



LITHUANIAN UNIVERSITY  
OF HEALTH SCIENCES



10<sup>th</sup> EBRAINS Baltic-Nordic Summer School on Neuroscience

# From Neurons to The Virtual Brain, Consciousness and Artificial Intelligence

28-31 May 2024

Baltic Ferry Boat Helsinki-Stockholm-Helsinki  
University of Helsinki, Helsinki, Finland  
Royal Institute of Technology, Stockholm, Sweden



## Scientific Committee and Organizers

Ausra Saudargiene, Lithuanian University of Health Sciences, Lithuania

Marja-Leena Linne, Tampere University, Finland

Peter Jedlicka, Justus Liebig University Giessen; Goethe University Frankfurt, Germany

Pawel Herman, KTH Royal Institute of Technology, Stockholm, Sweden

Walter Senn, University of Bern, Switzerland

Viktor Jirsa, Aix-Marseille Université, France

## Contact

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## Further information and registration

[lsmu.lt/en/events/ebrains](https://lsmu.lt/en/events/ebrains)

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28 May 2024

University of Helsinki, Finland

16.00-19.00	<p><b>Workshop at University of Helsinki, Finland</b></p> <p><b>Computational neuroscience and deep learning for brain medicine</b></p> <p>Chair: Marja-Leena Linne (University of Tampere, Finland)</p>
16.00-16.20	<p>Viktor Jirsa (Aix-Marseille Université, France; EBRAINS)</p> <p>EBRAINS challenges and achievements</p>
16.20-16.40	<p>Pierpaolo Sorrentino (Aix-Marseille Université, France; EBRAINS)</p> <p>Introduction to EBRAINS The Virtual Brain</p>
16.40-17.00	<p>Eero Pekkonen (Dept Neurology, Helsinki University Hospital, Finland)</p> <p>Deep brain stimulation in advanced Parkinson’s disease</p>
17.00-17.20	<p>Päivi Nevalainen (Helsinki University Hospital, Finland)</p> <p>Presurgical evaluation of epilepsy</p>
17.20-17.40	<p>Saeed Montazeri (Dept of Physiology, University of Helsinki, Finland)</p> <p>Advancing automated EEG analysis for neonatal intensive care: from engineering to bedside solutions</p>
17.40-18.00	<p>Tuomo Mäki-Marttunen (University of Tampere, Finland)</p> <p>Psychiatric disorders from the computational neuroscience perspective</p>
18.00-19.00	<p>Discussion and visiting Biomag at Meilahti campus, University of Helsinki, Finland</p>



29 May 2024

Ferry Boat, Helsinki, Finland

10.30 – 11.30	Boarding in Helsinki, registration. Coffee/Tea
11.45 - 12.00	<b>Welcome &amp; Introduction</b> Organizers
	<b>I session. The whole brain models &amp; ethics</b> Chair: Walter Senn (University of Bern, Switzerland)
12.00-12.30	Viktor Jirsa (Aix-Marseille Université, France; EBRAINS) The Virtual Brain for personalized whole brain models in health and disease
12.30-13.00	Alain Destexhe (European Institute for Theoretical Neuroscience, Paris, France) Brain responsiveness in conscious and non-conscious states
13.00-14.00	Lunch
14.00-14.30	Christiane Woopen (Center for Life Ethics, Rheinische Friedrich-Wilhelms-Universität Bonn) TBC Ethics in Neuroscience and AI (TBC)
	<b>II session. Synapses, neurons, astrocytes and networks</b> Chair: Peter Jedlicka (Justus Liebig University Giessen, Germany)
14.30-15.00	Marja-Leena Linne (Tampere University, Finland) Astrocyte-neuron interactions: From synapses to cognition and brain disease
15.00-15.30	Michele Migliore (Institute of Biophysics, Palermo, Italy) Ausra Saudargiene (Lithuanian University of Health Sciences, Lithuania) Cognitive functions (and dysfunctions) emerging from data-driven models of hippocampus
15.30-16.00	Bruce Graham (University of Stirling, UK) Information transmission in neocortical pyramidal cells
16.00-16.30	Simo Vanni (University of Helsinki, Finland) Adopting visual system models to decode cortical computations
16.30-18.00	Coffee break.
17.00	Departure from Helsinki.
18.00-19.30	<b>Student spotlight presentations</b> Chair: Ausra Saudargiene (Lithuanian University of Health Sciences, Lithuania)
19.30-23.00	Dinner and Social Program

30 May 2024

Ferry Boat, Stockholm, Sweden

7.00-9.00 10.00	Breakfast Arrival in Stockholm
	<b>Parallel hands-on tutorials</b>
9.00-10.30	Tutorial 1. The Virtual Brain for building personalised virtual brain models Spase Petkoski (Aix-Marseille Université, France) Damien Depannemaecker (Aix-Marseille Université, France)
9.00-10.30	Tutorial 2. Neuron and TREES for building biologically realistic neurons and networks Herman Cuntz (Frankfurt Institute for Advanced Studies, Germany) Arnd Roth (Wolfson Institute of Biomedical Research, University College London, UK)
11.00-13.00	Bus tour and sightseeing in Stockholm, Sweden
13.00-15.00	<b>Workshop at KTH Royal Institute of Technology, Stockholm</b> Chair: Pawel Herman (KTH Royal Institute of Technology, Stockholm, Sweden)
13.00-13.30	Viktor Jirsa (Aix-Marseille Université, France; EBRAINS) Introduction to EBRAINS and The Virtual Brain
13.30-14.00	Johan Lundström (KTH Royal Institute of Technology, Stockholm, Sweden) What the nose tells
14.00-14.30	Erik Fransén (KTH Royal Institute of Technology, Stockholm, Sweden) The synaptome atlas, investigations of the weight matrix of the brain
14.30-15.00	Discussion
15.00-16.00	Returning to the ferry boat
16.45 16.45-18.30	Departure from Stockholm Dinner
	<b>III Session. Synaptic plasticity, learning and memory</b> Chair: Alain Destexhe (European Institute for Theoretical Neuroscience, Paris)
18.30-19.00	Jeanette Helgren-Kotaleski (KTH Royal Institute of Technology, Stockholm, Sweden) TBC Dopamine signal and multi-scale models of basal ganglia in learning and consciousness
19.00-19.30	Peter Jedlicka (Justus Liebig University Giessen, Germany) Degeneracy and Pareto optimality: Towards robust biophysical models of neurons
19.30-20.00	Daniel Wojcik (Nencki Institute for Experimental Biology, Warsaw, Poland) Individual and group effects in mice learning
20.00-22.00	Coffee, tea. Social Program



31 May 2024

Ferry Boat, Helsinki, Finland

7.30-9.00	Breakfast
	<b>IV session. AI meets Neuroscience</b> Chair: Viktor Jirsa (Aix-Marseille Universite, France; EBRAINS)
9.00-9.30	Walter Senn (University of Bern, Switzerland) Real-time error-based processing in cortical circuits
9.30-10.00	Timothee Proix (Department of Basic Neurosciences, Faculty of Medicine, University of Geneva, Geneva, Switzerland) Neural manifolds for speech processing
10.00-10.30	Johannes Mehres (NeuroAI lab, EPFL, Switzerland) Topographic artificial neural networks predict neural and behavioral responses to causal perturbations
10.30-11.00	Arrival in Helsinki Coffee break
11.00-11.30	Pawel Herman (KTH Royal Institute of Technology, Stockholm, Sweden) Diving into working memory: experimental evidence, theory and models
11.30-12.00	Daniele Marinazzo (University of Ghent, Belgium) The importance of hemodynamics and blood arrival time in modelling fMRI data
12.00-12.30	Gaute Einevoll (Norwegian University of Life Sciences & University of Oslo, Norway) Electric Brain Signals: Foundations and applications
12.30-13.00	<b>Farewell</b> Organizers
13.00-13.30	Disembarking the Ferry Boat in Helsinki, Finland