

# PROGRAM

Thursday, 16 September 2021

UZH Central Campus, Lecture Hall HAH E3, Haldeliweg 2, Zurich

- 08:30 – 08:45    **Introduction**  
Prof. Fritjof Helmchen, Director ZNZ
- 08:45 – 09:30    Volker-Henn Lecture  
**Circuit mechanisms of vector computation in fly navigation**  
Prof. Larry Abbott, Center for Theoretical Neuroscience,  
Columbia University
- 09:30 – 10:15    Coffee Break
- 10:15 – 11:45    Parallel Workshops
- Machine learning in neuroscience and neuroimaging**  
Lecture Hall E3, Organization: PD Dr. Andras Jakab
- Aversive memories: Translating basic science to clinical treatment  
(CRPP Synapse & Trauma)**  
Lecture Hall E11, Organization: Prof. Birgit Kleim
- From neuroscience to neuromorphic intelligence**  
Lecture Hall F1, Organization: Dr. Melika Payvand and Dr. Elisa Donati
- 11:45 – 14:15    **Poster Session**, Lunch (Foyer)
- 11:45                **General Assembly of ZNZ group leaders** (Lecture Hall E3)
- 14:15 – 14:30    **ZNZ Award for the Best PhD Thesis 2021**

Short Talks of New Members

- 14:30 – 14:50 **The role of cortical changes and movement adaptations in persistent low back pain**  
PD Dr. Michael Meier, Department of Chiropractic Medicine, UZH
- 14:50 – 15:10 **Is hearing loss a risk factor for dementia? The role of the brain in the hearing-cognition association**  
Prof. Nathalie Giroud, Department of Computational Linguistics, UZH
- 15:10 – 15:30 **Novel immunotherapeutic approaches against glioblastoma**  
Dr. Tobias Weiss, Department of Neurology, USZ
- 15:30 – 15:50 **Scalp high frequency oscillations and the quest for biomarkers in epilepsy**  
PD Dr. Georgia Ramantani, Dep. of Neuropediatrics, University Children's Hospital
- 15:50 – 16:30 Coffee Break
- 16:30 – 17:15 Betty and David Koetser Award Lecture  
**Novel mechanisms of neurogenesis and neural repair**  
Prof. Magdalena Götz, Department of Physiological Genomics, LMU
- 17:15 – 18:00 Apéro

## **Parallel Workshops, 10:15 – 11:45**

### **Machine learning in neuroscience and neuroimaging**

(Lecture Hall E3)

In the past decade, machine learning has made a tremendous impact on virtually all fields of research and data analytics, and this is also the case for the neuroscience field. Advancements in machine learning have led to the introduction and usage of different network architectures, often leaving scientists unsure as to which approach is best for which set of problems.

This workshop will highlight approaches applied to neuroscience and neuroimaging problems, focusing on medical image segmentation, classification and disease modelling and the large-scale analysis of 3D microscopy data.

#### **Introduction and moderation**

PD Dr. Andras Jakab, Center for MR-Research, University Children's Hospital Zurich

Prof. Dr. Theofanis Karayannis, Brain Research Institute, University of Zurich

10:15 - 10:40

#### **Machine learning in neuroimaging: from nuts and bolts to clinical applications**

PD Dr. Meritxell Bach Cuadra, Medical Image Analysis Laboratory (MIAL), CIBM Center for Biomedical Imaging, Lausanne University and University Hospital

10:40 - 11:05

#### **Modeling tumor growth and disease progression in patients with glioma**

Prof. Dr. Bjoern Menze, Department of Quantitative Biomedicine, University of Zurich

11:05 - 11:20

#### **Machine learning for whole brain vascular structures**

Johannes Paetzold, Image-Based Biomedical Modeling Group, Technical University of Munich

11:20 - 11:45

#### **Exploring the principles of cortical development through deep learning**

Dr. Asim Iqbal, Brain Research Institute, University of Zurich and Mathis Lab, Center for Intelligent Systems, Swiss Federal Institute of Technology EPFL

## **Parallel Workshops, 10:15 – 11:45**

### **Aversive memories: Translating basic science to clinical treatment** (Lecture Hall E11)

Aversive learning is a key factor involved in the development of posttraumatic stress disorder (PTSD) and other psychiatric disorders. Recent discoveries about synaptic plasticity inhibitors provide potential for secondary prevention of PTSD after psychological trauma, and possibly also for improving treatment. In our presentations, we will first provide a multi-omics molecular snapshot of synaptic changes across day and night, and show how inhibitory synaptic scaffolding affects aversive memories. From there, we'll demonstrate evidence for potential applications of plasticity-inhibiting drugs, and showcase how we prepared their clinical implementation across human and animal studies through integration of molecular neuroscience with clinical psychology and psychiatry. Finally, we will discuss the unique challenge of translating basic science findings and bringing them to clinical translation and how these can be tackled and overcome to push forward and advance evidence-based clinical treatment (Roundtable discussion).

#### **Introduction and moderation**

Prof. Birgit Kleim, Institute of Psychology, University of Zurich

Prof. Dominik Bach, Queen Square Institute of Neurology, UCL

Prof. Steven Brown, Inst. of Pharmacology and Toxicology, University of Zurich

Prof. Shiva Tyagarajan, Inst. of Pharmacology and Toxicology, Univ. of Zurich

- 10:15 - 10:35 **Cortical synaptic changes: a question of clocks and sleep**  
Prof. Steven Brown, Inst. of Pharmacology and Toxicology, University of Zurich
- 10:35 – 10:50 **The inhibitory synaptic scaffold: controlling point for sleep and affective behaviour**  
Andrin Abegg, Inst. of Pharmacology and Toxicology, University of Zurich
- 10:50 - 11:10 **Blocking human fear memory with the matrix metalloproteinase inhibitor doxycycline**  
Prof. Dominik Bach, Queen Square Institute of Neurology, UCL
- 11:10 - 11:25 **Traumatic memories in PTSD: from time and sleep to metalloproteases**  
Laura Meister, Institute of Psychology, University of Zurich
- 11:25 - 11:45 **Discussion: Promises and pitfalls of translating basic science findings to the clinic**

## **Parallel Workshops, 10:15 – 11:45**

### **From neuroscience to neuromorphic intelligence**

(Lecture Hall F1)

The connectivity between the neurons in the brain plays a key role in its computational function. This workshop will cover ideas starting from the rewiring of connectivity in the brains, simulate and emulating it for computation and technological advantage, and finally applying it to biomedical and robotic applications.

#### **Introduction and moderation**

Dr. Melika Payvand, Dr. Elisa Donati and Dr. Elisabeth Abs  
Institute of Neuroinformatics, University of Zurich and ETH Zurich

10:15 - 10:30

#### **Rewiring of an adult brain circuit**

Dr. Wenshu Luo, Brain Research Institute, University of Zurich

10:30 – 10:45

#### **SpaRCe: Improved learning of reservoir computing systems through sparse representation**

Prof. Dr. Eleni Vasilaki, Department of Computer Science, University of Sheffield

10:45 - 11:00

#### **The neuromorphic mosaic: Reconfigurable in-memory small-world graphs**

Dr. Melika Payvand, Inst. of Neuroinformatics, University of Zurich and ETH Zurich

11:00 - 11:15

#### **Neuromorphic computing for human-machine interaction**

Dr. Elisa Donati, Institute of Neuroinformatics, University of Zurich and ETH Zurich

11:15

#### **Panel discussion**