

**VI IEEE International Conference  
"Video and Audio Signal Processing in the Context of Neurotechnologies"  
SPCN – 2021**

8-12 of November 2021 St. Petersburg, Russia

<https://spcn.co>

The 6-th International Conference SPCN -2021 November 2021 St. Petersburg, Russia is organized as part of IEEE cooperation with the implementation of the program of the world-class scientific center – “Pavlov center "Integrative physiology - Medicine, High-Tech Healthcare and Stress resistance Technologies " in accordance with an agreement with the Ministry of Education and Science No. 075-15-2020-921 dated 13.11.2020.

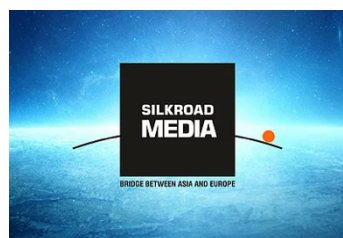
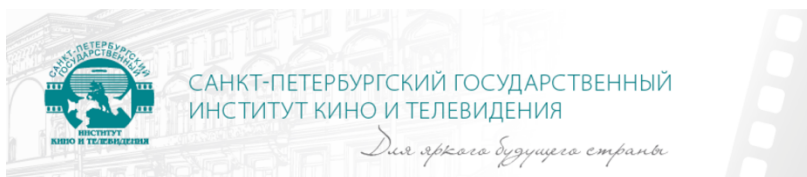
To connect to the Zoom conference on November 8th till 12th, please use the following link or Meeting ID:

<https://us06web.zoom.us/j/89642086259?pwd=RFFQbUdubko0MzR0cWRNRFNRL3djUT09>

Meeting ID: 896 4208 6259

Passcode: 377593

**PAVLOV INSTITUTE OF PHYSIOLOGY  
RUSSIAN ACADEMY OF SCIENCES**



## November 8

Chairs: Varvara Semenova, Kirill Kotchenko

Time	Authors	Affiliation	Report Title
10:00	Ludmila Filaretova	<i>Pavlov Institute of Physiology of the Russian Academy of Sciences, St. Petersburg, Russia</i>	Welcome to integrative physiology
10:20	Dmitrii Barsukov	<i>St. Petersburg State University of Film and Television, St. Petersburg, Russia</i>	Artificial intelligence and education
<p><b>To the centenary of the birth of Professor Mavr Antipin, the founder of national scientific school for integral assessment of television images quality and the research direction on the use of television technology in film industry</b></p>			
10:40	Boris Antipin	<i>Radio Engineer, The Bonch-Bruevich Saint-Petersburg State University of Telecommunications, Russia</i>	About my Father, Mavr Vasilievich Antipin
11:00	Boris Antipin	<i>Radio Engineer, The Bonch-Bruevich Saint-Petersburg State University of Telecommunications, Russia</i>	About my work
11:30	Konstantin Glasman	<i>St. Petersburg State University of Film and Television, St. Petersburg, Russia</i>	About my teacher, Mavr Vasilyevich Antipin
<p><b>To the centenary of the birth of Professor Ilya Tsukkerman, the founder of the scientific school for image processing and compression and the leading figure of digital television</b></p>			

12:00	Maria Rud	<i>Artist and creator of The AniMotion Show</i>	About my Father (Ilya Ioannovich Tsukkerman) and his world view
12:30	Maria Rud	<i>Artist and creator of The AniMotion Show</i>	About my work
13:00	Samuel Gorelik	<i>St. Petersburg National Research University of Information Technologies, Mechanics and Optics (ITMO University)</i>	About my teacher and the book "Electronic optics and television"
13:30	Yuri Shelepin	<i>Pavlov Institute of Physiology RAS</i>	Ilya Tsukkerman's contribution to the development of sensory physiology
LUNCH TIME			
16:30	<b>Results of the SPCN 2021 hackathon "Artificial Intelligence in film Art"</b>		

## November 9

Chairs: Varvara Semenova, Kirill Kotchenko

Time	Authors	Affiliation	Report Title
10:00	Alexandr Gerasimov	<i>Almazov National Medical Research Centre, Russia</i>	Developmental and epileptic encephalopathies as an experiment set by nature
10:20	Natalia Ivanova, Alexandr Gerasimov	<i>Polenov neurosurgical institute, Almazov National Medical Research Centre, Russia</i>	Pathophysiology (VR and AR) and genetic aspects of neurorehabilitation in neurooncology
11:00	<b>Workshop:</b> Ivan Gligorijevic	<i>mBrainTrain, Serbia</i>	<b>Mobile EEG: current approach and potential for future research?</b>
12:00	Vladislav Lebedev, Svetlana Muraveva, Olga Schemeleva	<i>Pavlov Institute of Physiology RAS</i>	Reconstruction of neural activity upon perception of stimuli subjected to wavelet filtering
12:20	Liubov Ivanova, Alexey Harauzov, Daria Podvigina	<i>Pavlov Institute of Physiology RAS</i>	Gamma band activity occurring with the Mismatch Negativity in the monkey's' brain
12:40	Alexey Harauzov, Liubov Ivanova, Daria Podvigina	<i>Pavlov Institute of Physiology RAS</i>	Gamma band brain activity of an awake and sleeping monkey in response to flashes of light
13:00	Manabu Tanifuji, Nam Yunjun	<i>RIKEN Brain Science Institute, Japan</i>	Understanding the mechanism of invariant object vision from monkey inferior temporal cortex
13:20	Daria Podvigina, Liubov Ivanova, Anna Yakupova, Alexey Harauzov	<i>Pavlov Institute of Physiology RAS</i>	Rhesus monkeys performing cognitive tests in a virtual environment
13:40	Igor Bondar	<i>Institute of Higher Nervous Activity and Neurophysiology of Russian Academy of Sciences, Russia</i>	Representation of naturalistic visual stimuli in the brain of vertebrates

14:00	Diana Naumova, Anna Kosyakova, Ksenia Skuratova	<i>St. Petersburg State University; Pavlov Institute of Physiology RAS</i>	Application of eye-tracking technology to identify stress related disorders and depression
LUNCH TIME			
15:00	<b>Workshop:</b> Aleksandr Kirsanov	<i>Laboratory of behavioral neurodynamics, SPbU, Russia</i>	<b>How to create audio and visual stimuli: speech experiments experience</b>
16:00	Alexander Lunichkin, Alisa Gvozdeva, Irina Andreeva, Larisa Zaitseva, Elena Ogorodnikova	<i>Sechenov Institute of Evolutionary Physiology and Biochemistry, Pavlov Institute of Physiology RAS</i>	Analysis of spectral changes in vowels of Lombard speech
16:20	Olga Labutina, Elena Ogorodnikova, Anna Balyakova, Sergey Pak, Elvira Stolyarova	<i>Pavlov Institute of Physiology RAS</i>	Targeting to the speaker in conditions of voice competition under normal auditory function and with hearing and speech disorders
16:40	Diana Salikova, Ekaterina Petropavlovskaya	<i>Pavlov Institute of Physiology RAS</i>	Auditory masking: pushing & pulling effect for moving sounds
17:00	Maria Agaeva	<i>Pavlov Institute of Physiology RAS</i>	Signals Localization in the vertical plane in masking conditions
17:20	Sergey Surma, Boris Shchegolev, Vasiliy Stefanov, Dmitriy Klyachko, Elena Ogorodnikova	<i>Pavlov Institute of Physiology RAS</i>	Testing the application of magnetometry in audiological practice
17:40	Elizaveta Tsiplakova	<i>ITMO University, Russia; University of Bordeaux, France</i>	Algorithms on phase retrieval from intensity distributions formed by terahertz radiation
18:20	Aleksey Grigorev, Elena Lyakso	<i>St. Petersburg State University, Russia</i>	Analysis of the shape of the electroglottographic wave in

			patients before and after thyroid surgery
18:40	Sergey Koskin, Ivan Stepanets	<i>S.M. Kirov Military Medical Academy, Russia</i>	Standardized ophthalmic tests for evaluating reading parameters

## November 10

Chairs: Daria Podvigina, Varvara Semenova, Kirill Kotchenko

Time	Authors	Affiliation	Report Title
10:00	Nikita Solovyev	<i>St. Petersburg State Institute of Psychology and Social Work, St. Peterburg, Russia</i>	Quantum neurophilosophy
10:20	Alexander Zhegallo	<i>Institute of Experimental Psychology MSUP, Russia</i>	The duration of fixations as a marker of decision-making in the "Believe / Don't believe" model game
10:40	Olga Zhukova, Yuri Shelepin, Petr Vasiljev, Vladimir Fokin, Andrey Sokolov	<i>Pavlov Institute of Physiology RAS</i>	Facial expression perception under threshold conditions
11:00	Evgeniy Khoze, Aleksandr Zhegallo	<i>Moscow State University of Psychology &amp; Education, Russia</i>	Perception of dynamic expressions of complex emotions
11:40	Evgeny Serov, Olga Korolkova, Maria Marinova	<i>Moscow State University of Psychology &amp; Education, Russia</i>	Determination of personal qualities of a person while watching the movements of his face
12:00	Vladimir Barabanschikov, Maria Marinova, Artem Abramov	<i>Institute of Experimental Psychology, Moscow State University of Psychology &amp; Education, Russia</i>	Virtual Personality of a Moving Thatcherized Face
12:20	Olga Zhukova, Sergey Pronin, Po-Lei Lee, Narisa Nan Chu, Yuri Shelepin	<i>Pavlov Institute of Physiology RAS, National Central University, Taiwan;</i>	Non-verbal communication between Russians and Chinese during purposeful activity

		<i>CWLab International, IEEE CTSoc &amp; EMBS, Los Angeles, USA</i>	
12:40	Denis Yavna, Vitaly Babenko, Olga Gorbenkova, Igor Plavelsky, Viktoria Voronaya	<i>Southern Federal University Rostov-on- Don, Russia</i>	The role of second-order visual features in the classification of objects
13:00	Sergey Pronin	<i>Pavlov Institute of Physiology RAS</i>	Symmetrical patterns in natural images
13:20	Valeria Bondarko, Marina Danilova, Sergey Solnushkin, Valeriy Chikhman	<i>Pavlov Institute of Physiology RAS</i>	Image segmentation, size estimation and the model of modules
13:40	Andrei Khrennikov	<i>Karl Linnaeus University, Sweden</i>	Quantum-like model for unconscious-conscious interaction and emotional colouring of perceptions and other conscious experience
<i>LUNCH TIME</i>			
15:00	<b>Workshop: Grassl Reinhard</b>	<i>Mangold International, Germany</i>	<b>“It’s easy to miss something you’re not looking for” Video-based Scientific Observation made easy</b>
16:00	Vladimir Barabanschikov, Maria Marinova	<i>Institute of Experimental Psychology, Moscow State University of Psychology &amp; Education, Russia</i>	Perception of video images of the chimeric face
16:30	Olga Korolkova, Elena Lobodinskaya	<i>Moscow State University of Psychology and Education, Russia</i>	BEVEL: A new dataset of natural dynamic facial expressions
17:00	Ivan Mazanov, Maxim Ereemeev, Anna Levina	<i>ITMO University,</i>	Digital processing of video recordings of rodent behavior: analysis of optical



		<i>Pavlov Institute of Physiology RAS</i>	distortion of the image for tracking purposes
17:20	Irina Pal'chikova, Evgenii Smirnov, Evgeniy Solenov, Igor Iskakov	<i>Technological Design Institute of Scientific Instrument Engineering of the Siberian Branch of the RAS; Institute of Cytology and Genetics, Siberian Branch of RAS, S. Fyodorov Eye Microsurgery Federal State Institution, Novosibirsk Branch, Russia</i>	Features of the digital camera transfer function
17:40	Valery Korotaev, Pavel Safonov	<i>ITMO University, Russia</i>	Review of the elaboration status of thermal imaging technology: matrices and infrared cameras
18:30	Ilia Bokatyi, Valeriy Korotaev	<i>ITMO University, Russia</i>	Analytical review of photon counters based on silicon photomultiplier
19:00	Narisa Nan Chu	<i>CWLab International, IEEE CTSoc &amp; EMBS, Los Angeles, USA</i>	Brain Communication - Consciousness and Intelligence

# November 11

Chairs: Arina Boiko, Evgeny Shelepin

Time	Authors	Affiliation	Report Title
10:00	Po-Lei Lee	<i>National Central University, Taiwan</i>	Brain Computer Interface based Rehabilitation System
10:30	Miriam Reiner	<i>Technion - Israel Institute of Technology, Israel</i>	A brain machine interface for enhanced human performance
11:00	Elmira Panakhova, Ulduz Hashimova, Kamala Javadova, Khuraman Miryusifova, Arzu Allkhverdiyeva, Nigar Huseynova, Aleksandra Zamaro, Irana Galandarli	<i>Institute of Physiology named after Academician Abdulla Garayev of the Academy of Sciences of Azerbaijan, Azerbaijan</i>	Peculiarities of Alzheimer's disease development in bulbectomized albino rats experimental model and curcuma longa effect
11:20	Svetlana Alekseenko, Polina Shkorbatova	<i>Pavlov Institute of Physiology RAS</i>	Integrative transformations in direct neuronal connections between cortical areas of different hierarchical levels
11:50	Marina Danilova, John Mollon	<i>Pavlov Institute of Physiology RAS, University of Cambridge, UK</i>	Why do the white-matter tracts of the brain contain axons of different diameter?
12:20	Natalia Merkulieva	<i>Pavlov Institute of Physiology RAS</i>	Third visual parallel channel
12:40	Natalia Merkulieva	<i>Pavlov Institute of Physiology RAS</i>	Thalamic perigeniculate nucleus: function and development.
13:00	Alexandr Tsitsulin	<i>Television Scientific Research Institute, St. Petersburg, Russia</i>	Principle of dominant information

13:20	Ruslan Khlynov, Victoria Ryzhova, Valeri Korotaev	<i>ITMO University, Russia</i>	Four-channel polarization system for hematocrit level monitoring
<i>LUNCH TIME</i>			
15:00	<b>Workshop:</b> Dariusz Zapała	<i>CortiVision, Department of Experimental Psychology at the John Paul II Catholic University of Lublin, Poland</i>	Measuring brain hemodynamic response during the perception of images and sound using fNIRS
16:00	Elena Mikhailova	<i>Institute of Higher Nervous Activity and Neurophysiology of Russian Academy of Sciences, Russia</i>	Sex differences in visual-spatial working memory: Analysis of ERPs in the sensors and sources space
16:20	Elena Kozhevnikova, Valerya Bondarko, Elena Ogorodnikova, Maksim Struzhkin	<i>Pavlov Institute of Physiology RAS, Word- Class Research Center Pavlov Center «Integrative Physiology to Medicine, High-Tech Healthcare and Technologies of Stress Resistance», Russia</i>	To the 30th anniversary of early intervention in Russia: assessment of visual functions in infants (in memory of A.A. Nevskaya)
16:40	Valeria Kovaleva	<i>St. Petersburg State University, Russia</i>	Behavioral markers of the error detection in solving cognitive tasks
17:00	Sergei Saveliev, Alexander Chuev	<i>Federal State Budgetary Institution «A. P. Avtsyn Research Institute of Human Morphology» St. Petersburg State University, Russia</i>	Semantic analysis of the computer environment for the formation of adolescent writing
17:20	Elisaveta Galperina, Olga Kruchinina, Ekaterina Stankova, Diana Guillemard	<i>Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, Russia</i>	Complex grammar comprehension in 4-5 years old Russian-speaking children influence the ERP during sentence-picture matching task

17:40	Ekaterina Budenkova, Elena Ogorodnikova	<i>Pavlov Institute of Physiology RAS, Word- Class Research Center Pavlov Center «Integrative Physiology to Medicine, High-Tech Healthcare and Technologies of Stress Resistance», Russia</i>	Characteristics of antisaccades in children aged 7-9 years with typical development
18:00	Veronika Anikina, Evgeny Khoze, Irina Strizhova	<i>Institute of Experimental Psychology, Moscow State University of Psychology &amp; Education, Russia</i>	Dynamics of mental states of learners working with didactic VR programs using VR technologies of various levels.
18:20	Elizaveta Karaseva	<i>Pavlov Institute of Physiology RAS</i>	Computational methods for electromagnetic radiation and heterogeneous media interaction description

## November 12

Chair: Vladislav Lebedev, Mariia Kniazeva

Time	Authors	Affiliation	Report Title
10:00	Narisa Nan Chu, Yuri Shelepin	<i>CWLab International, IEEE CTSoc &amp; EMBS, Los Angeles, USA Pavlov Institute of Physiology RAS, Russia</i>	Conscious and Unconscious Vision of Interlocutors
10:20	Valeriia Demareva, Julia Edeleva, Roman Golubin	<i>Lobachevsky State University, Russia Brausweig Technical University, Germany</i>	Eye movements processing in the context of proficiency evaluation
10:40	Evgeny Shelepin, Kseniya Skuratova	<i>Pavlov Institute of Physiology RAS</i>	Eye tracking as a tool for assessing the development of a professional skill
11:00	Natalia Yarovaya, Elena Isaeva, Kseniya Skuratova, Evgeny Shelepin, Veronika Zueva	<i>The First Pavlov State Medical University of St. Petersburg, Ministry of Health of Russia, Pavlov Institute of Physiology RAS</i>	Self-perception of the face: the effect of accentuated personality traits
11:20	Anzhelika Okolzina, Maxim Likhanov, Mikhail Kurushkin	<i>ITMO University, Russia</i>	Personalized monitoring of the process of teaching chemistry in immersive virtual reality based on eye-tracking technology
11:40	Sergey Sergeev	<i>St. Petersburg State University, Russia</i>	Human-machine interaction in induced intelligent virtual environments
12:00	Valeriya Yachnaya	<i>Pavlov Institute of Physiology RAS, St. Petersburg State University of Aerospace Instrumentation, Russia</i>	Semantic map distortion effect on Conditional Generative Adversarial Network Pix2Pix

12:20	Anton Mamaev, Ivan Gorbunov	<i>St. Petersburg State University, Russia</i>	Muller-Lyer illusion in CNN trained for 3D object height estimation
12:40	Mikhail Titarenko, Roman Malashin	<i>Pavlov Institute of Physiology RAS, ITMO university, State University of Aerospace Instrumentation, Russia</i>	Application of semantic information in deep neural networks for image reconstruction under conditions of high noise
13:00	Roman Malashin, Arina Boiko	<i>Pavlov Institute of Physiology RAS</i>	Q-learned least action classifier
13:20	Valery Korotaev, Liliana Rodikova, Artyom Akhmerov, Aleksandr Timofeev, Aleksandr Vasilev, Victoria Ryzhova	<i>ITMO University, Russia</i>	Method and algorithm for processing digital images during videoendoscopy of working blades of steam turbines
13:40	Alexander Pavlov, Artur Gaugel	<i>ITMO University, Russia</i>	Decision-making under contradiction of bias and facts: an influence of individual peculiarities of the decision-maker's neural network
		LUNCH TIME	
15:00	Discussion: Archil Kezeli Manabu Tanifuji Yuri Shelepin	<i>Laboratory of Physiology of Vision I.Beritashvili Center of Experimental Biomedicine, Georgia, RIKEN Brain Science Institute, Japan, Pavlov Institute of Physiology RAS</i>	Invariant description of form and recalibration of color in peristriate cortex BA19 - BA37
16:00	Katerina Malakhova	<i>Pavlov Institute of Physiology RAS</i>	Distributed encoding of images and categories in artificial neural networks