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Krakow  
Poland

Neuronus 2024



NENCKI INSTITUTE OF EXPERIMENTAL BIOLOGY, WARSAW, POLAND



# NEURONUS 2024 NEUROSCIENCE FORUM

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## ORGANIZERS

### STUDENT NEUROSCIENCE SOCIETY 'NEURONUS'

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### PSYCHOLOGY STUDENTS' ASSOCIATION

Institute of Psychology, Jagiellonian University

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## HONORARY PATRONAGE

Dariusz Wiczorek – Minister of Science

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Prof. Jacek Nowak – Dean of the Faculty of Philosophy of the Jagiellonian University

Prof. Paweł Grzmil – Head of the Institute of Zoology and Biomedical Research  
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Fundacja Młodej Nauki

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TVP3 Krakow

## PROGRAMME

24<sup>TH</sup> APRIL 2024

INSTITUTE OF PSYCHOLOGY OF JAGIELLONIAN UNIVERSITY

- 8:30–12:20**      **Workshop I – Room 0.03**  
Neuropixels by Cagatay Aydin  
*KU Leuven, Belgium*
- 12:00–18:00**      **Workshop II – Room 1.09**  
QuPath by Ewelina Bartoszek  
*University of Basel, Switzerland*
- 8:30–18:00**      **Workshop III – Room 1.02**  
DeepLabCut by Konrad Danielewski  
*Nencki Institute of Experimental Biology, Warsaw, Poland*
- 9:00–13:00**      **Workshop IV – Room 1.07**  
NeuroImaging Data Analysis by Jakub Szewczyk and Mikołaj Compa  
*Institute of Psychology at the Jagiellonian University in Krakow, Poland*
- 13:00–16:00**      **Workshop V – Room 0.03**  
Virtual reality, physiology and biofeedback by Slav Dimov  
*European Sales Executive bei BIOPAC Systems, Inc.*

## SCIENCE JAM – PIWNICA POD BARANAMI

- 19:00–20:00**      **Career Development by Ali Jawaid<sup>1</sup> and Michał Ślęzak<sup>2</sup>**  
<sup>1</sup> *Nencki Institute of Experimental Biology, Warsaw, Poland*  
<sup>2</sup> *Łukasiewicz-PORT, Wrocław, Poland*
- 20:15–21:15**      **Scientific communication by Joanna Podgórska<sup>1</sup> and Ilona Kotlewska<sup>2</sup>**  
<sup>1</sup> *SWPS*  
<sup>2</sup> *Institute of Psychology, Jagiellonian University*

25<sup>TH</sup> APRIL 2024

AUDITORIUM MAXIMUM, JAGIELLONIAN UNIVERSITY

- 9:00–10:10**      **Official Opening and Opening Lecture – Large hall A**  
*Karolina Warzecha (Head of Neuronus 2024)*  
*Letter of Rector of the Jagiellonian University Prof. dr hab. Jacek Popiel*  
Translating computational mechanisms to clinical applications  
*Speaker: Quentin Huys (Max Planck & UCL, UK)*
- 10:10–10:45**      **Flashtalks – Large hall A**
- 10:45–11:15**      **Coffee Break**

- 11:15–12:45**      **Symposia Session I – Large hall A**  
Towards Precision Psychiatry  
*Speakers: Juan P. Lopez, Charlotta Henningson, Magdalena Ziemiańska, Anna Gugula*
- Symposia Session II – Large hall B**  
Integrating Spiking Neural Networks in Neurobiology and Computer Science  
*Speakers: Matej Mertik, Maciej Wielgosz, Kinga Przybylska, Szymon Mazurek, Joan Falco-Roget, Jan Argasiński*
- Symposia Session III – Medium hall B**  
Visual perception in cognitive psychology  
*Speakers: Piotr Buczkowicz, Ingrida Zelionkaitė, Katarzyna Jurewicz, Julia Papiernik*
- 12:45–13:15**      **Lunch**
- 13:15–14:30**      **Poster Session I – Exhibition room**
- 14:30–15:30**      **Keynote lecture – Large hall A**  
Dynamic Algorithmic Networks of Visual Categorizations  
*Speaker: Philippe Schyns (University of Glasgow, Scotland)*
- 15:30–17:00**      **Symposia Session IV – Large hall A**  
Visual perception in naturalistic environment  
*Speakers: Marius Peelen, Natalia Rutkowska, Michał Bola, Marek A. Pedziwiatr, Diana Kollenda*
- Symposia Session V – Large hall B**  
Bilateral Brain-Body Interactions  
*Speakers: Urte Neniskyte, Edyta Bulanda, Weronika Tomaszewska, Magdalena Gomołka, Ivan Arzhanov*
- Symposia Session VI – Medium hall B**  
Aging Retina  
*Speakers: Kai Kaarniranta, Michał Bogocz, Piotr Rodak, Anna Pacwa*
- 17:00–17:30**      **Coffee Break**
- 17:30–18:30**      **Keynote lecture – Large hall A**  
Non-canonical mechanisms underlying amygdala mediated memory representation  
*Speaker: Andrew Holmes (NIAAA, NIH, USA)*
- 18:30**              **Welcome Reception**

**26<sup>TH</sup> APRIL 2024**

**AUDITORIUM MAXIMUM, JAGIELLONIAN UNIVERSITY**

- 8:00–9:00**              **NeuroFitness**  
*Speaker: Anna Pałasz*
- 9:00–10:00**          **Keynote lecture – Large hall A**  
Neural circuits underlying curiosity-driven exploration  
*Speaker: Sebastian Haesler (NERF, Belgium)*



- 10:00–11:30**      **Symposia Session VII – Large hall A**  
Inhibitory control: Responses, errors, and their neural and psychophysiological correlates  
*Speakers: Bob Barry, Krzysztof Bielski, Patrycja Kalamala-Ligeza, Christina Thunberg*
- Symposia Session VIII – Large hall B**  
Molecular profiling of neurodegenerative disorders  
*Speakers: Jörg Hanrieder, Jack Wood, Alicja Szadziewska*
- Symposia Session IX – Medium hall B**  
Posttranslational Modifications in the Brain  
*Speakers: Thomas Klarić, Ugne Kuliesiute, Natalia Pudelko-Malik, Savani Anbalagan*
- 11:30–12:00**      **Coffee Break**
- 12:00–13:30**      **Symposia Session X – Large hall A**  
Molecular Mechanisms of Synaptic Plasticity  
*Speakers: Jakub Włodarczyk, Monika Puchalska, Anbarieh Saadat, Bogna Badyra*
- Symposia Session XI – Large hall B**  
Computational approaches to understand brain complexity  
*Speakers: Wiktor Młynarski, Katarzyna Sawicka, Emilia Kaczmarczyk, Magdalena Szponar*
- Symposia Session XII – Medium hall B**  
Psychedelics  
*Speakers: Paweł Orłowski, Anastasia Ruban, Maja Wójcik, Čestmír Vejmola, Adam Wojtas*
- 13:30–14:00**      **Lunch**
- 14:00–15:15**      **Poster Session II – Exhibition hall**
- 15:15–17:00**      **Symposia Session XIII – Large hall A**  
Untangling neural circuits supporting specific behavior  
*Speakers: Bianca Silva, Anthony Kischel, Katarzyna Hryniewiecka, Aleksandra Nogaj, Jakub Mlost, Oskar Markkula*
- Symposia Session XIV – Large hall B**  
Face Perception and its application in audiovisual integration  
*Speakers: Maria Ida Gobbini, Ilona Kotlewska, Magdalena Szmytke, Maria Nalberczak-Skóra*
- Symposia Session XV – Medium hall B**  
Exploring New Drugs for Brain Therapy  
*Speakers: Sara Xapelli, Angelika Jagielska, Nicolas Singewald, Judith Schweimer*
- 17:00–17:30**      **Coffee Break**
- 17:30–18:30**      **Keynote lecture – Large hall A**  
Hyperalignment: modeling shared and individuating information embedded in idiosyncratic fine-scale cortical topographies  
*Speaker: James Haxby (Dartmouth College, USA)*
- 21:00**              **Neuronus Party**

**27<sup>TH</sup> APRIL 2024**  
AUDITORIUM MAXIMUM, JAGIELLONIAN UNIVERSITY

- 9:00–10:00**      **Keynote lecture – Large hall A**  
From Molecular Codes to Behavioral Patterns: Deciphering Autism Spectrum Disorders  
*Speaker: Gaia Novarino (IST, Austria)*
- 10:00–11:30**      **Symposia Session XVI – Large hall A**  
Automatization in behavioral studies – a key to objectivity  
*Speakers: Aleksandra Badura, Veronika Kovarova, Patrycja Ziuzia, Julia Świdorska, Anjaly Yadav*
- Symposia Session XVII – Large hall B**  
Microglia in Health and Disease  
*Speakers: João Relvas, Izabela Lepiarz-Raba, Natalia Malek, Natalia Stelmach*
- Symposia Session XVIII – Medium hall B**  
EEG correlates of consciousness  
*Speakers: Marcin Koculak, Klaudia Krystecka, Urszula Górską-Klimowska, Anna Zofia Leśniewska*
- 11:30–12:00**      **Coffee Break**
- 12:00–13:30**      **Symposia Session XIX – Large hall A**  
Neuroendocrine Brain  
*Speakers: Michael Greenwood, Svenja Leibnitz, Julian Zacharjusz, Natalia Konopinska, Naveen Nedunchezian*
- Symposia Session XX – Large hall B**  
OpenfUS  
*Speakers: Marcin Lewandowski, Alan Urban, Michiel Camps, Nora Fitzgerald, Klaudia Csikós, Tianzi Wang*
- Symposia Session XXI – Medium hall B**  
How to train the brain  
*Speakers: Alicja Olszewska, Aurimas Mockevičius, Syanah Wynn, Tomasz Ściepuro, Gabriela Rajtar*
- 13:30–14:00**      **Lunch**
- 14:00–15:15**      **Poster Session III – Exhibition hall**
- 15:15–16:45**      **Symposia Session XXII – Large hall A**  
Neuroimaging of abnormal brain functions in schizophrenia  
*Speakers: Todd Woodward, Rafał Skiba, Wiktor Więclawski, Camilo Enrique Sánchez*
- Symposia Session XXIII – Large hall B**  
Cellular Mechanisms of Pain and Touch  
*Speakers: Mateusz Kucharczyk, Felipe Meira de-Faria, Basil Duvernoy*
- Symposia Session XXIV – Medium hall B**  
Reading brain in blind individuals  
*Speakers: Anna-Lena Stroh, Maksymilian Korczyk, Małgorzata Paczyńska, Maciej Gaca, Jacek Matuszewski, Cemal Koba*
- 16:45–17:15**      **Coffee Break**
- 17:15–18:15**      **Keynote lecture – Large hall A**  
Habitats and human physiology on multiple time scales  
*Speaker: Kathrina Wulff (Umeå University, Sweden)*
- 18:15**                **Awards & Closing Ceremony – Large hall A**

## ANTISEIZURE EFFECTIVENESS OF NICOTINAMIDE AND DIAZEPAM INCREASED AFTER BRAIN TRANSCRANIAL DIRECT CURRENT STIMULATION (TDCS)

Prybolovets K.O\*, Pastuhov O.O., Budigay N.S., Kibysh Ya.A., Godlevsky L.S.

*Physiology and Biophysics Department, Odesa National Medical University, Odesa, Ukraine*

\*Email: kseniaprib@ukr.net

tDCS of the cerebellum prevented PTZ-kindled seizures, and such an effect was strengthened after diazepam administration. The work aimed to investigate the pronouncement of antiseizure effects of nicotineamide and diazepam performed after preliminarily applying tDCS to the cerebellar or forebrain of PTZ-kindled rats. Kindling was induced with three weeks of PTZ (35.0 mg/kg, i.p.) administrations. Rats with generalized tonic-clonic seizures were used for the observation. Nicotinamide (100.0 mg/kg, i.p.) and diazepam (0.5 mg/kg, i.p.) did not significantly reduce seizure severity. Being administered after three trials of tDCS of the cerebellum (500 mcA, anode, 5.0 min), the severity of seizures was reduced in both nicotineamide and diazepam-treated rats by 35.0% and 45.0% correspondently

( $P < 0.01$ ). Generalized tonic-clonic fits were prevented, and rats demonstrated myoclonuses of forelimbs and rearings. In rats with forebrain tDCS, nicotineamide administration resulted in the development of generalized seizure fits in 6 out of 9 rats ( $P > 0.05$ ), while the latency of seizures increased by 1.57 times ( $P < 0.05$ ). Diazepam (0.5 mg/kg) prevented generalized seizures in 6 out of 9 rats and reduced seizure severity by 26.5% ( $P < 0.05$ ). Gained data favored the heightening of sensitivity to antiseizure effects of nicotineamide and diazepam caused by anode tDCS of the cerebellum and forebrain.

Funding: Research was supported by the Ministry of Health Care of Ukraine (grant N0121U114510).

## NEURONAL LOSS AND NEOANGIGENESIS ARE SUPPRESSED WITH CEREBELLAR TRANSCRANIAL DIRECT CURRENT STIMULATION (TDCS) IN PENTYLENETETRAZOL (PTZ) KINDLING

Pervak M.P.<sup>2</sup>, Al-Nadawi N.<sup>3</sup>, Kashchenko O.A.<sup>1</sup>, Bidnyuk V.K.<sup>1\*</sup>, Tselukh V.A.<sup>1</sup>, Aksenenko A.V.<sup>1</sup>

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The work aimed to investigate the effects of cerebellar tDCS on neurons' degeneration and microvessels' density in the brain structures of PTZ-kindled rats. Kindling was produced in Wistar male rats by administration of three-week PTZ (35.0 mg/kg, i.p.). tDCS of the cerebellum (500 mcA, anode, 15.0 min) was performed before each PTZ injection. Neurons were counted with light microscopy using the object colocalization module available in the HALO software (Indica Labs, USA). The number of degenerative neurons in the frontal cortex and hippocampus (CA3) of PTZ-kindled rats by 3.4 and by 4.9 times correspondently exceeded those in the intact control group ( $P < 0.001$ ). The number of microvessels in the frontal cortex and the ventral hip-

pocampus exceeded such ones in the control by 44.5% and 49.2% ( $P < 0.05$ ). In tDCS-treated rats, the number of degenerative neurons in the frontal cortex and ventral hippocampus was less by 1.85 and 2.30 ( $P < 0.05$ ) times, and the number of microvessels was less by 1.52 and 1.76 times when compared with data in kindled rats ( $P < 0.05$ ). Hence, data favors the pathogenic significance of neuronal loss and angiogenesis as a mechanism of chronic epileptic activity development and the effectiveness of prevention, such deteriorations with cerebellar tDCS.

Funding: Research was supported by the Ministry of Health Care of Ukraine (grant N0121U114510).