PROGRAM
Thursday, 16 September 2021
UZH Central Campus, Lecture Hall HAH E3, Häldeliweg 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 Zürich
Prof. Dr. Theofanis Karayannis, Brain Research Institute, University of Zürich

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 Zürich 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