplication in a particular model of PA1 are interpreted as a computable function, then the model is a standard model (is omega-ordered). In the structuralist tradition, natural numbers are identified with the elements of an omega-structure. Computational structuralism in the (QZ07) interpretation, proposes an additional postulate: to adequately the omega-order must be computable and models are identified up to a computable isomorphism.

Second, according to a corollary of Tennenbaum's theorem, there exist non-computable omega-models of PA1, the so-called deviant (or degenerate) progressions (or permutations). These permutations, which comprise the concepts of computability and of natural number - already being the target of (S82) - when considered from the perspective of conceptual analysis of theoretical concepts, lead to vicious circles. The straightforward example of such a vicious circle is the following reasoning:

• The Church-Turing Thesis states that Turing Machines formally explicate the intuitive concept of computability.

• The description of Turing Machines requires a description of the notation used for the input and for the output.

• How to characterise such a notation without using the concept of computability?

The vicious circles remain, regardless of the philosophical position in the background (nominalism, realism, etc.).

Third, similar to what (S82) already suggests, the way out of vicious circularity lies outside the purely theoretical framework, I propose to replace conceptual analysis with the Carnapian method of explication. I contrast this method with model-theoretic realism (basic arithmetic concepts are relativized to specific PA1 models (D13)) and develop the idea of how to think of computability, natural number, intended notation, finiteness or quantifiers as - to use an expression popularized by conceptual engineering - conceptual fixed points.

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11:30 – 12:00

Nikolay Bazhenov (Sobolev Institute of Mathematics), Dariusz Kalociński (Institute of Computer Science, Polish Academy of Sciences), Michał Wrocławski (Department of Philosophy, University of Warsaw) - Connecting computable structure theory and structuralism: a case study of (ω, <)

Topic: A.1 Mathematical Logic

Abstract: According to structuralism, mathematics is the general study of structures. This position has been famously advocated, e.g., in [1, 2]. Isomorphic structures are indistinguishable from each other

and are hence considered to be basically “the same structure”. The way in which a structure is presented, is ignored. Such perspective overlooks notions derived from computability theory which strongly emphasises importance of the choice of presentation of a structure.

Computable structure theory is an area of mathematics which offers tools that can be used to overcome this issue. It explores the relationship between computability and countable algebraic structures [3]. To this aim, it introduces some new methods which can be used to describe various aspects of computable models. One of the key topics of this area deals with classifications of structures and relations on these structures, based on the algorithmic properties of their structural invariants [4]. This leads, ideally, either to a structural characterization of a given computational property, or to a theorem saying that no such characterization exists.

In our talk we make some initial observations about the benefits computable structure theory can bring to the structuralist view of mathematics. As a case study, we consider the structure $(\omega, <)$ which has been vividly discussed by structuralists. For instance, an important theorem in computable structure theory [5] establishes a structural characterization (in terms of definability) of the computational notion of intrinsic computability on $(\omega, <)$. Further results [6] in this direction show, for example, that a structural property of a (nontrivial, recursive) function on $(\omega, <)$ (e.g., having a finite range, or being a non-quasi-block function) fixes a unique degree spectrum. In general, the range of possible spectra can be limited based on model-theoretic properties of such functions.

Last but not least, our observations are motivated by Shapiro’s notations, introduced in [7]. They became influential in philosophy of mathematics, and serve as a useful formal tool supporting argumentation on matters such as Church’s thesis, notations’ acceptability, definition of computability and others. However, as we will show, there is a direct parallel between notations and computable structures that has been largely overlooked. In our talk we explore connections between both these areas of investigation.

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12 :00 – 12 :30

Michał Tomasz Godziszewski (University of Warsaw), Luca San Mauro (Vienna University of Technology) - Mathematical structuralism and philosophy of computability - insights from conputable model theory.

Topic: A.1 Mathematical Logic

Abstract: large body of work labeled as *structuralism* by both expanding it philosophically and exploring it mathematically. Second, we do the first steps towards a future \emph{philosophy of computability}.

Structuralism is a view in philosophy of mathematics, according to which mathematics is *the general study of structures* and that it does not matter what are the objects instantiating a given structure. The view can be dated back at least to the 1960s, and has been receiving attention since then - including recent discussions. According to this account mathematics is not concerned with the internal nature or specific ontological characterization of the elements in the structure, but with how the elements are related to each other.

What demands careful explication here, is then the notion of the structural property. On the level of informal intuitions, structural properties are usually characterized in terms of invariance under structural similarity (which is then usually explicated in terms of the isomorphism of mathematical system instantiating a structure) and abstraction from structurally similar (usually: isomorphic) systems.

Or, in a slogan: *Presentations don't matter.*

Our claim is that:

- Computational properties of mathematical systems should be a part of the explication of the notion of structural property;
- Some computational property (most notably, ``being computable'') should count as structural.

We agree with the structuralist interpretation that the elements of a given mathematical system should not be identified with a particular (e.g. set-theoretic) characterization, but we argue that an important part of the notion of structure is constituted by the computational features that can be exhibited by the systems instantiating the structure.

This requires to:

* revise the notion of structure in a way that encompasses morphisms, transformations, maps, actions, i.e., everything that belongs to the \emph{performative} part of mathematics and that cannot be faithfully represented as an object;
* incorporate computability-theoretic properties of mathematical systems into the explication of the notion of mathematical structure and structural property;
* give account of the notion of structural similarity that should replace (or at least, expand) the notion of isomorphism in the structuralist interpretation of mathematics;
* reply to the so-called epistemological access challenge by employing the notion of computation in the structuralist characterization of mathematical discourse and knowledge.

The interpretation we propose has central advantages over what might be called traditional structuralism, especially in giving a fine-grained analysis of structurality and structural similarity and in providing a convincing answer to the epistemological access challenge faced by structuralism (and, noteworthy, other positions in philosophy of mathematics, such as Platonism).

12:30 – 13:00

Leon Horsten (University of Konstanz), Luca San Mauro (Vienna University of Technology), Giorgio Venturi (University of Pisa) - Learning the intended model of arithmetic.

Topic: A.1 Mathematical Logic

Abstract: The problem of how we manage to grasp the standard model of arithmetic, denoted N, has been widely discussed in contemporary philosophy of mathematics. In particular, there's debate over whether the classic Tennenbaum's theorem, which states that no countable nonstandard model of Peano Arithmetic is computable, can account for why knowing basic arithmetic leads one to understand N rather than some nonstandard model [HH05, BS12]. In this work, we borrow recent ideas at the intersection of algorithmic learning theory and computable structure theory [BFSM20] to develop a novel way of framing such a problem.

Specifically, we aim at formalizing the following game, which is inspired by the famous thought experiment that Wittgenstein and later Kripke adopted to illustrate the rule-following paradox:

(*) A teacher T wants to see if a student S has understood N after being taught how to add or multiply natural numbers. Let us denote by M the model of arithmetic that S grasps. At any given stage, T is allowed to ask any atomic question about M and is then required to output a conjecture as to whether M is an isomorphic copy of N. If the teacher eventually stabilize on a correct guess, we say that T validates M (and so wins the game).

We outline a few different ways of formalizing the game we just sketched. We prove that the success (or lack thereof) of determining if the student managed to grasp the intended model depends on the type of algorithmic constraints one chooses to impose. That is:

1. First, we prove that, if M can be an arbitrary isomorphic copy of either N or a nonstandard model of arithmetic, then the teacher has no winning strategy.

2. Secondly, we relax the winning conditions of the game by imposing that, if the student has managed to grasp a copy of the intended model, then such a copy must be sufficiently nice (e.g., fully primitive recursive). This is a fair request, after all one expects that the student have been taught addition and multiplication in some effective way. We prove that, under this assumption, the teacher does have a winning strategy and we discuss the philosophical meaning of this result.

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Symposium continues in the same room, next time slot.

ROOM 13

(COPHITES-ML) From previous time slot, same room.

Symposium Commission on the Philosophy of Technology and Engineering Sciences (CoPhiTES): Philosophy of science for Machine Learning

11:00 – 11:30

Stefan Buijsman (TU Delft) - Machine Learning models as Mathematics: non-causal scientific explanations.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: There has been a recent effort to create frameworks for AI explanations using accounts of explanation from the philosophy of science (Buijsman, 2022; Duran, 2021; Räz, 2022; Watson & Floridi, 2021). These frameworks draw on explanations as given in the natural sciences, looking at causal or unificationist accounts of explanation. However, another angle to examine machine learning models

is to treat them as pieces of mathematics, and look instead at the literature on explanations in mathematics (Lange, 2021; Reutlinger & Saatsi, 2018). I argue that the notion of explanation via constraints can be fruitfully applied to AI models, yielding a new type of explanation that has not been noticed before, but is unlikely to yield explanations at the level of individual outputs. Second, I argue that the non-causal counterfactual account (Jansson & Saatsi, 2019; Woodward, 2018) shows how the current trend of framing AI explainability in terms of causal explanations can be further substantiated even when viewing AI models as causally inert mathematical functions. I argue that this better captures the independence from actual implementation that we observe with AI explainability. However, the non-causal accounts are not uncontested, especially in whether they explain the asymmetry of explanations (Lange, 2021). I aim to show that this asymmetry can be introduced more naturally for the situation where AI outputs are explained, in terms of the process of fitting the resulting function to data and explaining the output in terms of inputs and parameters. While this will not solve the general issue of asymmetry in non-causal explanations, it does help to further clarify how we might think about explanations of and with AI models.

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11:30 – 12:00

Giorgia Pozzi (Delft University of Technology) - Epistemic injustice and the social dimension of disease causation in ML-mediated medical practices.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: One of the merits of the framework of epistemic injustice (Fricker, 2007) is that it motivates the need to consider epistemic subjects as embedded in specific social contexts, as these inevitably affect their epistemic status. Authors that have applied this framework to the field of medicine and healthcare have shown that the social identity of patients has a bearing on crucial healthcare procedures (Carel and Kidd, 2014). For instance, attributing less credibility to patients for epistemically invalid reasons (e.g., their race or gender) can have very damaging practical consequences (e.g., misdiagnoses) above and beyond the fact that their epistemic status is unjustifiably deflated.

What has yet to be considered is how epistemic injustice can occur because the social dimension of disease causation is neglected. We dedicate this contribution to exploring the

connection between causality and epistemic injustice in medicine and healthcare. In doing so, we build upon approaches in the philosophy of science aiming to establish the legitimacy of social causes as real causes (Russo 2022, Kelly and Russo 2017). We bridge these discussions to the debate on epistemic injustice, considering what is taken to be a legitimate source of evidence in medical interactions. If only a hardcore evidence-based approach is taken that does not attribute merit to a patient's testimony and lived experience (which are, notably, crucial ways for a patient to express their social situatedness), particularly diseases that lack a clearly identifiable physiological manifestation (e.g., psycho-somatic diseases) will inevitably remain unconsidered by physicians and testimonial injustices are likely to emerge.

As a context of application in discussing the issue mentioned, we refer to the role machine learning-based systems deployed in medicine and healthcare can play in bringing about forms of epistemic injustice (Pozzi 2023a, 2023b). We expand on these debates showing that epistemic injustice can occur specifically because ML systems contribute to naturalizing social factors, thus reinforcing the epistemic superiority of mechanical causes. Overall, this contribution aims to substantiate further the claim that social causes need to be considered as causes complementary to the importance of biological causes (Russo, 2022) by showing that failing to do so could, among other issues, be connected to instances of epistemic injustice.

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12:00 – 12:30

Andrés Páez (Universidad de los Andes) - Axe the X in XAI: A Plea for Understandable AI

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: In two recent papers, Erasmus et al. (2021, 2022) have defended the idea that the black box problem in machine learning can be solved using any of five different extant accounts of explanation in the philosophy of science literature: the Deductive Nomological, Inductive Statistical, Causal Mechanical, New Mechanist, and Unificationist models. In this paper, I show that the authors' claim that these accounts can be applied to neural networks as they would to any scientific phenomenon is mistaken, and I provide a more general argument as to why any such attempt is misguided. The net result will be that the notion of explainability as it is currently used in the XAI literature bears little resemblance to the traditional concept of scientific explanation. It would be more fruitful to use labels such as "interpretable machine learning" (Watson & Floridi, 2021) or "understandable AI" to avoid the confusion that surrounds the goal and purposes of XAI methods. In the last part of the paper, I argue that understanding is a success concept that is better suited to play the role often attributed to explanation in XAI.

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12:30 – 13:00

Luis Lopez (Leibniz Universität Hannover) - Genuine Understanding or Mere Rationalizations? Approximations and Idealizations in Science and XAI.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: The deployment of deep neural networks (DNNs) in high stakes settings (such as healthcare, hiring and criminal justice) has been criticized since it began. This has been mainly due to the opacity that characterize these models. The field of explainable AI (XAI) has emerged to address this problem and its consequences. The core idea behind XAI is that explaining the decisions made by DNNs (and other black box machine learning models) is necessary for a fair and trustworthy deployment of them. One way to address this issue is through local post hoc XAI methods such as LIME, SHAP, and saliency maps. Several authors, however, have argued that models generated by these methods do not provide a genuine understanding of why a given neural network made a certain decision. Instead, they provide mere rationalizations (or "ersatz understanding") and, therefore, should not be used in high stakes settings (e.g., Rudin, 2019). Fleisher (2022) claims to have condensed these criticisms into an argument he refers to as "the rationalization objection," and challenges one of its premises (a normative premise) by drawing on insights from the literature on idealized scientific models (ISMs). If ISMs can provide a genuine understanding of their targets (despite misrepresenting them) he argues, so do models generated by local post hoc XAI methods. Such a thesis is based on (1) a reframing of the discussions about transparency, interpretability and explainability in XAI in terms of 'understanding,' and (2) some relevant features, centered around idealization, (potentially) shared by ISMs and post hoc XAI models (i.e., simplification, flagging and focus on specific causal patterns). In this contribution, I show that Fleisher's optimism is based on a flawed and incomplete analysis, and offer an alternative account. While both Fleisher and I draw upon insights from the literature on ISMs, our approaches and conclusions differ in key ways. I ground my analysis in an account that: (1) focuses on mathematical functions (instead of on causal patterns); (2) clarifies their role in explanatory understanding of their targets; and (3) emphasizes the differences between approximations and idealizations both in science and XAI. Such an account supports the thesis that although ISMs and current local post hoc XAI models share some notable similarities in the way they can facilitate intelligibility of their targets, the former (at least the ISMs used by Fleisher as examples) offer genuine understanding, while the latter (at least for now) do not. Thus, "the rationalization objection," properly understood, remains valid. Therefore, it is recommended that current local post hoc XAI methods are avoided or used with caution in high stakes settings, especially when inherently interpretable models are available. While a comprehensive and definitive framework for addressing the question of when they can be said to provide a genuine understanding of DNNs' decisions is currently not available, the clarifications provided in this contribution are crucial for the development of such a framework, or so I argue.

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Symposium continues in the same room, next time slot.

ROOM 14

(METSC) From previous time slot, same room.
Symposium: Perspectives on the Metaphysics and Epistemology of Science

11:00 – 11:30
Dalila Serebrinsky (UBA), Bruno Borge (UBA-CONICET) - Disagreement in the Metaphysics of Science.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: Peer disagreement is a widely discussed issue in analytic philosophy. In philosophy of language, debates are mainly devoted to disagreement concerning evaluative matters, with particular attention to disputes about taste, which some authors regard as cases of faultless disagreement. This talk is focussed on factual disagreement (i.e. disagreement about matters of fact) as it is addressed in the context of social epistemology. More precisely, we analyze some disagreements about scientific ontology as cases of disagreement between epistemic peers.

There are two main views regarding peer disagreement in social epistemology: the conciliatory view and the steadfast view. On the one hand, for conciliationists, the only (maximally) rational response when disagreeing with a peer is to change one's original doxastic attitude (i.e. the initial doxastic attitude that one held previous learning of the disagreement). Defenders of the steadfast view, on the other hand, maintain that at least in some cases of peer disagreement it is permissible to maintain one's original doxastic attitude. In other words, sometimes it is rationally admissible to stick to one's guns.

The main aim of this paper is to show how epistemology and the metaphysics of science can join hands for mutual benefit. To begin, we offer a brief review of the debates on the epistemology of peer disagreement. We present the main motivations for the conciliatory and steadfast views and the epistemic principles that underlie them. We argue that a proper account of peer disagreement in the metaphysics of science should consider the role of what we call epistemic perspectives. They are closely related to Chakravartty's (2017) epistemic stances in scientific ontology, and Goldman's (2010) E-systems. We briefly review these three notions, offer an account of relative peer disagreement, and provide a new definition of 'epistemic peer' that takes into account the notion of epistemic perspective. Next, we introduce a distinction between two kinds of peer disagreement and show that one of them is immune to conciliationist arguments. Finally, we consider the debate over the metaphysics of structure as a case study that allows us to draw more fine-grained lessons about the nature of peer disagreement in the metaphysics of science. Additionally, we make some very general remarks on the prospects of a collaborative epistemology that takes into account the limits imposed by some cases of relative peer disagreement.

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11:30 – 12:00

Ivan F. Da Cunha (Federal University of Santa Catarina) - Values between Science and Technology: Otto Neurath against metaphysics in modern architecture.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: As a contribution to reach the aim of the symposium -- the discussion of the limits of the interaction among metaphysics, epistemology and the sciences -- this presentation makes a brief historical reconstruction of the failed participation of Vienna Circle member Otto Neurath in CIAM-IV, the fourth meeting of the International Congress of Modern Architecture in 1933. Neurath's well-known antimetaphysical stance, central to the logical empiricism of the Vienna Circle, conflicted with methodological and epistemological conceptions of CIAM's architects. This becomes clear as we see that Le Corbusier, CIAM's leading architect, grounds his urban planning in a metaphysical conception of science and art. He considers that the aesthetic harmony perceived in certain constructions, associated with the exactness of the calculations, is an indication of the adequacy, or correctness, of the urbanization plans he presents. In contrast, Neurath advances that fallibility and plurality are fundamental features of scientific knowledge, which must always be seen as tentative and uncertain. In this logical-empiricist perspective, the adequacy of technological proposals, such as those of urbanism, cannot be determined or deduced from scientific knowledge, and as a consequence Neurath sees an inalienable political dimension in (social) technology. That is, for scientific knowledge to reach practical applications in society, political decisions must be taken. In this context, Neurath assumes a democratic point of view that makes possible a criticism of the methodology adopted by Le Corbusier and which permeates most of the projects inspired by CIAM: due to the metaphysical foundations adopted, these projects purport to be certain; this assertion of certainty leads to a pretentious authority that may not be compatible with a democratic conception. By taking this tension between Neurath and Le Corbusier as an example, this talk is going to argue that certainty, understood as a feature of traditional metaphysics, can have harmful consequences for the political discussions about the technological application of science. In contrast, this presentation shows that Neurath's logical-empiricist antimetaphysical epistemology offers better conditions for such a discussion to develop, because of Neurath's emphasis on fallibilism and plurality. Thus, this talk raises the question of the relation among epistemology of science, metaphysical outlook, and the values between science and technology. Participants of the symposium will be invited to reflect on the import of metaphysical stances towards the application of science, especially in society.

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12:00 – 12:30

Ignacio Madroñal (Universidad de Buenos Aires, SADAF), Manuel Herrera (Universidad de Buenos Aires) - The Interplay between the Nature of Space-Time and the Ontology of Scientific Laws.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: In the metaphysics of science field, two important questions are (1) what is the nature of the space-time described by current physical theories, on the one hand, and (2) what is the ontological status of scientific laws, on the other hand. In the case (1), we are particularly interested in the debate between substantialists and relationalists as well as in its different ramifications (Sklar, 1974; Earman, 1989; Maudlin, 1988; Brighouse, 1994; Rynasiewicz, 1994; Hoefer, 1996; Dorato, 2000; Rickles, 2008; Esfeld y Lam, 2006; among others) while in the case (2), our focus is whether scientific laws should be understood as regularities without any necessity (Lewis, 1973, 1986), as dispositions (Mumford & Anjum, 2011) or as governing interactions between entities (Armstrong, 1983).

Although both problems have been discussed independently, our physical theories tend to postulate important relationships between them. For instance, laws require that space-time display specific symmetries (Earman, 1989, p. 46). Additionally, having a conception of space-time is necessary in order to discuss about laws, as laws cannot work properly without it. Thus, there seems to be a reciprocal influence between both categories.

Given the aforementioned relationship, we propose to explore the connections between these problems. We consider that it is philosophically valid to investigate the interaction between the different positions on the nature of space-time and the different approaches to scientific laws. Specifically, we argue that our position regarding the nature of space-time tends to have an impact in our potential answers to the issue of laws, and the reverse is also true. Through this exploration, we aim to demonstrate that adopting a particular perspective on one of these questions entails some compromises with some viewpoint of the other question.

In order to do so, we will begin by showing how physicists seek to determine the characteristics of space-time from the laws stipulated in their theories. After exposing how commitments to laws and space-time are linked in scientific practice, we will try to show that this link is often transposed into the metaphysics of science by means of two examples. The first of these reside in the search for parsimony in scientific ontology, and the second is related to attempts to demonstrate that our world is governed by some kind of physical necessity. Both will allow us to conclude, towards the end of our presentation, that the joint treatment of the commitments around laws and space-time is a necessary and fruitful task for future reflections in this area of research.

12:30 – 13:00

Guadalupe Mettini (UBA-CONICET) - Where the Epistemic magic happens. The role of imagination in Scientific Thought Experiments.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: Imagination is the place where thought experiments occur. In a general and provisional way, a thought experiment could be defined as a story that describes a situation that the reader must represent in his imagination and in which she must introduce variations in order to evaluate a hypothesis or theoretical principle. Philosophical analysis of the role of this faculty in scientific

knowledge, recently revitalized and extended, has established that although imagination is extremely important for the formulation of new hypotheses and for the exploration of hypothetical scenarios, it does not play important roles in the context of justification. Something similar occurs with the epistemological analysis of thought experiments and a certain skepticism prevailed among philosophers regarding the functions that thought experiments are capable of performing in the justification of scientific hypotheses.

One of the most heated discussions about thought experiments revolves around whether these devices can perform "epistemic magic" (Norton, 2004: 44), that is, whether some of these experiments have managed to transcend what mere assumption makes possible by providing new knowledge about natural phenomena without the introduction of new empirical data. In this presentation I will argue that thought experiments perform some epistemic magic. Like magic tricks, the illusion can be explained, but this does not mean that when they are executed, some of them aren´t really surprising. Specifically, I propose to clean up and order the perspectives on the role of imagination in thought experiments, link this issue with other recent and important issues such as the functioning of scientific models, scientific idealization, understanding and scientific representation and show that the explanation of the functioning of the imagination in thought experiments can contribute to progress in these discussions. To do all this I will briefly review some perspectives on the role of imagination in scientific reasoning, on how thought experiments work, and on the role of imagination in thought experiments. Finally I will present my interpretation of how these experiments provide new knowledge and couple it with a perspective on the scientific imagination. In this way I will show that experiments can do more than just revise or reorganize our prior knowledge: they can certainly help to disprove hypotheses, they can help to pose a problem, show the explanatory potential of a theory, and occasionally they can provide an apologetic function for a hypothesis, showing an exemplary case of the applicability of a theory.

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Symposium continues in the same room, next time slot.

13:00 - 14:30 LUNCH

14:30 - 15:30 INVITED SPEAKER: ELAINE PIMENTEL

AUDITORIUM 1

INVITED SPEAKER
Elaine Pimentel
(Federal University of Rio Grande do Norte, Brazil, and University College London, UK)

Axioms as rules: How to reason with mathematical theories

Chair: Benedikt Löwe (University of Cambridge)

Topic: A.1 Mathematical Logic

Abstract: One of the advantages of using sequent systems as a framework for logical reasoning is that the resulting calculi are often simple, have good proof theoretical properties (like cut-elimination, consistency, etc) and can be easily implemented, \eg\ using rewriting.

Hence it would be heaven if we could add axioms in mathematical theories to first order logics and reason about them using all the machinery already built for the sequent framework. Indeed, the general problem of extending standard proof-theoretical results obtained for pure logic to certain classes of non-logical axioms has been the focus of attention for quite some time now.

The main obstacle for this agenda is that adding non-logical axioms to systems while still maintaining the good proof theoretical properties is not an easy task. In fact, adding naively axioms to sequent systems often result in non cut-free systems. One way of circumventing this problem is by treating axioms as theories, added to the sequent context. This is already in Gentzen's consistency proof of elementary arithmetic. Now the derivations have only logical axioms as premises, and cut elimination applies.

But we can do better by transforming axioms into inference rules. In this talk, we will propose a systematic way of adding inference rules to sequent systems. The proposal will be based on the notions of focusing and polarities. We will also discuss how our framework escalates to hypersequents and systems of rules, and the application of this to modal logics.

This is a joint work with Dale Miller, Sonia Marin, Marco Volpe, Agata Ciabattoni and Timo Lang.

15:30 - 16:30 INVITED SPEAKER: GIUSEPPE ROSOLINI

AUDITORIUM 1

INVITED SPEAKER
Giuseppe Rosolini (Università di Genova)

Categories for Logic

Chair: Luis Estrada-González, Luis (Universidad Nacional Autónomca de México)

Topic: A.1 Mathematical Logic

Abstract: One of the great achievements in the mathematical work of F.W. Lawvere has been that of redesigning the algebraic perspective on logic by means of categories. In a series of seminal papers

started with [1,2], he presented a radically new approach to the algebra of logic, which has been proved extremely fruitful in the following years. They go under the name of hyperdoctrines.

We shall argue that the power of hyperdoctrines rests on its unifying aspects, and we shall present by examples how the structural perspective offers powerful tools for both foundational studies and applications, with important results in foundations as well as in theoretical computer science and in statistics.

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AUDITORIUM 2

(LTF) From previous time slot, same room.
Symposium: Scientific Evidence and Uncertainty about the Long-Term Future

14:30 – 15:00
Joe Roussos (Institute for Futures Studies) - Our ignorance about the long-term future.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: One of our biggest challenges in reasoning about the long-term future is our inability to predict scientific and technological development over long timelines. This manifests itself as a particular kind of uncertainty, which decision theorists call unawareness or ignorance about the relevant space of possibilities (Steele & Stefánsson, 2021). The pervasiveness of ignorance is a major reason for the methodological development of futures studies away from prediction and towards various exploratory and imaginative methods, such as scenarios, visioning, and backcasting (Gordon, 1992). This apparent limitation is of great importance to the moral project of longtermism (Greaves & MacAskill, 2019), which often appears to presume that probabilistic prediction is possible: prediction of long-term risks, of the efficacy of interventions, and of the development of human society. This is a part of the problem of cluelessness (Greaves, 2016; Lenman, 2000), but one whose severity is obscured by combining it under that heading along with empirical uncertainty. To frame the challenge, I consider a stone-age longtermist, and review some ways in which their predictions for our era would be radically wrong. I argue that we should expect increasing ignorance the further we look into the future, and that this form of uncertainty is particularly resistant to reduction. I argue that ignorance warrants a general downgrading of our confidence in statements about the long-term future and suggest that merely assigning low probabilities to statements about the future is an insufficient way to represent this. I consider some reasons to think we are in a different position and argue that they are insufficient to dispel the concern. I close by noting that this argument implies an asymmetry between actions with significant benefits located nearby in time, and actions whose benefits are all

located distantly in time. We are similarly clueless about the full effect of each, but the former has some epistemically bankable effects.

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15:00 – 15:30

Amanda Askell (Anthropic), Sven Neth (University of California, Berkeley) - Myopia and Discounting.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: From a moral point of view, people do not seem to count less just because they happen to exist in the future. But how should we compare improvements to the far future to improvements we can make in the near term? An agent is *myopic* if their decisions depend more on the near-term consequences of their actions than consequences in the distant future. Agents are myopic to the degree that their actions depend on such near-term consequences.

We begin by outlining what agents which do not discount the future should prioritize relative to those who do discount. In many cases, agents who do not discount the future should act differently. In particular, agents who do not discount the future should assign higher value to preserving their options. Such agents should also assign higher value to learning information about the future.

However, there are also reasons for agents who do not discount the future to act myopically. One such reason is that agents might believe that the causal consequences of their actions will wash out over time. Another reason is that even if the consequences of their actions do not wash out, they might become less and less predictable over time. Many physical systems are chaotic in the sense that their future trajectory is highly sensitive to initial conditions and becomes much harder to predict with the passage of time. In such cases, actions which change the initial conditions of the system can have long-lasting effects of the trajectory, but the trouble is that we often have no good way of predicting what these effects are.

For similar reasons, while the value of learning more about the future is high for agents who do not discount the future, information about the future is often noisy and unreliable. Furthermore, information becomes even more noisy and unreliable for the more distant future. Other things being equal, this consideration decreases the value of learning such information. Agents might also suspect that they will not act rationally in the future, which also decreases the value of information about the future. Even if information could enable agents to identify better options, this doesn't help if there is a substantive probability that agents will not choose these better options (or even choose worse options).

After taking these reasons into account, we believe that agents who do not discount the future will sometimes still act differently from agents who discount. However, the gap between these agents is often smaller than one might suspect. As a result, the practical consequences of not discounting the future are perhaps less revisionary than they might first appear.

15:30 – 16:00

Timothy Williamson (Global Priorities Institute, Faculty of Philosophy, University of Oxford) - Answering Cluelessness.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: The long-term future is inscrutable, and this threatens to undermine many commonsense claims about what we should do (at least, if we care about the total consequences of our acts). This is (one version of) the well-known cluelessness worry (see Greaves 2016 and Mogensen 2021). In this talk, I argue that insofar as the long-term future is inscrutable, this has relatively modest implications for what we should do. In particular, though evidence about the long-term consequences of our acts matters, plausible decision theories designed to handle severe uncertainty yield intuitive verdicts when we face long-term inscrutability.

I consider just how to understand the kind of inscrutability involved in the cluelessness worry. One natural way of doing so is that we have no idea about how to model the relationship between our acts and what ultimately matters, moral value in the long-term future. But I argue that if this is true, then we should accept the Model Parity Thesis: roughly, the claim that each of our acts is compatible with the same probability distributions over total long-term moral value. And if the Model Parity Thesis is true, then many plausible decision theories yield intuitive verdicts. The key idea is that given the Moral Parity Thesis, we are not clueless with respect to the instrumental value of each of our acts. To demonstrate, I show that a class of plausible theories, which includes the well-known Gamma-Maximin and Smooth Ambiguity Aversion models, allows that the near-term consequences of our acts serve as a tie-breaker when we are faced with an inscrutable long-term future. So, on plausible decision theories designed to handle severe uncertainty, inscrutability washes out.

I consider two objections to this argument.

First, the Model Parity Thesis might be false: perhaps not all acts are in the same epistemic boat with regards to long-term consequences. I respond that in situations where the Model Parity Thesis is false, the theories I consider may well yield counterintuitive verdicts. But these are just the situations where we should expect the correct normative theory to yield counterintuitive verdicts. After all, they will be situations in which we have surprising evidence that rules out some acts' being conducive to long-term (dis)value. And there is nothing objectionable about a theory that yields surprising verdicts in light of surprising evidence.

Second, I consider whether unawareness might strengthen the case for cluelessness. (Roughly, we are in a situation of unawareness when we cannot even model or conceptualize some features of a decision situation.) While unawareness does complicate the discussion (in particular, it raises challenges for learning) it does not undermine the basic epistemic and decision-theoretic commitments that the reply to cluelessness here relies on. So, on plausible decision theories designed to handle severe uncertainty, even inscrutability due to unawareness washes out.

References

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Symposium continues in the same room, next time slot.

ROOM 01

(MODEL) From previous time slot, same room.

Symposium: The Many Faces of Scientific Model Building: Methodological and Epistemological Issues

14:30 – 15:00

Andrés A. Ilcic (Universidad Nacional de Córdoba (UNC)), Marisa Velasco (Universidad Nacional de Córdoba (UNC)), Pio Garcia (Universidad Nacional de Cordoba (UNC)) - Is that robust enough? The reliability of computer simulations through a methodological lens.

Topic: B.1 Methodology

Abstract: Computer simulations constitute a particular kind of model-building practices, many times playing a major role in the discovery of new models that shed light on experiments and theories. Epistemological analyses of computer simulations have to engage with the 'reliability issue', that is, how and why a particular simulation study's results might be said to be fit for its intended epistemic goal, while also considering how such results might be extrapolated to other domains.

Philosophers of science have used several strategies to tackle this problem; more prominently among them are comparisons with experimental practices (which might or not involve simulations themselves), the conceptual analysis of how a simulation can be said to explain phenomena, and particular analysis of the methodologies applied to transform a mathematical model into a simulation model (e.g. Durán, 2018; Morrison, 2015; Winsberg, 2010).

While acknowledging some of the insights proposed by those analyses, in this talk we engage with the problem from the perspective of how methodologies are designed, decided upon, applied and readjusted in the context of simulation model-building. To this effect, we propose an outlook that is sensitive to the methodological practices as defined by the scientific and engineering communities that work with simulations, but at the same time engages with the broader epistemic problem that lies behind trusting simulations results as grounded new knowledge about a target system. Our account takes into view the intertwined relationship between the epistemic claims arrived at by means of computer simulations and the particular methodologies used within a scientific or engineering community to solve a complex problem. We suggest that although methodological recommendations are crucial for any trustworthiness that computer simulations results may have, every particular simulation study requires a local instantiation of a global methodology that must be sensitive to—and thus adapted to—the context of applicability and the external elements that give rise to a set of epistemic criteria or values that temporary and dynamically interact with the methodology being applied, and may even trigger its future adjustment.

Thus, a core hypothesis in this paper is that similarly to how a model encodes certain assumptions about its intended target systems, a particular methodology within a scientific community encodes certain epistemological assumptions about what knowledge is and how it is supposed to be sought out and warranted. In other words, assumptions about what constitutes a 'good-enough' model and how it can be further extended in future research. These assumptions are usually cashed out in terms of epistemic values within a community that sanction the many judgment calls that researchers have to perform, even while applying an already established methodology of inquiry.

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15:00 – 15:30

Maximiliano Bozzoli (Facultad de Filosofía y Humanidades, Universidad Nacional de Córdoba (FFyH, UNC) – CONICET.), Xavier Huvelle (Facultad de Filosofía y Humanidades, Universidad Nacional de Córdoba (FFyH, UNC) – CONICET.), Dante Paz (Instituto de Astronomía Teórica y Experimental (IATE, CONICET) – Observatorio Astronómico de Córdoba (UNC).) **- Validation of Observational and Simulation Models in Astronomy.**

Topic: B.1 Methodology

Abstract: Summary. The traditional concept of observation in astronomy has undergone considerable changes in recent decades due, in part, to the way some concrete observational problems are solved through computational modeling of astrophysical phenomena. Moreover, this metamorphosis is also due to the identification, selection, and adjustment of parameters for simulations that are fixed based on new observations. Considering some case studies, in this talk we tackle the issue related to the external validation of observational and simulation models. Some of the most recent validation strategies will be discussed: the "bottom-up" and "top-down" types, as well as those that allow for more direct comparison and contrast between database visualizations that are not only observed but also simulated. Thus, data acquired both via classical observation, and from simulations, will be considered to analyze the different mechanisms of data production and their usage within Astroinformatics (Lovell et al., 2022). Based on this analysis, we offer a characterization of observability related to these modeling practices. The latter is based on certain properties of phenomena, achieved through both ways of acquiring data. More specifically, we take a critical stance toward authors who we regard as understating the distinction between "reproduction" and the "production" of new knowledge (Wilson, 2016, 2017) (Weisberg, 2018) (Jacquart, 2020, 2021). By examining the well-known astronomical "missing satellite problem" (also known as the "dwarf galaxy problem"), and some proposed solutions through computational models, we will explore different links that may hold between observational and simulation models. This might support accepting some predictions of the standard cosmological model (ΛCDM) due to hierarchical clustering and cannibalism between galaxies and their respective dark matter halos. One of these predictions implies the acceptance of the "dark galaxy hypothesis", which holds the existence of galaxies that are composed only of this dark matter. In contrast, we will analyze the case of the existence of a certain type of diffuse galaxies that doesn't have compound halos of this exotic matter (van Dokkum, 2018).

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15:30 – 16:00

Juan Rocha (Universidad Nacional de Córdoba), Francisco Elías Moreno (Universidad Nacional de Córdoba - Facultad de Psicología), Barbara Paez Sueldo (Universidad Nacional de Córdoba) -
Exploring the notion of state variables through machine learning models.

Topic: B.1 Methodology

Abstract: In a recently published paper, scientists from the University of Columbia explained how their use of a new artificial intelligence (AI) program, capable of analyzing frames from video recordings of physical dynamic systems, predicted how the next frames will look like, i.e. how the system would behave. The accuracy of its predictions suggests that the program successfully identifies the relevant set of state variables that are needed to model the target system, even in the cases where the intrinsic dimensions (ID) were unknown (Chen et al, 2022). The analyzed systems range from a double pendulum to a lava lamp, providing vastly different examples of dynamic phenomena. To us the ability of this AI program, to analyze widely different systems and find their ID and provide a set of candidates for their state variables, represents a step forward for what lately has been known as data-driven science.

Nevertheless, the difficulties arise when it comes to clearly determining what is being identified as a state variable and what it represents (Alvarado & Humphreys, 2017). Succinctly, the AI program is capable of discovering the ID of the dynamical system and, at the same time, identifying candidate sets of state variables, without any given physics knowledge. The aforesaid represent the biggest differences with common data-driven scientific methods that function with an input of the state variables relevant to the system (Vervoort et al, 2021). Untangling these concerns could clear the way for the development and further understanding of not only data-driven science, but also of some aspects of the ID of physical phenomena that are beyond our current comprehension.

In this talk, we explore how this new method provides insights on several aspects around the notion of state variables that might be relevant for the current philosophy of scientific practices. To do so, we will explore the differences between how scientists usually understand and make use of state variables and how the program's mathematical language calculates them. In summary, we hope to shed light on how our notion of state variables could be changing through the lens of this machine learning model.

References

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16:00 – 16:30

Maria Silvia Polzella (Universidad Nacional de Córdoba (UNL) centro de investigaciones de la facultad de filosofía y humanidades), Andres Ilcic (Universidad Nacional de Córdoba (UNL) - IIF - SADAF - CONICET), Penélope Lodeyro (Universidad Nacional de Córdoba (UNL) - Centro de Investigaciones de la Facultad de Filosofía y Humanidades) - **Has the protein folding problem been solved with artificial intelligence? An epistemological survey of novel simulation techniques in structural bioinformatics.**

Topic: B.1 Methodology

Abstract: Proteins perform many essential functions for life. The classical dogma states that structure determines function; thus, knowing the structure should enable us to determine its function. Additionally, the thermodynamic hypothesis of protein folding states that the native secondary and tertiary structure are implicit in the amino acid sequence itself. Therefore, the native structure of a protein could, in principle, be determined from its amino acid sequence (Anfinsen et al., 1961).

Research into the three-dimensional structure of proteins has been conducted for over 50 years. Initially, X-ray crystallography was used to address this problem, followed by the addition of cryo-electron microscopy (cryo-EM), nuclear magnetic resonance spectroscopy (NMR), and more recently, cryo-electron tomography (cryo-ET). These techniques, however, require a great deal of time and resources.

As available computational power has increased, various numerical simulation methods have been developed to address this issue. However, these methods have yet to reach an acceptable level of accuracy and efficiency.

After the completion of the Human Genome Project, protein folding gained renewed interest. By 2020, the structures of around 170.000 proteins, nucleic acids, and complex assemblies had been determined (RCSB Protein Data Bank, n.d.), though this is only a small fraction of the billions of known protein sequences.

In recent years, the open availability of high-quality, very large datasets, such as the Protein Data Bank (PDB), combined with the increased computational power obtained by new architectures (e.g. GPUs, parallel computing) and advances in machine learning methods, have changed the way scientific computing is done in many fields. Molecular biology is no exception, as exemplified by the recent success at CASP14 (Critical Assessment of Methods of Protein Structure Prediction Round 14) in 2020 of software based on machine learning techniques, such as DeepMind's AlphaFold (Jumper et al. 2021; Tunyasuvunakool et al 2021).

In this talk, we identify and discuss some epistemological issues arising from recent AI approaches that claim to have cracked the protein folding problem and to extrapolate their protein folded models beyond the theoretical knowledge, experimental evidence, and computer simulation benchmarks available. This is a particularly sensitive topic in drug design, as some proteins can fold into several possible conformations with different effects or functions, some of which can endanger life, such as prions. We find some aspects of the methods employed that arouse reservations and should be taken into account when making knowledge claims obtained by such means.

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Symposium continues in the same room, next time slot.

ROOM 02

(TIVSM)
Symposium: Towards an integrated view of scientific modelling

Chair: Matsuo, Masahiro

Topic: B.1 Methodology

Abstract: These two decades, what a scientific model is and what role the model plays in scientific research has been one of the most crucial topics in philosophy of science. Particularly, most intensively debated is a representational relationship, which is supposed to be held between models and targets. Although several important aspects were revealed in these arguments, such as the roles of an agent as a necessary condition for the representation, there seem to be not a few yet to be cultivated.

Firstly, representational relationship in modelling is still taken as a static one between a model, a target, and an agent. Dynamical aspects of modelling (construction, evaluation) are almost untouched; so is the subjectivity of an agent (just confined to the roles of an agent), even though it appears to be sometimes a driving force in modelling in science. Secondly, the arguments on models in science are in essence considered to be tied closely to those on theories in science. However, efforts to delve into this relationship are limited so far. Thirdly, the arguments on models in science have been almost exclusively focused upon 'scientific' models. There are few, if any, attempts to combine them with 'statistical' models. Theories of models in science, if they are meant to treat models in science as a whole, need to be supplemented with the argument on representation in statistical models as well. And finally, as is always the case in philosophy of science, we are exposed to the risk of arguing dogmatically not caring much about scientific practices. Theories of models are no exception. Though there are a few attempts to interview scientists on models, there seems to be no attempts to have philosophical theories of models examined by scientists.

We treat these issues respectively.

Speakers:
1) Kazutaka Takahashi: Languages and models: beyond the syntax-semantics debate.
2) Mahsahiro Matsuo: How construction and evaluation of scientific models can be incorporated into philosophical model theories.
3) Kenichiro Shimatani: Philosophical issues in ecology do not cover data and statistical modelling but are biased to mathematical models and laws'.
4) Ryota Morimoto: Subjectivity in Scientific Modelling
5) Yuki Ozaki: A Philosophical analysis of the ambiguity problem in a statistical model of human perceptual learning
6) Yusaku Ohkubo: The status of the statistical predictionalism on the philosophy of scientific model representations'.

14:30 – 15:00

Kazutaka Takahashi (Hokkaido University) - Languages and models: beyond the syntax-semantics debate

Topic: B.1 Methodology

Abstract: In my presentation, I will focus on the relationship between scientific theories and models, reviewing historical debates. There are two different approaches to explicate the relation between scientific theories and the (empirical) world. Logical empiricists, such as Carnap (1956), developed the so-called syntactic view, which regards a scientific theory as a set of sentences of (higher order) predicate logic. In their approaches, a sentence including theoretical terms is empirically meaningful, provided that the correspondence rules connecting theoretical terms with observational ones are given. In contrast, van Fraassen (1980) and others offer the semantic view which regards a scientific theory as a class of models (structures) representing the (empirical) world, though there are various kinds of approaches in it depending on how they grasp the notion of representation. Overall, the semantic view emphasizes the importance of the role of language-independent models in scientific practice, while the syntactic view takes theories as linguistic entities.

In either way, it is necessary to offer criteria of equivalence of theory. In the syntactic view, the criteria are provided by a sort of logical equivalence between sets of sentences. In the semantic view, the criteria are given in terms of isomorphism between two structures. Halvorson, who advocates the syntactic view, argues that the semantic view relying on a standard notion of isomorphism doesn't correctly identify theories (Halvorson 2012). And this failure inevitably leads to a language-dependent notion of structure. Referring to Halvorson's argument, Lutz claims that there is no difference between semantic approaches and syntactic approaches with respect to their dependency on languages (Lutz 2017). He concludes that the difference between them is just in whether a set of symbols is considered to be predicate logic or indexes. If this way of argument of Halvorson and Lutz's argument is correct, then autonomy of models gets lost and a model is relegated as a secondary entity.

In order to discuss adequacy of Halvorson and Lutz's argument, I will review the syntax-semantics debate with a clear distinction between object and meta language, and show that even though it is inevitable for either approach to depend on some language, they rely on it in quite a different way. In my view, the two approaches are complementary in that each gives an explication to a different aspect of scientific practice. I think that this analysis of the syntax-semantics debate will provide a good insight into current debates on scientific models as well.

References

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15:00 – 15:30

Masahiro Matsuo (Hokkaido University) - How construction and evaluation of scientific models can be incorporated into philosophical model theories.

Topic: B.1 Methodology

Abstract: Models in science has been one of the crucial themes in philosophy of science since 'Semantic View' of scientific theories, though the focus of the arguments has shifted from the theory of science to the model itself. In the research of the model itself, philosophers' main interest has been in the representational relationship which seems to hold between a model and its target. What seems to be broadly agreed upon recently among several different views is that modelers or model users play an indispensable role in this representational relationship, which is added to the dyadic relationship between a model and a target: with some roles about interpretation and selection played by an agent, instantiation in the similarity views and isomorphic relation in the structure views are supposed to be narrowed down in kind and scope according to the objective pursued in each field of science (Giere 2004, Weisberg 2013). In the fiction view, both the use of imagination and general principles urged by those who made the model plays the core part of representation (Frigg 2023).

Although this kind of involvement of an agent in scientific representation is indeed necessary to cultivate a better understanding of scientific models and to get closer to actual practices of modelling, there seem to be two problems in common in these recent arguments: one is, though they are successful in shedding some light on how models are used in science, they seem to fail in making clear the process of model construction by putting too much emphasis on the roles of an agent without specifying them enough. The second problem seems that the process of how models are evaluated is almost omitted in their theories. After all, recent arguments are still restricted to a static and rather fragmentary relation of representation between a model and a target even after adding the roles of an agent.

In this presentation, after making clear what seems to be overlooked in recent philosophical arguments on scientific models, I will show how this could be supplemented as follows: in order to capture the phase of construction of models precisely, I will spell out the roles of an agent by introducing an intermediate concept of projection in the triadic relation between a model, a target, and an agent. This concept could be linked to other important arguments on models, such as toy models (Reutlinger et al. 2018) and templates (Humphreys 2019); in order to capture the phase of model evaluation properly in a philosophical framework, I will reconsider the epistemological status of representation, particularly the relation between representation and understanding.

References

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15:30 – 16:00

Kenichiro Shimatani (The Institute of Statistical Mathematics) - Philosophical issues in ecology do not cover data and statistical modelling but are biased to mathematical models and laws.

Topic: B.1 Methodology

Abstract: Are there general laws in ecology? (Lawton 1999). Is there a general theory of community ecology? (Roughgarden 2009).

Although these questions are extremely fundamental in sciences, presence/absence of laws and general theories have been one of the most controversial issues in ecology. Since the import of mathematical models from physics, roles of mathematical models in ecology have been intensively discussed between ecologists, and in particular, after Levins (1966) stated the trade-off between generality, realism and precision in models of population biology, scientific philosophers also participated in discussion. Presently, philosophical discussion is commonly seen not only on ecological journals but also on philosophical ones. However, despite rapid progresses in computer technologies, data collection technologies in ecological studies and state-space modelling that links mathematical models and real data through statistics, roles of up-to-date statistical modelling have scarcely been discussed on philosophical journals. Instead, topics have been biased to mathematical ecology, classical hypothesis test (significance), and Bayesianism. When we examine an ecological hypothesis based on spatio-temporal ecological datasets, up-to-date hierarchical statistical modelling is required, then, although inferences begin with data and are basically inductive, statistical parts contain deduction (mathematical theorems and proofs), thus, the inference is a mixture of induction and deduction, and ecologists need to establish some foundation in such inferences with helps of statisticians and philosophers (Shimatani 2022).

In this talk, I first review a few papers that were published on ecological journals and have been repeatedly cited on philosophical journals. Then, I participate in the discussion as a statistical scientist who has been using up-to-date statistical modelling to examine ecological hypotheses based on up-to-date ecological data, and provide perspectives for linkages between mathematical ecology and ecological statistics.

References

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16:00 – 16:30

Ryota Morimoto (Health Sciences University of Hokkaido) - Subjectivity in Scientific Modelling.

Topic: B.1 Methodology

Abstract: The notions of idealization, approximation and abstraction are the main topic of scientific modelling (Frigg 2023). Indeed, these are essential parts of model building. On the other hand, some elements of subjectivity may be included in some scientific models and play an important role in model building. For example, ecologists cannot usually know the true survival and reproductive rates in a wild bird population because it is hard to monitor every pathway of all the birds in the population. In practice, they usually cannot know the exact numbers of dead and alive birds. For their ignorance, ecologists can only get incomplete ecological data, then estimate the survival and reproductive rates form incomplete ecological data through a statistical model. To predict or explain population dynamics, they set these parameters into a mathematical model like a matrix population model. In this ecological case, the element of subjectivity is essential to the mathematical and statistical models.

The role of subjectivity or ignorance in the ecological model sounds negatively to represent the dynamics. Ecologists usually depend on the models to make up for their ignorance. However, an element of subjectivity can play a positive role in other models. The finiteness of measurement resolution cannot reveal the precise state of a micro-system. Willard Gibbs developed the coarse-graining approach method in statistical mechanics and three types of ensemble models, i.e. microcanonical ensemble, canonical ensemble, and grand canonical ensemble, based on the different macroscopic constraints which physicists can know. The size of the coarse-grained cells or the choices of a specific coarse-graining is said to depend on the knowledge of physicists or the measurement setting which is not an objective property of the system. In statistical mechanics, physicists can use the three models depending their knowledge or purposes. So the coarse-graining approach is said to introduce an element of subjectivity into statistical mechanics (Jaynes 1965, Ridderbos 2002). In this presentation, I take a matrix population model of ecology and the three types of ensemble models of statistical mechanics as examples, and analyze the roles of subjectivity in scientific modelling.

Reference
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Symposium continues in the same room, next time slot.

ROOM 03

(STRUCT)
Symposium: The Limits of Mathematical Structuralism: a practice-oriented analysis

Chair: Legris, Javier

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: In recent decades, structuralism has enjoyed great success as a philosophical perspective on mathematics. The roots of this movement lie in the new methods of so-called “modern mathematics” adopted by Dedekind, Hilbert, Emmy Noether and others, but a philosophical position emerged under the pressure of some well-known riddles posed by Benacerraf. One may single out ante rem structuralism (whose main exponent is Shapiro) as a particularly popular elaboration, but there are several other forms of structuralism, including category-theoretic ways of presenting it.

From a broad philosophical standpoint, several different questions emerge concerning how to frame a successful form of structuralism. The “modern” methods being rather abstract and advanced, how do they connect with human basic cognitive abilities? Can structuralism be compatible with a general naturalized theory of knowledge? And also, to what extent does structuralism illuminate less modern practices of mathematics? Given that sophisticated mathematical knowledge has had a long history, and adopted several different forms throughout history, does this constitute an argument against structuralism?

Even concentrating on 20th century math, when one considers differences among branches of mathematics, it may be unclear whether structuralism is a satisfactory perspective. The methodology

may not apply sufficiently generally to be entirely satisfactory: it has been particularly dominant and transformative in areas dominated by algebraic ideas (e.g. algebraic geometry), but not across the board. To give just an example, the field of differential equations has never been transformed in a profound way by the intrusion of structuralist methods.

Does all that mean that there are limitations to the structuralist perspective, as a philosophical approach? Will it be necessary to supplement structuralism with other perspectives, in order to account for mathematics broadly conceived? This is the main topic of our symposium, which will gather some prominent names in the philosophy of mathematics, each talk discussing pros and cons, triumphs and limits of structuralism. The symposium is sponsored by the Association for the Philosophy of Mathematical Practice, whose current president is prof. Jessica Carter (Aarhus, Denmark).

Speakers:
1) Oscar Esquisabel: Leibniz's Science of Forms as structuralist science
2) Jessica Carter & Javier Legris: Peirce's Semiotics and mathematical structuralism
3) Colin McLarty: Structure in differential equations: the fundamental solution
4) Sorin Costreie: Thinking through mathematical structures
5) Bernd Buldt: Why structuralism can only be part of the story
6) Piotr Błaszczyk: Structure of real numbers vs. mathematical and historical facts.

14:30 – 15:00

Oscar M. Esquisabel (CONICET-INEO/CIF-UNLP) - Leibniz's Science of Forms as a structural science and its applications to mathematics.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: In our exposition, we propose that form is Leibniz's term for 'structure', at least in the field of formal sciences like logic and mathematics. From this point of view, the so-called Science of Forms is in fact a structural science, which deals fundamentally with abstract relations and operations. In this way, the Science of Forms entails a structural approach to Mathematics, to the extent that, according to Leibniz`s point of view, Algebra and Geometry, for example, are depending on or, better, are "applications" of abstract relations and operations. For this reason, in his essays on Universal Mathematics and Analysis Situs, Leibniz tries to show the importance of such structural properties and proposes this new science, the science of forms, in order to deal with these in an abstract and general way. In this way, we understand similarity, the property that the Science of Forms deals with, in terms of the identity of structure, that is, the instantiation of the same set of relations and operations. Although we cannot find a systematic treatment of structural properties in Leibniz, there are some hints in his works that allow us to grasp how could have been the object and scope of this science. We approach this issue through Leibniz's applications of formal relations in Algebra and Geometry. Finally, this Leibnizian approach has as a consequence a structural view on the nature of mathematical objects, since they are determined by the abstract relationships that they instantiate. Thus, from a Leibnizian point of view, mathematical entities can be characterized as systems of relationships rather than substantive objects.

15:00 – 15:30

Jessica Carter (Center for Science Studies, Department of Mathematics, Aarhus University), Javier Legris (IIEP/UBA/CONICET) - Peirce's Semiotics and mathematical structuralism.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)
Abstract: In a previous paper, Carter (2020) discusses Charles S. Peirce's philosophy of mathematics in the context of the "prehistory" of mathematical structuralism. There is enough evidence to claim that Peirce shared some ideas with the mathematical structuralists of the late 19th Century. For example, his constant emphasis on the importance of relations in mathematics and his modern approach to the mathematics of his time, including algebra, non-Euclidean geometry, topology and set theory, insisting that mathematics cannot be defined as the 'science of quantities'. On the basis of these, it is fair to say that he belongs to the pre-history of mathematical structuralism which in (Reck & Schiemer) is traced back to H. Grassmann.

In this paper we explore the links between Peirce's theory of signs and mathematical structuralism. We would like to stress that Peirce conceived mathematics in the framework of his theory of signs. For example, Peirce developed an account of mathematical reasoning based on his semiotics: Reasoning is a process that depends on constructing, and observing relations in, an iconic representation, that is referred to as a "diagram". Moreover, Peirce's emphasis on processes in order to elucidate the nature of mathematics must be also considered. Elaborating on Peirce's characterization of mathematical reasoning, requires that one takes all of his theory of signs into account including the semiotic processes involved: the fact that there is an "immediate object" and a "final object" as the designation of the sign. The interpretation triggers a subsequent semiotic process, and so on.

Hence, if there is a chance to place Peirce's philosophy of mathematics within the "prehistory" of mathematical structuralism, his semiotic ideas must be carefully taken into account. We also note that Peirce's emphasis on operations with signs and visualization distinguishes Peirce's view from other positions on mathematical structuralism.

When discussing mathematical structuralism, it is common to distinguish between methodological structuralism and metaphysical structuralism. We make a case that it is possible to talk of a semiotic structuralism in Peirce, with many methodological nuances. Simultaneously we argue that there are serious limits to characterize Peirce as structuralist stricto sensu, that is, as a metaphysical structuralist. Semiotic structuralism is compatible with the idea that "mathematical theories, always or at least in many central cases, are meant to characterize abstract structures (as opposed to more concrete, individual objects)" (Reck & Schiemer 2020a, p. 1). The difference lies in the and nature and origin of these "abstract structures".

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15:30 – 16:00

Colin McLarty (Case Western Reserve University) - Structure in differential equations: the fundamental solution.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Structuralism in philosophy of mathematics usually argues for structural ontology or foundations of arithmetic, while different structuralists differ on how this does or should relate to working mathematics. If we go further to ask about structural working methods, then we must look at the methods of each field. For example much work in differential equations rests on quite concrete

calculations with no evident structuralism (beyond whatever is implicit in arithmetic). But in fact structural working methods are also standard in differential equations from second year calculus on up. The "fundamental solution" of a differential equation (when it exists) gives the central example. Function spaces normally get isomorphism-invariant definitions entirely by the mapping relations between them, albeit not much like the usual philosophical structuralisms. They nearly never get specified set-theoretic reductions. This talk looks at one sophomore textbook, and one state of the art monograph on the Navier-Stokes equation in fluid dynamics, to see this structural method at work.

16:00 – 16:30

Sorin Costreie (Faculty of Philosophy, University of Bucharest) - Thinking through mathematical structures.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Recent studies (Horsten & Starikova (2010)) concerning mathematical cognition show that we may find mathematical cognitive capacities in young infants. This direction of research could be seen as providing new grounds for a revival of Kantian intuitionism. These studies show that we possess an innate intuition of natural integers around the age of six months, before acquiring language and being able to grasp conceptually natural numbers. Furthermore, studies in monkeys show that we share this capacity to deal intuitively with numbers with other non-human primates.

It is worth noting here that what seems to explain human mathematical cognition, especially in its early phases is a cognitive mechanism based on structure recognition (see Longo & Viarouge (2010). The process is exactly at odds with the traditional way in which it was thought that we first grasp the elements and only afterward we combine them in sets according to a selection criterion which most often it is a common trait of the elements See Maddy (2000). Here, on the contrary, we have first the mental grasp of a structure and only after then it is said that we can construct points and lines and numbers.

However, what they still need to explain is why we have these cognitive abilities. The most natural answer to this question, especially since humans share these skills with other non-human species, is that it is an evolutionist adaptation to our environment. However, what they should have still to explain is whether the world really comprises those structures, or they just happened to be useful tools in adapting ourselves (both humans and non-humans) to the same environment; yet this is just one way, and there are many others ways we could have done it. The obvious consequence of the latter point is that in fact, the world does not comprise those mathematical structures which constitute the basis of their theoretical explanation of human cognition, and thus they are only useful adaptive tools, without having any actual correspondence to the real world. But then, if mathematical cognition is not grounded in the real world, how could we substantively talk about intuitions in terms of perception, for ultimately we do not perceive anything, but just projected structures onto the world?

So, summing up, it seems that modern intuitionism based on innate arguments coming from the study of mathematical cognition leads to a form of structuralism: in order to be perceived, the mathematical structure should both be inherited and be in the actual world. My paper is a defense of this position, critically analyzing different counterarguments which may threaten this position.

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Symposium continues in the same room, next time slot.

ROOM 04

(VALOR)
Symposium: Values in Organismal, Environmental and Multi-Species Research in Biology and Biomedicine

Chair: Jukola, Saana

Topic: C.3 Philosophy of the Biological Sciences

Abstract: How we define individuals and the boundaries with their environment(s) affects our social relations, the set of rights and duties we have, and the criteria according to which we are regarded as healthy or sick. This session addresses the role of epistemic and non-epistemic values in research on the relationship between organisms, including individual humans, and their environments in biological and health sciences. Against the background of increasing interest in postgenomic and environmental frameworks in these fields, it aims at explicating current theoretical and practical challenges when it comes to individuating, conceptualizing and methodologically approaching organisms, as well as identifying relevant targets of health interventions and classifying individuals into health-related groups.

The symposium consists of five talks, that span across the contemporary spectrum of organismal, environmental and multi-species research. The first contribution argues that, contrary to how levels of organization are depicted in textbooks, there is no 'organism level' in nature, and discusses some of the epistemic values of the organism concept. The second contribution explores how abstraction features in the conceptualization of organismal environments and which epistemic values guide their construal in scientific practices. Moreover, it analyses how biologists go on about measuring organismal environments and challenges traditional accounts stemming from the philosophy of measurement. The third talk discusses how the environment is conceptualized in human microbiome ecology, as external to the host or as co-constructed by the host's actions. The methodological and ethical challenges of each of these two epistemic frameworks are identified. This ranges from issues about data sampling and storing protocols to suitable ethical guidelines that strengthen indigenous rights and data ownership. The fourth contribution argues that racial categories lack the epistemic means to partition populations, environments, and microbes in relevant ways in microbiome research. Instead, the author suggests analyzing the value-systems underlying scientific research and categories used in this field. By looking at studies done in South Africa and Mexico, the paper shows that by selecting different (non-)epistemic 'glasses' researchers can evaluate how different criteria frame different populations. The final talk of the symposium analyses the epistemic landscape of alcohol research and argues that tensions in science-based alcohol policy arise because medicine, social science and public health differ in how they conceptualize problematic alcohol use – as caused by factors intrinsic or extrinsic to the body. In the medical framework an

alcohol problem is conceptualized as an (innate) condition of an individual, while in social science and public health drinking behavior that is labelled as problematic in a particular environment constitutes an alcohol problem.

Speakers:
1) Guido Prieto: Distrust the textbook: There is no organism level of organization.
2) Alejandro Fábregas-Tejeda: Measuring and conceptualizing organismal environments: Ontological and epistemological issues
3) Jan Baedke: One host, 100 trillion microbes – what's their environment? Methodological and ethical challenges for human microbiome ecology.
4) Abigail Nieves Delgado: Race, racism and values in human microbiome research.
5) Saana Jukola: An analysis of conceptualizations in alcohol research

14:30 – 15:00

Guido I. Prieto (Department of Philosophy I, Ruhr University Bochum) - Distrust the textbook: There is no organism level of organization.

Topic: C.3 Philosophy of the Biological Sciences

Abstract: Organisms are usually depicted as belonging to a specific level of organization, especially in textbooks, where an 'organism level' is invariably found somewhere between the cell and ecosystem levels. For instance, in the widely-used Campbell Biology (Urry et al., 2021), the organism level is intercalated between the molecule–organelle–cell–tissue–organ and the population–community–ecosystem–biosphere sequences of levels (see also Brooks, 2021). Moreover, the organism level is the most frequently named level of organization in biology and science education journals (Schneeweiß & Gropengießer, 2019). In this talk, I will argue that, despite its ubiquity in levels of organization depictions, there is no 'organism level'. This is because, on the one hand, there is no idiosyncratic organismal scale range. Organisms span ~20 orders of magnitude (Heim et al., 2017), and thus they overlap extensively in size with entities at other levels. Put simply, some cells are larger than small multicellular organisms, and many multicellular organisms are larger than entire communities and ecosystems. On the other hand, organisms are distributed across all levels from 'cell' to 'organ system'. To begin with, there are unicellular as well as multicellular organisms, so the 'cell level' actually comprises both tissue-forming cells and unicellular organisms. This rather trivial observation can be replied to simply by renaming the 'organism level' as 'multicellular organism level'. However, at closer examination, the category 'multicellular organism' encompasses organisms displaying varying degrees of organizational complexity that roughly correspond to levels of organization such as tissue (e.g., diploblastic animals), organ (e.g., plants), and organ system (e.g., 'higher' animals). Additionally, multicellular organisms often start their life cycle as single cells and sequentially develop tissues, organs, and organ systems. Therefore, these organisms 'jump' across levels of organization throughout ontogeny, and their belonging to a given level of organization is a function of time. Finally, I will discuss how these considerations challenge traditional conceptualizations of (i) the epistemic value of the organism concept, and (ii) the nature and educational value of the levels of organization notion.

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15:00 – 15:30

Alejandro Fábregas-Tejeda (Ruhr University Bochum) - Measuring and Conceptualizing Organismal Environments: Ontological and Epistemological Issues.

Topic: C.3 Philosophy of the Biological Sciences

Abstract: In recent years, biologists from manifold scientific fields have shown that organism-environment reciprocal interactions are widespread and causally significant, and thus need to be more seriously underscored in their theories, models and explanations (Baedke et al., Biol Philos 36(5):48, 2021). In this endeavor, they face two cognate methodological challenges: (i) how to account for the effects of environmental factors in the developmental trajectories of individual organisms (e.g., identifying measurement targets, delimiting plastic traits, selecting adequate proxies); and (ii) how to grasp and measure the complex settings in which ontogenies are situated, including the environmental modifications brought about by organismal action. This paper delves into the second challenge as the questions of what organismal environments are and how scientists try to apprehend them have not been sufficiently addressed by philosophers of biology and philosophers of measurement. My motivation is to evince that a number of underexplored ontological and epistemological issues arise whenever biologists delve into the environing contexts of organisms.

I first contend that we need to spell out what kind of relatum an organismal environment is taken to be and which epistemic values guide its construal in scientific practices. I maintain that, metaphysically speaking, an environment is a relational indexical class of multifarious biotic and abiotic components without common ontological ground that are extrinsically linked through their (actual or potential) causal effects on a token organism. An epistemic corollary is that, if we grasp the multiplicity of ontologically very heterogeneous factors that are included as components of a single entity (i.e., the environment of an organism), we face the realization that we are dealing with an abstraction, a higher-order composite entity formed through a process of 'aggregation' sensu Gallegos Ordorica (Stud Hist Philos Sci A 56:161–167, 2015). Vis-à-vis environments, most biologists vouch for the epistemic values of simplicity and fruitfulness, and accordingly conceptualize the plurality of surrounding conditions by working with two manageable singular terms in juxtaposition, namely, organism-environment.

Second, I explore how biologists measure organismal environments in ecology and contemporary phenotypic plasticity research. I argue that traditional accounts in the epistemology of measurement cannot fully provide a framework to capture how this is performed in biological practice. According to philosophers of measurement, two dimensions need to be assessed: (a) a concrete process involving interactions between an object of interest, its environment, and an instrument; and (b) a representation of said process (Tal, Philos Compass 8(12):1159–1173, 2013). However, for the case in point, environments amount to the abstract objects of epistemic interest that will be probed by instruments across different spatio-temporal scales, and these are defined with respect to the relations they hold with particular organisms. In a measurement procedure, should we

construe the organism, paradoxically, as the environment of its environment? I provide an answer to this puzzling framing, what I dub “the two-environment problem”, which emerges from traditional accounts in the philosophy of measurement. I further discuss how scrutinizing organismal environments impacts considerations on coordination in measurement.

15:30 – 16:00

Jan Baedke (Ruhr University Bochum) - One host, 100 trillion microbes – what’s their environment? Methodological and ethical challenges for human microbiome ecology.

Topic: C.3 Philosophy of the Biological Sciences

Abstract: In recent years the microbiome has become a target of various research projects in the biological and biomedical sciences. This development has been driven by the finding that in many species symbiotic microbes can play crucial roles by providing selectable variation and biasing the evolution of their host, and by transmitting information across generations. In particular, studies in animals and humans showed that microbes can be central agents that affect normal development and play various roles in health and disease. The human microbiome, consisting of around 100 trillion bacteria, archaea, fungi, protists, and viruses (on the skin, in the placenta, uterus, seminal fluid, lung, saliva, and gastrointestinal tract), has been associated with autoimmune diseases, respiratory diseases, and metabolic disorders, like diabetes mellitus, metabolic syndrome, and obesity. Such findings suggest that biological normality is not intrinsic to organisms but arises through complex relations with other organisms and with various factors of the material and social environment (nutrition habits, lifestyles, economic situation, etc.) of the host-microbiota collectives.

By focusing on case studies of human microbiome ecology on indigenous populations in Latin America, I discuss methodological and ethical challenges of this research when collecting, processing, and storing data from microbial and socio-cultural environments. This includes (i) identifying the epistemic and non-epistemic values that underly conceptualizations of environments as external (i.e. environments are in some way causally decoupled from the actions of the host) or constructed (i.e. host and its surroundings are reciprocally interrelated). Based on each conceptual framework, I show that (ii) researchers adopt different microbes sampling protocols, interact with target populations differently, and store data differently. Finally, (iii) a number of ethical problems are discussed. This includes, for example, to avoid objectifying indigenous bodies from which ‘healthy microbes’ are collected (especially in externalist approaches that decouple microbes from hosts, to whom researchers then have no moral obligations); or to prevent intensive long-time sampling from multiple body sides to be invasive and culturally inappropriate (especially in views of complex co-constructed and permanently changing environments). More generally, obstacles to developing clearer ethical guidelines are discussed that include strengthening indigenous rights and data ownership.

Symposium continues in the same room, next time slot.

ROOM 06

14:30 – 15:00

Laura García Díaz (Universidad de La Laguna), Natividad Garrido Rodríguez (Universidad de La laguna) - The epistemological and pedagogical value of audiovisual fiction in narrative medicine.

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: Fiction is an ideal study tool for philosophy and other knowledge, and is particularly interesting for exploring issues in narrative medicine. Narrative medicine is an alternative model of health practice that is concerned with improving medical skills by giving great importance to the personal narrative of illness and the patient's point of view. This model finds in fiction a great epistemological and pedagogical value as it allows us to analyse and improve medical practice. In this paper we propose to follow this line of research and show that audiovisual fiction is an ideal medium for reflecting the experiences of medicine, both from the point of view of health professionals and, especially, from the patient's point of view. To this end, we will focus on analysing some examples of fictions that reflect fundamental issues for bioethics, medicine and clinical practice. It is nothing new for cinema to represent themes such as illness or death by focusing on the patient's perspective, for example, in works such as La pudeur o l'impudeur, Philadelphia and Le Scaphandre et le Papillon. However, this is something new in television fiction. Until recently, series related to illness or medicine focused on narrating the experiences of healthcare workers, an example of this can be found in series such as Grey's Anatomy, Dr. House, Emergency Room or St. Elsewhere. In recent years, and as a result of the new video-on-demand platforms, there has been an increase in the number of series starring characters who suffer from illness, relate to medicine and deal with death and existential anguish, an example of which can be found in The Big C, It's a Sin or Looking. In short, this paper aims to explore audiovisual fiction as a medium particularly capable of reflecting the issues with which narrative medicine is concerned.

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15:00 – 15:30

Chris Zajner (UWO) - The Impact of Public Health and Medical Theory on the Societal Response to the 1889 Russian Flu.

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: The 1889 Russian (also called ‘Asiatic’) Flu epidemic can be described as one of the first modern pandemics. It has traditionally been suggested to have been a precursor to the 1918 Spanish flu, but has recently even been suggested be an example of a pandemic coronavirus rather than an influenza virus (Berche, 2022; Brüssow & Brüssow, 2021). Nonetheless, prior to this period infectious diseases were limited in extent due relatively circumscribed human mobility. The development of

extensive railroad networks during and prior to this period facilitated the previously unprecedented movement of goods and people around the world. It additionally propagated the process of shrinking the barriers between the countryside and major metropolises. While the current COVID-19 pandemic has resulted in lockdown measures nearly worldwide and has prompted widespread social, economic, and cultural disruptions, the Russian Flu was not accompanied by such drastic changes. In this article I argue that the reasons for the blunted historical consciousness of this epidemic was a result of the limited societal means to act upon it through technology or rigorous public health measures. The lack of effective public health measures, and the absence of cases from the public eye relegated the disease to a merely statistical existence in the press and public health bureaus. While the world was being brought ever closer together with the development of steam power and inter- as well as intra-continental movement, influenza was able to traverse the globe as it had never done before. However, the disease did not present itself as a practicably controllable disease at this time. Scientific understanding of infectious agents was in its infancy, and the conceptualization of 'influenza' as a controllable disease would await a more sophisticated appreciation of its etiology. Indeed, the acceptance of Influenza as an infectious agent was fundamental to the later approaches of controlling it – and as I argue – in conceptualizing it as a distinct illness. Prior to such conceptual and technological developments the 'Russia Flu' could not impact the public consciousness to a significant degree. As a result, the 1889 Russian pandemic, though significant in terms of its mortality, and economic impact, was quickly forgotten by the general public, and remains a lost lesson from history.

15:30 – 16:00

Mathias Frisch (Leibniz Unversity Hannover) - Uses and Misuses of Models in Pandemic Policy Advice.

Topic: C.4 Philosophy of the Biomedical and Health Sciences

Abstract: The Covid-19 pandemic required policy makers to make decisions under deep scientific uncertainty concerning the infectiousness or the fatality of the Sar-Cov-2 virus. This was especially true early on in the pandemic, when scientific evidence concerning the virus was only slowly beginning to emerge. One tool that epidemiologists used to advise policy-makers in decision-making processes is provided by epidemiological models. While a number of models, such as the CovidSim model developed at the Imperial College, London, appear to have been quite influential on policy-making, the use of epidemiological models in public policy debates has also been heavily be criticized by some medical researchers and philosophers, who argued that modeling results were too uncertain to be able to legitimately and responsibly inform policy decisions.

In this talk I will examine the epistemic status of models and possible roles they can play in scientific policy advice in situations characterized by missing data and poorly constrained parameter-values. My main focus will be on uncertain predictions in situations in which, as in the case of Covid-19, an extreme and fast developing threat requires urgent and immediate action. But I will also contrast this type of case with that of the climate crisis, where more varied and robust evidence is available and time frames for urgent action are somewhat longer.

I will argue that the results even of highly uncertain models can in situations of extreme urgency legitimately inform scientific policy advice. I will do so by distinguishing different roles models can play, only one of which is delivering accurate predictions. Some of the criticism of modeling efforts, I will argue, presuppose both an overly narrow conception of possible uses of models and of what form an adequate decision framework ought to take.

But I will also argue that criticisms of epidemiological modeling draw attention to pitfalls and possible misuses for models in policy advice. Scientific experts giving policy advice are confronted with two apparent dilemmas: first, the tension between scientific prudence calling for robust results

before making actionable predictions, on the one hand, and policy-makers' need to make scientifically informed and far-reaching decisions in response to an immediate threat, on the other; and second, the tension between the demand on scientific integrity to report uncertainties honestly and openly, on the one hand, and the need to provide scientific policy guidance that is neither paralyzing nor is too demanding for non-experts, on the other. One upshot of my discussion will be that scientific experts have to engage in difficult context-sensitive value-judgments in determining how best to translate the outcome of a (class of) models into policy advice.

ROOM 07

(SYMPISPC) From previous time slot, same room.
Symposium: Symposium the International Society for the Philosophy of Chemistry

14:30 – 15:00
Llored Jean-Pierre (Associate professor in philosophy. CentraleSupélec engineering school) - On the context-dependency of chemicals and its philosophical consequences.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Chemistry as a science is the exploration of possible combinations and reactions between chemicals. Chemical bodies cannot be studied exhaustively by being considered in isolation from each other; their properties constitutively depend on what surrounds and acts upon them. What can we learn as philosophers from the context-dependency of chemicals?

To answer this question, I will first highlight: (1) the way chemical reactions and bodies are co-defined within chemical practices, and (2) the constitutive role of the modes of intervention and the surroundings in the definition, always open and provisional, of chemical bodies. I will then insist on the epistemic limitations of chemistry and I will point out how methodological pluralism proposed by chemists is a tool for addressing this epistemic situation. Thirdly, I will emphasize that, if chemical discourses refer to active bodies and simultaneous variations of factors to describe and explain each particular action upon substances, the application of the ceteris paribus clause is not illusory in chemistry, but implies that we adapt our understanding of that which is 'stabilized' within such practices of measurement. Following this line of reasoning, I will show how this refinement of the meaning of the ceteris paribus clause in chemistry is of interest to understand how consistencies and inconsistencies are integrated into open-ended sets of practices of stabilization, and how these sets of practices make it possible for a relational type of consistency to emerge in analytical chemistry. Last but not least, I will point ou how quantum chemists have developed whole-parts strategies to perform calculations in order to address the context-dependency of chemicals. This last part will enable me: (1) to assess the extent to which the holism-reductionism dichotomy is relevant when coping with the specific situation of chemistry; and (2) to highlight the need for the development of a non-classical mereology, that is a non-extensional one, that can capture the nature of the relationships between chemical wholes and their parts in specific kinds of surroundings.

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15:00 – 15:30

Pieter Thyssen (Université Catholique de Louvain) - Natural Kind Pluralism.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Paradigm cases of natural kinds are few and growing fewer. Yet, the notion of chemical elements is still widely held to capture ontological reality by “carving nature at its joints”. Following Putnam’s and Kripke’s essentialist theory, the elements are typically individuated on the basis of their atomic number.

But despite their paradigmatic status, philosophers of chemistry have increasingly questioned the element’s kindhood, due mostly to the notion of isotopy. While the isotopes of a particular element share the same nuclear charge, they often exhibit kinetic and thermodynamic differences. VandeWall [1] thus argues that “it remains unclear whether different isotopes of the ‘same element’ belong to the same natural kind.” And Woody [2] wonders: “which are the natural kinds, elements, or their isotopes, or both, and why?”

Inspired by Scerri [3], I first draw on the distinction between the elements as basic and simple substances to support the essentialist doctrine. Contrary to Scerri, I do so with a view to defending microstructural essentialism against the anti-microstructuralist camp that focuses on macroscopic essences to individuate natural kinds.

I then evaluate two commonly raised objections against treating the isotopes as chemically distinct:

1. The isotope effects are most pronounced for hydrogen, and diminish with increasing atomic weight. Hence, for most elements the isotope variations remain marginal. This begs the question as to where one should draw the line. At what point does a marginal difference become significant? Put differently, how much similarity is required to treat the different isotopes as chemically identical?

2. The isotope effects are due to mass differences between isotopes, but mass is a physical property. Hence, although isotopes may be physically distinct, they are chemically identical. This begs the question whether the physical/chemical distinction has any ontological import, and what role it should play in the individuation of substances?

I argue that most philosophers of chemistry have fallen into the trap of natural kind monism, and defend natural kind pluralism. According to this view, there is no unique way of carving nature at its joints. The world can be categorised in many different, pluralistic, cross-cutting ways, with each

taxonomy being equally natural and legitimate. Although this resonates with Dupré's promiscuous realism, I apply it within a weakened essentialist framework by relating it to Lombardi's ontological pluralism [4].

The idea, in short, is that natural kinds are level-specific. A kind may not be natural simpliciter, but only with respect to a disciplinary matrix. The element kinds can be obtained via a coarse-graining of the isotope kinds by neglecting the neutron number. As such, the isotopes can be considered subkinds of the elements, in line with Khalidi's [5] hierarchy thesis regarding natural kinds.

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15:30 – 16:00

Juan Camilo Martinez Gonzalez (CONICET- UBA), Hernan Accorinti (CONICET - UBA) **- Magnitudes without units: quantifying electronegativity in quantum chemistry.**

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: One of the most relevant questions for quantum chemistry is: what are electrons doing in molecules? To answer it, chemistry has been busy postulating a growing number of models of different degrees of specialization that allow chemists to infer physicochemical information from electron distribution. In addition, those models enable the design of chemical structures and reaction mechanisms that frame chemical reactivity in terms of structural variations. One of the simplest but most useful ways to approach the behavior of electrons in specific bonds is electronegativity.

Electronegativity has a long history in chemistry (Jensen 1996, 2003), but it was firmly established thanks to G. N. Lewis (1923) and his theory of chemical bonds. However, the modern definition is generally attributed to Linus Pauling as "numbers representing their [elements'] power of attraction for electrons in a covalent bond […]"(Pauling, 1950, p. 236). Although the concept has remained stable, with the development of quantum chemistry, multiple models have tried to propose new scales of electronegativity giving rise to different ways of measuring it. Ranging from the empirical to theoretical determinations, the interplay between what is measured, what counts as measurement and what quantification means has been tested: all electronegativity models propose a different measurement domain resulting in different units for the same quantity, regarding this chemical literature and textbooks has preferred to remain silent on the issue and electronegativity is presented dimensionless.

Electronegativity provides a case study to delve into the function of models in measurement and the case of multiple models that, although empirically equivalent, describe the target system in different ways. It is my objective to analyze the models of Pauling (1932) and Mulliken (1934) around the debate of measurement, quantification, and the role of models in quantum chemistry.

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16:00 – 16:30

Martín Sebastián Pérgola (CEFIEC Institute, Faculty of Exact and Natural Sciences, University of Buenos Aires), Jesus Alberto Jaimes-Arriaga (CONICET-University of Buenos Aires) - Quantum Theory of Atoms in Molecules as a case of two-step emergence between quantum mechanics and molecular chemistry.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: The relationship between chemistry and physics is one of the most discussed topics in the foundations and philosophy of chemistry. In particular, the question is how the molecular level arises from the quantum world. Quantum chemistry plays a central role in this discussion since it intends to supply a quantum description of chemical systems.

In this context, understanding the properties of atoms and functional groups in molecules during chemical transformations is essential to chemistry. However, by challenging the individuality and the separate existence of physical systems (see Martínez González et al. 2019), quantum mechanics offers no friendly conceptual framework for a classical notion such as that of chemical atom, conceived as a component of a molecule. QTAIM, a quantum-chemical theory, is proposed as a solution to this problem inasmuch as it intends to offer a purely quantum characterization of the atoms that make-up a molecule: "QTAIM enables one to extract in a rigorous manner the essential chemistry from a complex quantum mechanical calculation" (Bader and Matta 2013: 273). Against this background, our interest in this work is essentially ontological: We present an attempt to understand the role played by QTAIM in the articulation of the domains referred to by molecular chemistry and quantum mechanics.

QTAIM was developed by the late Richard F. W. Bader who hold a strong reductionist stance advocating to replace all the classical chemical concepts by their quantum counterparts (Bader 2011). According to the author, QTAIM supplies a theoretical framework to make such a task since the QTAIM concepts of topological atom and bond path can replace the classical chemical notions of atom and bond. Thus, by pointing out the limitations of Bader's strong reductionism, and the ontological independence of much of chemistry's own concepts, an emergentist stance is adopted here according to which the domain of chemical entities at the molecular level emerges from the quantum basal realm. In particular, we argue that the emergence link between the two ontic domains must be analyzed in two conceptual steps. First, an intra-domain emergence where electron density, a central magnitude of QTAIM, emerges as a coarse-grained quantity from the wave function. Second, an inter-domain emergence that involves an analogical link between the chemical concepts of atom and bond, with those of topological atom and bond path. Hence, QTAIM plays a relevant intermediate role in this two-step link and the elucidation of this intermediate role will supply new conceptual tools to analyze the import and scope of QTAIM.

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ROOM 08

(KUHN1) From previous time slot, same room.
Symposium: Incommensurability, World Change and Metaphysics in Scientific Dynamics

14:00 – 14:30
Carlos Garzón (Universidad de Antioquia) - Epistemic diversity as methodological incommensurability.

Topic: B.3 Empirical and Experimental Philosophy of Science

Abstract: The thesis of epistemic diversity consists in the idea that there are different epistemic systems. An epistemic system refers to a complex of epistemic norms, social imaginaries, habits of cognition and, in general, to a set of conditions that a group of knowers adopts for the production, evaluation and legitimization of knowledge (Dotson, 2014). At first sight, "epistemic system" seems to coincide with "paradigm". However, the notion of paradigm, as Kuhn characterized it in The Structure of Scientific Revolutions (1970), entails ontological and epistemological commitments that result in the possibility of semantic incommensurability. According to the latter, two rival theories are incommensurable when it is impossible to find a common language that allows inter-theoretical translation between the theories in dispute. This type of incommensurability manifests itself in translation failures and communication problems between rival theories. The talk will argue that the notion of epistemic system relevant to the characterization of epistemic diversity does not imply such commitments. However, it will be shown that it does imply methodological incommensurability between different theories. This type of incommensurability is that between different epistemic systems in relation to epistemic values, criteria of legitimacy, relevance, and evaluation of theories. Traditionally, three possible scenarios have been analyzed (Rosa-Pérez, 2000): 1. Methodological incommensurability occurs when two epistemic systems share the same concepts at the level of epistemic values (e.g., precision, simplicity, elegance, predictive fecundity, explanatory fecundity, empirical adequacy), but assign different weights to these values in the evaluation of theories. 2. Methodological incommensurability occurs when there is agreement on the weight assigned to epistemic values, but there is no agreement on the application of that value in a specific explanatory instance. 3. Methodological incommensurability occurs when epistemic systems differ in the list of legitimate problems and solutions according to epistemic values.

In the talk two other possible scenarios (not necessarily incompatible with the previous ones) will be exposed: 4. There is methodological incommensurability when an epistemic system declares the insufficiency of the epistemic values accepted by a rival epistemic system. 5. There is methodological incommensurability when an epistemic system declares the inadequacy of the epistemic values accepted by a rival epistemic system. It will be explained what these two types of

methodological incommensurability consist of with the purpose of extending the characterization of epistemic diversity.

15:00 – 15:30

Paula Atencia (UCM) - Thomas Kuhn: A promiscuous realist?

Topic: B.3 Empirical and Experimental Philosophy of Science

Abstract: In his writings of the 1970s Thomas Kuhn delves into the semantic components of his incommensurability thesis so he can better illustrate the communication problems that occur during scientific revolutions between advocates of competing paradigms. This exploration takes him to examine elements concerning the meaning and reference of natural kind terms, and his remarks on the subject agree with the thesis that natural kind terms may have a plurality of extensions, that is, natural kind terms may have different extensions depending on the taxonomy or conceptual framework that scientists employ (see Fernández Moreno & Atencia Conde-Pumpido 2021). In this vein, incommensurable conceptual frameworks make use of contrasting criteria to classify a given set of individuals, so a particular object may belong to a different category or (natural) kind depending on the framework in which it appears, and similarly the same category or kind may include different objects. This affects the terms that are used to refer to these categories, whose extension varies from one framework to another. Thus, Kuhn argues that many natural kind terms have been redubbed during revolutionary periods due to the modification of the criteria of membership into its extension, which entails that the reference of natural kind terms is not fixed at once in an initial act of dubbing, but it is subject to redubbing during scientific revolutions.

It can be argued that this view contrasts with scientific realism, a philosophical position that accepts the metaphysical view that "most of the objects that populate the world exist independently of our thought and have their natures independently of how, if at all, we conceive them" (Lowe 2008: 9). More particularly, it contrasts with an interrelated thesis that is generally assumed to be part of this metaphysical realism, as it has been pointed out by some authors (see e.g. Chakravartty 2011, Kitcher 2012), that states that independent reality is independently structured, so it comes pre-divided into privileged kinds of objects, and hence there is only one correct way to organize these objects into kinds; or, put differently, that "the world has a definite and mind-independent natural kind structure" (Chakravartty 2011: 160) that should be mirrored by the taxonomies employed by scientists, so they carve nature at its joints.

Kuhn´s view seems to suggest just the opposite, namely that there are many equally legitimate ways of dividing the world into kinds, none of which is more correct than the others. And this is precisely the core affirmation of "promiscuous realism", a doctrine defended by John Dupré, who insists that this taxonomical pluralism is compatible with realism.

In this talk I intend to examine whether Kuhn´s conception on natural kinds can be interpreted from the perspective of promiscuous realism, and elucidate to what extent promiscuity about natural kinds is compatible with realism. If it is possible to attribute Kuhn a promiscuous realist position while showing that this doctrine is compatible with realism, then we could claim that Kuhn´s view on natural kinds and incommensurability does not necessarily lead to antirrealism.

15:30 – 16:00

Alex Levine (University of South Florida) - Kuhn on Translation.

Topic: B.3 Empirical and Experimental Philosophy of Science

Abstract: I offer a reading of a metaphor developed by Kuhn in the late 1960s and 1970s, most famously articulated in the "Postscript" to the second edition of Structure: to work through a revolutionary rupture, scientists on either side of the divide recognize each other as belonging to different language communities, and work to become translators. On my reading, not only has this metaphor been misunderstood, but its potential significance both for a Kuhnian view of scientific change, and for the account of scientific communication that comes with it, has been neglected. The process of becoming a translator poses challenges to the scientist commensurate with the duty of the translator not to transfer meaning, but to create it.

16:00 – 16:30

Hernán Miguel (Universidad de Buenos Aires), Miguel Fuentes (CONICET) - Complexity Measures and the restore of scientific dynamics rationality.

Topic: B.3 Empirical and Experimental Philosophy of Science

Abstract: One of the most salient features of scientific practice concerns the criteria considered in a revolutionary change. The conception of the dynamics of scientific knowledge could appear more rational, irrational, or a-rational, depending on how these criteria are considered, which could be approached at two different levels. The level of scientific practice and the level of the discourse used to reconstruct and conceptualize these dynamics from a historical or philosophical point of view.

In this paper, we will discuss how measures of complexity shown by theories can be taken to obtain a new criterion for choosing between rival theories. In doing so, we can account for that choice as a rational behavior of the scientific community, even when the theories involved may have different terms or the same ones with different meanings.

Then, if this is possible, we can recover some archimedean points in the discussion of theory change and make room for a criterion shared by two parties in the controversy at the same time that cannot agree on their worldviews.

This proposal does not need to assume that there is a neutral conceptual platform to establish the correspondence between notions and words before and after the change.

Because of this freedom, the complexity measure can play a new role in comparing theories at the time of the controversy. In the same train of thought, there is no need to address any metaphysical commitment to this new feature of the theories, given that it corresponds to a metatheoretical feature, not intended to refer to any object or process in the world.

We hope that focusing on this type of feature may open a new path to explore in the analysis of scientific change.

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ROOM 09

(CSE) From previous time slot, same room.

Symposium: Ethico-political dimensions in contemporary social epistemology: disagreements, epistemic communities, scientific denialism, post-truth

14:30 – 15:00

Daniel L. Pared (Universidad Nacional de Mar del Plata) - Towards a possible computational model of echo chambers.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Computational models in epistemology and social sciences usually centred in how to represent belief change and/or polarization. Two well-known examples in epistemology and from epistemology are Hegselmann-Krause model (presented for the first time in an article from 2002), and Olsson-Angere's software Laputa (released in 2014), but is possible and easy to find more examples. My aim, quite different from current practice in epistemology and social sciences, is to take the first steps towards a computational model of echo chambers as they are understood in epistemology, i. e., the phenomenon of an epistemic community with specific characteristics that separates it from similar epistemic phenomena like epistemic bubbles or filter bubbles.

Despite the fact that there is discrepancy in epistemology about what characteristics, exactly, a community should have to count as an echo chamber, there is agreement in the idea that an echo chamber is an epistemic community in which we find the following characteristics: (1) it has a set of meta-beliefs shared by all members of the community, (2) those meta-beliefs create a distinction in the way the members attribute trust to each others and to non-members (attributing the last ones a lower or no degree of trust), the difference in trust assignment makes (3) the community an epistemically closed community and (4) makes escaping from an echo chamber require the members to broke all ties with the community they belong.

The characteristics from (1) to (3), I think, are the ones that matter from an epistemic point of view, and these can be modelled in a computational model. We already have all we need to do it. The branch of computer science NLP (Natural Language Processing) employs different technics to represent the words of a natural language in a vector space and in this way they can be treated algebraically. This kinds of models does not need to accept an atomistic point of view about the language, so they can represent degrees of relation between the words (this with vectors).

In few words, the computational model of echo chambers I propose can be developed if we treat the echo chambers not as a community, but as a set of all the beliefs that are hold by the community. Then, following the examples of NLP treatment for words, the beliefs in an echo chamber (now a set of beliefs) and their relations can be represented in a vector space.

15:00 – 15:30

Claudio Cormick (IIF-SADAF-CONICET), Valeria Edelsztein (CEFIEC (FCEN-UBA) - CONICET) - Know your enemy: a characterization of scientific denialism.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Scientific denialism can be considered a key element in the characterization of the "post-truth" culture, and it is possible to identify its presence in various fields and expressions (Björnberg et al., 2017; Cowie, 2019; Mallapaty, 2021; McIntyre, 2018, 2021; Strozewski, 2021). Despite its relevance, there is no consensus on a rigorous and exhaustive elucidation of the phenomenon of "science denialism". For example, the characterization currently used by a scientific authority such as the WHO (World Health Organization. Regional Office for Europe, 2017) was taken indirectly (via Diethelm & Mckee, 2009), but uncritically, from an Internet blog (About | ScienceBlogs, 2007), whose authors, despite their good intentions, do not seem to have done any empirical or theoretical work to arrive at it. This standard definition not only suffers from theoretical imprecisions, but also risks being inapplicable to denialist discourses in the real world−a risk it shares with the also highly influential characterization proposed by Hansson (2017).

We argue that the standard analyses of scientific denialism are flawed in two respects, and support this claim on an exhaustive survey and analysis of hundreds of publications by the most important and active anti-vaccination group in Spain and Latin America (Médicos por la Verdad). First, by drawing attention to the supposed majority of "false experts" in denialist discourses (in terms of the analysis accepted by the WHO) or to the factor of “lack of competence” (as Hansson puts it), they overlook the large amount of denialism mobilized by real experts who nevertheless disagree with the scientific consensus. Anti-vaccination experts, we show, are often true experts, even if we restrict the term to the highest ranks of a hierarchy of expertise as the one proposed by Elizabeth Anderson (2011). In this respect, we argue, the example of the Oregon petition in the case of denialism about climate change cannot be generalized and is misleading when fighting denialism in other areas.

Second, by describing the typical denialist trick as "selectivity" (WHO) or “neglect of refuting information” (Hansson) the standard analyses wrongly imply that denialist discourse relies on the omission of evidence that explicitly contradicts its claims. Nonetheless, whereas there is an obvious contradiction between the statements ‘Vaccines cause autism’ and ‘Vaccines do not cause autism’, there is no contradiction between ‘Vaccination against COVID should be encouraged’ and ‘COVID vaccination can cause heart problems in some people’. Latin American anti-vaccine groups usually cite articles which are too specific to be contradictory with other works (Baumeier et al., 2022; King et al., 2021; Perry et al., 2021). The problem is not whether the statements defended by anti-vaxxers are contradictory with other scientific knowledge, but whether they should be weighed as being decisive against vaccination.

We offer an alternative proposal to characterize scientific denialism which takes into account these obstacles.

15:30 – 16:00

Victoria Lavorerio (Universidad de la República) - Deep Scientific Disagreements? A new model for conceiving of deep disagreements in science.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Since Robert Fogelin coined the expression in 1985, much has been written about deep disagreements in philosophical scholarship. Deep disagreements are persistent and systematic disagreements, where the parties have different epistemic standards, and their arguments don’t convince their counterpart. Given this description, it seems that some scientific disagreements can be analyzed as instances of deep disagreements. However, this endeavor is not as straightforward as it can appear at first glance.

There seems to be an inner tension in the very idea of a deep disagreement in science, as deep disagreements are thought to involve divergent worldviews and epistemic standards. Take a

paradigmatic case of a deep disagreement: the dispute between creationists and geologists over the age of the Earth. Here, we can see a divergence in worldviews (a religious and a secular one) and the divergence of epistemic standards, one takes the Bible as a crucial source of evidence, and the latter doesn't. This dispute, however, cannot be said to happen in science or among scientists, as creationism is not a scientific theory. It seems that it is the unscientific nature of creationism what causes the depth of the disagreement.

It could be tempting to conclude that there are no deep disagreements in science. On the contrary, I believe that if deep disagreements exist, many can be found within the scientific realm. Furthermore, looking at scientific disputes through the lenses of deep disagreements can be illuminating. For this, however, we need a more refined model of deep disagreements. By analyzing some examples taken from the literature (Schönfeld 2006, Longino, 2006, De Cruz & De Smedt 2013, among others), I present a model that can accommodate deep disagreements in science, the broad strokes of which are the following.

Firstly, 'deep disagreement' isn't a class that a certain dispute either belongs to or doesn't, but a framework with which we can learn more about the particularities of a disagreement. Secondly, the depth of a disagreement is a gradable property, some disagreements are deeper than others. Thirdly, the depth of a disagreement manifests itself among several dimensions. The epistemic dimension of a disagreement refers to the parties' differing epistemic standards and is just one dimension that a deep disagreement exhibits (or doesn't).

In conclusion, when we take the possibility of scientific deep disagreements seriously, the model of deep disagreements that emerges is multi-dimensional, gradualist, and granular.

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ROOM 10

(PARAF) From previous time slot, same room.

Symposium: Paraconsistent Reasoning and other Forms of Flexible Reasoning

14:30 – 15:00

Abilio Rodrigues (Federal University of MInas Gerais) - What do 'evidence' and 'truth' mean in the logics of evidence and truth.

Topic: A.2 Philosophical Logic

Abstract: The aim of this paper is twofold. First, we present and discuss some recent developments in the logics of evidence and truth (LETs),
namely, finitely-valued propositional versions and first-order versions with Kripke-style semantics.

Second, in order to answer some criticisms raised against LETs,
we explain the notions of evidence and information underlying the intuitive interpretation of LETs, and also clarify in which sense the deductive behavior of conclusive evidence is expressed in terms of preservation of truth.

15:00 – 15:30

Hitoshi Omori (Ruhr University Bochum), Jonas Becker Arenhart (Federal University of Santa Catarina) - Do we need paraconsistent logic for paraconsistent reasoning?

Topic: A.2 Philosophical Logic

Abstract: As is well known, paraconsistent logic is typically defined in terms of a consequence relation that rejects ex contradictione quodlibet. On the other hand, reasoning, let alone paraconsistent reasoning, is not formally identified in the literature, although paraconsistent reasoning is sometimes conflated with paraconsistent logic. For our purpose of this talk, we understand paraconsistent reasoning, whatever this is, as reasoning that does not allow one to reason from a contradiction to any arbitrary conclusion. The aim of this talk is to address the question, as the title indicates: do we need paraconsistent logic for paraconsistent reasoning? Our answer is to the negative. In fact, classical logic is a perfect tool for paraconsistent reasoning! This claim will be backed up by the presentation of a formal system that is meant to capture paraconsistent reasoning, by building on (a very standard, nothing unusual) classical logic. The formulation of the system is inspired by Graham Priest's system that is meant to model the account of negation as cancellation, as presented in [2], and our suggestion can be understood as a simplified version of Priest's system. After presenting some notable features of the system, we shall discuss some of its less technical implications. More specifically, we will build on the following remark made by David Makinson in [1]:

"As already emphasized, there is nothing wrong with classical logic. Moreover, we need to understand and use it when trying to understand other kinds of reasoning. In effect, we will show how the `good old relation of classical consequence' may be deployed in certain ways to define stronger relations that are of practical value, but happen to fail monotony. Rather than talk of non-classical logics, it is more illuminating to speak of more sophisticated ways of employing classical logic, which generate non-monotonic behaviour."

Our basic idea is to identify "sophisticated ways of employing classical logic" as various forms of reasoning, and in particular, paraconsistent reasoning, to be precisely those that generate paraconsistent behaviour that is of practical value in the context in which consistency fails. We will also discuss the variation of Makinson's idea in light of Adaptive logic framework as well as the distinction of logic and reasoning proposed by Gilbert Harman and applied fruitfully in the context of subclassical logic by JC Beall.

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15:30 – 16:00

Walter Carnielli (Centre for Logic, Epistemology and the History of Science – CLE) - Evidence and probability in paraconsistent logics as novel reasoning tools.

Topic: A.2 Philosophical Logic

Abstract: This talk discusses some of the main ideas behind the notions of probability and evidence in non-standard logics. Evidence can be either contradictory or incomplete, or both, thus justifying the use of a paracomplete and paraconsistent logics.

A logic with such characteristics, LET_F, extending Belnap-Dunn's logic of first-degree entailment FDE with a classicality operator OA that recovers classical character for formulas in its scope was first proposed in [1], together with a probabilistic semantics able to quantify the amount of evidence available for a judgement A. The main intuition is that evidence can be partially positive (A is true), partially negative (A is false), missing (no evidence for A) or conflicting (contradictory), while a formula OA means that the information about A, either positive or negative, is conclusive.. This proposal extends the interpretation of FDE as information-based logics. I argue that this framework can fruitfully expand Bayesian epistemology and the dynamics of belief change, developing a genuinely new reasoning tool. This talk is based on material from the book "Contradictions, Evidence and Truth: An epistemic Account of Paraconsistency" (W. A. Carnielli, M. E. Coniglio, A. Rodrigues, Synthese Library), to appear.

Reference

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16:00 – 16:30

Juliana Bueno-Soler (Centre for Logic, Epistemology and the History of Science and School of Technology-Unicamp) - Paraconsistent and Paracomplete Popperian Probabilities.

Topic: A.2 Philosophical Logic

Abstract: Several authors defend that relative probability should be taken as a primitive notion, regarded as binary functions, while absolute (unary) probability should be analyzed as their particular cases. Perhaps the main reason for the suspicion that surrounds the usual notion of probability is the ratio formula, where conditional probability P(A/ B)is defined as P(A & B)/P(B), undefined when P(B) = 0. The obvious restriction P(B) > 0 does not work, since probability-zero events are not impossible, and this causes some disturbing paradoxical consequences. Hájek [3]identifies other three varieties of trouble that plague this ratio analysis, including cases where neither P(A & B) nor P(B) are defined, and yet the probability of A, given B is clearly defined.

Roeper and Leblanc [7] discuss several rival theories of relative probability proposed by R. Carnap, K, Popper, J. M. Keynes and A. Renyi. Among such proposals, Popper's formulation ([5]) appears to be the most acceptable among philosophers and logicians, as it allows one to condition naturally on events of zero probability.

Besides the zero-probability problem in the conditional construal, some other intuitions about conditional probability connected to the notion of probabilistic independence fail to be captured, as noticed in B. Fitelson and A. Hájek [2].

These are not the only weaknesses of the classical theory of probability that not even Popper's proposal manages to solve: standard theory cannot support contradictory events, or events with missing probabilities. In such cases, a theory of paracomplete and paraconsistent probability appears as a useful tool for flexible reasoning.

Taking into account that Popper himself flirted with paraconsistent logic, which he later disdained for its ”practical uselessness” [4], our aim is to enlarge Popper's notion of probability in order to obtain a new version of a paraconsistent and paracomplete probability theory defined over the logic LET_F ([6]) called paraconsistent and paracomplete Popperian probability theory where absolute paraconsistent (as in [1]) and Kolmogorovian probabilities can be obtained as particular cases. The main intention is to obtain a probability theory which is able to deal with contradictory and missing events, at the same time avoiding the philosophical criticisms about the Kolmogorovian conditional probability.

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[2]- B. Fitelson and A. Hájek. Declarations of independence. Synthese, 194(10):3979–3995, 2017.
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[6]- A. Rodrigues, J. Bueno-Soler, and W.A. Carnielli. Measuring evidence: a probabilistic approach to an extension of Belnap–Dunn logic. Synthese, 198(22):5451–5480, 2021.
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ROOM 11

(PIHL)
Symposium: Perspectives and issues in history of logic

Chairs: Dahlquist, Manuel; Urtubey, Luis

Topic: A.4 Historical Aspects of Logic

Abstract: Every discipline possesses its own history, Logic too. Nonetheless, the case of ‘logic is different’ as Sara Uckelman says. Where does this difference lie? Taking a look at the history of other sciences the situation is such that -in Uckelman’s words- ‘lots of what we used to “know” is false’. In the history of logic, the situation looks indeed diverse. Many enduring problems that used to keep busy logicians since ancient times still remain under the scrutiny of logic scholars nowadays. In this contributed symposium we make a historical–philosophical examination of some of these problems that persist from antiquity to the present days of logical research. Philosophers thinking about logic would do well to scrutinize the history of the concepts involved carefully. And we philosophers of logic need to understand the nature of the problems we are confronting. In this session we showcase various attempts to do such historical– philosophical work, with a focus on logic. Manuel Dahlquist and Luis Urtubey will approach some alternatives that follows from solutions to the renown Master Argument, attributed to Diodorus Cronus; a trilemma, in which the consistency of the notion of possibility along with other temporal concepts is questioned. Diodorus himself appears to have offered a solution, which was apparently challenged by other prominent Stoic logician, namely, Chrysippus of Soli. The authors consider a third alternative which appeared in the context of a

medieval discussion of validity; more precisely in the First Sophism of chapter 8 of Sophismata by Jean Buridan. In its turn, Buridan put forward a change in the notion of possibility separating the concept of possibility from that of truth. Aspects of this notion of possibility are considered with respect to its affinity with possible worlds semantics. This presentation will be followed by other three studies. Reetu Bhattacharjee, Jens Lemanski and Andrea Reichenberger will address the investigation of practices of visual communication in the history of mathematics and logic to gain more proper and deeper understanding of not only different types of diagrams but also of different types of gestures, their functions and reciprocal translatability in those disciplines. Lucas Angioni will discuss Aristotle's usage of the clause "toi tauta einai". Aristotle employs the "toi tauta einai" in the definition of "syllogismus" in the beginning of the Prior Analytics but not in the Topics. The question is whether Aristotle's terminological preferences are tracking significant differences or nuances in each context. The author will argue that the significant differences between the definition of "syllogismus" in Prior Analytics and the Topics are due to the specific conceptual projects each treatise is engaged with. Last not least, Sara Uckelman presentation will tackle the logical genre of "obligationes", one of the most distinctive contributions of medieval logic. She will introduce the basics of the obligational disputations, and look closely at how they were used in the analysis and solution of various alethic and epistemic paradoxes in the 14th century.

Speakers:
1) Sara Uckelman: Obligations: A Method for Analyzing Paradoxes
2) Manuel Dahlquist and Luis Urtubey: Annihilated Propositions that do not exist, but subsist. A reflection on existence and possibility in Buridan and Chrysippus
3) Reetu Bhattacharjee, Jens Lemanski and Anrea Reichenberger: Visual-Spatial Communication in the History of Logic
4) Lucas Angioni: Aristotle's uses of "toi tauta einai"

14:30 – 15:00
Sara L. Uckelman (Durham University) - Obligationes: A Method for Analyzing Paradoxes

Topic: A.4 Historical Aspects of Logic

Abstract: The logical genre of "obligationes" is one of the most distinctive contributions of medieval logic. An obligatio is a structured discourse or disputation between an Opponent and a Respondent wherein the Respondent's responses are governed by certain rules. While the origins of these disputation and their purpose have been disputed by modern scholars, one thing is clear from the 14th-century literature of insolubilia and sophismata -- i.e., paradoxes -- is that it is rife with the method and terminology of obligationes. In this talk, I will introduce the basics of the obligational disputations, and then look closely at how they were used in the analysis and solution of various alethic and epistemic paradoxes in the 14th century.

15:00 – 15:30
Manuel Dahlquist (Universidad Nacional del litoral), Luis Urtubey (Universidad Nacional de Córdoba) - Annihilated Propositions that do not exist, but subsist. A reflection on existence and possibility in Buridan and Chrysippus.

Topic: A.4 Historical Aspects of Logic

Abstract: Diodorus' famous trilemma a.k.a Master Argument argued that the following three propositions cannot all be true ([1],38):

D1 Every proposition true about the past is necessary;
D2 An impossible proposition cannot follow from (or after) a possible one;
D3 There is a proposition which is possible, but which neither is nor will be true; since D1 and D2 are more plausible or intuitive than D3, Diodorus proposed to accept the truth of D1 and D2 and reject D3. Chrysippus challenges the validity of this argument affirming the falsehood of D2 and from it the truth of D3. His counter involves the idea that some propositions are "destroyed" or "perish". According to the standard interpretation, propositions cease to exist when they are destroyed [2]. This "ceasing into existence" of some propositions and the logical implications that this entails, is the interest of our work. We retrieve an argument involving D2 and D3 from the context of a medieval discussion of validity, which appears -among other places- in the First Sophism of chapter 8 of Sophismata by Jean Buridan: (PS) Every proposition is affirmative; therefore, no proposition is negative ([3],952) Buridan considers this inference valid. One of the objections is that PS does not respect the truth of D2: “For the first is possible, namely, since God could annihilate all negatives whilesparing the affirmatives. But the other is impossible, for in no case can it be true”. ([3], 953). Stoic [4], medieval [5], and contemporary [6] modal logic agree that for a proposition to be possible, it must be true in at least one state. Buridan proposes a change in this notion separating possibility from truth. Thus, the conclusion is a possible non-true sentence [7][8]. This allows him to assume D2 in a weakened way holding the truth of D3. The implication occurs between propositions, which are objects that do not exist but are logically manipulable. This thesis can be understood, contrasted, and reviewed in the light of positions such as those of [9] about the existence of objects, and diverse forms of possibility[10][11], which we will do in this work.

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15:30 – 16:00

Reetu Bhattacharjee (Faculty of Humanities, Scuola Normale Superiore, Pisa, Italy, Philosophical Seminar, WWU Münster, Germany), Jens Lemanski (Philosophical Seminar, WWU Münster, Germany, Institute of Philosophy, FernUniversit¨at in Hagen, Hagen, Germany), Andrea Reichenberger (Institute of Philosophy, FernUniversit¨at in Hagen, Hagen, Germany) –
Visual-Spatial Communication in the History of Logic.

Topic: A.4 Historical Aspects of Logic

Abstract: In recent years, “visual-spatial communication,” in the form of gestures and diagrams, in mathematics and logic has become a focus of research [9]. From an early modern period, researchers have repeatedly emphasized that there are certain properties of visual-spatial communication in

mathematics and logic that the classical forms of representation do not possess [4]. These properties must be considered in a differentiated way, especially in the field of mathematics and logic.

From the 1990s onward, a new trend of including visual reasoning in the field of logic, mathematics, psychology, and AI has begun. The breakthrough in philosophy and mathematics was Sun-Joo Shin's paradigmatic work [8], which showed that visual communication can be used in logic on a par with other algebraic languages. Later Mateja Jamnik's work [3] on visual communication in the field of mathematics created a foundation for application of visual communication in AI [6]. Atsushi Shimojima's paradigmatic research for cognitive science showed that diagrams can not only be used as a formal system but also have cognitive advantages (e.g., free rides, observational advantages etc.) that algebraic and arithmetic notations do not possess [7]. Simultaneously with these studies, today a strongly growing research area is also the study of visual-spatial communication in the field of the history of logic [3, 5]. In this context, little attention has been paid to diagrammatic gestures, except for a few studies—e.g., [1].

The main objective of this paper is to investigate practices of visual communication in the field history of mathematics and logic to gain a better and deeper understanding of not only different types of diagrams but also of different types of gestures their functions and reciprocal translatability in those disciplines.

Acknowledgement. This paper is part of the DFG-project `Gestures and Diagrams in Visual-Spatial Communication.'

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16:00 – 16:30

Lucas Angioni (University of Campinas) - Aristotle's uses of "toi tauta einai".

Topic: A.4 Historical Aspects of Logic

Abstract: Aristotle employs the "toi tauta einai" clause a couple of times in his works. As is widely known, the clause is employed in Aristotle's definition of "sullogismos" in the beginning of the Prior Analytics. A very similar definition of "sullogismos" is found in the beginning of the Topics, but the "toi tauta einai" clause is not employed. The important question is whether Aristotle's terminological

preferences are tracking significant differences or nuances in each context. I argue for a positive answer. I argue that the significant differences between the Prior Analytics definition of "sullogismos" and the Topics definition of "sullogismos" are due to the specific conceptual projects each treatise is engaged with. Aristotle's employment of the "toi tauta einai" clause in the Prior Analytics expresses a requirement about the role played by the premises in the sullogismos. Yet the same requirement seems to be operative in the Topics concept of sullogismos (and this is what has led many scholars to believe that the two definitions are equivalent). Premises must play a significant role in deducing the conclusion, even for the dialectical syllogism. However, the Topics enterprise is not concerned with the general question of what minimal requirements must be fulfilled for a syllogism to be successful, independently of the content of the premises. This is the central question of the initial chapters of the Prior Analytics. Aristotle focuses on (what we nowadays call) the categorical forms, and aims at identifying the minimal requirement that must be fulfilled for a syllogism to be successful. It is at this point that we find his remark that a syllogism is successful (i.e., the syllogistic conclusion follows from the premises) because exactly those premises (instead of others) have been taken. This is how the "toi tauta einai" clause is employed. In this context, the pronoun "tauta" refers to the categorical forms or, even more restrictively (as I will argue), to premise-pairs of categorical forms. Now, this restriction in the reference of the pronoun is due to the context, and this is also why the employment of the same "toi tauta einai" clause ahead in the Topics (in Book VIII) does not bring an objection to my proposal.

ROOM 12

(NDPCT) From previous time slot, same room.
Symposium: New Directions in Philosophy of Computability Theory

14:30 – 15:00
Marta Fiori Carones (Sobolev Institute of Mathematics) - Where does intensionality lie in computability?

Topic: C.6 Philosophy of Computing and Computation

Abstract: A discipline is intensional when the way the objects of the discipline are represented matters to the study of the discipline itself, so that two different representations of an object may count as two different objects within that discipline. Oppositely, a discipline is extensional when it studies the objects independently from their presentation. For example, Zermelo-Frankel set theory is considered the prototypical extensional discipline, since it includes the axiom of extensionality, which states that a set in only determined by its elements.
Some authors have already focused their attention on intensionality in mathematics. To give an example we cite the very recent special issue of Syntheses "Intensionality in mathematics: problems and prospects", edited by Antonutti Marfori and Quinon. Moreover, the thesis that computability is an intensional discipline has been advanced by some authors, among which Rescorla in the paper "The Representational Foundations of Computation". It seems that, so far, this thesis has been mainly motivated focusing on the importance for the development of computability of the choice of a notation for the natural numbers. Indeed, Turing machines compute over symbols, certainly not over numbers, and the choice of a notation themself can affect the computation. However, it is undeniable that the choice of notation is a very specific aspect of computability theory, and it is even disputable whether it is so central in all branches of this discipline.

We want to think a bit further on the claim that computability is an intensional discipline, looking at different branches of computability and trying to understand what does it mean that computability is an intensional discipline. In particular, we want to point out that computability gives tools to answer intensional questions, such as whether two objects or statements are equivalent/reducible/equal according to some notions taken for granted. Several tools have been developed since the birth of computability to answer this type of questions. (Indeed, it is maybe possible to argue that computability serves precisely to this purpose, since it is often recalled that computability actually studies how much incomputable some objects are.) Consider a statement of the form "an object has these properties if and only if it has these other properties", where essentially two representations are stated to be representations of the same object. Some branches of computability theory study under which hypotheses, or thanks to which tools, one can prove the byimplication.

Behind the distinction between intensionalty and extensionalty there is also an epistemological question. In fact, to define intensionality, one generally says that two different representations of an unique object count as two objects, already taken for granted that it is known that the significant of two senses is the same. Some branches of computability allow to consider which are the epistemological resources which allow to argue that this is the case.

We hope that the examples we will propose in this talk may serve as a starting point for further clarification of the intensionality of computability and possibly of other mathematical disciplines.

15:00 – 15:30

Matteo Plebani (Università degli Studi di Torino) - Counterpossibles in computability theory: reconsidering the oracle objection.

Topic: A.1 Mathematical Logic

Abstract: Philosophers have recently become obsessed with counterpossibles: counterfactuals with impossible antecedents. According to the orthodoxy (Williamson 2017) counterpossibles are all vacuously true. Recently, several philosophers and logicians have tried to question the orthodoxy by providing (alleged) examples of counterpossibles that are either false or non-vacuously true.

The connection between counterpossibles and the topic of this symposium is provided by a paper by Matthias Jenny (2018), where it is argued that we can find examples of non-vacuously true counterpossibles and examples of false counterpossibles in computability theory.

According to Jenny, the following is an example of a (non-vacuously) true counterpossible:

(*) If the validity problem were algorithmically solvable, the halting problem would be algorithmically solvable

In this paper, I want to challenge Jenny's claim that (*) is a genuine counterpossible.

My challenge consists in reconsidering an objection that Jenny himself discusses in his paper: I will call it the oracle objection.

The oracle objection contends that (*) is not a genuine counterpossible, on the ground that its antecedent is not standardly interpreted as describing an impossible situation. According to the oracle objection, when computability theorists evaluate (*) they don't suppose that something contradictory is true, i.e. that a non-computable set is computable, and try to derive the consequences of such a contradictory assumption; rather, they consider the consistent situation where information that cannot be provided by an algorithm were available to us, and try to figure out which problems could be solved by algorithms that had access to that information.

Jenny replies to the oracle objection by saying that computability theorists had an informal notion of what it means for a problem to be reducible to another problem before the notion of Turing-reducibility was elaborated. Turing reducibility, according to Jenny, is a good analysis of this pre-theoretical notion of reducibility but is not identical to it.

I will argue that Jenny's reply misses the point of the oracle objection, which is not about whether we had a pre-theoretical notion of reducibility or not. Rather, the point of the objection is that, if we look at the mathematical practice, the antecedent of (*) is not interpreted as describing a contradictory situation. To support this analysis, I will contrast the case of (*) with a different conditional:

(**) if the halting problem were algorithmically solvable, then a Turing machine would at the same time halt on a given input and fail to halt on the same input

I will argue that (**) is a genuine counterpossible, where the antecedent is taken at face value, and its absurdity is proved by deriving a contradiction from it.

I will conclude by considering cases of apparent counterpossibles that are rejected by computability theorists, like:

(***) If the halting problem were algorithmically decidable, arithmetical truth would be computable.

I argue that the rejection of claims like (***) is best explained by assuming that the antecedent of those conditionals is not interpreted as describing an impossible situation.

15:30 – 16:00

Farhod Ibragimov (National University of Uzbekistan named after M. Ulugbek), Mars Yamaleev (Kazan Federal University), Maxim Zubkov (Kazan Federal University) - Group representations over locally negative equivalences.

Topic: A.1 Mathematical Logic

Abstract: An equivalence relation is said to be negative if the set of pairs of non-equivalent elements is computably enumerable. An equivalence relation is said to be positive if the set of pairs of equivalent elements is computably enumerable. A structure A is said to be representable over an equivalence relation E if there exists a structure B such that B/E is isomorphic to A. Presently, questions of the representability of algebraic systems over positive and negative equivalence relations are being actively studied both in computability theory and in theoretical computer science [1-5].

Over any negative equivalence, unlike positive ones, it is possible to implement very rich classes of the system.

An equivalence relation is said to be locally negative if it contains at least one class that is a co-computably enumerable set.

It is easy to see that if an Abelian group is representable over a locally negative equivalence relation, then every class of the given equivalence relation is cocomputably enumerable. It is known that if a translationally complete algebra is representable over locally negative equivalence relations, then the equivalence relation is negative. We will show that this is not true for groups, namely, there is a computable group that is representable over locally negative, but not negative, equivalence relations. Moreover, this group is isomorphic to the group of integers by addition.

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16:00 – 16:30

Tomasz Steifer (Pontificia Universidad Católica de Chile & Institute for Fundamental Technological Research, Polish Academy of Sciences) - Statistical learning and computability.

Topic: A.1 Mathematical Logic

Abstract: Fundamental theorem of statistical learning provides equivalence between a certain notion of statistical learnability, called PAC learnability, and combinatorial properties of the class of hypotheses. This characterization consider the existence of learner as a mathematical object, without any assumptions on its implementability. Recently, a new framework combining PAC learning with computability was proposed. In computable PAC learnability, we ask for the existence of a computable learner, i.e., one which can be realized by a computer program. An immediate observation is that the combinatorial characterization no longer holds for computable learners. We discuss this and other results, including solutions to some open problems from two COLT papers. This is a joint work with Valentino Delle Rose, Alexander Kozachinskiy and Cristobal Rojas.

ROOM 13

(COPHITES-TV)
Symposium: Technology and values in an uncertain world

Chair: Franssen, Maarten

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: This symposium will explore the extensive normative, value-related dimensions of technology and engineering. First of all, technology has been distinguished from science in that technology is inherently normative. As Herbert Simon phrased it, science is concerned with how things are whereas technology is concerned with how things ought to be in order to function. In technology, knowledge claims can take the form of conditional prescriptive statements: in order to achieve K, do L. This contrast concerns a distinction in the products of science and technology. Additionally there is the normative dimension of engineering as a praxis and technology as an activity in the world, as they give rise to the question of how one should go about realizing the products and objectives of engineering as a praxis, that is, questions of its methodology. Jointly these two aspects are part of what can be termed the internal side to the role of normativity in technology and engineering. What can be termed its external side concerns what the praxis of engineering, and the larger activity of technology associated with it, bring about in society. This latter side has grown in importance along with the increasing presence of technology in virtually all aspects of human life. To be sure, scientific theories have had an enormous influence on human existence just as well in their own way, through their influence on how humanity looks at itself, at the world and at its place in it. This, however, is not usually seen as something scientists should be concerned about in their work and in their considerations about which knowledge claims to propose and which to accept. Technology's direct,

material shaping of human life is of such different character that engineers and applied scientists cannot reasonably refrain from incorporating moral and societal values into their considerations of what to (propose to) construct and how to construct it. Which inevitably puts into question the position that is still dominant in science, that the internal and external sides to the practical normativity of technology and engineering can be kept apart.

Some contributions to the symposium will focus on the internal side, and will discuss the methodology of engineering and explore similarities and dissimilarities with the well-researched case of science. Other contributions will focus on the external normative dimension of technology, and on what could be termed its meta-methodology: which approaches are available for discussing the questions that are raised and in what respect is one approach better, or more adequate, than another? And some contributions, finally, will discuss how internal and external issues interact in the development of new technology, in particular technology with a disruptive potential for all sorts of societal practices.

Speakers:
1) MAARTEN FRANSSEN & IBO VAN DE POEL: The ethics of engineering vs. the politics of technology.
2) SJOERN HANSEN: Data science as engineering.
3) ZWART: Ampliative normative reasoning in engineering.
4) MAARTEN FRANSSEN: Comparative methodology of engineering and science.
5) PIETER VERMAS: The politics of quantum technologies.
6) LUCA POSSATI: An ethical approach to quantum technologies through the lens of identity politics

14:30 – 15:00

Maarten Franssen (Delft University of Technology), Ibo van de Poel (Delft University of Technology) - The ethics of engineering vs. the politics of technology.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: Unlike philosophy of science, value questions have always been central to the philosophy of technology. However, the field lacks a unified view on how to tackle them. In the past 25 years, 'ethics of technology' has become the single label under which normative issues are studied. This is highly problematic, because the perspective of ethics is of an individual acting in the world. Ethical theories concern whether an individual agent's actions are right or wrong, 'to do' or 'to do not' given some duty, and which values an individual agent's action will honour or harm. Certainly this perspective can be brought to bear on technology, in the form of professional ethics – the ethics of engineering. Many normative issues related to technology, however, concern the development and implementation of technologies, their societal impact and their regulation and control, all of which concern the societal, that is, aggregate level. There we lose moral track of the actions of individuals. Even within engineering ethics it is already problematic to what extent the design of technologies can be seen as under any individual's control, but although this is occasionally acknowledged (e.g. Van de Poel & Royakkers 2011), still exclusively the conceptual framework of ethics is offered for structuring the discussion.

In this talk, we make a plea for introducing a radically different approach to many normative and value-related issues raised by technology: through political philosophy rather than ethics. By political philosophy we mean approaches that target the normative structure of society, the rules, rights and duties that define the arena for the actions of its individual members. Philosophically this work is dominated by the contractarian approach adopted by Rawls (1971/1999). In arguing its relevance, we point out its shortcomings for dealing with technology as well. Rawlsian moral-political philosophy identifies the individual agents making up society as the only entities that act, and 'society'

as their mere collection, and argues for a principle of maximal liberty for agents. What needs to be developed in addition is (1) a conception of supra-individual corporate agents, since virtually all technology is developed by such agents, as well as (2) a conception of the state as agent, since the state also plays a crucial role in technology development and control (Mazzucato 2013), as well as (3) a conception of the sovereign state as a member of a global community of sovereign states, since many of the great issues of today (e.g. global warming, geo-engineering) can be meaningfully addressed only at that level. Rawls's attempt (1999) to cover the latter aspect is inadequate. Finally it is important to address the challenge that technology poses to the contractarian approach itself, since it "rests on an assumption of equal rationality among persons which differences in technology deny" (Gauthier 1986).

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15:00 – 15:30

Sjoerd Zwart (Delft University of Technology) - Ampliative Normative Reasoning in Engineering.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: 'There are many roads to Rome' and 'there are more ways to skin a cat' as the English express the idea that there are multiple actions to achieve a goal. Unlike science, engineering is about achieving technical goals and thus action; it is about designing technical artefacts or processes that perform a predetermined function operationalized through design requirements. Meeting such criteria can be done in many ways, and design tasks typically have many 'right answers,' namely those solutions that meet all requirements. And even some of these solutions are better or worse than others. In addition to artefacts, engineers also produce prescriptive or 'means-end knowledge,' of the form 'if you want to achieve technical goal G, in engineering context C, perform action A.' This conditional advice may be effective, efficient, short sighted or perhaps even immoral, but it is not true or false (Zwart, 2020). Engineering, then, is normative all the way down. But where does all this normativity come from? Not from science, because if your conclusion is normative, at least one of your premises must be normative (Hare 1952, para. 2.5). And how do engineers arrive at their normative conclusions? Note that most normative engineering conclusions are the result of ampliative reasoning; the conclusion is logically stronger than the sum of its premises. So decision theory cannot answer this question because it is deductive. Once all axioms and other premises are accepted, the best option is determined deductively. Nor does informal logic help, because for the sake of simplicity, ampliative normative reasoning is often omitted (e.g., Churchill 1986, 1-5, 11).

This contribution defends a matrix approach (Multiple Options & Criteria Matrix) as an unbiased way to analyze almost all ampliative normative engineering reasoning (Zwart, Young forthcoming). It will be shown how internal evaluations of criteria and values (e.g., efficiency, robustness, safety) and external values (moral, societal and aesthetic) are balanced in argumentations that support a normative conclusion. Note that the matrix method is emphatically not a way to arrive at the preferred solution, but helps to unravel the foundation of ampliative normative claims. Not only does the matrix approach provide the most insight into ampliative normative reasoning in engineering

(it covers many quantitative shortcuts used by engineers), but it may also be the most promising and unbiased overarching method for analyzing ampliative normative reasoning in general.

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15:30 – 16:00

Maarten Franssen (Delft University of Technology) - Comparative methodology of engineering and science.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: Philosophy of technology has tended to emphasize that technology is different from science. A significant separation is nevertheless not intuitively plausible, given the extent to which the practices of science and engineering are intertwined. One way to bring out the similarities between technology and science without implying a subordination of technology to science that compromises technology's worthiness of philosophical scrutiny is to argue that it is not scientific knowledge or theory that is applied in technology – much of the knowledge it requires is generated by technology itself and there are substantial differences between the theories employed in science and in technology – but the method of science (Bunge 1966). This approach has hardly been developed since, however. There is still much that needs to be learned about the specific methods underlying technology and engineering. Within philosophy of technology, a distinct subfield of philosophy of engineering has come into being in the past fifteen years, resulting in the publication of a first handbook in the philosophy of engineering in 2021 (Michelsfelder & Doorn eds.). Although many of its chapters discuss issues of method, a unifying approach is still lacking. 'Methodology' occurs in the title of exactly one chapter, but it discusses exclusively the methodology of engineering science.

The similarity of science and engineering at the level of method has received some support from engineering, notably in the position defended by Roozenburg and Eekels (1995) that the engineering design process is structured similarly to the empirical cycle in science. In both cases we can distinguish a context of discovery and a context of justification, with the latter consisting of a phase of empirical testing followed by a phase of 'final assessment'.

This mutual approach, however, should not turn us away from the many differences between science and engineering. In particular, it is again implausible that in technology the context of discovery can be as free and informal as has been claimed for scientific discovery. Technological design is severely constrained by considerations of time and money and the need for accordance with all sorts of regulations. Technology has to deliver. I will argue that, indeed, (1) for normal design, (i) the context of discovery is, as regards methodology, highly structured, so much so that (ii) the phase of empirical testing contributes relatively little, but that, in contrast, (2) for radical design, represented by cases as different as the development of the jet engine (Constant 1980) and the do-it-yourself photographic camera (Jenkins 1975), (i) the context of discovery is much less structured and (ii) the phase of empirical testing is crucial, such that in this case the similarities to science are much more evident.

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Symposium continues in the same room, next time slot.

ROOM 14

(METSC) From previous time slot, same room.
Symposium: Perspectives on the Metaphysics and Epistemology of Science

14:30 – 15:00
Tuomas Tahko (University of Bristol) - Making Reductionism True.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: The notion of reduction has a key role in discussions regarding the levels of reality, unity of science, and the hierarchical picture of reality. This paper aims to reassess our understanding of reductionism in the light of recent literature, and propose an understanding of it in terms of truthmaking. The paper constitutes a case study in metaphysics of science, in line with the general aims of this symposium.

The threat that reduction undermines reality or existence has caused reductionism to fall out of fashion. If composed entities are reducible to their components, then the composed entities can be eliminated, they do not exist. For the ontological minimalist (e.g., Cameron 2010, Heil 2021) this the desirable result. But what to do about the fact that scientific theories refer to higher-level composed entities?

In a recent paper, deRosset has examined two of the most popular strategies to deal with this challenge from the ontological minimalist's point of view: grounding and truthmaking. The resulting view purports to be very powerful:

[W]e can explain the sense in which, e.g., the biological truths are dependent on and determined by chemical truths without appealing to properly biological or chemical entities. This opens the door to a view on which, though there are more truths than just the purely physical truths, there are no entities, states, or properties other than the purely physical entities, states, and properties. (deRosset 2017: 535.)

The core of deRosset's proposal is that relative fundamentality applies to theories rather than entities. So, a proponent of this view would resist the popular line of thought that explains the relations among theories by appealing to a layered structure of domains of entities that those theories refer to. The result is a 'flat' world, with layered theories or truths.

I shall argue that this is not what the ontological reductionist is trying to do and, I contend, not what the reductionist should try to do either. My argument is based on an analysis of an underlying

assumption concerning the hierarchical picture of theories and natural kinds, and especially crosscutting kinds (e.g., Havstad 2021). The existence of these kinds requires us to abandon the hierarchical picture. Some common examples of crosscutting kinds come from biology and chemistry. Consider the notoriously tricky kind, mammal. Humans are mammals, and so are monotremes such as the platypus. The platypus is also oviparous, meaning that it produces offspring by laying eggs, like birds. But birds and humans cannot be classified together either as mammals or as oviparous. So, something must give.

I conclude that we should acknowledge the messiness and context-dependence of scientific representation and abandon the hierarchical picture on both sides of the representation/reality divide.

References

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Heil, J. 2021. Truthmaking and Fundamentality. Synthese 198 (3): 849–860.

15:00 – 15:30

Franco Menares Paredes (Carnegie Mellon University) - Structural and Inferential Approaches to the Science–World Relation.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: Recently, some work has been done in articulating a further distinction within the so–called semantic conception of scientific theories.

The semantic conception conceives of scientific theories as extra–linguistic entities whose identities are defined by some collection of models. However, Suarez and Pero (2019) make a further distinction: on the one hand, there is what they call the *structural semantic conception*, which endorses the additional premise that models are mathematical structures and, therefore, theories would be essentially collections of mathematical structures. In contrast, they characterize the \textit{representational semantic conception}, which considers theories as representations; it opposes the structural view since ``representations are not constituted by structures". Pointing to similar considerations, Bobby Vos (2022) has offered a story about how one can account for the science–world relation in purely structural terms. These works have contributed to the debate advancing a great deal in drawing important distinctions.

However, I shall argue that a structural account of scientific theories can make sense of their representational role by presenting a mechanism by which theories meet (represent) the world. In the present paper, I shall present such a mechanism. First, I shall frame the debate and the important distinctions at play. Then, I shall briefly present some alternative stories and point out why I consider them to fail. Finally, I shall present an inferential view of how mathematical models represent, that is to say, how they give us information about things in the world when interpreted into the framework of some scientific theory.

Key for my account will be the notion of \textit{data models} of some theory and the way in which they capture their target phenomena. We will see that theoretical models represent their target systems by the construction of data models that are later embedded into those more abstract models. The story of the science–world relation is completed by the stipulation that the adequacy of theoretical models is appraised by the inferential power they give us to make predictions about the relevant phenomena at play.

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15:30 – 16:00

Gabriel Chiarotti Sardi (University of São Paulo (USP)), Débora de Oliveira Silva (State University of Campinas (UNICAMP)) **- Scientific realism, theoretical continuity and the chemical revolution in the 18th century**

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: Scientific Realism is the philosophical stance that argues that scientific theories progressively move towards an approximate truth and that the unobservable entities postulated by them really exist (Chakravartty, 2017).

But how can a realist deal with historical episodes in which important theories of the past were abandoned along with their unobservable entities? Larry Laudan (1981) reformulated the problem known as “Pessimistic Metainduction”, in which he questions realistic convictions, since if we look at the history of science we will come across several cases where past scientific theories posited entities we no longer believe in. One such historical episode is the famous “Chemical Revolution” of the 18th century, in which phlogiston, an unobservable entity (supposedly) responsible for combustion, was abandoned in favor of oxygen, postulated by Antoine Lavoisier in his Traite Eleméntaire de Chimie (1789).

This work aims to examine the realistic response of Stathis Psillos to the case of the Chemical Revolution of the 18th century in which phlogiston theory was supplanted by oxygen theory.

Psillos (1999) argues through the strategy divide et impera that we must be realistic only concerning those parts of theories that played some essential role in their success. About unobservables, if the postulation of this type of entity was essential for the success of some abandoned theory, with the use of the hybrid theory of reference he aims to show that we can defend the reference maintenance in certain episodes of theoretical substitution, so as to argue that abandoned theories got the reference right and also could be classified as approximately true, since they would be continuous with actual theories concerning reference.

We argue that, if we observe the work of theoretical-conceptual reconstruction of holistic bias carried out by the philosopher Paul Thagard (1990) who, using computer science and artificial intelligence, showed that theories of oxygen and phlogiston were so radically divergent with regard to the interpretation of the meanings of the terms related to entities and phenomena treated by theories, that even though the scientists of both theoretical proposals shared terms and some notions, they did not deal with the same objects; that is, due to the different conceptual relationships within theoretical networks, the realistic attempt to propose a perpetuation of entities does not prove to be so effective, since, according to Thagard's view, it is the conceptual interrelationship between concepts that gives them significance, affecting what they refer to.

This indicates, perhaps, that it may not be possible to establish any link of continuity between the phlogiston theory and oxygen theory, which would make Psillos’ realistic response — based on reference maintenance — unfeasible in this case.

References

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16:00 – 16:30

Ulrich Meyer (Colgate University) - Best Systems in Lawless Worlds.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: David Lewis' Best System Account (BSA) of lawhood is modeled on scientific practices of theory reduction. It argues that science aims at the best combination of simplicity and strength, and claims that a law of nature is "any regularity that earns inclusion in the ideal system" (“New Work for a Theory of Universals” AJP 61, 1983, p. 367)

This paper argues that BSA finds laws of nature in lawless worlds, where there are no laws to be discovered. In a lawless world, everything happens by accident. But there can still be a few minor regularities, all of which would be purely accidental. Yet since there are no other regularities that could account for them, theory reduction would begin and end with these accidental regularities, which BSA would then falsely classify as lawlike. Since the accidental regularities are the only regularities there are, they figure in the best system of the lawless world by default. But these regularities are still accidental.

An obvious solution is to impose a strength threshold for lawhood. The simplicity-cost of counting a regularity as a law is always the same: it increases the number of "axioms" by one. The strength-benefit, on the other hand, depends on how pervasive the regularity is. For the same simplicity-cost, a minor regularity only offers a modest increase in strength, by rendering a relatively small number of particular facts redundant. This suggests that some regularities do not have enough instances to justify the simplicity-cost of counting them as laws.

However, a strength-threshold would also rule out lawlike regularities with few instances. This means that BSA cannot admit both (i) lawless worlds that have only accidental regularities, and (ii) law-governed worlds with sparsely instantiated laws. Without a strength threshold, BSA finds laws in lawless worlds; with a strength threshold, it overlooks sparsely instantiated laws.

17:00 - 18:00 INVITED SPEAKER: DÉCIO KRAUSE

AUDITORIUM 1

INVITED SPEAKER
Décio Krause
(Graduate Program in Logic and Metaphysics/PPGLM, Federal University of Rio de Janeiro)

Non-Reflexive Logics and the Foundations of Quantum Theories

Chair: Umberto Rivieccio (Universidad Nacional de Educación a Distancia)

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Non-Reflexive Logics (or `nonreflexive' logics, NRL) are logics that depart from classical logic with respect to the Standard Theory of Identity (STI), and in particular, derogate the Principle of Identity in some of its formulations. Since there are several non-equivalent formulations of such a principle, we can find several different logics of this kind. Although there are also propositional NRL, here we shall be concerned with the departure from the notion of identity in first-order systems and also in standard set theories. We start by noticing that classical logic, standard mathematics and classical mechanics are theories grounded on classical logic, hence are theories of individuals, entities which can be identified and re-identified in different contexts even if only in principle. That is, in having two entities, there is (always) some way to discern them absolutely, that is, by a monadic property. But a reasonable interpretation of quantum physics assumes that it is a land of anonymity, where proper names do not play any significant role and where quantum entities can be absolutely indiscernible, called non-individuals. So, the claims of some philosophers of physics that quantum entities would be only 'relationals' (discerned by relations only) or `weakly discernible' only (discerned by an irreflexive and symmetric relation) cannot be grounded in `standard' frameworks such as a standard set theory based on classical logic. Thus, in order to support the thesis that quantum entities can be seen as non-individuals, we need to move to a different framework, namely, quasi-set theory, which is grounded on a non-reflexive logic. Although we do not present the theory in this talk, its main ideas are sketched, in special the problem of cardinality: since we can have collections of several indistinguishable entities, we need to consider them endowed with a cardinal but without an associated ordinal, and this poses a problem since this is contrary to what happens in standard set theories. But quasi-set theory enables us to supersede this problem, by showing that we can have `quasi-sets' with a cardinal but with no ordinal and that proper names are only mock names which do not retain re-identification.

17:00 - 18:00

AUDITORIUM 2

(LTF) From previous time slot, same room.
Symposium: Scientific Evidence and Uncertainty about the Long-Term Future

17:00- 17:30
Peter Vickers (Durham University) - Using history to gauge a consensus threshold for future-proof science

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Many scientific results are far-beyond-reasonable-doubt (FBRD); we would typically only doubt them in a philosophy class, in a discussion of Descartes' Meditations for example. In Identifying Future Proof Science (Vickers 2022), 30 examples of 'future-proof science' are listed in Chapter 1,

including ‘Smoking causes cancer’ and ‘The Sun is a star’. Such examples are supposed to be FBRD, even if they are certainly not proven in the sense of mathematics/geometry. But how are we to identify such examples? What criteria need to be met?

Vickers (2022) presents criteria intended to be sufficient for “established scientific facts” (FBRD scientific claims). The heaviest weight is carried by the criterion which states that there needs to be a 95% scientific consensus; this is meant to be a sweet spot between an impossibly high bar (e.g. 99%) and a lower bar (e.g. 90%) which would invite counterexamples from the history of science. Perhaps very occasionally in science, a 90% consensus is reached regarding a claim that is false. Perhaps this happened in America with the ‘continental drift’ question in the 1930s, 40s, and 50s: scientists in the US were sure, at the time, that ‘drift’ was impossible. Similarly, Von Neumann’s false proof, ruling out a hidden variables interpretation of quantum mechanics, perhaps enjoyed a 90% consensus within the relevant scientific community, for a period.

But when we consider the very long-term future, a problem arises. The beauty of the 95% criterion is meant to be that it is a sufficiently high bar such that there are no counterexamples in the entire history of science; apparently, Vickers’ criteria have never been met for a claim that was subsequently overturned. But in the very long run, we should expect very rare scenarios to develop, and this would seemingly include exceedingly rare cases where scientists reach even the high bar of 95% consensus regarding a false idea. Perhaps it is true that there is no counterexample in “the entire history of science” where a 95% international scientific consensus has been reached concerning an idea that was subsequently overturned. But “the entire history of science” is a vanishingly tiny period of time once one looks ahead a million years. Thus, from a certain long-term perspective, the historical foundation supporting Vickers’ criteria for future-proof science looks meagre.

This talk defends the notion of ‘future-proof science’ in light of this longtermist objection. The historical support for ‘future-proof science’ consists not merely in an inductive base of historical examples, but additionally in an argument (drawing on McMullin 1984) from the development of new technologies which allow us to ‘see’ (in a reasonable sense) that which was previously purely theoretical.

References

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17:30 – 18:00

David Thorstad (University of Oxford) – General-purpose institutional decisionmaking heuristics: The case of decisionmaking under deep uncertainty

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: It is often desirable to guide policymaking using rigorous scientific methods. However, most existing methods are ill-equipped for decisionmaking on a timescale of centuries or millennia. Existing decision-theoretic, econometric and statistical methods are usually inapplicable on this timescale, and when they are applicable they often prove inaccurate or unreasonably costly. This raises a problem, since many policy decisions such as long-term infrastructure investment and climate mitigation strategies have effects on very long timescales.

A suite of methods for decisionmaking under deep uncertainty (DMDU) have recently been developed by risk analysts, mathematicians and philosophers of science to provide rigorous guidance for the conditions of deep uncertainty characteristically found in long-term decisionmaking (Helgeson 2020). These methods include robust decisionmaking, info-gap decision theory, and scenario

planning. DMDU methods have been successfully applied to guiding deliberation about very long-term policy projects such as investments in energy infrastructure or climate change mitigation.

What is the question to which DMDU methods are an answer? Some authors have interpreted DMDU methods as criteria of rightness for long-term decisionmaking, explaining what it means for a decision under conditions of deep uncertainty to be correct. Mogensen and Thorstad (2022) argue that just as decision-theoretic criteria, such as expected utility maximization, have been interpreted as criteria of rightness for decisionmaking under friendlier conditions, so too DMDU methods should be interpreted as embodying criteria of rightness under conditions of deep uncertainty.

An alternative answer takes DMDU methods to be heuristic decision procedures for long-term decisionmaking. On this view, DMDU methods make no claim about rightness, or indeed no normative claim of any kind. DMDU methods are instead proposed as feasible and effective processes by which agents can make decisions under conditions under deep uncertainty, which are likely to score well under many different criteria of rightness.

In this paper, I argue for a heuristic interpretation of DMDU methods by arguing that DMDU methods bear four marks of heuristicality, characteristic features of heuristic decision processes. I show how the heuristic interpretation of DMDU methods answers two common objections to DMDU methods by revealing those objections to be special cases of familiar objections to heuristic methods, which can be answered in familiar ways. I also draw out a novel implication of the heuristic interpretation of DMDU methods: on the standard ecological approach to heuristic rationality, it is widely agreed that different methods are appropriate for different environments. If that is right, then there can be no sense to arguments about which DMDU method is `correct': we must ask of any given method in which environments it would be appropriate, and in which environments it would be inappropriate.

References

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ROOM 01

17:00 – 17:30

Matthew Slater (Bucknell University), Matthew Barker (Concordia University) - Norm-Driven Scientific Classification Can Be Rational without Objectivity.

Topic: B.1 Methodology

Abstract: According to a widespread view of scientific classification, empirical discoveries drive classificatory progress and make objective classification possible. We contest this Discovery Picture and instead claim that successful classification is driven significantly by decisions based on normative commitments — commitments to pragmatic classificatory norms (as we call them). We will only sketch our argument for the activity of these norms; our main aim will then be to address a potential concern about normative pictures of this sort: namely that undermining the objective empirical ground for classification claims, they invite a corrosive form of pluralism. David Hull, for example, warned that

pluralism "provides no means or even motivation for reducing conceptual luxuriance" (1987, 178) — a worry that Kitcher anticipated in his discussion of species pluralism (1984) under the rubric of "a return to Babel". More recently, biologists Garnett and Christidis have argued against what they call "taxonomy anarchy" in species classifications as hampering conservation efforts (2017, 25).

Other authors have, of course, discussed the threat of this sort of pluralism (see, e.g., Kitcher 1984; 1987; Dupré 1993). But we have found those responses wanting. They typically seek to restrict pluralism to a modest rather than radical form on the basis of identifying a certain kind of foundation for the relevant classificatory work — whether it is something having to do with the aims of the inquiry in question or of the taxonomic system desired (e.g., Haslanger 2016), or to do with the proverbial "joints of nature" (even if these are non-monistic). On our view, there are no such final foundations. Once one recognizes the "norm-ladenness" of classification claims, one is forced to recognize a sort of regress wherein classificatory norms can be sanctioned only by other higher-order norms.

We shall argue, however, that this situation is not as dire as it might appear. While the norm-ladenness of classification does open science up to the *possibility* of endless profusion of acceptable classificatory systems, radical pluralism is only problematic for science if the profusion gets out of hand in ways that disrupt scientific work. By shifting focus from an (unattainable) *objectivity* of classification systems to their *rationality*, we will explain how investigators can locate a position of "neutral buoyancy" at which they either find agreement on the normative basis of classification claims, or simply allow certain projects to bifurcate. We will further argue that recognizing the norm-ladenness of scientific classification would help resolving apparently endless classificatory disputes.

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17:30 – 18:00

Steve Elliott (Arizona State University) - An Epistemic Account of Complex Phenomena.

Topic: B.1 Methodology

Abstract: James Ladyman and Karoline Wiesner propose a framework of complex systems that has been influential especially among practicing scientists and mathematicians (Ladyman et al. 2013; Wiesner and Ladyman 2019; Ladyman and Wiesner, 2020). In brief, they define complex system as those that exhibit "some or all of spontaneous order and self-organization, nonlinear behavior, robustness history and memory, nested structure and modularity, and adaptive behavior," such that these "features arise from the combination of the properties of numerosity, disorder and diversity, feedback and non-equilibrium" (Ladyman and Wiesner 2020, 10). Ladyman and Wiesner (LW) also extensively discuss extant measures for each of those features, thus continuing a tradition of bridging philosophical discussions of complexity with the needs of practitioners (e.g. Mitchell 2003; Bechtel and Richardson 2010; Strevens 2016). LW intend their framework to fit with the ontological position of Rainforest Realism (Ladyman et al. 2007), and ultimately to inform the debate between realism and instrumentalism as to the correct view of the cognitive status of scientific theories (Ladyman et al.

2013). I propose here a few challenges for LW's framework. These challenges are about the difficulty of knowing when systems satisfy the definitional conditions for complexity, especially numerosity, disorder, and diversity. These challenges provide opportunities to buttress LW's framework, not justifications for abandoning it.

I propose an epistemic account of complex phenomena, which complements LW's ontic framework for complex systems. It addresses the challenges raised without requiring commitment to either instrumentalism or realism. Briefly, the epistemic account treats phenomena (of which systems are a kind), as complex only in relation to a set of theories/models putatively used to understand them. Thus, phenomena may be complex with respect to one set of theories/models, but not (or less so) with respect to another. This account is useful for at least three reasons. First, it complements LW's framework and further enables those with metaphysical commitments beside Rainforest Realism to use it. Second, it dissolves the challenges I raise for LW's account. Finally, it helps us explain how practicing scientists integrate theories or models to understand complex phenomena, or how they change their research aims over time.

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ROOM 02

(TIVSM) From previous time slot, same room.
Symposium: Towards an integrated view of scientific modelling

17:00 – 17:30
Yuki Ozaki (Hokkaido University) - A Philosophical Analysis of the Ambiguity Problem in a Statistical Model of Human Perceptual Learning.

Topic: B.1 Methodology

Abstract: Statistical models of human perceptual learning have been widely studied in cognitive science. One of the main targets of the research is to model how humans estimate the three-dimensional structure of objects on the basis of two-dimensional images. This target of the research raises the problem of the ambiguity of a two-dimensional image: the same image can be compatible with multiple three-dimensional structures. To solve this problem, the idea that humans make a kind

of top-down judgment using their background knowledge when they face the ambiguity (an idea that goes back to Helmholtz's unconscious inference (Helmholtz 1925)) is formalized by means of mathematical Bayes' theorem. The models of human vision based on this idea are called Bayesian models of perceptual learning or probabilistic models of vision. The basic idea of such models, including the idea that perception is a kind of inference from 2D image description to 3D object description, is summarized in Kersten Yuille Mamassian (2004). While the recent research on the Bayesian model of vision has focused on its implementation utilizing machine learning methods including convolutional neural networks (CNN), the basic idea of the Bayesian model of vision seems to have been exhausted in this paper.

The purpose of this presentation is to review this scientific model by reference to philosophical arguments on Bayesianism. In these arguments, various problems concerning Bayesian inference, mainly which are related to the updating of the degree of belief, have been dealt with. Among such criticisms, probably the most notable is the one concerning so-called grue paradox (Goodman 1955, Earman 1992), a paradox pointing that two different predicates are equally confirmed by the same instance. I will show that some parallelism between philosophical issues of grue paradox and the problem of the ambiguity of a 2D image in the Bayesian model of vision, and that Goodman's theory of projection, a theory proposed as a solution to the paradox, would provide a promising clue to the handling of the ambiguity problem in the Bayesian model of vision. I will also show some general implications of this argument to recent debates on scientific models, particularly about the inclusion of subjectivity, which seems necessary in scientific modelling but seems almost dismissed in scientific practices.

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17:30 – 18:00

Ohkubo Yusaku (The Institute of Statistical Mathematics) - The status of the statistical predictionalism on the philosophy of scientific model representations.

Topic: B.1 Methodology

Abstract: Models play important roles in science and have been a focus of many philosophers in these decades. In particular, to address how the scientific model represents the real world is one of the centric issues in the literature of the philosophy of the scientific models (e.g. Weisberg 2012, Frigg & Nguyen 2020). However, little attention has been paid to the role of statistical inference in the theory of scientific representation of the models. Since, in the modern practice of science, statistical inferences "bridge" the gap between a hypothesis and empirical data, incorporating an adequate statistical perspective is desired in the successful account of scientific model representation.

In this presentation, I clarify the role of statistical inference in the scientific model representation accounts, based on the recent advancement of the model selection theory. While, in the philosophy of science, the field of model selection has been picked up to discuss the rationale of simplicity (i.e. Occam's razor), several statisticians (e.g. Konishi & Kitagawa 2008) go further to

advocate an axiological concept called “Frequentist predictionalism” based on this field, where the representation of statistical model can be reduced to the recovery of the best accurate “predictive” distribution in the Frequentist sense. This concept could connect the philosophical insights of scientific model representations with the role of empirical data analysis by the model selection theory.

I introduce the concept of the “Frequentist predictionalism” and clarify its limitations. Then, I examine the relationships between the previous philosophical theories of representations and the “Frequentist predictionalism” by comparing this view with an alternative concept called “focused **(STRUCT)**parameter” (Claeskens & Hjort 2008; Jullum & Hjort 2017).

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ROOM 03

(STRUCT) From previous time slot, same room.

Symposium: The Limits of Mathematical Structuralism: a practice-oriented analysis

17:00 – 17:30

Bernd Buldt (Purdue University Fort Wayne) - Why structuralism can only be part of the story.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: When I teach our Fresh(wo)man Success Seminar, I advise them not to worry whether mathematical objects qua abstract objects do exist but to simply conceive of them as concepts that we, humans, made up in order to devise better models of real-world phenomena. But this is not just advice for undergraduates; I think it is a better approach for philosophers of mathematics, too.

Historically speaking, this approach is in line with how Cantor or Dedekind as well as Hilbert conceived of mathematics before the latter two were almost exclusively read through structuralist lenses—an approach that became prominent not so much on its own strength but because many believed it to be the most promising response to questions of mathematical existence Beneceraf had raised half a century ago. While structuralism may shine in fields dominated by algebraic ideas (which, I hasten to add, may include number systems at the foundation of analysis), it fails to offer a satisfactory account for everything else, which, according to Dieudonné (1960, p. ix), is then informed by ideas from analysis:

“All branches of modern mathematics involv[e. . .] ‘analysis’ (which in fact means [it is]everywhere, with the possible exception of logic and pure algebra).”

Structuralism fails as a comprehensive philosophy of mathematics, or so I wish to argue, because we do not have a good structuralist account of how a number of processes (such as limit or convergence) or objects (such as the unit circle or an open set), or concepts (e.g., the idea of a mapping, a concept that is even presupposed for structuralism to work) behave in their 'natural habitat,' mathematical practice. Moreover, as a general philosophical framework structuralism falls short of providing guidance for answering other questions one may consider important; questions, e.g., about the role of intuition or on how mathematical epistemology connects to and fits into a general naturalized theory of knowledge.

In my talk I plan to start with key quotations from Cantor and Dedekind and then sketch how turning away from ontological questions (mathematical objects) and instead homing in on mathematics as a fabric of concepts does more justice to mathematical practice — which, I hasten to add, is not confined to research or expositions in textbooks and journals but must include activities such as teaching and learning mathematics — and elucidate this general claim with the help of a few selected examples.

17:30 – 18:00

Piotr Błaszczyk (Institute of mathematics, Pedagogical University of Cracow, Poland) - Structure of real numbers vs. mathematical and historical facts.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: We show that Mac Lane's and Shapiro's concepts of the structure of real numbers neglect crucial mathematical and historical facts. We present real numbers as a domain of specific deductive techniques, primarily of sequences and limits.

1.The first constructions of real numbers occurred in the 70-ties of the 19th century. In 1900, Hilbert set up axioms for an ordered field while declaring that real numbers make the biggest Archimedean field. In 1903, Huntington found a straightforward continuity axiom and proved the categoricity of axioms for real numbers. They are believed to describe the structure of real numbers [1],[2],[3].

Shapiro's take on real numbers is framed by Benacerraf's multiple-reductions argument and the categoricity of axioms. He identifies real numbers as an ontological structure, while Cantor fundamental sequences or Dedekind cuts are to exemplify that structure [4],[5].

2.In [6], Pontriagin applied to real numbers the concept of a topological field that combines an ordered field and the continuity of algebraic operations. By interpreting Cauchy and Dedekind's completeness in terms of locally compact and connected space, he proved that any locally compact and connected topological field is isomorphic to the field of real or complex numbers, or quaternions.

Assuming commutativity and topological dimension 1, Pontriagin's theorem provides another unique characteristic of real numbers. Any ordered field is a topological field, but not the other way. There is no rationale, thus, to favor the perspective of ordered fields.

3.Mac Lane offers an odd explanation of the fact that nonstandard and standard analysis get the same results: ``there are other models of the reals – as indeed there are multiple models for many mathematical ideas" ([2],107). The transfer principle establishes the relationship between these two analyses, meaning a reference to formal language rather than a structure is more effective in that context.

4.We show that:

a) standard analysis interprets the results of Newton and Euler achieved through techniques such as formal power series or infinitesimals [7]. Thus, the claim that "real analysis is the study of the pattern of any complete real closed field" ([5],259) is ahistorical.

b) Cantor and Dedekind's dichotomy of rational and irrational numbers sends back to Euclid's co- and in-commensurate line segments rather than the structure of real numbers.
c) the concept of an ordered field rather than real numbers links Euclidean proportion and calculus (contrary to [2],76).
d) Hilbert geometry does not provide foundations for Euclidean proportion (contrary to [3],176). Moreover, although Euclidean proportion paved the way for early modern mathematics, it got no rigorous form in modern geometry [8].

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[6]Über stetige algebraische Körper, 1932.
P.Błaszczyk, A.Petiurenko,
[7]Euler's series for sine and cosine. An interpretation in nonstandard analysis, 2022.
P. Błaszczyk
[8]Descartes' Transformation of Greek Notion of Proportionality, 2022.

ROOM 04

(VALOR) From previous time slot, same room.
Symposium: Values in Organismal, Environmental and Multi-Species Research in Biology and Biomedicine

17:00 – 17:30
Abigail Nieves Delgado (Utrecht University) - Race, racism and values in human microbiome research

Topic: C.3 Philosophy of the Biological Sciences

Abstract: Recently, the concept of race has become central in the rapidly growing field of human microbiome research. Here, it is widely used to classify the different predisposition to health problems (e.g., obesity, type-2 diabetes) suffered by different human groups. In contrast to previous understandings of race, this new 'race' is not primarily genetic but refers to different microbial compositions (e.g., in the gut) of human groups in certain environments. This leads to a situation where race can either refer to genetic ancestry (e.g., of the host) or to local cultural practices, like diet patterns, and different lifestyles that are embodied by the host through its microbiome, or both at the same time. I argue that resorting to race in this field of research does not provide with the epistemic means to make sense of the relevant differences between populations under study. Instead, we need to rethink the ways in which populations and their environments are portioned through the epistemic and non-epistemic values motivating our categorization practices. In other words, to find the relevant differences between populations and to determine whose microbiomes in which environments

represent a biomedically relevant combination, we need to look at the value-systems underlying scientific research in each case.

To do that I suggest we can use different 'glasses' to look at human diversity and race in human microbiome research. Given a particular research population, scientists 'see' this one population through each 'lens' differently. Choosing a particular lens means favoring certain (a) epistemic criteria (e.g., precision, proportionality), (b) non-epistemic criteria (ethical and social considerations) and (c) contextual factors (self-identification, segregation/discrimination). Evaluating these criteria helps us determine which research situation needs which 'lens' – a local focus (culture, lifestyle, diet) or a global focus (genetic ancestry) – to meet the adequate explanatory level, identify socially relevant health differences, and avoid stereotyping or discriminating when studying human and microbial diversity. This framework will show that using one lens only may lead to biases and blind spots. For example, seeing indigenous communities in the Amazonas primarily through the global lens (using racial-genetic categories to compare them to US or European populations) may serve the non-epistemic value of fighting global diseases (e.g., obesity). But it can stir objectification of these groups (as 'containers' of primitive microbes to be harvested for a greater good) and blind scientists to important local (non-)epistemic questions (What diseases do indigenous groups face and how to treat them? How does their microbiome change due to environmental destruction? etc.). I use this view of 'glasses' to examine how studies done in South Africa and Mexico conceptualize populations under study. In addition, I especially look at the values favored when characterizing populations under study. Finally, through this analysis I show that the multifaced concept of race has little explanatory power in human microbiome research and can effectively been substituted by other more relevant categories.

17:30 – 18:00

Saana Jukola (University of Twente) - An analysis of conceptualizations in alcohol research.

Topic: C.3 Philosophy of the Biological Sciences

Abstract: Given the prevalence of deaths related to alcohol consumption as well as the suffering caused by alcohol, research-based measures to intervene on alcohol problems are needed. Yet in both research and policymaking there exists debate about how problematic alcohol use should be conceptualized and what operationalizations should be adopted in research. 'Alcohol problem' is thus a so-called Ballung concept, i.e., concept that has multiple context-dependent meanings (e.g., Bradburn et al. 2017). I argue that in research, there are three different frameworks for studying alcohol problems: medical, social scientific, and public health frameworks. By applying Longino's (2002) account of "local epistemologies", I analyse how these frameworks study alcohol problems and explicate their theoretical foci and limitations. In particular, I show how the frameworks differ in whether they conceptualize alcohol problem as a condition that is situated in an individual's physiology, psychology, or as (drinking) behaviour that is labelled as problematic in a certain socio-cultural environment. I also argue that theoretical and practical tensions arise because of these different conceptualizations.

In the medical framework, an alcohol problem is conceptualized as an (innate) condition of an individual. This view often takes a binary position: a person either has a condition (i.e., has an alcohol problem) or has doesn't (i.e., does not have problems with alcohol). This conceptualization of the alcohol problem as a condition situated in individual physiology or psychology is criticized for being too narrow by researchers studying the phenomenon within a social science framework. Social scientists argue that one should focus less on the individual and more on the population level. Here, considerable costs and harms of alcohol use are attributable to drinkers who are not addicted or diagnosable as suffering from alcohol related medical conditions. Instead, 'alcohol problems' are conceptualized as behaviors that are labelled as problematic in their environment, for instance

belligerence or missing work because of drinking. The medical framework's conceptualization of alcohol problems as located in the make-up of pathological individuals is contrasted also by the third, namely, public health framework. In this framework, an alcohol problem is conceptualized as consumption that exceeds certain daily or weekly limits regardless of whether the individual satisfies the diagnostic criteria of any alcohol-related disease or whether any of their behavior is labelled as by their peers.

The multifaceted nature of the concept of 'alcohol problem' and the differences in how it is conceptualized in empirical research (ranging from individual to population levels, and from physiological to psychological and behavioural characterizations), create tensions, which arise particularly when amalgamating and comparing knowledge from different fields is required for practical decision-making: Evidence produced using different conceptualizations supports different measures for reducing alcohol-related harms to society. For example, public health scholars argue that the medical framework's conceptualization of alcohol problems as individual-level problem of pathological drinkers is used to biomedicalize alcohol problems and support arguments against potentially useful policies targeting alcohol consumption at the population-level.

ROOM 06

17:00 – 17:30

Migdalia Arcila Valenzuela (Cornell University) - Attachment theory: Towards an Ethological Approach to Grief.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: Grief poses a dilemma. On the one hand, there is evidence of the universality of grief among humans and non-human animals that suggests that grief is a reaction favored by natural selection.

On the other hand, grief usually involves detrimental behavioral tendencies such as loss of appetite, loss of sexual drive, and suicidal ideation. Therefore, there are reasons to think that grief is also maladaptive. Current accounts of grief (Cholbi, 2022; Marusic, 2022) have approached this problem by denying the second horn of the dilemma, i.e. they sustain that grief has a function that consists in rebuilding one's identity after the death of a loved one and re-accommodating one's life after such a loss.

In this paper, I argue that these approaches ignore relevant evidence from ethology. Grief is a byproduct of the system of attachment that allows us to sustain social bonds and, as such, has no function. Instead, grief is the price we pay for the possibility of maintaining social bonds that provide security and comfort. This is an idea that can be traced from Darwin to the early Dutch ethologist (Gerard Baerends, 1976; Niko Tinbergen, 1942, 1951). To explain the relevance of ethology for debates about the nature of grief I rely on John Bowlby's attachment theory (1969, 1973, 1980), according to which grief originates in the same biological system that promotes social behavior, both in humans and in large mammals. Therefore, as a response to abandonment, grief becomes fruitless in cases where there is no possibility of a reunion with the attachment object. Furthermore, by relying both on ethological evidence and psychoanalytic concepts, attachment theory would help us to see the relevance of interdisciplinary approaches to grief.

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17:30 – 18:00

Nataliia Viatkina (Skovoroda Institute of Philosophy of National Academy of Sciences of Ukraine)
- Concept of Deference: Semantic and Pragmatic Interaction.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: The aim of the paper is to highlight the main areas of debate surrounding the concept of deference and to make sense of the meaning of deference by outlining a theoretical and practical framework for the concept of deference.

This term is almost never found in dictionaries and encyclopedias of philosophy. But it can be argued that the concept of deference is gradually taking its place among the tools of language analysis, speech behavior, social communication, theory and practice of argumentation,
expert opinion, knowledge presentation models [Dorst, K., et al. (2021). Deference Done Better.mPhilosophical Perspectives 35 (1):99-150].

The idea of deference is not new, but it cannot be called well-studied. There is a considerable amount of studies on different aspects of deference, and only one generalizing, but not exhaustive, account (Stojanovic, De Brabanter, Fernandez, Nicolas, 2005 Deferential
Utterances. http://jeannicod.ccsd.cnrs.fr/ijn_00000575/document). There is a lack of research on the formation and qualification of those branches of deference as judicial deference, as well as related concepts such as respect, trust or confidence, taking deference as an intensional relation
[Mahtani, A. Deference, respect and intensionality. Philos Stud (2017) 174:163–183]. The same applies to research that connect different areas of practical application of deference (public law,multidisciplinary team research, expertise, socio-semantic knowledge networks).

Among those who write about deference, the distinction between epistemic and semantic deference is generally accepted. Semantic deference is of two types - deliberate and default [Villanueva, N., de Brabanter, P. 2007 A linguistic road to semantic deference https://jeannicod.ccsd.cnrs.fr/ijn_00345341].

The phenomenon of semantic deference consists in the fact that the meanings of some of our concepts are fixed in the minds of other people. Semantic deference encompasses the fact that ordinary people rely on a competent authority (or they ascribe an expert quality to them)
who ascribes to “apriori empty concepts” (ontological fictions like Virgin, etc) the meanings and connotations they have not right or competence to do [Kaufmann, L (2006) The Paths of Deference. On the Nature of Sociopolitical concepts. In Langage et Societe. Vol.227, Issue 3,pp.89-116]

How such concepts can work, as well as why we should have such concepts the content of which is fixed or determined by others, is considered in the paper. A similar question appears when we use someone else’s opinion to define our own in cases of expert deference [Pettigrew,R., Titelbaum, M. (2014). Deference Done Right. Philosopher’s Imprint Vol 14, No.35] and in the shifts of burden of proof to the other party in an argumentative discussion [Walton, D., & Koszowy, M.

(2018). Whately on Authority, Deference, Presumption and Burden of Proof. Rhetorica: A Journal of the History of Rhetoric, 36(2), 179–204].

Answering these questions means finding out that deference exists on the border between semantics and pragmatics. Such an intermediate position allows to separate deferential concepts from referential ones as related to different classes of objects [Kaufmann, 2006] and to use deferential concepts in limited contexts, such as idiolect, sociolect or professional jargon.

ROOM 12

17:00 – 17:30

Onyu Mikami (Tokyo Metropolitan University) - Reconsidering the role of the Notion of Truth -- Assumptions as a resource for inference --.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: There have been many arguments about whether the central notion of logic is proof (justification, verification) or truth. Those who take the position of realism (or Platonism) would insist on the latter, and hardcore constructivists would emphasize that we must stand on proof alone. Michael Dummett, as is well known, gives a sympathetic argument for constructivism. However, in seeking to establish a theory of meaning based on the concept of justification, he seems to point to the inescapability of the concept of truth in certain contexts.

One such context is assumptions in future-tense conditionals such as “If you go into that room, you will die before nightfall”. If you understand such a proposition, what do you understand about the antecedent of this proposition? It would not be its justifiability, in other words, its present tendency to occur. Rather, if we understand such a statement, we can conclude by relying on this assumption, regardless of whether this antecedent is in principle justifiable. From this, we can see that the notion of truth has a role to play in mastering the linguistic act of assuming that constitutes our inference/reasoning process.

Such a conception of truth is somewhat weaker than classical truth (which is usually characterized by correspondence to the objective world). So there is room for further consideration of what role "assuming to be true", which is still at issue in constructive proofs, has in such proofs. I want to focus on the view that assuming propositions to be true allows them to serve as a "resource" from which we derive a consequence. In mathematics and other reasoning practices, when we assume certain propositions, we stand on the states in which they hold, and derive the new proposition in question by using those assumptions and applying the appropriate rules to them. In such practices, assumptions serve as resources in the sense that they serve as material for the proof of the proposition in question and that they are considered as having internal structures that deserve to be subjected to inference rules. The structure (which, as I will discuss in detail in my presentation, is nothing other than the notion of “sense (Sinn)” which Dummett inherits from Frege) can be thought of as giving the sentence its informativeness as a resource.

In substructural logic and related fields, researchers have taken the approach of restricting structural rules such as weakening and contraction, allowing classical and intuitionistic logic to be analyzed in terms of more foundational (resource-sensitive) concepts. In my presentation, I will explain the relations between the above conception of truth and recent research in substructural logic, and re-assess Dummett's insights on truth in a context that is conscious of resources.

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17:30 – 18:00

Jesús E. Granados Gurrola (National Autonomous University of Mexico) - Uniform solution without inclosure schemas?

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: In this paper I want to present a new conceptual analysis around paradoxes of circularity and their interaction with the Inclosure Schemas and the Principle of Uniform Solution. Paradoxes are a very notorious topic, not only in logic, but in many philosophical and scientific areas such as: metaphysics, epistemology, mathematics, etc. One of the most known and studied kinds of paradoxes are the circular ones. In 1994 Graham Priest wrote a notable paper about the structural properties of this kind of paradox. In that paper, Priest does a review on previous literature regarding two positions. The first claims that all these paradoxes have a different structure so they cannot be included into the same family, this is known as Ramsey’s position. The second proposal is Russell’s, affirming that all circular paradoxes share the same structure, and thus they are part of the same family. Priest agrees with Russell, and has since made two independent contributions. One of them is a schema that characterizes all the circular paradoxes and only them, these schemas are known as Inclosure Schemas. The other one is the Principle of Uniform Solution (PUS), which means it is natural to expect all the paradoxes of a single family to have a single kind of solution. Priest himself admits his schema cannot comprehend Curry’s paradox so this paradox requires other treatment. There are other alternative analyses on the structure of paradoxes with similar intents, but there are analyses without these intents for example Lawvere’s. Lawvere’s work does not follow an inclosure schema, that’s because the same structure can be found in many other phenomena. Usually Inclosure Schema and PUS are taken together so my main goal in this text is not to propose a new conceptual tool or solution, instead I’m going to analyze how much we can defend the PUS and the use of Lawvere’s result without the presence of inclosure.

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(COPHITES-TV) From previous time slot, same room.
Symposium: Technology and values in an uncertain world

17:00 – 17:30
Pieter Vermaas (TU Delft) - The politics of quantum technologies.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: This contribution argues for two positions: work on the societal impact of quantum technologies demonstrates that normative discussions of technology can include political values; and research on engineering systems is a useful resource to philosophy for analyzing these political values of technology.

Landon Winner [3] already announced that artefacts have politics by showing that technology comes with specific "arrangements of power and authority in human associations." Philosophers of technology have since taken up the project to further analyze this aspect of technology, also for finding ways to design technologies such that they strengthen, or not harm, our values. In this project technology is typically taken as, indeed, artefacts, and resources for philosophy are then theories of innovation and engineering design methods.

Quantum technologies are new technologies that attracted attention for their possible impact on society. Philosophical research again focusses mainly on projected artefacts, exploring ethical questions about, e.g., quantum computers decrypting digital communication, access to quantum internet, and responsible use of quantum sensors. Although important, this focus ignores that quantum technologies have become part of geopolitics. While early funding initiatives aimed at securing national economic positions, current funding brings in geopolitical considerations like digital security and technological sovereignty. These geopolitical discussions of quantum technologies are normative and also ethically important: the U.S., China, Europe, et cetera, all want to develop their own quantum technologies, avoid supply chains dependencies, and limit accessibility.

Engineering systems [1,2] are defined as complex global sociotechnical systems that provide solutions to central economic and societal challenges, fulfil important functions in society and exist over long lifespans. Examples include energy generation and distribution, manufacturing, and communication. Engineering systems are researched since they resist the controlled manner by which engineers want to introduce new technology: by their long lifespans, engineering systems can effectively only be redesigned; by including social groups and institutions, they contain non-technological elements, like politics, that resist pinning down problems in terms of fixed design requirements; and by their global connectedness, (political) changes elsewhere in the world may disturb local functioning of engineering systems, as witnessed during the covid pandemic.

Research on engineering systems can inform explorations of the societal impact of quantum technologies, and let it go beyond the ethics of quantum artefacts towards the politics of technology. Quantum computers may decrypt digital communication, leading to the development of new (post) quantum encryption, and the standardization of such encryption. For engineers the second effort seems a political process that frustrates the first; from an engineering systems perspective both efforts are needed for incorporate quantum computers in the engineering system of communication. The geopolitical struggle over quantum technologies can in turn be seen as a redesign of supply chains to avoid global knock-on effects and maintain autonomy and equality between nations.

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17:30 – 18:00

Luca Possati (Delft University of Technology) - An Ethical Approach to Quantum Technologies Through the Lens of Identity Politics.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: This paper intends to analyze the current debate on quantum technologies (QTs) through the lens of identity politics.

The classic approaches to the ethics of technology and technology assessment do not work for QTs for three reasons: a) the high level of uncertainty associated with QTs (we do not yet know their social impact or many of their applications); b) the large gap between experts and laypeople on quantum mechanics and QTs; and c) the high risk of technology determinism. Therefore, there is a need to develop a new approach to QTs that is not based on classical socio-economic categories and theories. This paper claims that the identity politics approach can significantly contribute to this goal. The core of identity politics is the critique of classic socio-economic theories, which—according to the theorists of this approach—lead to biases (discrimination, marginalization, epistemic injustice, etc.). Instead, the identity politics approach claims that it is necessary to identify these biases and defend social identities so that a fully ethical approach can be developed for society.

At the heart of this approach to political problems is defending the social identities of historically marginalized and discriminated groups, such as Blacks, Indigenous people, women, homosexuals, and persons with disabilities. Whereas theorists from the liberal philosophical tradition adopt a universal stance (i.e., they demand justice for all), the identity politics approach argues that this is not enough to stop discrimination in real societies [1].

Applying the identity politics method to QTs means a) analyzing the current political debate on QTs, b) identifying the main biases in this debate, and c) developing creative design solutions to overcome these biases. For example, what is the role of the Global South in the development of QTs? Which kind of marginalization is operated against the Global South? How can we improve accessibility to QTs for the Global South?

The first part of the paper will include the results of a literature survey on QTs. Four layers of biases will be identified: rhetorical biases concerning the language used to talk about QTs, such as the rhetoric of “disruptiveness” or the “weirdness of quantum”; global-political biases related to the distribution of QTs, such as the lack of equitable distribution in poor countries; epistemic biases that cover the expertise gap on quantum mechanics and QTs; and cognitive biases that influence our attitudes toward QTs and are also common to other technologies.

The second part of the paper will analyze design solutions that can fix or attenuate these biases. For example, a problem is representing quantum data so that it is more understandable for non-expert people. A possible design solution could include the sonification of quantum data. In fact, data sonification can better represent the essential characteristics of a qubit (e.g., superposition) than data visualization.

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ROOM 14

17:00 – 17:30

Mihai Hîncu (Valahia University of Târgoviște, Romania) - Meaningful Recantations. A Game-theoretical Approach to the Semantic Uncertainty of Retraction Speech Acts.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: The spectrum of situations in which someone can issue retractions ranges from contexts of ordinary conversations to contexts of critical discussion and of scientific research. Although pervasive in different compartments of our lives, the theme of retraction is new to the philosophy of language. As a second-order speech act, retraction has recently been mobilized dialectically to justify certain semantic theories (i.e., relativism) about perspectival expressions (e.g., predicates of taste, epistemic modals). Likewise, speakers' intuitions about retraction data have been experimentally tested in various empirical studies to draw conclusions about the predictive validity of these semantic theories.

In this paper, I focus on some problems related to the complexities of retraction not addressed in the literature. Insofar as a speaker S can effect a retraction by uttering “I retract that” or “I take that back”, a first problem regards the semantic uncertainty of the performed speech act. More precisely, does S express an endorsement of the complementary denotation of what was previously asserted, or by retracting S only intends to publicly signal that he is no longer disposed to uphold the denotation of the original assertion? Insofar as a successful retraction requires a modification in one’s previous perspective, a secondary problem concerns the agents’ cognitive dynamics. More specifically, the question is how a listener L should understand S's epistemic position with respect to the set of propositions constituting the Stalnakerian common ground of a conversation: as a revision of the propositional content expressed by the doxastic correlate of S’s antecedent assertion, or as a suspension, induced by a lack of evidence, of the initially asserted belief? A corollary problem is related to the inferential space: sometimes a retraction may trigger a cascade effect (e.g., in case a conditional has already been accepted by all conversation participants, the retraction targeting its consequent entails a retraction of its antecendent), sometimes it may not (e.g., the retractor linguistically signals an unopinionated informational state from which nothing should be logically entailed). In this regard, both agents must coordinate to correctly circumscribe the inferential space generated by retraction and to agree on what is permissible to contextually infer.

To address these problems, using the conceptual framework of game-theory, I present a scenario of strategic communication involving retractions, I model it as a two-agent coordination game, and I show what logical conditions have to be satisfied in order for rational agents to reach a Nash equilibrium when the retraction’s surface syntax is probabilistically silent about the meaning ensuring their coordination. My model highlights the mutually recursive way in which each agent reasons about the other agent’s probabilistic reasoning, and it manages to integrate the above uncertainties related to retraction.

I conclude by showing that ignoring those manners of retraction that mimic the epistemic policy of conciliationism, and the possibility of the retractor to contextually exploit unmarked linguistic expressions, generates methodological flaws in the experimental designs treating the expression “I was wrong”, which occurs in their vignette-based instruments for data collection, as a central linguistic marker of retraction.

17:30 – 18:00

Rodrigo Lopez-Orellana (Universidad de Valparaíso), Bralind Kiri (Universidad de Granada) - Scientific understanding and mathematical modelling in economics.

Topic: C.7 Philosophy of the Humanities and the Social Sciences

Abstract: We propose an inferential and pragmatic perspective on economic models. This perspective can be useful to mitigate issues such as fragmentation, arbitrariness, and lack of introspection in economics. Along our inquiry, we hold that economic phenomena are intrinsically open to a wide range of possibilities and for this reason we build upon the concept of Scientific Understanding, as in the version contemplated in de Regt et al. (2009). We draw attention to the improper use of mathematical modelling, which may arbitrarily restrict our considerations for the immense abundance of economic phenomena. Moreover, we infer that the incorrect use of models at the theoretical level has led to issues, such as those pointed out beforehand. In our view, models, in line with the criteria of surrogate reasoning and directionality (i.e., the model-M is directed toward a target system-TS, and not the other way around), should be able to generate: (i) new problems in the form of inconsistencies between empirical observations and theoretical predictions, (ii) new value in the form of a better understanding of the phenomena, and (iii) new actions to be taken, usually in the form of posing new hypotheses. These three elements altogether, i.e., new problems, new value, and new actions, will consequently lead to the application of the principle of Scientific Understanding, a rationale of economic modelling, which seems to be completely omitted by the mainstream view on economic models. Additionally, we believe that Scientific Understanding is a pragmatic position towards mathematical models of any type. It considers them as mediation tools between theory and reality, to be used autonomously, without interfering with target systems (TS), and to the aim of surrogate reasoning. Among other things, we hold that this view may contribute to avoid the endogeneity in public choice, a form of arbitrariness pointed out by Witt (1992), and which refers to the negative side of specialized agents' (e.g., academic economists) comparative advantages compared to other agents' (e.g., laymen, or other non-specialized agents) abilities in selling some ideas. On this issue, we believe that the standard of Scientific Understanding, while it is rooted in the criteria of surrogate reasoning and directionality, would significantly contribute to a higher reliability of economic modelling. In practical terms, the new perspective would imply a stronger emphasis on models as tools for comprehension rather than for attaining the so praised prediction accuracy. Accordingly, in line with the Popperian view, economic models should not limit the intrinsic capacity of phenomena to crystallize a various range of propensities, which may well imply new forms of economic value and welfare (ex-ante unthinkable). We provide examples of models, which do (do not) allow to achieve a good level of Scientific Understanding. Overall, we conclude that the notion of Scientific Understanding as a function of economic models can be useful to bridge the gap between diverse economic approaches, which are seemingly opposing and irreconcilable.

SATURDAY, JULY 29TH

09:00 - 11:00	INVITED SPEAKER: NIKOLAJ JANG LEE LINDING PEDERSEN

AUDITORIUM 1

INVITED SPEAKER

Nikolaj Jang Lee Linding Pedersen (Yonsei University)

Considerations on the alleged inevitability of paraconsistent (and paracomplete) consequence

Chair: Juliana Bueno-Soler, Juliana (Centre for Logic, Epistemology and the History of Science and School of Technology-Unicamp)

Topic: A.2 Philosophical Logic

Abstract: Consider the following two theses:

(T1) Classical logic is the correct view of logical consequence.

(T2) Possibility behaves in accordance with classical logic (i.e. possible worlds are closed under classical logic).

Let The Classical Combo be the conjunction of (T1) and (T2).

Jc Beall has recently claimed to show that, given the Classical Combo, a very natural paraconsistent, paracomplete consequence relation is inevitable. Beall's purported consequence relation is defined over duo-pairs: ordered pairs of worlds where one acts as a 'truth-maker world' and the other as a 'false-maker world'. He defines duo-consequence over duo-pairs and shows that duo-consequence is paraconsistent and paracomplete. He proceeds to conclude that paraconsistent, paracomplete consequence is inevitable given The Classical Combo. I offer a critical assessment of Beall's conclusion by scrutinizing whether there is any philosophically interesting, relevant sense in which duo-consequence is inevitable for advocates of the Classical Combo. I argue that, for all Beall has said and done, there is no reason to think so and discuss what, if anything, Beall's construction shows.

Reference

Beall, Jc. (2022). From possible worlds to paraconsistency: on the inevitability of paraconsistent entailment. Asian Journal of Philosophy, 1, article number: 26. DOI: https://doi.org/10.1007/s44204-022-00028-0.

10:00 - 11:00	INVITED SPEAKER: FENRONG LIU

AUDITORIUM 1

INVITED SPEAKER

Fenrong Liu (Tsinghua University)

Social Epistemic Logic

Chair: Otávio Bueno (University of Miami)

Topic: A.2 Philosophical Logic

Abstract: I will argue why adding a social dimension to current epistemic logic is essential to understanding informative communication in structured groups of agents. Then I will give an overview of the recent social network logics in which social relationships between agents are explicitly represented. This makes it possible to study social influence, as well as the dynamic evolution of beliefs. I will show some meta-properties of the logic system. A few social scenarios will be analyzed, and the contrast between low rationality and high rationality will be discussed in this context, too.

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3. Johan van Benthem, Fenrong Liu and Sonja Smets, Logico-Computational Aspects of Rationality, in Markus Knauff and Wolfgang Spohn (eds.) The Handbook of Rationality, The MIT Press, 2021
4. Fenrong Liu and Dazhu Li, Ten-Year History of Social Network Logics in China. Asian Studies, 10(2), 121-146, 2022

10:00 - 11:00	IUHPST ESSAY PRIZE

AUDITORIUM 2

IUHPST Essay Prize
Ahmad Elabbar (University of Cambridge)

The curatorial view of assessment and the ethics of scientific advice: Beyond decisional autonomy towards distributive epistemic justice

Topic: B.6 Historical Aspects in the Philosophy of Science

Abstract: The curatorial view of assessment and the ethics of scientific advice: Beyond decisional autonomy towards distributive epistemic justice Scientific assessments play a central role in shaping policy decisions in our world. In this paper, I offer two connected contributions to the analysis of contemporary scientific assessments. The first is descriptive: Drawing on museology, I develop a novel account of the practices of assessments that does justice to their diversity and complexity, which I term, the curatorial view of assessment. The curatorial view, and the connected notion of curatorial risk, reveals broader ways in which values impinge on expert judgement beyond those presently recognised in the values-in-science literature. The broader description of value-ladenness in assessment leads to the second contribution of this paper, addressing the normative question of how advisors should manage value-laden choices in assessment. I argue that dominant proposals in the literature, despite their apparent differences, share a common commitment to the principle of decisional autonomy: advisors should resolve value-laden choices in a manner that preserves the

decisional autonomy, or self-determination, of advisees. I argue that the principle of decisional autonomy faces severe limits in guiding advisors, given the curatorial nature of complex assessment. Instead, I propose an alternative principle, grounded in distributive epistemic justice: Advisors should resolve value-laden choices in a manner that promotes a fair distribution of epistemic goods among stakeholders with an objective interest in them and provides policymakers with the knowledge necessary for the pursuit of justice.

ROOM 01

9:30 – 10:00

Irina Griftsova (Moscow Pedagogical State University), Galina Sorina (Lomonosov Moscow State University) - The concept of a system in the context of conceptual engineering.

Topic: B.1 Methodology

Abstract: The concept of a system is one of the most frequently used in philosophy, science, technology and everyday life. As is well known, many philosophers used it in the titles of their treatises. We speak of an educational system, a political system, a security system, a system of beliefs, a nutrition system, a diet system, etc. But is it a single concept that is used here, or does the term remain the same while its meaning alters? Does the role of the concept of a system change in response? Where and how are these changes registered? Why have all the attempts to create a universal systems conception been unsuccessful? And why, among other things, did the term 'Tektology' coined by Aleksandr Bogdanov in the 1920s to refer to a universal organisational science (practically a universal theory of systems) fail to come into circulation? We believe that conceptual engineering may provide some variants of answers to these questions. In this presentation, conceptual engineering will be construed, following D. Chalmers (Chalmers 2020), as 'design, implementation, and evaluation of concepts'.Our presentation aims to explore how definitions of the concept of system evolved, how it was interpreted depending on the field of application (philosophy, science or technology) and the reverse influence on the visions of these spheres. The concept of system will be analysed using tools of conceptual engineering, such as 'designing a new concept' and revising an old concept, or reengineering. In the mid-1970s, the penetration of systems language into various scientific and applied disciplines, along with multifarious programmes for constructing numerous versions of a systemic-structural methodology and a universal theory of systems, gave rise to somewhat of a 'systemic movement' bringing together specialists from across different areas. The concept of a system acquired new meanings; concepts such as a second system, a metasystem, a system of systems and others appeared. The rapid spread of systems thinking and systems language is quite astounding against the background of a lack of unanimity regarding the central concepts of systems research, as well as its object, role and purpose. Boris Yudin (Yudin 1981) explains this quick spread by the absence of theoretical rigidity, the vagueness and fuzziness of the applied concepts, which allows one to use the systems approach in different fields and situations having very little in common. Note that the concept of a system takes on a different role in this case: it contributes to the formation of an attitude, a vision of the situation, and thus becomes not an ontological or epistemological but methodological concept. What is meant here is a systems orientation affecting the perception and the manner of problem setting across various scientific and applied fields.

Acknowledgements. The reported study of I. Griftsova was supported by the Russian Science Foundation grant No. 21-18-00428(Moscow Pedagogical State University).

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2. Yudin, Boris. Some features of systems research. Systems research: 1981

10:00 – 10:30

Veli-Pekka Parkkinen (University of Bergen) - When is a causal model correct?

Topic: B.1 Methodology

Abstract: Benchmarking causal discovery methods presupposes a qualitative criterion of correct representation that is precise enough to be used in automated tests, and respects intuitive correctness judgments. One intuitive desideratum for such a criterion is that is accounts for how causal structures may be correctly represented at different granularities: an incomplete model that omits some details of its target may nonetheless be correct in a qualitative sense, as long as every causal ascription it makes is appropriately supported or licensed by the structure it represents. This presentation considers what, exactly, does it mean for a candidate model to be supported or licensed by its target, and proposes two qualitative criteria for correctness of causal models: methodological correctness and strict target-correctness. I consider the application of each criterion in the context of probabilistic modeling with causal Bayes nets (CBNs), and deterministic modeling with Boolean (configurational) causal models (CCMs). Methodological correctness requires each causal ascription made by a model to be licensed by the evidence that the target would entail in light of the theory of causation that underlies the search method being tested. Strict target-correctness additionally requires that the candidate model causally orders the modeled relata according to the target. Both criteria permit correct representation of causal structures at different granularities. Methodological correctness is appropriate when testing the validity of a particular implementation of a search method, but strict target-correctness arguably better captures intuitive, informal judgments about correct representation of causal relations, and is more readily applicable for comparing the performance of different search methodologies. However, requiring that a correct candidate model reproduces the causal ordering found in the target presupposes that causal structures are in principle always uniquely identifiable. A comparison of CBNs and CCMs reveals that whether causation is defined as deterministic or probabilistic relation, this assumption amounts to the same metaphysical claim: for every empirically ambiguous structure there exists an embedding context which includes further exogenous causes, such that adding those causes to the analyzed structure suffices for unique identifiability. No argument can be given to clinch such an assumption. Various reasons that are independent of correctness considerations are given for why such an assumption is nonetheless standardly made.

10:30 – 11:00

Maribel Barroso (Universidad Alberto Hurtado) - Towards a semantic analysis of the Induction

Topic: B.1 Methodology

Abstract: The discussion about the invalidity of inductive arguments and the uncertainty of their conclusions (Baker 1963; Wright 1965) had significant repercussions in the twentieth-century philosophy of science. One was to lead part of the tradition to reject the analysis of scientific discovery

due to "While the process of invention by which scientific discoveries are made is as a rule psychologically guided and stimulated by antecedent knowledge of specific facts, its results are not logically determined by them" (Hempel 1965, 5).

Another result of this debate was to divide 20th-century philosophers of science based on their positions on the justification of induction. For instance, the justificationists agreed in accepting induction as an uncertain but indispensable type of inference for understanding the empirical basis of science, although they disagreed among themselves as to whether to claim its use in scientific practice based on vindication rules or the basis of logical-probabilistic proposals (Reichenbach 1957; Carnap, 1945).

If we lookout closely at positions about induction one has that: (i) they belong to the Statement View of Theories, according to which the basic unit of analysis is the statements or propositions that compose their arguments, so (ii) induction is conceived linguistically, that is, as a particular type of inference consisting of statements or propositions, (iii) they accept that induction is a deductively invalid argument and (iv) they have tried to dissolve or solve this problem, again, within an enunciative or propositional framework.

After the abandonment of the Statement View and the shift towards the modelistic conception of theories, i.e., the Semantic View (Balzer et al. 2012; van Fraassen 1996; Giere 1988; Bueno & French 2011) and Pragmatic View (Morgan & Morrison 1999; Cartwright et al.1995) the reflection on the role of induction was left aside from other issues considered central by the new perspective: the characterization of models, scientific representation and so on. But, if induction has continued to play a fundamental role in scientific activity, why have the semantic and pragmatic model approaches not paid sufficient attention to this type of inference?

I contend that this is because the current analysis of induction is still carried on from a linguistic approach, i.e., based on statements, propositions, or formulates, so this constitutes an obstacle and an inappropriate approach to account for inductive inferences in science. Therefore, I suggest replacement with a semantic analysis based on the notion of model.

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ROOM 02

9:30 – 10:00

Andrea Berber (Institute for Philosophy University of Belgrade) - Epistemic vices in context: Towards a comprehensive picture of the epistemic character.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Contemporary vice and virtue epistemology are cognizant of the possibility that epistemic vices can give rise to positive epistemic outcomes. For example, epistemic vices of a team member such as dogmatism or arrogance may be conducive to finishing the project before the deadline and may lead to the epistemic success of the team as a whole. This situation may strike us as surprising for vices are not expected to lead to epistemic success. In the sketched example, individual vice is useful for the collective concerning the specific task of finishing the project. Thus, a relatively modest conclusion would be that we cannot get a complete picture of epistemic vices and their effects if we abstract from the context in which they arise and manifest. In the mentioned case, the most salient aspects of the context of vice manifestation are the team the vicious agent is a member of and the task this team should get done. Our epistemic lives do not take place in a social and contextual vacuum. Although not controversial, this fact is still underexplored and underexploited in its theoretical potential for understanding the epistemic character. With that in mind, I intend to focus on the context by analyzing the specific contextual factors that allow vices to lead to epistemic success.

I subdivided the epistemic context into the following factors without pretension that this list is exhaustive: f1) internal context, f2) team context, f3) task context and f4) institutional, social and political context. The internal context concerns the fact that agents' individual epistemic traits interact with other traits of their characters, either epistemic, moral, or psychological. Working in teams, epistemic agents interact and during this interaction, their epistemic and non-epistemic characters interact as well – this represents the team context. Tasks context means epistemic traits relate differently to tasks that should be performed, thus in different phases of the project, the same trait may not be equally useful or detrimental. Finally, epistemic activity does not take place in ideal institutional, social, or political conditions. All these conditions may affect agents' epistemic activity since agents of different epistemic profiles are favored relative to these conditions. An important note is that besides taking all these factors into account, we should also take into consideration their complex mutual interaction since every factor can affect others.

Compared to the other approaches that consider the epistemic environment, my approach adds new factors such as f1 and f3. Considering the interconnectedness and complexity of interactions of all factors, adding new factors into the picture gives a whole new perspective on the epistemic character in context. Thus, when we encounter the example of a vice that produces epistemically positive outcomes we should analyze how all these factors interact with the vice and mediate its epistemic consequences. The general theoretical insights my analysis will suggest are that a) studying effects of epistemic traits should be fine-grained contextualized, b) epistemic traits outside the context as character epistemology usually constructs them are, although immensely useful, still theoretical idealizations.

10:00 – 10:30

Gabriele Caroline Fontanive (Universidade Federal de Santa Catarina (UFSC)) - Imagining the future: thought experiments and cyberculture.

Topic: B.5 Ethical, Social and Political Issues in the Philosophy of Science

Abstract: Our society is currently experiencing a moment of transition in which our lives are increasingly marked by the use of technology. Although even through a simple assessment we can notice how cyberculture quickly changes our way of living, the consequences of this technological society are still unknow to a large extent and will be a result of what we are experiencing now. In this presentation, we will explore the use of fiction works, especially in the cyberpunk universe, to help us think about the valuation of proposals for technological innovation in society. In order to do so we shall relate the ideas of authors such as Otto Neurath and Catherine Elgin.

In “International Planning for Freedom”, Neurath briefly presents his “scientific utopia”. In this sense, the sciences should engage in the analysis of possible imaginary patterns for the future society, in the form of projects: “we could as social engineers also think about new types of patterns just as technical engineers discuss machines wich does not exist up to the present.” (NEURATH, P. 432). For the philosopher, the methodology of scientific utopia would be applied in societies that are experiencing a specific problem.

According to Catherine Elgin, fictional narratives lead us to elaborate imaginary scenarios that can be handled experimentally, thus opening the possibility of obtaining cognitively relevant information. Just as a physical experiment is a controlled manipulation of events, the design and execution of which are thought to enhance one specific phenomenon over others, works of fiction – when interpreted as thought experiments – also select, isolate, control and manipulate certain events in order to to highlight some specific phenomena.

In “Cyberpunk and cyberculture”, Dani Cavallaro (2000, p. 5) states that since the 1950s science fiction has shown itself to be increasingly interested in working with the effects of technology in everyday life. Artistic and literary movements that emerged at that time dealt with issues such as environmental pollution and the relationship between technology, crime and sexuality. In this context, the strands that make up the cyberpunk movement focused their scripts on the impacts of technology on present and future societies, adding elements of computational technology. These trends developed reflecting on the advancement of technology in societies, even approaching themes that bring them closer to contemporary philosophy, such as, the issue of pseudosciences.

Our final aim is to show that by relating the ideas of Neurath and Elgin, the study of works of fiction from the cyberpunk subgenre is fruitful to provide a possibility of reflection on the conditions of life in a society deeply marked by technology.

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10:30 – 11:00

Nataly Guerra (Universidad Nacional Autónoma de Mexico) - Brain, place and affects in embodied education.

Topic: B.7 Educational Aspects of Philosophy of Science

Abstract: In this paper I argue that it is essential to relate body, affectivity and place in the understanding of cognition and, therefore, in the implementation of pedagogical strategies for an embodied education. The research field of 4E cognition constitutes the ground of this presentation, as this work is only possible within the framework of the discussion of the body-brain system that has taken place in psychology and cognitive neuroscience. I consider its applications in educational settings where special attention is to be paid to place, landscape and affect. The starting point consists in the worked critique of the duality between body and mind; it draws on the contributions of Merleau-Ponty to consider an embodied dimension of cognition. In this dimension of cognition, the body is understood as a space of movement, action, thought and affectivity. The article "Affect and Meaning" by Flor Emilce Cely and Laura Mojica is of great help to think about the interdependent relationship that exists between our reasoning and our affects. I will pay special attention to this affective dimension, in order to glimpse the importance of giving affect the place it deserves in pedagogical

approaches. I propose that in an embodied education, with emphasis on the bodily dimension of affect, it is essential to understand the affective links that are created with the place and the pedagogical potential of this linkage. To this end, I will rely on Yi-Fu Tuan's work on the affective links that human beings develop with places and Marc Augé's work on spaces that, by becoming transitory, have no relevant charge for the identity or memory of those who pass through them. I defend the need for educational spaces to be more than transitory spaces, in which pedagogical agents can use their affective charge in the promotion of learning.

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ROOM 03

9:30 – 10:00

Lei Ma (Huaqiao University) - Is there a better ordinary thinking logic than traditional syllogism?

Topic: A.4 Historical Aspects of Logic

Abstract: Traditional syllogism faces some theoretical difficulties. First, it handles only categorical propositions, but actual ordinary reasoning may involve more types of propositions or sentences. Second, it excludes indefinite sentences and considers quantifying the subject, not the predicate of a universal or particular sentence. Third, it does not include the case where a negative term or a contradictory judgment is introduced. Fourth, it increases the fourth figure but distinguishes sharply between the major and minor premises, limits severely the major and minor terms, missing some moods of figures described by Aristotle. Fifth, the order of the major and minor premises of Aristotle's syllogism is not fixed, but later logicians fix the order of the major and minor premises, making the syllogism deviate from actual ordinary thinking. Sixth, it does not contain the contradiction of a quality proposition and the negative terms, causing a loss of the richer types of the form structure of syllogism.

Compared to traditional syllogism, a rich variety of structural forms of the conclusion can be seen in Aristotle's syllogism. In order to inherit the advantages of Aristotle's syllogism and eliminate the disadvantages of traditional syllogism, a more unified ordinary thinking logic different from the syllogism should be found. The new logic is based on the substitution of thinking elements. It can be used to describe the inference process of human minds more properly, bypassing rigid figures, moods, and cumbersome rules of traditional syllogism. The new logic combines categorical inference with relation and modal inferences, expanding the scope of the syllogism so that more complex quantification inferences can be captured. We can imagine a unified syllogism that can deal with the reasoning not only of categorical premises but also of hybrid premises. In the context of ordinary linguistic logic, we should re-examine the distribution theory which is related to some rules of traditional syllogism. The substitution of thinking elements is the basic feature of human thinking, and

the substitutions can be further applied not only to all abstract and image fields of thinking but also to practical fields of action methodology.

10:00 – 10:30

Minxing Huang (University of Kansas) - Aristotle's Syllogistic and Its Relation to Knowledge.

Topic: A.4 Historical Aspects of Logic

Abstract: Aristotle's Prior Analytics is probably the earliest existing systematic philosophical writing of a syllogistic system and a theory of logic. In this work, Aristotle introduces what we call the Categorical Syllogistic, which consists of three figures and fourteen valid moods. This paper examines some distinctive non-logically motivated elements of Aristotle's Categorical Syllogism to show that Aristotle's syllogistic can be better understood as a part of his epistemological project to secure explanatory primitive principles. More importantly, this paper explores the possibility that Aristotle's syllogistic is more properly founded on his rules for scientific inquiries. I argue that the primary purpose of the syllogistic is to guide inquirers to construct demonstrative arguments out of observable data that makes the explanatory principle of an explanandum evident.

10:30 – 11:00

Andres Bobenrieth (Universidad de Valparaiso / Universidad de Chile) - "Logic" of Andrés Bello.

Topic: A.4 Historical Aspects of Logic

Abstract: Many times it is said that work on logic in Latin-America only began in the 20th century, thus ignoring the important works that were done on topics related to logic by authors linked to colonial universities. Regarding the XIX century it is very notorious and annoying how little reference is made to the philosophical work of Andrés Bello: Filosofía del Entendimiento (a book that was translated into English in 1948 by special order of the OAS), and this is almost null with respect to the second part of this work, called "Logic". It is not simply a "handbook" of logic, because it goes much further than dealing with the types and forms of judgments, reasoning, syllogisms and fallacies (subjects that it addresses in chapters II, III, IV and VIII), which was the scope of many texts of this type at that time. Indeed, in the first chapter, called "Of knowledge", Bello contrasts empirical knowledge with a priori knowledge, and after presenting the principles of causality, substance, contradiction and sufficient reason, he presents what he calls empirical principle and ends up arguing with Kant, Cousin and Steward. Chap.V deals especially with mathematical proof. The titles of the remaining chapters are quite striking for a "logic" book: chap.VI, "On Reasoning in matters of fact"; chap.VII, "Of the method, and especially that which is typical of physical investigations"; chap.VIII, "Of the causes of error". One of the peculiarities of these chapters is that they link very directly logical principles with knowledge in mathematics --it was written since 1840 and with no notice of the works of Boole and other author of mathematical logic-- and with the "laws of nature".

Andrés Bello was born in Caracas, lived in London for 19 years, where he had a close relationship with James Mill and through him with Jeremy Bentham. In 1829 he arrived in Chile where he developed a vast body of work that has earned him the title of "polygraph of America". He was the first rector of the University of Chile, author of three highly reputable works in their academic fields: Código Civil de la República de Chile, Gramática de la Lengua Castellana destinada al uso de los Americanos, Principios de Derecho de Jentes (sic). There are two editions of his complete works (15 volumes published in Santiago since 1881 and 26 volumes published in Caracas since 1951).

In this talk I will present the main elements of this work and encourage its study, orienting this to specialists in logic and its history, epistemology and philosophy of sciences; therefore, this CLMPST is very adequate for this aim.

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ROOM 04

9:00 – 9:30

Jean-Charles Pelland (University of Bergen) - Which Number is that? On notational privilege.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: While the criticism of the Frege-Russell definition of numbers in Wittgenstein's surveyability argument has been shown to be problematic (e.g. Steiner 1975), an interesting aspect of this argument is its appeal to psychological considerations — including features of visual perception and how we can survey proofs — to attack part of the Principia.

Using psychology to compare notations raises questions about our access to numbers, many of which were taken up by Kripke in a series of lectures. There, Kripke explores the possibility that some notations for numbers might be privileged because they are better than others at mirroring properties of numbers, due to their 'buckstoppers'. The idea is that the first few symbols of some notational systems — including, according to Kripke, decimal notation — wear their numerical content on their sleeves, so that the need for semantic processing stops at perception of the symbol.

A problem with Kripke's characterization of the number-numeral relation is that it seems to make some aspects of numbers to be culture-specific, since notations capture properties of numbers 'directly' up to specific boundaries which vary with culturally-determined features of the notation. Another problem is that giving Indo-Arabic numerals a privileged position goes against some well-received taxonomies of numeration systems (e.g. Chrisomalis 2004). Complicating this issue further is data suggesting that large numerals appear to be grounded to other symbols for numbers instead of representations of numerical magnitude in our heads (Lyons et al. 2012).

In response to such problems, I propose an empirically-motivated account of buckstopping, which is rooted in data concerning how we process numerals and numerical information. More specifically, I propose an account based in empirical data on how symbols are grounded in the so-called 'Approximate Number System' (Dehaene 2011), as well as data on subitizing. I then link this account to Zang & Norman's (1995) notion of representational effect to explain why some numeral systems appear to require less computing to access their denotation than others. I argue that adopting an empirically-grounded functionalist approach to the numeral-number relation removes the culture-specific aspects to buckstoppers, which not only settles the culturally problematic implications of Kripke's proposal, but also allows us to better characterize the strengths and weaknesses of numeration systems. The idea here is to offer a graded scale of numerical abilities that introduces distinctions which help disentangle cultural from biological aspects to the number-numeral relation.

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9:30 – 10:00

Juan Manuel González De Piñera (Universidad de Buenos Aires) - A conservative revolution: the cartesian nature of radical enactivism.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: The enactivist proposal of Daniel Hutto and Erik Myin (2013; 2017) begins with a critique of the contemporary philosophy of mind and cognitive sciences. The scope of this critique does not only affect cognitivist and orthodox theories, but also other enactivist proposals. The latter, it is argued, have not managed to detach themselves from a series of stipulations linked to the traditional way of conceiving the mind. This is the case with the notion of content. It has been uncritically accepted that the mind is co-extensive with content. That is why radical enactivism posits a notion of "basic mind without content", showing that a large number of mental phenomena can and should be explained without appealing to content. However, content must be restored in order to explain the rest of the mental phenomena, so radical enactivism proposes an explanation of content in terms of socio-cultural scaffolding. Therefore, the mind must be studied in dualistic terms.

The first criticism to be made of this approach is internal. It will be shown that the central argument against the notion of content posited by Hutto and Myin, i.e. the "hard problem of content", holds only by accepting a reductionist naturalism. And, on the other hand, the central hypothesis that allows us to recover the notion of content in order to understand the phenomena that fall outside the "basic mind without content", can only be sustained with a pluralistic naturalism completely different from the one applied in the first case. The consequence of this is fatal, for if one opts for reductionist naturalism, one cannot explain "the natural origins of content"; and under the scope of pluralistic naturalism, no "hard problem of content" emerges in the first place.

The second criticism shows that radical enactivism presents itself as a maximally revisionist theory of both cognitive and "4E" positions. However, its exclusive focus on the notion of content means that, on a more general level, it leaves unscathed most of the Cartesian presuppositions of the more orthodox cognitivism: dualism, internalism, intellectualism, sense data and human exceptionalism. Therefore, it will be concluded that radical enactivism not only maintains most of the commitments of the conception it wishes to replace, but is more conservative than a large part of alternative enactivist proposals (cfr. Hutto & Myin, 2021; Noë, 2021). Hutto and Myin, like Descartes, try to make a hyperbolic doubt. But, like him, they end up crystallizing a large number of assumptions of the inherited conception.

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10:00 – 10:30

Oliver Holdsworth (University of Cambridge) - The Validity and Validation of the Test.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: Psychological validity, roughly understood as good measurement, has a varied definitional history (Newton and Baird, 2016). Taken by some to be a test property, and others a property of test inferences, the question of its scope and proper domain is equally controversial and diverse. Frequent moves to polish up its definition have been met with strong resistance, however. Those who argue in favour of a broad notion point to the multiple concerns surrounding measurement (including a test's use in practice). Those who advocate instead for a restricted definition (focusing on a test's proper interpretation for example), argue that we avoid unwieldiness, in favour of simplicity and practicality.

In the presentation I concentrate on one validity concern; when it applies to the measurement qualities of a test or instrument. Despite this focus, I also argue that it is unhelpful to fix a single validity definition, to be applicable for all occasions. Instead, multiple accounts can each capture something valuable about measurement and its surrounding concerns. That is not to say any definition will do however; some are better than others in capturing these concerns. My proposal for the validity of a test is: 'For a given context, a test is valid to the degree in which its measures are successfully sensitive and specific to a target psychological attribute'. In the presentation I defend why this definition fares well against other validity proposals (while not making any claims to its exclusivity).

Part of this defence consists of carefully delineating the relationship between validity and validation. Briefly, validity refers to a measurement property, while validation refers to the process in which we establish this property. We commit a category mistake when validation criteria, are instead taken to define validity. Doing so confuses what we want to secure (validity), and how we are to achieve it (validation), and unnecessarily restricts the measurement tools available to us. On the contrary, appropriate validation criteria should be determined by the twin factors of a target psychological attribute and the measurement model used. These twin factors will determine, for example, if and how the criteria of test consequences or test content are required for validation. That these factors should determine whether these criteria are relevant, and not the definition of validity, is often ignored, and partly explains the current disagreement over validity definitions. Furthermore, letting the target attribute set validation practices (instead of validity definitions or pre-determined validation practices) favours tools which properly measure the attribute, in all its varied complexity. This avoids focusing on particular validation criteria to the detriment of others (for example, overly prioritising internal consistency in factor analysis, to the detriment of test content).

As I make clear in the presentation, good validity accounts walk in lockstep with good validation accounts. We can only judge the appropriateness of the former, when we see how it is to be achieved in practice.

Paul E. Newton & Jo-Anne Baird (2016) The great validity debate, Assessment in Education: Principles, Policy & Practice, 23:2, 173-177

10:30 – 11:00

Raphael Aybar (University of Vienna) - Mind the Predictive Mind.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: Predictive processing (PP) proposes that cognitive beings deploy models of the world and of themselves in perception and action (I). Its central assumption is that brains like ours are predictive machines that operate through error-driven learning. Brains compute the discrepancies between their self-generated predictions and the sensory evidence and use the resulting error signals to gather information and improve their models. T Despite its establishment as a paradigm in cognitive science, its literature needs more clarity regarding its philosophical and scientific implications. In particular, whether it implies realism or instrumentalism about mental models is unclear (II). The first is the view of mental models as theoretical constructs used by scientists to gain knowledge of behaviors. It implies that scientific claims about cognition as modeling are theory-laden. The second view is that models are mental kinds, similar to mental states or representations, located in the brain, body, or environment. To be a mental modeling realist, one must accept the ontology above as a serious description of cognition.

I will argue that committing to mental modeling realism is unwarranted. PP and related theories can benefit from understanding models as artifacts scientists construct and manipulate to address questions and problems about cognition. The PP ontology is scientifically valuable because it serves the characterization of cognition as probabilistic inference within scientific practices. My treatment of models in PP will draw on recent debates in the philosophy of science about scientific models, which I take to be the practice of building and manipulating epistemic artifacts to address open scientific questions and problems. The artifactual approach to PP undermines mental modeling realism.

In scientific practices researchers use conceptual, statistical and computational models to investigate cognitive problems. Hence, models are artifacts extending scientists' reasoning (III). Generative models, the statistical models used in PP (IV), are epistemic artifacts constructed by scientists to deal with pending problems. Scientists use them as information-processing architectures to model various target cognitive systems.

My talk will conclude that the epistemic gain from modeling the mind as a predictive processor depends on model construction. I present two cases justifying this point. The first case concerns the Action Observation Network model of the communication of brain areas involved in action perception. In this case, epistemic gain involves formulating testable hypotheses and specific predictions about this target system's behavior. The second case study is the Agent-Environment Coupled System. This is a targetless model of niche construction. Targetless modeling does not increase knowledge about natural phenomena but serves the epistemic practice of constructing scientific models that can be use for simulating a target system.

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ROOM 05

9:00 – 9:30

Marco Gomboso (University of Lisbon) - Causality under uncertainty relations: the case in quantum physics theory and reality.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: Amongst the most important metaphysical issues in the current debate of philosophy of science, the problems raised by quantum mechanics are certainly puzzling. In particular, Heisenberg's uncertainty principle, the consequence of the double character of matter in quantum physics, raises the question of what ultimately constitutes the nature of matter. According to Heisenberg, the values of position and momentum (quantity of movement) of a particle cannot be simultaneously well defined in terms of a corpuscular theory. This is because of the fact that matter also behaves in a wave-like manner. Once a measurement of position is made, the possibility of measuring its momentum diminishes, for a measurement of a small volume necessarily "fixes" a particle in a corpuscular manner, thus "hiding" its wave-like function.

In fact, Heisenberg preferred to talk of inaccurate or inaccuracy relations rather than of a principle. This suggests that the uncertainty exists actually because the measuring of, for instance, the position of an electron, is related to the impossibility to determinate its other features.

Now, relatedness does not imply causality in a necessary fashion. Thus it is legitimate to ask about what happens regarding causal relations under the theoretical framework of quantum physics. One of the most striking theories that can be useful in this context is Reichembach's common cause principle, which states that if there is a correlation between two events A and B and a direct causal connection between the correlated events is excluded, then there exists a common cause of the correlation. Notwithstanding the problematic character of this possible "common cause", the direct causal connection between events is under scrutiny; and so is the thinking of an exclusion of it, however contrary to the belief that any event has a causal root on others. My intention in this paper is to expose a possible consequence derived from the uncertainty character of the measurements of ultimate pieces of matter, namely: if we can talk of the absence of causal relations, assuming the uncertainty condition is not just a result of the scientist's interaction (thus blurring a reality that is causally determined and fixed), but a symptom of an ontologically objective nature.

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9:30 – 10:00

Roman Roshkulets (Yuriy Fedkovych Chernivtsi National University, Чернівецький національний університет) - Metaphysical Aspects of the Values in Science in light of P.Yurkevych's Philosophy of Heart.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: Contemporary philosophy of science is characterized by a crisis of its Weltanschauung grounds. Speculative metaphysics once upon a time led to positivism whose incompletness gave the green light to Post-positivism with rehabilitation of metaphysics within. But now as it seems Post-positivism itself is in crisis. But what comes next? Dialectically post-post-positivism as Aufgebung returns us to positivism. And we got a modified kind of positivism what appears in trends toward physicalization, technization of science.

That's why we guess now relevant are ideas of Ukrainian philosopher Pamphil Yurkevych (1826-1874) who, representing traditions of Platonism and Cordocentrism, opposed main positivism risks in science. Base of sciense, according to P.Yurkevych, is in idea as well as a base of our cognition. It is not only cognitive, but also metaphysical basis of science. It makes possible cognition of the world as reasonable and purposeful wholeness. P.Yurkevych refers to Plato when said: "that which is not penetrated by idea as always a vague existence that is unfocused, unthinkable, unknowable and is not subject either word or definition" [Yurkevych, 1984, p.25].

P.Yurkevych said about three kinds of cognition: through feeling, when we knows subjective associations, not the meaning of things; through the concept where thing and think about thing are equal; through the idea when we perceive the subject from the point of view of the beginningless basis of all things. So idea became a source of methodological conscience of science.

Such attitudes are relevant to the Post-Non-Classical scientific rationality as it was called by V. Styopin. Some key features of Post-Non-Classical science mentioned by I.Dobronravova [Dobronravova, 2022]. This rationality is opposes both various variants of positivism and the ironic and chaotic attitudes of postmodernity.

So it is with P.Yurkevych, who does not deny empirical and experimental components of science, but tries to supplement it by metaphysics as a sphere of values. Even if values seems accidental, external and "imposed" from outside on scientific knowledge, even they aren't immanent to science, they are nevertheless necessary for science to ensure its integrity as a phenomenon of culture and human activity. About these peculiarities of science E.Agazzi said too [Agazzi, 2004, p. 51]. So we can deduce from the of P.Yurkevych's position regarding the role of metaphysics in science the necessity of the medial kind of metaphysics in the philosophy of science. It denies both extreme metaphysical idealism and anti-metaphysical trends. We consider such medial kind of metaphysics most relevant for contemporary philosophy of science.

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10:00 – 10:30

Antonio Rodríguez Puente (Universidad Autónoma Metropolitana) - Projectibility Without Metaphysical Foundation: Towards an Holistic Account of the Inferential Roles of Scientific Kinds.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: A kind is considered projectible if it is possible to infer the presence of all of its associated properties from the presence of some of them. This notion, initially proposed by Nelson Goodman (1979), has been placed at the center of the philosophical analysis of scientific classifications in recent years. Thus, the projectability of scientific categories has been identified as the source of their utility for induction, prediction, and explanation. However, things are less clear when it comes to the foundation of the projectible character of scientific kinds. The most popular answer to this question is Richard Boyd's claim that a kind's projectability is grounded in its accommodation with an underlying causal mechanism that accounts for the stability of its cluster of properties (1999). Against this view, critics point out the problematic nature of the notion of mechanism (Craver, 2009; Khalidi, 2013), as well as the fact that it does not explain how we could know that our classificatory categories accommodate the causal structure of the world (Franklin-Hall, 2015). On a different line of thought, Matthew Slater (2015) has proposed an explanation of the epistemic roles of scientific kinds that aims to eliminate the idea of a metaphysical ground. From his perspective, a proper account of projectability only needs to characterize the type of stability that a cluster of properties must show to warrant induction. Nonetheless, it has been suggested that the type of stability that Slater has in mind cannot be determined by purely observational means, but that it also requires certain metaphysical assumptions (Kendig & Grey, 2021). Therefore, it may seem that projectibility necessarily implies a metaphysical foundation, such as mechanisms or essences. Having said that, I think this conclusion is only inevitable under the methodological presupposition that classificatory categories (and their epistemic roles) can be analyzed considering each of them in isolation. Hence, I propose that the source of the epistemic fruitfulness of scientific kinds should be sought in the systematic relations that exist between them. In this view, the inferences from specific property clusters to others are warranted by a network of categories (and operations guided by categories) that certify the association between properties. This account of projectibility avoids the epistemological problem of the accessibility of an ultimate foundation,and offers observational criteria strong enough to warrant the inferential roles of scientific kinds.

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10:30 – 11:00

Daniele Molinini (Department of Philosophy and Communication Studies, University of Bologna)
- Converse applications and the inferential conception of applied mathematics.

Topic: B.4 Metaphysical Issues in the Philosophy of Science

Abstract: The philosophical problem that stems from the successful application of mathematics in the empirical sciences has recently attracted growing interest within philosophers of mathematics and philosophers of science. Nevertheless, little attention has been devoted to the converse applicability issue of how considerations coming from the empirical sciences find successful application in mathematics (such converse issue is acknowledged in Levi 2009, Skow 2015, Ginammi 2018 and Molinini 2021, 2022). In this talk I address the latter issue and I discuss it in connection with the inferential conception of application, originally proposed by Otávio Bueno and Mark Colyvan (Bueno and Colyvan 2011).

Although there have been many attempts to implement, extend, or even criticize the inferential conception of application proposed by Bueno and Colyvan (see, e.g., Rizza 2013, Bueno and French 2018, Soto and Bueno 2018), such 'mapping view' of applied mathematics is still the most influential strategy adopted by philosophers to address the philosophical problem stemming from the successful application of mathematics in the empirical sciences. But does it work for cases of converse applications (i.e., cases in which the successful applicability involved is that which goes from the empirical sciences to mathematics)? In this talk, focusing on some case studies, I argue that the mapping view of applied mathematics does not have the resources to handle the converse applicability issue. I point to the difficulties that the inferential conception has in this context and, finally, I sketch a view of application that bypasses two major difficulties faced by the inferential conception and that opens fresh research paths that are yet to be explored.

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ROOM 06

9:00 – 9:30

Kiran Pala (Itä-Suomen yliopisto) - Operational relations function at organizational scales.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: Interdisciplinary programs for hierarchical analysis have become a significant force in knowledge emergence, as a consequence of booming interest in development of emergence theories [1]. The recent research on knowledge emergence phenomena affirms that a mass of practices have been focused on dynamics of structural realism dealing with state transitions of components at different levels (scales) [2-3]. Given this, by exploring the plausible reasons for knowledge emergence, beyond 'The Continuity of Mind' by Michael Spivey (2008), 'Cognitive Systems and the Extended Mind' by Robert D. Rupert (2009), 'The Dynamics of Control' by Fritz Colonius, Wolfgang Kliemann (2012) demands a sustained operational engagement within the state transitions of components between the levels.

The progression of this idea can be explored if the components of a system can be achieved by describing a formalism from the kinds of propositions which will be constituents of operationality convergence. This is to say that instead of treating the components of a system as given (level/scale) and interpreting their mere behavioral outcomes, we should be looking for underlying operational relations distribution among the components. In order to explain this assembly–an analysis of local properties/compositions (constraints) of components and combining them would provide the criteria for operational relations [4]. This argument is linked with the relations carrying potential surprises, which means that the components operationally are fixed differently from a system's own version of potentiality [5].

Furthermore, among other components used in transition states does not characterize it as a system all by itself. However, it must include some of the relations for existential one that has been acquired as a result of its interventions. Which has emerged among its own configurations, allowing it to grow operationally [6]. Our interpretation of such enformation derived from the interventions, as it is operationally viable. For example, the forms of phonological, semantic and pragmatic relations would offer a partial change in lexemes; at a large scale these informational constraints manifest as cognates in languages. To assume, these are partially reduced early casual ancestors for an operational convergence [7]. This realization could be unstable as it depends upon other partially reduced situations or supplied missing informational constraints. Therefore, these informational constraints behave as operative acts, though relatively weak forces at their transitions such that the 'function of operative relations' in transition makes the morphological features distinct, which supplies enough further fixations of associated informational constraints. This demands an acquisition further and further in the process of operational growth, which adds owing to its flexible nature to absorb even internal (existential or historical) information values. These findings will augment the operational relations criteria in knowledge emergence.

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9:30 – 10:00

Enrico Brugnami (Universidad de La Laguna) - A pluralist solution to cognitive relativism: the case of conceptual space theory.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: Relativism is a phenomenon that nowadays seems to be everywhere, from fake news and social media to pseudosciences (Baghramian and Coliva, 2020). There are many types of relativism, and cognitive relativism is one of them. It says that, among different cognitive and epistemic practices, or among different knowledge instances, we cannot decide which practice or which knowledge offers a better understanding of a certain phenomenon. They are equally valid. Even in science, incompatible explanations and predictions can be seen as equally correct, as N. Goodman's famous "grue" example.

Over the last decades, in the field of cognitive sciences has appeared the Conceptual Space Theory (CST). As proposed by P. Gärdenfors (2000, 2004), it is a theory that explains knowledge representation and concept formation, but not on a computational or neural level, but on a conceptual level. In a few words, a conceptual space is a geometrical and topological structure in which a plurality of qualitative dimensions (or properties) plays a significant role in representing data in mental models. So an entity will be represented as a set of selected values in a domain {red, green, …}, {round, square, …} for different quality dimensions (colour, form, …).

My contribution in this communication is double. First, I will consider CST as perspectival theory. Even if Gärdenfors itself recognize CST as giving room to pluralism, he did not say too much about perspectives. But with the increase of interest in perspectivism (specially in philosophy of science), there has been attempts to consider CST from a perspectival approach (Kaipainen and Hautamäki 2015, Hautamäki 2020). And my aim is to continue in this line. From CST, points of view are multidimensional entities that arise by weighting, using certain qualitative dimensions (and not others) to represent objects in a conceptual space.

Secondly, I will apply the perspectival approach of CST to cases of apparent cognitive relativism. CST allows to both bottom-up and top-down interactions between mental models and data, being capable to represent perceptual hierarchies and weightings that change in relation to perspectival dynamics. So relativist cases in our cognitive practices (that seem to be equally valid) can be now considered as differences in our perspectives that gradually change with our constant interaction with the environment. And those perspectives can be modelled geometrically in conceptual spaces. I believe this is an interesting and upcoming approach from cognitive sciences that allows to develop a more pluralistic and perspectivist philosophy of science without relativism.

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10:00 – 10:30

Raquel Krempel (Federal University of São Paulo) - Involuntary imagery in aphantasia.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: Aphantasia is a condition that is characterized as the impaired ability to create voluntary mental images (Zeman et al. 2015). Mental images are understood as experiences that resemble perceptual experiences, but which occur in the absence of the relevant stimuli. Since Zeman et al.'s 2015 paper, in which the term "aphantasia" was coined, aphantasia has attracted a lot of attention, and several behavioral studies corroborate aphantasics' self-reports of impaired imagery abilities.

The main reason aphantasia is characterized as a deficit in voluntary imagery, as opposed to in imagery formation more generally, is that many individuals with aphantasia report being unable to visualize something when prompted to do so, such as the face of a friend, but they still report having visual dreams. Given that dreams are taken to be a paradigmatic example of an involuntary process, which does not depend on one's intentions and is outside of one's control, it is said that involuntary images are preserved in aphantasia. The assumption that aphantasia selectively affects voluntary imagery, while leaving involuntary imagery intact, is central to most of the growing literature on aphantasia. Thus Blomkvist (2022) takes "the differential impairment in producing voluntary imagery and involuntary imagery" (p. 2) to be an explanandum for any theory of aphantasia, and Cavedon-Taylor (2022) argues that aphantasia does not affect involuntary imagery and maintains that aphantasia should be characterized as a deficit in voluntary imagery.

I will argue, however, contrary to the growing consensus, that the characterization of aphantasia as a selective deficit in voluntary images is incorrect, as it does not take into account the results of studies of aphantasia that assess, though not always explicitly, involuntary visual images. Aphantasics differed from controls, for example, in studies that assessed imagery formed while reading and visual images formed in interaction with perception. Importantly, I will also argue that the case of dreams is far from establishing that involuntary imagery is unaffected in aphantasia, since, although some individuals with aphantasia have visual dreams, aphantasics tend to report experiencing significantly fewer dreams than controls, and their dreams are also reported to be less vivid. All of this indicates that involuntary imagery is also impaired in aphantasia.

Clarity about the impact of involuntary imagery in aphantasia is important if we are interested in understanding what aphantasia really is and the mechanisms behind it – things that are not yet understood. Characterizing aphantasia as a volitional deficit is likely to lead researchers to give incorrect explanations about aphantasia, and to look for the wrong mechanisms underlying it. I suggest, then, that a broader characterization of aphantasia, as a deficit in forming mental imagery, whether voluntary or not, is more appropriate.

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10:30 – 11:00

Esteban Céspedes (Catholic University of the Maule) - Objective functions as inter-subjective projective functions and the recognition of harm.

Topic: C.5 Philosophy of the Cognitive and Behavioural Sciences

Abstract: In the fields of developmental cognitive science and machine learning, the problem of recognizing harm and pain, which is part of the more general problem of inferring and understanding mental states of other minds, can be central for the implementation of new technologies related to

diverse activities, such as transport and health care (Othman et al. 2021). The main question is an old one: How does normativity arise from non-normative states of affairs? Or, in other words, closer to control theory, how can (non-programmed) objective functions arise in a cognitive system? While some accounts have been focused on probabilistic normalization of observable behavior to answer these questions, other agendas are more relationalist and biologically inspired (cf. Hansen 2017; Taniguchi et al. 2019). Roughly put, these perspectives can be conceived, respectively, as instances of cognitivism and naturalism, points of view that have well-known limitations. On the one hand, cognitivism depends crucially on the notion of symbolic representation, an issue that, in the case of machine design, comes down to the arbitrariness of the relevant objective functions. On the other hand, strong forms of naturalism may fail to arrive at a genuine distinction between pain recognition and mere behavioral tracking.

In the present work, I will defend a general, value-laden notion of machine pain recognition, based on empathy and mirror cognition (cf. Rizzolatti 2015). Although one may acknowledge that some kind of intentionality has to be programmed or built in, it does not have to be the same intentionality that the system is designed to recognize. As argued, the system may be programmed with a) an intrinsic value function over a set v (which plays the role of phenomenal pain, i.e. basic intentionality) and b) a projection function J from an observable behavior to a value set v* (which plays the role of mirror neurons). It is shown that both functions may have cognitive and naturalistic features (associated, for example, with representations, embodied states and sensorimotor processes), although their interplay is essentially projective. As some examples can illustrate, the precise forms of v and J will vary depending on the inter-subjective interactions in which the agent is immersed and on the aims of technical implementation.

Several problems remain, particularly considering that not all empathy is based on mirror cognition. Many cases depend on cognitive processes at the inferential level (cf. Goldman 2011).

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ROOM 07

(MRT)
Symposium: In Memoriam -- Roberto Torretti

Chair: Acuña, Pablo

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Professor Roberto Torretti sadly passed away last November, at the age of 92. Over his career of more than six decades, he made outstanding contributions to the philosophy of science, especially in the field of philosophy of physics—his Philosophy of Geometry from Riemann to Poincaré (1978) and Relativity and Geometry (1983) are classics and standard references in contemporary research on the foundations of spacetime theories. Furthermore, he made notable contributions on Kant's theoretical philosophy, the philosophy of cosmology, general philosophy of science, and the philosophy of mathematics. This symposium aims at celebrating his life and outstanding work, and to cherish his memory as a colleague and friend.

The symposium will feature three talks by scholars who work on the philosophy of spacetime theories, and who are familiar with, and influenced by, Professor Torretti's work: Pablo Acuña (Pontifical Catholic University of Chile), James Owen Weatherall (University of California, Irvine) and James Read (Oxford University). Apart from these three talks, the Symposium will feature a short video with words and personal recollections by reputed senior scholars who knew well Roberto and his work (such as David Malament (University of California, Irvine) and Harvey Brown (Oxford University)).

Speakers:
1) James Read: Torretti on Newton's laws
2) Adán Sus: Coordination, convention and the constitution of physical objects in spacetime theories
3) Pablo Acuña: Alice through the (Convex) Looking Glass: a Helmholtzian lesson for the connection between chronogeometry and dynamics in spacetime theories.
4) James Owen Weatherall: Revisiting Spacetime Models for the World.

9:00 – 9:30

James Read (University of Oxford) - Torretti on Newton's Laws

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Roberto Torretti was—and remains—a titan of our field. I'll begin with some reflections on the particular influence which his work has had on Oxford philosophy of physics. I'll then home in on Torretti's writings on Newton's laws, which are (quite rightly!) required reading for all our undergraduates studying the philosophy of physics. There are various ways in which Torretti might be read on these issues: here, I'll assess which of these readings are defensible, and which (if any) is best.

9:30 – 10:00

Adán Sus (Universidad de Valladolid) – Coordination, convention and the constitution of physical objects in spacetime theories

Topic: C.2. Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: Roberto Torretti, beyond, and before, being a key figure in contemporary philosophy of physics and geometry, was an expert in Kant's philosophy. In this talk I intend to explore this convergence (addressed by Torretti at different places) by discussing the significance of the notions of coordination, constitution and convention, which occupy a central position in the discussions about the compatibility of relativity and Kantian philosophy in early logical positivism. My aim in so doing is to provide a better understanding of their relation to

conventionalism and to evaluate the prospects for a version of the relativized a priori based on a refinement of the notion of coordination. Moreover, I argue that the link between the early logical positivist requirement for the uniqueness of coordination and the Kantian account of empirical objectivity provides an interpretive key that sheds light on the alleged incompatibility between constitutive principles and conventionalism.

10:00 – 10:30

Pablo Acuña (Pontifical Catholic University of Chile) - Alice through the (Convex) Looking Glass: a Helmholtzian lesson for the connection between chronogeometry and dynamics in spacetime theories.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: The rise of the dynamicist view in the philosophy of spacetime theories has motivated a discussion about the way in which chronogeometric structure and dynamics are connected. Geometricists—represented in seminal works like Torretti's Relativity and Geometry—(allegedly) defend or imply that chronogeometry determines and explains dynamics, whereas dynamicists state that it is the other way around. Both parties assume that the arrow of explanation at issue involves a claim of fundamentality and priority of one of the elements over the other. I challenge this shared assumption, and I propose a third way to understand the connection. Drawing a lesson from the development in the philosophy of geometry in the XIX century (a topic masterfully treated in Torretti's Philosophy of Geometry from Riemann to Poincaré), I argue that in spacetime theories chronogeometry and dynamics are essentially and inextricably interconnected, so claims of fundamental explanation and priority, regardless of the direction of the alleged arrow, are misconceptions. The link between chronogeometry and dynamics in spacetime theories is properly understood in terms of a bidirectional arrow, not in terms of a unidirectional arrow of fundamental explanation.

10:30 – 11:00

James Owen Weatherall (University of California--Irvine) - Revisiting Spacetime Models for the World.

Topic: C.2 Philosophy of the Physical Sciences (including Physics, Chemistry, Earth Science, Climate Science)

Abstract: In Roberto Torretti's classic article "Spacetime Models for the World" [2000, SHPMP 31(2), 171-186], he argues that modeling practices in modern cosmology are a problematic departure from the tried-and-true methods of Newton and Galileo. Among the challenges he raises to cosmological modeling is that the highly symmetric FLRW models on which the Standard Model of Cosmology is based leave no room for incorporating the rich mesoscale structure of stars, galaxies, and clusters. In this talk I will revisit Torretti's concerns in light of the subsequent two decades of work in cosmology. I will argue that Torretti was correct that de-idealization in the context of cosmological modeling presents unique challenges, but that at least some of those challenges can be overcome.

ROOM 09

(GVFS)
Symposium: Goals and Values in the Formal Sciences

Chair: Erich Reck (University of California at Riverside)

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: In recent history and philosophy of mathematics, one can find the beginnings of a debate about the role of goals and values in the formal sciences, especially in mathematics; but similar considerations apply to logic and computer science as well. This concerns primarily epistemic and/or pragmatic goals and values. Basic examples include: truth, provability, calculability, also consistency and completeness for theories. Less widely known but also prominent in the literature are: mathematical depth, purity of method, being explanatory, increasing understanding, intuitive accessibility, and intellectual economy. Occasionally aesthetic aspects are considered as well, such as elegance or beauty; and even ethical aspects relevant for mathematical practice can be considered, e.g., fairness in attributing results and avoiding other kinds of epistemic injustice. Finally, the treatments of related topics in the formal sciences can increase our understanding of goals and values in turn, also beyond those sciences. In our symposium we consider this topic from a number of different angles. The talks range from general discussions of the kinds of values at play, through earlier but still relevant approaches to the topic in philosophy, e.g. in works by Edmund Husserl, to specific, more local examples of goals and values from current practice in the formal sciences, such as ontological parsimony and its costs in mathematics, "point free" thinking in topology, and the treatment of values in software engineering.

Speakers:
1) Erich Reck: Goals and Values in the Formal Sciences: A Survey
2) Mirja Hartimo: Husserl on Radical Besinnung and Carnap on Explication
3) Stella Moon: Husserlian Besinnung and Homotopy Type Theory
4) Marco Panza: Is Being Parsimonious about their Existence the Only Way to Limit the Price to Pay for Working with Mathematical Objects
5) Andrew Moshier: The Value of Point Free Thinking
6) Alexander Kurz: On Ethics, Values, and Cryptocurrencies

9:00 – 9:30
Erich Reck (University of California at Riverside) - Goals and Values in the Formal Sciences: A Survey.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: In the history and philosophy of science, discussions of the role of goals and values, or of the supposed value-freeness of science, has a long history. In the history and philosophy of mathematics and logic, this topic has started to come up as well, but so far mostly in terms of specific examples. Thus one can find attention to the values of truth, objectivity, consistency, completeness, provability, and calculability in the literature, more recently also to mathematical depth, purity of method,

increasing understanding, intuitive accessibility, and intellectual economy, among others. These are all epistemic and/or pragmatic goals and values relevant for mathematics. Occasionally aesthetic ones are brought up as well, such as elegance and beauty; and one can consider ethical and more broadly social goals and values relevant for mathematical practice as well, such as epistemic justice, e.g., in the attribution of results to authors and to intellectual traditions, including beyond Western mathematics and science. However, no general discussion of the variety of such goals and values has been attempted up to now, as far as I am aware. In this talk, I will provide such a discussion. This will involve embedding the specific cases one can find in the philosophical literature on mathematics and logic within an encompassing framework derived from parallel discussions in the philosophical literature on science.

9:30 – 10:00

Marco Panza (Chapman University (and CNRS, Paris, France)) - Is Being Parsimonious about their Existence the only Way to Limit the Price to Pay for Working with Mathematical Objects?

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Both platonists and nominalists seem to be worried about the existence of mathematical objects. The latter resolutely deny it. Though admitting it, and taking it as a datum, many of the former try to limit it to some sorts of basic objects. Still, both the former and the latter are incapable of providing direct arguments for this existence, by merely offering reconstructions of mathematical theories that make or do not make appeal to these objects. This makes existence (both affirmed and denied) a pure metaphysical dogma appearing on the background of an epistemological discussion, and often distorting it, by bending it to external and extrinsic needs. In my talk I will offer a different background, purely epistemological, for the discussion about the presence or absence of (abstract) objects in the practice of mathematics. To this purpose, I will introduce and explain the notion of epistemic economy. It depends on looking at (foundation of) mathematics as largely devoted to reconstructive enterprises, aiming at expressing available contents in new and possibly more virtuous ways. Limiting the intellectual resources to be appealed to in such a work of recasting of contents is a way of being virtuous and to practice epistemic economy. Far from arguing that this is the only possible virtue that mathematical practice should aim at, I will argue for the foundational import of it in the interest of conceptual clarity.

10:00 – 10:30

Andrew Moshier (Chapman University) - The Value of Point-free Thinking.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Locale Theory, often called “Point-free Topology”, is sometimes characterized as topology without the axiom of choice, because frequently (such as in the proof of Tychonoff’s Theorem) AC is needed to construct the points of a space. But this characterization hides a deeper reason to consider topology without points. One of the main features of locale theory (which has nothing to do with AC) is that a space, even a classical space that is built from points, has many more point-free subspaces than just its classical subspaces. This suggests that point-free thinking is not just an attempt to investigate topology with our hands tied (avoiding AC), but is actually a richer way to investigate topological structures. In this talk, I will set out the basics of Locale Theory concretely, including the crucial ideas of what constitutes a sub-object and how such sub-objects can be specified. From there, I will argue that locales provide a much richer view of topological structure. To illustrate, I will present

a particular quite peculiar locale: the point-free locale of reals. This is a natural topological structure that derives from the standard Euclidean topology of the real numbers by evacuating the real line. This has no points (no real numbers), but still carried an interesting topological structure. I will consider possible applications of this in analysis.

10:30 – 11:00

Alexander Kurz (Chapman University) - On Ethics, Language, and Cryptocurrencies.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)
Abstract: Bitcoin introduced tokens that can be used as a medium of exchange, as units of accounting, and as storage of value, that is, money. Ethereum and smart contracts allow everybody to create their own tokens (NFTs, other cryptocurrencies, etc). Software engineers use these new capabilities to run real-world experiments that shed new light on questions such as “What is language and how do tokens acquire meaning?” and “What is money?”. Moreover, cryptocurrencies create socio-technological systems with peculiar and novel interactions between people and technology. Questions such as “What is trust?”, “What is reputation?”, “How does democracy work (if at all)?”, “Should it be allowed to sell and buy votes?” and so forth acquire new urgency and can be tested in the wild by developing new communication protocols and applications. In this presentation I will review some of these experiments and discuss their philosophical implications.

ROOM 10

9:00 – 9:30

Dirk Schlimm (McGill University) - Towards a philosophy of mathematical notations

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: The use of notations is pervasive in mathematics and logic. It is thus no surprise that mathematicians have reflected upon the value and design of notations (e.g., Babbage, "On notation", 1830). Indeed, the phrase “philosophy of notation” was coined by Peirce in the title of an article on the algebra of logic (1885) and his reflections on the nature of signs have contributed to the founding of the area of semiotics, the general study of signs and their meanings. Due to their general nature, however, such studies (e.g., Goodman, "Languages of Art", 1968) have often neglected the specific character of mathematical notations, namely that they are not only meant to represent an intended subject matter but also to be operated with in order to gain new insights into that subject matter.
In recent years, individual mathematical notational systems, such as Euclidean diagrams, Peirce’s Existential Graphs, and Frege’s Begriffsschrift, have been the focus of detailed investigations and philosophers have emphasized the role of notations as epistemic tools (e. g., Krämer, "Diagrammatologie", 2016) and for driving mathematical progress (e.g., Grosholz, "Productive Ambiguity", 2007). Moreover, notations have also been studied in mathematics education (e.g., Tolchinsky, "The Cradle of Culture", 2003) and cognitive science (e.g., Giardino et al., "Proceedings DIAGRAMS 2022"). In general, however, in spite of a growing number of case studies, most investigations of mathematical notations lack a common theoretical framework with common terminology and research questions.

The aim of this talk is two-fold: First, to present a general outlook on the field and propose several areas of inquiry that a philosophy of mathematical notations should address: (1) A general characterization of mathematical notations, including the distinction of certain types of notational systems, such as diagrams and linear notations. (2) The identification of syntactic and semantic features of notations, which underlie their specific applications and support our engagement with them. (3) The study of how design principles for notations are related to specific tasks that the notations are intended to be used for. (4) The relation between notations and traditional philosophical problems pertaining, for example, to mathematical ontology and epistemology, the access to abstract entities, and mathematical progress.

My second aim concerns the discussion of specific difficulties that are frequently encountered when studying mathematical notations. As many proponents of different notational systems have noticed (and bemoaned, in the case of negative reactions towards their own favourite notation), the assessment of a notational system depends in large parts on how familiar one is with a system, what background knowledge is required for using it, and what tasks one wants to accomplish with the notation. Thus, familiarity (or the lack thereof), a neglect to carefully consider the epistemic and cognitive resources necessary for the use of a notation, and an underspecified set of tasks, can easily bias the discussion of a notational system. Being aware of these pitfalls is an important prerequisite for effective work in the philosophy of mathematical notations.

9:30 – 10:00

Marcos Silva (UFPE) - Revision of Logic, Verbal Disputes and Metalinguistic Negotiations.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Logical pluralism is the view that there is more than one correct logic. A particular view of this thesis is called domain-specific logical pluralism. In this perspective it is argued that the correct logic or logical connectives depend on the domain of use, the context of use, or the linguistic background in which the logical vocabulary is used. The philosophical difficulty, in this view, is that meaningful communication between logicians from different and rival traditions is impaired. It seems that all communication and discussion about revising logical principles turns into a mere verbal dispute. If two logicians approach the same domain with different logics guiding their investigations, then they must be using different connectives, and therefore using different languages, and consequently talking about different things without realizing it. In the discussion between rival logicians, we may think that we are, for example, having an argument about "¬ A", but in fact we are using different meanings for "¬", so that we are not really talking about the same thing. If we change the language, we change the subject. And there would be no real disagreement. This communication problem seems to prevent legitimate disagreements between rival logics. But how can we rationally justify our logical principles if the very possibility of rational justification presupposes them? How can we ground a set of basic principles of reason as correctness without circularity or infinite regress? In this work, a possible solution to this problem is articulated, without losing the pluralist thesis. A neopragmatist solution requires us to adopt a notion of metalinguistic negotiation that allows people to communicate, disagree and justify their logical choices even though they are in different domains and using different languages. My proposal regarding the problem of justification and normativity in logic revision explores the analogy between logic and other normative disciplines, such as ethics and law, in order to understand disputes between rival logicians by emphasizing the anti-realistic character of logical vocabulary and the normative role it plays in our usual discursive activities, especially in the context of metalinguistic negotiations.

10:00 – 10:30

Philippos Papayannopoulos (Université Paris 1 Panthéon-Sorbonne, IHPST), Alberto Naibo (Université Paris 1 Panthéon-Sorbonne, IHPST) - Euclidean Constructions, Algorithms, and Constructive Objects.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Can we regard Euclidean constructions as algorithms? From one point of view, the answer seems a definite "yes". One way of seeing Euclidean constructions is as corresponding to rules for producing objects of a certain type (segments, circles, triangles, etc.). Some of these rules are taken as primitive (corresponding to postulates) while others are taken as admissible from the primitives (corresponding to solutions of problems; e.g., the construction of an equilateral triangle from a segment). One can see the primitive rules as corresponding to what can be done with some permitted instruments (the ruler and the collapsible compass), and the admissible rules as what can be done by combining the use of these instruments. In this sense, we could say –though, in anachronistic terms– that Euclid describes a "model of computation", and that the computational concern of Euclidean geometry is the closure of the constructed objects under the Euclidean primitives and composition. As Preparata and Shamos say, "[t]he Euclidean construction satisfies all of the requirements of an algorithm: it is unambiguous, correct, and terminating" (Computational Geometry, 1985). However, from another point of view, algorithms are combinatorial procedures of symbolic formal manipulations: they specify mechanical operations over the concrete representations of the mathematical objects of concern. But Euclidean constructions cannot easily be seen as combinatorial operations of that sort. E.g., while the primitive mechanical operations in the classical models of computation (Turing, Markov, Kolmogorov-Uspensky, and machine models) are typically of a formal nature, an operation like "produce the circle through one point with center at another point" seems to rely for its execution on more than just the formal shape of the particular representation of the entities (points, circles, etc.) that stand before our eyes (or, arguably, they don't rely on such properties at all). In that sense, Euclidean constructions are not algorithms proper.

These two opposing points of view seem to rely on two different conceptions of the notion of "algorithm" as a sequence of steps. On one conception, the permitted steps are determined by what operations are stipulated as primitive. On the other, the permitted steps depend essentially on the employed symbolic representations themselves.

In this talk, we examine the relation between Euclidean constructions and the symbolic conception of algorithms. We focus on the notion of "constructive object", coming from the Russian school of constructivism (see the related entry by Nagornyi in the Soviet Mathematical Encyclopedia, 1995). A constructive object, roughly, is a finite object comprising discrete elements, equipped with an "internal coordinate system"; i.e., a way to identify any of its elements (Uspensky and Semenov, Algorithms, 1993). E.g., finite rooted trees are constructive objects, while finite cyclic graphs are not. According to the Russian school, this notion provides an essential condition for any possible algorithmic process: "algorithms may deal only with […] constructive objects" (ibid.,p7).

We argue that the objects considered in Euclidean constructions cannot be seen as constructive objects. As a result, Euclidean constructions cannot be considered algorithms from the perspective of the Russian approach to constructivism.

10:30 – 11:00

Markus Pantsar (RWTH Aachen) - Recognizing artificial mathematical intelligence.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: The study of intelligence in animals has two potential pitfalls. First, the setting for experiments may not be suitable for animals to exhibit their characteristic intelligence. Second, the observed behaviour may be misrepresented in terms of intelligence. Often this involves ascribing unjustifiably high level of intelligence to animals. In this talk, my focus is on artificial intelligence (AI) and how its study could avoid related pitfalls. In particular, I focus on artificial mathematical intelligence. Related to the first pitfall, I ask whether mathematical AI applications are systematically deprived of the chance to exhibit their characteristic intelligence (if any). Related to the second pitfall, I ask whether there is a danger in misrepresenting the processing of current mathematical AI applications in terms of intelligence. I argue that unlike in animal studies, the first pitfall is much more prominent than the second one. However, I argue that the second pitfall may become more serious as mathematical AI applications reach a sufficiently high level. As a proposed solution to both present and future problems, I propose a community-based approach to recognizing artificial mathematical intelligence.

ROOM 11

9:00 – 9:30

Favio E. Miranda-Perea (Departamento de Matemáticas, Facultad de Ciencias UNAM), Lourdes Del Carmen González Huesca (Departamento de Matemáticas, Facultad de Ciencias, UNAM) - Non-classical Epistemic Axioms for Computer-Aided Verification.

Topic: A.3 Computational Logic and Applications of Logic

Abstract: The traditional approach to representing and reasoning about knowledge (1) is based on classical (multi-)modal logics, in particular S5 where the formula □A, usually written as KA, means that A is known. These logics enjoy robust properties along with sound and complete axiomatizations formalizing distinct concepts of knowledge like common or distributed. On the other hand, there is a plethora of intuitionistic modal logics that arise from different motivations and applications, for instance, decision-making in Game Theory (2) or type systems for programming languages in Computer Science (3). In the case of these intuitionistic versions of knowledge, there is no consensus about what is the "authentic" epistemic logic and, certainly some of these logics are not originated in intuitionistic versions of modal logic. It is the case of logic IS5, introduced by Prior (4), which includes the so-called axiom of reflection KA → A (read as known propositions are provable) and related to classical logic by the equation S5 = IS5 + A ∨ ¬A (5). In contrast with the so-called Intuitionistic Epistemic Logic (IEL) (6) which departs from IS5 since it validates the coreflection scheme A → KA by considering knowledge (and belief) as the product of verification.
IEL is considered as both the logic of intuitionistic knowledge and the logic of provably consistent intuitionistic beliefs, which formally means that the K operator can be read as both modalities. With this in mind, a natural question arises: what kind of epistemic logic is generated by IS5? The aim of this contribution is to tackle this question by exploring the adequacy of the IS5-axioms maintaining the idea of knowledge as verification in the light of computer-aided verification processes using the following reading of the box and diamond modalities: □A means that A is certifiable, that is, any trusted software, like the Coq proof assistant (7) can potentially grant a formal certificate for A, whereas ◇A is read as A is verifiable but involving some kind of gap, like a non-trusted software component or the use of some admitted properties (as axioms without verification).
This way IEL corresponds only to verified knowledge, whereas IS5 corresponds to both verified knowledge (□A) and verified belief (◇A).

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9:30 – 10:00

Ken Satoh (National Institute of Informatics and Sokendai, Japan) - Compliance of Algorithimic Law by Abductive Logic Programming.

Topic: A.3 Computational Logic and Applications of Logic

Abstract: The government now uses computer programs for a decision making for public affairs . We call these programs "algorithmic law" since these decisions made by the AI system will be legally effective to enforce people. Along with frequent uses of such AI systems, algorithmic law will be a great matter for civil rights. Therefore, civil control of algorithmic law should be prepared urgently. In fact, in France, a lawsuit to ask government to publish a specification of algorithmic law has been invoked to require government agencies to publish the software, and as a result, various software was released (https://www.impots.gouv.fr/portail/ouverture-des-donnees-publiques-de-la-dgfip). Currently, analysis of software code is done manually. However, according to increasing number of such software, it would be very difficult to find a problem by human. In this paper we propose a method of automatic compliance check of legal norms for algorithmic law. We extend our previous work on abductive logic programming (https://www.jstage.jst.go.jp/article/jjsai/11/1/11_137/_article/-char/ja/) to represent violation of legal norms and to infer abducibles (hypotheses) which represent conditions under which violation occurs. The idea is as follows:
(1) We translate a specification of the AI system implementing algorithmic law into a logical formula.
(2) We assume that we can formalize a situation of violation as an integrity constraint in logic programming. If there is a violation of constraints, we could trace logical reasoning step and identify which part of the specification is a source of violating the constraints.
For example, In GDPR article 6-(a) says that “Processing shall be lawful only if and to the extent that at least one of the following applies: (a) the data subject has given consent to the processing of his or her personal data for one or more specific purposes.”
We can represent this norm using the following rule.
violation(C) <=
transfer(ControllerOrProcessor,
personal_data(DataSubject,not(get_consent(DataSubject,ConrollerOrProcessor)).
In this example, there are three methods to get consents (interaction1, interaction2, interaction3) and we assume that we know in advance that only interaction2 and interaction3 satisfies getting true consent.
get_consent(CorP,DS) <= interaction1(CorP,DS).
get_consent(CorP,DS) <= interaction2(CorP,DS).

We also have the following definitions of each interaction.
transfer(CorP,personal_data(DS,DT),TP)<=
controller_or_processor(CorP), personal_data(DS,DT), third_party(TP),
interaction(CorP,DS), transfer_act(CorP,personal_data(DS,DT),TP).
interaction(CorP,DS) <= interaction1(CorP,DS).
interaction(CorP,DS) <= interaction2(CorP,DS).
interaction(CorP,DS) <= interaction3(CorP,DS).
interaction1(CorP,DS) <= ask_click_permission_button(CorP,DS).
interaction2(CorP,DS) <= ask_send_an_email_consent_to_c_or_p(CorP,DS).
interaction3(CorP,DS) <= ask_to_reject_if_not_consent(CorP,DS).
We also need a hypothetical case description which is implemented as abducibles for fact predicates.
controller_or_processor(CorP) <= abd(controller_or_processor(CorP)).
personal_data(DS,DT) <= abd(personal_data(DS,DT)).
third_party(TP) <= abd(third_party(TP)).
ask_click_permission_button(CorP,DS)<= abd(ask_click_permission_button(CorP,DS)).
ask_send_an_email_consent_to_c_or_p(CorP,DS)<=
abd(ask_send_an_email_consent_to_c_or_p(CorP,DS)).
ask_to_reject_if_not_consent(CorP,DS) <=abd(ask_to_reject_if_not_consent(CorP,DS)).
transfer_act(CorP,personal_data(DS,DT),TP) <=
abd(transfer_act(CorP,personal_data(DS,DT),TP)).
where abd(P) means that P is abducible.
By asking violation(C), to the above abductive logic program, we get the following output:
violation(_806)
transfer(_824,personal_data(_832,_834),_828)
transfer_act(_824,personal_data(_832,_834),_828)
transfer_act*(_824,personal_data(_832,_834),_828)
interaction(_824,_832)
interaction3(_824,_832)
ask_to_reject_if_not_consent(_824,_832)
ask_to_reject_if_not_consent*(_824,_832)
third_party(_828)
third_party*(_828)
personal_data(_832,_834)
personal_data*(_832,_834)
controller_or_processor(_824)
controller_or_processor*(_824)
This means that interaction3 violates GDPR 6-(a).

10:00 – 10:30
Giuseppe Primiero (University of Milan) - Logics for Fair AI.

Topic: A.3 Computational Logic and Applications of Logic

Abstract: Since the advent of expert systems in the mid-60s, and the passing of their heyday between the 1980s and the 1990s, the role of logic in programming AI systems has shifted significantly. From being the discipline largely determining the algorithmic behaviour of in-depth knowledge systems on single inputs, logic has been superseeded by the evaluation of correlations on huge amount of data. The impressive efficiency of machine learning methods does not come, however, at no cost: their opacity and risk of bias are well known and largely discussed in the literature. While a variety of tools

are being developed to make ML systems more transparent, logical methods are coming back to play an increasingly important role: by their nature, they may help building and verifying transparent models of computations. A recent trend in building verified AI systems is growing, extending another historically important task for logic [1]. A major aim is therefore to develop formal methods that will help the verification of these systems' trustworthiness and fairness. In this talk, I will overview some recent work in this direction. The typed natural deduction calculus TPTND [2] is designed for reasoning about programs with probabilistic outputs obtained under possibly opaque distributions, for which trustworthiness can be formally verified as an admissible distance from the behavior of a fair and transparent counterpart. The variant calculus TPTND-BL [3] is apt for the formal verification of a maximum bias threshold in automated labeling methods. I will survey their rule systems, the meaning of trust and bias checking rules, their meta-theory and report on current work on their relational semantics and implementation.

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10:30 – 11:00

Valentin Goranko (Stockholm University) - Logic-based Strategic Reasoning with Normative Constraints.

Topic: A.3 Computational Logic and Applications of Logic

Abstract: We consider multi-agent systems consisting of rational agents (humans, intelligent robots, computerised devices, etc.) which act and interact in pursuit of their individual and collective preferences and goals, for the acievement of which they can reason, plan and execute strategies to achieve their goals.

This work is a logic-based study of agency and multi-agent systems which brings together rationality and normativity. In particular, we introduce and develop a formal logical system for reasoning about the strategic abilities of rational agents which act within a multi-agent system in pursuit of explicitly specified goals, in the context of individual and collective norms, such as permissions, obligations and prohibitions, which constrain accordingly their behaviour. Hereafter, a set of such norms referring to agents actions will be called a system of normative constraints. Typical such constraint is of the type:

"The agent a may / must / may not perform an action satisfying a given condition C."

These constraints naturally generalise to groups (coalitions) of agents.

The core version of the Logic for Strategic Reasoning with Normative Constraints SRNC introduced here extends the Coalition Logic CL [1] by conditioning the coalitional strategic operators of CL with such normative constraints, as follows. Given a system of normative constraints N of the

type described above, a group of agents A, and a goal represented by a formula ϕ in the language, the basic strategic operator of SRNC is of the type ⟨A⟩_u(N,ϕ) intuitively meaning:

"The coalition A has a joint action satisfying the system of normative constraints N which guarantees satisfaction of the goal ϕ regardless of the actions taken by all agents not in A."

This is the unconditional version of the basic strategic operator of SRNC, which presumes that the opponent agents (those not in the proponent coalition A) are not constrained by any of the norms in N. This is a realistic assumption in various real-life scenarios (e.g., when a team of law-enforcement agents acts towards capturing and neutralising a criminal gang, only the former act in accordance with the law, whereas the latter are generally unconstrained). In many other scenarios, however, all agents on the system are assumed constrained by the system of normative constraints N. For reasoning about such scenarios, we also introduce the constrained version ⟨A⟩_c(N,ϕ) of the basic strategic operator of SRNC, intuitively meaning:

"The coalition A has a joint action satisfying the system of normative constraints N which guarantees satis-faction of the goal ϕ against any actions taken by the agents not in A which also satisfy the constraints in N."

This talk with present, discuss, and illustrate with some examples the basic version of the logic SRNC involving both types of strategic operators, for which formal semantics will be given based on concurrent game models with normative constraints.

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ROOM 12

9:00 – 9:30

Guillaume Massas (University of California, Berkeley) - Infinitesimal Credences Without the Axiom of Choice.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: Non-Archimedean Probability theory (NAP) has recently been developed [1,2] as a way to address limitations of classical Kolmogorov probability theory with respect to fair lotteries on infinite sets. While there can be no uniform countably (or evenly finitely) additive probability function assigning a non-zero probability to every non-empty set of natural numbers when its range is the real interval [0,1], NAP avoids this issue by defining the codomain of a probability function as a non-Archimedean field determined by the sample space under consideration. Because the codomains thus defined are highly-abstract objects whose existence can only be proved assuming a strong fragment of the Axiom of Choice, NAP has faced several criticisms. In particular, the non-constructive nature of NAP functions arguably makes them an arbitrary, overdetermined and overly complex way of representing the credences of a rational agent regarding a fair lottery on an infinite set [3].

In this talk, I will discuss a small variation of NAP and argue that it answers many of the challenges raised against the non-Archimedean approach. The key idea is to replace the standard construction the codomain of a NAP function, which typically involves quotienting a ring of functions by a (non-constructive) maximal ideal, by considering instead the system of all quotients of a ring modulo an extension of a fixed ideal. The structure thus obtained is not a Tarskian first-order structure, but rather a possibility structure [4,5] which satisfies nonetheless all the first-order axioms of a field. I will show how the main intuition behind NAP can still be adequately formalized in this

setting, and argue that it offers an elegant way of modelling infinitesimal credences in a semi-constructive context, i.e., assuming only the Axiom of Dependent Choices.

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9:30 – 10:00

Samuel Fletcher (University of Minnesota) - Evidence in Classical Statistics.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: One reason that classical statistics remains dominant and flourishing in most sciences is that it helps many scientists achieve their goals. Yet these methods’ available justifications—why they work, when then do—often fall short. For example, even Fisher (1935) doubted whether these methods could satisfactorily quantify how data positively support hypotheses or express the variable confidence of statistical estimates—the idea that not all the values within a confidence interval are equally supported by the data. The subtleties of what these methods justifiably do and what they cannot do are an unfailing source of confusion for practitioners and students alike (Nickerson 2000).

To help rectify the situation, I propose a new conceptual foundation for classical statistical testing based on principles from 20th-century epistemology, especially those of adherence, sensitivity, and safety. Originally, these were advanced as necessary conditions for one’s justified, true belief that “H is true” to be knowledge. Versions of the three most important, for some agent S, are as follows. Adherence: If H were true, S would believe it. Sensitivity: If H were false, S would not believe it. Safety: If S were to believe H, then it would be true. (Nozick [1981] articulated versions of the first two conditions, and Sosa [1999] the third.) These principles have the form of subjunctive conditionals—if-then statements about possible states of affairs similar to our own—and are intended to rule out the possibility of “lucky” knowledge by requiring some sort of reliability in the belief-making.

Now consider H as a statistical hypothesis, and substitute each occurrence of “S would (not) believe H” in the above principles with “the data would accord (worse) with H with high probability.” The results are statistical versions of adherence, measured by a p-value, sensitivity, measured by a version of Mayo’s severity concept (e.g., Mayo & Spanos 2006) that is a data-dependent version of power, and safety, measured by a new quantity I call “coFit”. They also go beyond Mayo’s conception of error statistics by applying to tests other than the one-sided z-test and to multi-dimensional hypotheses, among others. These new, data-dependent measures of evidence help quantify the positive evidence data provide for a statistical hypothesis according to how well the data fit the hypothesis and how poorly they fit alternatives. Each criterion quantitatively measures a “dimension” of the evidence, a distinct sense in which the evidence are reliable (not misleading) indicators of the truth of that hypothesis: strong evidence comes from sufficiently adherent, sensitive, and safe data.

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10:00 – 10:30

Vladimir Reznikov (Institute of Philosophy and Law of the SB RAS) - Verification of the Conditions for Application of Mathematics as a Philosophical Problem.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: In the publication, I defend the thesis that the problem of verifying the conditions for the application of classical probability theory has features of a philosophical nature. Firstly, according to Suppes, the philosophical problem has a general character; however, mathematical statistics is popular science in applications, therefore the verification of the conditions of its use has a mass character. Secondly, philosophical problems are complex; let us note that the verification of the conditions for the application of classical stochastic mathematics involves solving two problems: the determination of the distributions of the data and how they are related; in the simplest case, they are independent. I observe that it is not easy to get decisions of the tasks. For example, Shafer and Vovk wrote about the fundamental difficulties in verifying independence for the results of ongoing experiments. Note that the methods of testing hypotheses about the distribution, in particular, the Pearson’s chi-squared criterion, are not fully justified, since it assumes grouping of data, whereas in statistics the procedure of objective grouping for a finite data set cannot be always realized. So, hypothetical opportunities open up for philosophers who possess scientific methods to participate in science as opponents of these methods, since it is not customary in science to criticize if no alternative approaches are suggested. Thirdly, some approaches to verifying independence in data are based on using of philosophical notions. Kolmogorov believed that within the framework of mathematics it is impossible to identify conditions that suggest using models with independent experiments, and thought the problem belongs to the philosophy of natural science. Indeed, to describe independence, formalizations of causal relations are used in expert systems. However, non-philosophers are not so profoundly familiar with the philosophical ideas, therefore, the participation of philosophers have value. Fourthly, verification of the conditions of applicability of formal methods as a methodology for studying philosophical problems on the example of statistical wars. In the paper, attention is directed to the criticism of one of Kolmogorov's conditions for the application of probability theory by Frechet and Levy. Opponents criticized this condition on the basis of Bernoulli's theorem, believing that it is the conclusion of the theorem and turns out to be redundant. I formulated a thesis about justified criticism with the help of formalizations based on verification of their application conditions. Criticism based on a formal apparatus is permissible if the verification of its application conditions by the criticizing party is carried out no less strictly than by representatives of the criticized concept. In the context of applications, Kolmogorov followed Mises, a representative of the frequency interpretation, in which it is customary to carefully empirically determine the presence in the data of the basic properties of the object of the theory: probability and independence. Kolmogorov's critics were representatives of the subjective interpretation; there verification of the conditions for the application

of mathematics is not mandatory. Therefore, their criticism of the Kolmogorov's condition is not well-grounded.

10:30 – 11:00

Ivan Vladimir Gavriloff (Universidad Nacional de Tucumán (UNT) - CONICET) - Peirce's scroll for structural reasoning: the structural rules.

Topic: C.1 Philosophy of the Formal Sciences (including Logic, Mathematics, Statistics)

Abstract: In recent years several Peirce manuscripts were published (e.g. Peirce (2019), Peirce (2021a), Peirce (2021b)). Those manuscripts influx new analysis to the diagrammatic logic, existential graphs in particular. Given those manuscripts new relation between existential graphs and contemporary logic can be found. In this paper I will give an interpretation of the structural rules of sequent calculi in terms of Peirce's Existential Graphs. In order to claim this interpretation, I will consider Peirce's scroll as an analogous sign to the sign used in sequent calculi. On the basis of this interpretation, (1) the notion of scriptability will be compared with the procedures for graph transformation and (2) a topological analysis of the scroll by means of the Jordan's Curve Theorem will be carriedout. For (1) I will consider the MS 516 in Peirce (2019) where Peirce developed the scriptability notion and the transformations of graphs. For (2) peircean scroll will be compared with the peircean cut and carry out and explication why the former is not a Jordan Curve and the latter it is. Hence, a better understanding of the scroll and its properties obtains, paving the way to a new approach to issues in structural reasoning and proof theoretical semantics. Moreover, a comparison to White (1976), the first paper which relate sequent calculi and existential graphs will be made. Several advantages of the structural rules given in this paper will be provided. Finally, some applications to non-classical logic will be pointed out.

ROOM 13

9:30 – 10:00

Elena Chebotareva (Saint Petersburg state university) - Philosophical analysis of evolutionary approaches in the modern technosphere.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: Biological, primarily evolutionary approaches in the modern technosphere are experiencing a surge of research interest. I assume that the more autonomous and "smarter" machines become, the more willingly technical principles will be used for understand biological evolution (and vice versa).

One of the main difficulties of the biological approach to the technosphere is, of course, semiotics: language, models, metaphor. As Paton, the specialist in biocomputing and computational biology, points out when considering the potential of biological metaphors in Internet systems, machine description is not enough for an organism: much more work that is philosophical is required for these metaphors to become truly constructive. The analogies currently found in the network processes of organic and mechanical systems are not strict enough and depend on the specifics of software networks, which excludes additional factors and limitations that are present in nature. In this sense, the idea of considering engineering networks as an alternative domain for the study of evolutionary processes may seem overly optimistic. A lot in these analogies depends on the methods

of their study and the reality they create, which is based on a system for recording and monitoring the traces of agents' trajectories in biological and technological systems.

One of the most important determinants of scientific and technological development - economic - is completely overlooked by the majority of modern researchers, primarily, of course, working in the camp of natural and technical sciences. In my opinion, this should be one of the starting points for considering this issue (as was done by Canguilhem). As already mentioned, Canguilhem emphasizes that the modern mechanistic theory is clearly related to the modifications taking place in the economic and political structure of Western society at that time. He also notes that the connection between technical and economic is largely provided by labor specialization, i.e. mechanization and rationalization of human labor. It is noteworthy that Law also focuses on this phenomenon, referring the division of labor to one of the methodological problems of research related to the creation of different pictures of reality in each individual scientific practice.

Obviously, without taking into account all these various interdisciplinary and methodological aspects, it is impossible to draw reliable conclusions about the prospects of biological approaches in the technosphere, and the advantages of technical analogies outside it.

10:00 – 10:30

Robin Kopecký (Academy of Arts, Architecture, and Design in Prague) - Founding Philosophical Intuitions about Robotic Mind and Moral Status.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: The question of the impact of the new technologies and AI on human society becomes ever more pressing. Children of the next generations will be born into the world full of new stimuli that will form their thinking in the crucial years of development. It is possible that they will ascribe certain specifically human traits to robots that will exhibit certain behavioural patterns. In our interview study with children and teenagers (N=209, 109 F, age range 6-17, mean age=11.05) we decided to test the children's reaction to different types of robots.

The children were asked to judge whether they would ascribe certain attributes (sense perception, thinking, emotions, self-reflexion, life, soul, and freedom) to different beings or entities described to them. The training examples were an ordinary dog and a human girl or a boy. Then they were asked about a robot with basic perception and motor abilities that can also do complicated maths and talk, and a robot who is also capable of being an active participant of a dialogue and can talk about how it perceives the world in a way indistinguishable from a real person. The results showed that children were more prone to ascribe certain human abilities to the android than to the mathematical robot (esp. emotions and freedom). Both robots scored highly in sense perception and thinking, and android scored also in self-reflexion. However, even the android didn't score when it comes to the ascription of life and the soul. Participants ascribed soul and life only to the living beings.

The results show that the children are capable to ascribe certain level of cognition, emotions and even freedom to sufficiently complex robots, but are still reluctant to see robots as living beings with a soul. The concept of the soul may be understood as an essential moral core of the person that is capable of moral conduct and deep interpersonal bonds and which is conceptualized differently than the mind. Despite their behavioural complexity and intelligence, robots might not manage to cross the boundary between machines and full-fledged persons in the eyes of children.

Preliminary results of follow up Study 2 are also being presented. Using similar methods another group of participants (N=218) were interviewed about their evaluation of moral status of robotic machines of different purposes (smartphone, military robot-dog, lifeguard robot-otter). The children judged moral status of three types of machines in following categories: wrongness of deleting

robot's memory; possibility of robot being praised, robot being capable of lying, robot being punished, robot having a soul.

Results show that the purpose of specific robot has an effect of the perception of its moral status. In case of machine created to helping people (lifeguard robot-otter) its moral status is evaluated stronger across all categories compared to machines created with problematic purpose (military robot-dog).

10:30 – 11:00

Ioan Muntean (University of Illinois, Urbana-Champaign) - Algorithmic explanations in machine learning: in search of (some) explananda.

Topic: C.8 Philosophy of the Applied Sciences and Technology

Abstract: This paper evaluates the explanatory power of a class of machine-learning algorithms (MLA) when used in computationally-intensive and data-driven scientific disciplines. By acknowledging that as powerful categorization and classification tools, MLA discover patterns in data (rather than properties of real systems or processes), this paper investigates whether MLA explain something at all, without representing a target. Based on an analogy between MLA and ensembles of scientific models, this paper considers model explanation as a separate issue from the accuracy of model representation. Similar to some "non-representational" models (e.g. "minimal models", "exploratory models" etc.), some MLA can explain without representing reality. Overall, the paper argues that MLA do not offer 'how-actually' explanations of real-world targets but answer some "how-possibly" questions about explananda such as: scales of representation, categories of systems, or parameters of theories. Even if MLA do not directly represent a target, they convey information about quasi-target systems.

This paper argues that although MLA do not directly represent a target system (this failed connection is called "link uncertainty" by E. Sullivan), they can be explanatory (in a weaker sense than typical explanations) because they provide information about an explanandum. Some possible candidates for MLA explananda are considered here based mainly on the structure of MLA. In summary, these are the main steps of the present argument:

(1) MLA informativeness: MLA inform us about something, rather than representing something.

(2) Informativeness of targetless (or quasi-targetless) models: Some scientific models (e.g. minimal models, exploratory models, call them "targetless or quasi-targetless models") do not represent directly a target, although they provide information.

(3) MLA-model analogy: MLA are similar in respect of some scientific goals (prediction, explanation, i.a) to ensembles of targetless models (rather than to one, individual model).2 Prediction, accuracy of representation, and explanation, are independent goals of science.

(4) ML explanation (MLE): Some targetless models explain. Based on assumptions (6)-(8), MLA can provide in some cases Machine Learning (based) Explanations (MLE).

(5) Explananda of MLE: When MLAs explain, the explananda of MLE is highly dependent of the architecture, design, and the purpose of MLA, the most plausible candidates are theoretical entities (theories, classes, scales, parameters, or some combinations thereof).

This paper focuses on the epistemic roles of artificial epistemic agents in science as sources of scientific explanation. As scientific explanation is solving problems and enlarges our epistemic reach (as it generates scientific knowledge), we can ask about the contribution of MLA in particular to scientific progress. Most scientific disciplines will become increasingly "data-intensive" and

“computationally-laden”: in the times of Big Data, it is hard to deny the contribution of numerical simulations and data processing algorithms to the progress of science (both in the context of discovery and the context of justification). Hence, the philosophical topic of the epistemic role of artificial epistemic agents in the data- and computationally-intensescience. Together with the already settled literature on numerical simulations, several philosophers of science have recently tackled the epistemology and the methodology of machine learning—with its success and failure.

11:00 – 11:30	COFFEE BREAK

11:30 – 13:00	CLOSING CEREMONY