ZNZ Annual Symposium 2022

Thursday, 15 September 2022
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
Molecular genetics of essential tremor
Prof. Guy Rouleau, Director Montreal Neurological Institute-Hospital, McGill University

09:30 – 10:15 Coffee Break

10:15 – 11:45 Parallel Workshops

Structural and functional adaptations of brain networks (URPP AdaBD)
Lecture Hall E3, Organization: Prof. Fritjof Helmchen

StimuLOOP: Precision sensorimotor neurorehabilitation through personalised stimulation loops
Lecture Hall E11, Organization: Dr. Oliver Lambercy and Prof. Andreas Luft

The Hochschulmedizin Zurich Flagship Project STRESS
Lecture Hall F1, Organization: Dr. Miriam Ries

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 2022

Short Talks of New Members

14:30 – 14:50 Dopamine-dependent circuits and behavior across the lifespan
Dr. Marie Labouesse, Translational Nutritional Biology Lab, ETH Zurich

14:50 – 15:10 Marmoset monkeys as model species in Evolutionary Anthropology and Neuroscience
Prof. Judith Burkart, Department of Anthropology, University of Zurich

15:10 – 15:30 Beyond cortico-motor control: Probing the role of the reticulospinal system in movement control and functional recovery after spinal cord injury
PD Dr. Linard Filli, Spinal Cord Injury Center, Balgrist University Hospital

15:30 – 15:50 Deep brain stimulation in epilepsy: Studying neural dynamics between the anterior thalamus and the cortex in epilepsy patients
PD Dr. Lukas Imbach, Medical Director, Swiss Epilepsy Clinic, Klinik Lengg AG

15:50 – 16:30 Coffee Break

16:30 – 17:15 Plenary Lecture
Mapping and modeling microglia states to function in development and disease
Prof. Beth Stevens, F.M. Kirby Neurobiology Center at Boston Children’s Hospital and Harvard Medical School

17:15 – 18:00 Apéro
Parallel Workshops, 10:15 – 11:45

**Structural and functional adaptations of brain networks** (Lecture Hall E3)

Neural circuits in the brain form during embryonic and postnatal development, but also remain adaptive throughout adulthood, which is considered the basis for flexible behavior and learning. Adaptations comprise both structural reorganizations (e.g., rewiring) and functional adaptations (e.g., changes in excitability or in the interactions of cells or brain regions). Structural and functional changes typically go hand in hand, as structural changes on one level often imply functional changes on the next higher level. However, we still poorly understand the principles that underlie brain plasticity or the responsible mechanisms. The University Research Priority Program “Adaptive Brain Circuits in Development and Learning” (URPP AdaBD) focuses on such mechanisms of brain network adaptations from the molecular level to the large-scale circuit level. In this workshop, we will discuss diverse examples of brain network adaptations, covering a wide range of spatial scales – from molecular programs to changes in brain connectivity – as well as the translational axis from mouse to humans. Furthermore, we will discuss the role of non-neuronal cells in adaptive processes. The challenges remain high to better bridge and connect adaptive phenomena across scales, to achieve a more comprehensive understanding of brain adaptations and their behavioral significance.

**Introduction and moderation**

Prof. Esther Stoeckli, Department of Molecular Life Sciences, University of Zurich
Prof. Fritjof Helmchen, Brain Research Institute, University of Zurich

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:15 – 10:20</td>
<td>Introduction</td>
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<tr>
<td>10:20 – 10:45</td>
<td>Shaping cortical wiring and molecular programs by spontaneous neuronal activity</td>
<td>Prof. Peter Scheiffele, Biozentrum, University of Basel</td>
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<td>10:45 – 11:00</td>
<td>Adolescence is a sensitive period for glia cells to act on structural and functional maturation of the prefrontal cortex</td>
<td>Dr. Tina Notter, Institute of Pharmacology and Toxicology, University of Zurich</td>
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<td>11:00 – 11:15</td>
<td>Changes in brain network connectivity with learning and maturation in child development</td>
<td>Prof. Silvia Brem, Department of Child and Adolescent Psychiatry and Psychotherapy, University of Zürich</td>
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<td>11:15 – 11:30</td>
<td>Dynamic reorganization of the cortico-basal ganglia-thalamo-cortical network during task learning</td>
<td>Dr. Yaroslav Sych, Institute of Cellular and Integrative Neurosciences, University of Strasbourg and CNRS</td>
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<td>11:30 – 11:45</td>
<td>Rewiring of adult brain circuits</td>
<td>Prof. Csaba Földy, Brain Research Institute, University of Zurich</td>
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StimuLOOP: Precision sensorimotor neurorehabilitation through personalised stimulation loops (Lecture Hall E11)

Parkinson’s disease and stroke lead to a considerable socioeconomic burden for patients and health systems worldwide. Neurorehabilitation includes treatments to reduce disability, but their efficacies vary largely between individuals, and they frequently fail to achieve meaningful outcomes. The StimuLOOP project (supported by the LOOP Zurich and the Vontobel Foundation), aims at investigating two personalized and complementary approaches: real-time feedback during neurorehabilitation therapy sessions based on biomechanical or neural biomarkers, and modulation of sleep for offline consolidation.

In this workshop, we will highlight the different research avenues of the project at the interface between neurology, neurorehabilitation, and technology development. We will discuss the key research questions in the ongoing clinical trials, present preliminary results and depict a roadmap for the implementation of more personalized neurorehabilitation approaches that bridge the domains of neurorehabilitation and sleep.

Introduction and moderation
Prof. Andreas Luft, Stroke Center, University Hospital of Zurich
Dr. Olivier Lambercy, Rehabilitation Engineering Laboratory, ETH Zurich

10:15 – 10:25 Introduction

10:25 – 10:40 Neurorehabilitation: feedback, motor learning and recovery
Dr. Meret Branscheidt, cereneo Center for Neurology and Rehabilitation, Hertenstein

10:40 – 10:55 Designing actionable feedback for personalised gait rehabilitation
Dr. Christopher Awai, cereneo Foundation, Hertenstein

10:55 – 11:10 Deep Brain Stimulation neurofeedback in Parkinson’s patients
Lena Salzmann, Rehabilitation Engineering Laboratory, ETH Zurich

11:10 – 11:25 Sleep enhancement for boosting and consolidating rehabilitation gains
Nora Hjördis-Moser, Clinic for Neurology, University Hospital of Zurich

11:25 – 11:40 Gait biomarkers for personalised rehabilitation in people with Parkinson’s disease
Dr. Deepak Ravi, Institute for Biomechanics, ETH Zurich

11:40 – 11:45 Closing remarks
Parallel Workshops, 10:15 – 11:45

Hochschulmedizin Zurich Flagship Project STRESS (Lecture Hall F1)

Stress affects millions of people worldwide and can have a continuing impact on physical and psychological wellbeing. It is a risk factor for chronic conditions including cardiovascular diseases and can negatively influence mental health. Despite its prevalence, the diagnosis and treatment of stress remain a challenge, especially in young people. A better understanding is needed of the mechanisms linking stress exposure to its negative effects.

This workshop, organized in conjunction with the Hochschulmedizin Zurich Flagship Project STRESS, will highlight the transdisciplinary nature of stress research, from the molecular to the clinical.

Introduction and moderation
Prof. Dr. Birgit Kleim, Psychiatric University Hospital Zurich and Department of Psychology, University of Zurich
Dr. Miriam Ries, Scientific Coordinator of Hochschulmedizin Zurich Flagship Project STRESS, ETH Zurich and University of Zurich

10:15 – 11:00

Neurocognitive markers of stress-resilience: the relevance of emotional action control
Prof. Karin Roelofs, Behavioural Science Institute, Radboud University

11:00 – 11:10

Presentation of the Hochschulmedizin Zurich Flagship Project STRESS
Prof. Isabelle Mansuy, Institute for Neuroscience, ETH Zurich and Brain Research Institute, University of Zurich
Prof. Birgit Kleim, Psychiatric University Hospital Zurich and Department of Psychology, University of Zurich

11:10 – 11:45

Short talks

Investigating brain-based predictors of stress resilience and mental health in medical personnel
Ella McPherson, Institute of Psychology, University of Zurich

Effects of parenting on the emotion regulatory brain development
Mirjam Habegger, Department of Psychology and Department of Economics, Jacobs Center for Productive Youth Development, University of Zurich

More points, fewer mice
Dr. Oliver Sturman, Institute for Neuroscience, ETH Zurich

Cell-free RNA biomarkers of stress
Dr. Bogdan Mateescu, Brain Research Institute, University of Zurich and Department of Chemistry and Applied Biosciences, ETH Zurich

The effects of pupil-based neurofeedback on emotional responses
Dr. Sarah Meissner, Department of Health Sciences and Technology, ETH Zurich

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