ZNZ SYMPOSIUM 2022

15 September 2022
08.30 – 18.00

UZH Central Campus
Häldeliweg 2
8044 Zürich
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PROGRAM

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, Dep. of Molecular Life Sciences, University of Zurich
Prof. Fritjof Helmchen, Brain Research Institute, University of Zurich

10:15 – 10:20 Introduction
10:20 – 10:45 Shaping cortical wiring and molecular programs by spontaneous neuronal activity
Prof. Peter Scheiffele, Biozentrum, University of Basel

10:45 – 11:00 Adolescence is a sensitive period for glia cells to act on structural and functional maturation of the prefrontal cortex
Dr. Tina Notter, Institute of Pharmacology and Toxicology, University of Zurich

11:00 – 11:15 Changes in brain network connectivity with learning and maturation in child development
Prof. Silvia Brem, Department of Child and Adolescent Psychiatry and Psychotherapy, University of Zürich

11:15 – 11:30 Dynamic reorganization of the cortico-basal ganglia-thalamo-cortical network during task learning
Dr. Yaroslav Sych, Institute of Cellular and Integrative Neurosciences, University of Strasbourg and CNRS

11:30 – 11:45 Rewiring of adult brain circuits
Prof. Csaba Földy, Brain Research Institute, University of Zurich
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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1 Functional heterogeneity in cerebellar granule cells: P. O’Neil, M. Müller, I. Delvendahl

Group Leader: CSABA FÖLDY

2 Rewiring of hippocampal CA1 pyramidal cells in the adult mouse brain: N. Cruz-Ochoa, W. Luo, D. Lukacsovich, C. Földy

Group Leader: IGOR DELVENDAHL

3 Homeostatic depression of release counteracts increased AMPAR function: K. Kita, M. Müller, I. Delvendahl

Group Leader: MARTIN MÜLLER

4 KCNQ2 channelopathy: probing variant-specific effects on channel function and neural excitability: A. Kapnulina, G. Siegel, A. Frei, K. Schmidt, A. Rauch, M. Müller

Group Leader: MARIE LABOUESSE

5 An axon collateral circuit for motor control in the adult striatum: M. Labouesse, A. Torres-Herraez, J. Villarin, J. Greenwald, X. Sun, A. Tang, M. Zahran, S. Lam, J. Bonaventura, F. de Carvalho, C. Lacefield, M. Michaelides, S. Chan, O. Yizhar, C. Kellendonk
NEURAL DEVELOPMENT

Group Leader: ESTHER T. STOECKLI


7 Investigating the role of primary cilia during neural circuit formation: E. Yusifov, A. Dumoulin, E.T. Stoeckli

8 Characterization of FoxP family genes’ impact on the development of neural circuits associated with autism spectrum disorders: H. Yeliseyeva, E. Stoeckli

Group Leader: SEBASTIAN JESSBERGER

9 Exploration of hippocampal intercellular signalling networks across age by single cell and spatial data modalities: V. Korobeynyk, Y. Wu, I. Mallona, M.D. Robinson, E. Llorens, J. Frisen, S. Jessberger

10 MLC1 promotes neural stem cell quiescence: D. Machado, K. Buthey, A. Denoth-Lippuner, S. Jessberger

Group Leader: GIANCARLO NATALUCCI

11 2D co-culture of human oligodendrocytes and cortical neurons to analyse human milk nutrients contribution on myelination: S. Chie, Z. Szentpetery, G. Natalucci, M. Miletta
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Group Leader: TINA NOTTER


13 The role of astrocytes in postnatal synaptic refinement of the medial prefrontal cortex: J. Furrer, S. Schalbetter, T. Notter

Group Leader: BRUNO WEBER

14 How does a ketogenic diet affect the body and brain?: R. Meister, M.T. Wyss, L. Ravotto, B. Weber

Group Leader: AIMAN SAAB


Group Leader: MILAN SCHEIDEFFECTER

16 Effects of the psychotropic ayahuasca-constituents N,N-DMT and harmine on cerebral energy metabolism and activity on the 5-HT2A receptor in the rodent brain: K. Egger, P. Cumming, M. Palner, B. Quednow, M. Scheidegger
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Group Leader: ADRIANO AGUZZI

17 **Therapeutic potential of LCP-conjugates in neurodegenerative diseases:** H. Zhang, P.R. Nilsson, S. Hornemann, A. Aguzzi

Group Leader: RUIQING NI

18 **Aquaporin 4 is differentially increased and dislocated in association with tau and amyloid-beta:** V. Kecheliev, L. Boss, U. Maheshwari, U. Konietzko, A. Keller, D. Razansky, R. Nitsch, J. Klohs, R. Ni

19 **In vivo imaging of α-synucleinopathy using THK565-4 in M83 mouse model:** N. Straumann, X.L. Dean Ben, J. Gerez, V. Kecheliev, Z. Chen, U. Konietzko, D. Noain, R. Roland, N. Okamura, D. Razansky, R. Nitsch, R. Ni

Group Leader: ADRIANO AGUZZI

20 **High-throughput whole genome-wide CRISPR activation screening for the identification of potential modifiers of alpha-synuclein aggregates:** S. Neupane, E. De Cecco, A. Aguzzi

Group Leader: MAGDALINI POLYMENIDOU

21 **Template dependent amplification of pathological TDP-43 and roles of phosphorylation:** P. De Rossi¹, A.J. Lewis², J. Furrer¹, L. De Vos¹, T. Demeter¹, A. Zbinden¹, W. Zhong¹, V.I. Wiersma¹, C. Scialo¹, C. Böing³, T. Lashley⁴,⁵, H. Stahlberg² and M. Polymenidou¹

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²Laboratory of Biological Electron Microscopy, Institute of Physics, SB, EPFL, Dep. of Fundamental Microbiology, Faculty of Biology and Medicine, UNIL, Lausanne, Switzerland
³C-CINA, Biozentrum, University of Basel, Basel, Switzerland
⁴Queen Square Brain Bank for Neurological diseases, Department of Movement Disorders, UCL Institute of Neurology, London, UK
⁵Dep. of Neurodegenerative Disease, UCL Institute of Neurology, London, UK
22 Oligomerization acts as gatekeeper for TDP-43 nucleocytoplasmic shuttling and modulates its aggregation patterns: V.I. Wiersma, M. Pérez-Berlanga, L. De Vos, E. Tantardini, A. Zbinden, M. Hruska-Plochan, M. Polymenidou

23 Synaptic RNA homeostasis in Amyotrophic Lateral Sclerosis (ALS): What is all the FUSs about?: E. Tantardini, V. Wiersma, M. Polymenidou
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24 Neural activation during digit processing in children at the end of primary school: S.V. Di Pietro, I.I. Karipidis, S. Brem


26 Learning novel symbols and speech sounds associations: a model-based fMRI approach: G. Fraga-Gonzalez, P. Haller, D. Willinger, V. Gehrig, N. Frei, S. Brem

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27 Probing neural alpha lateralization as a marker for auditory target selection and distractor suppression: J. Jacobs, M. Alavash, T. Popov, M. Wöstmann, J. Obleser, B. Preisig

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28 The neural basis of spectro-temporal glimpsing speech-in-noise: H. Swanborough, S. Frühholz

Group Leader: MARTA ROCCIO

29 Human pluripotent stem cells-derived inner ear organoids recapitulate otic development in vitro: D. Doda1*, S. Alonso Jimenez1*, V. Valsamides1, H.R. Widmer2, M. Roccio1

1Inner Ear Stem Cell Laboratory, Dep. Otorhinolaryngology Head and Neck Surgery, University Hospital Zurich and University of Zurich
2Experimental Neurosurgery Laboratory, Dep. Neurosurgery, University Hospital Bern and University of Bern
* equal contribution

30 Transcriptional characterization of otic placode development in human iPSC-derived in inner ear organoids: S. Alonso, V. Valsamides, D. Doda, M. Roccio
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31 A single atypical phosphoswitch in specific SCN neurons gates winter seasonality in mice: S. Pierre-Ferrer, B. Collins, D. Lukacsovich, S. Wen, Y. Chai, J. Winterer, B. Auerbach, M. Li, J. Yan, L. Pedersen, C. Földy, S.A. Brown


Group Leader: RETO HUBER

33 Changes in reindeer sleep regulation across the year: A central role for rumination?: M. Furrer, S. Meier, M. Jan, P. Franken, M. A. Sundset, R. Huber, S. A. Brown, G. C. Wagner

Group Leader: DANIELA NOAIN

34 Myelin basic protein assessments as marker of potential neuroprotection upon up-phase closed-loop auditory stimulation in TBI rats: M. Gönel, C.G. Moreira, A. Müllner, C.R. Baumann, D. Noain

35 Defining optimal parameters for auditory stimulation (CLAS) during slow-wave sleep in mouse models of Alzheimer's and Parkinson's disease: I. Dias, M. Lopez, M. Hunger, C. G. Moreira, S. Kollarik, C. Baumann, D. Noain
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Group Leader: BASIL PREISIG

36 The influence of alpha power lateralization on auditory spatial attention: an EEG-based neurofeedback study: A. Glättli¹, J. Jacobs¹², B. Preisig¹²³

¹ The Department of Comparative Language Science, University of Zurich, Switzerland
² Zurich Center for Linguistics, University of Zurich, Switzerland
³ Neuroscience Center Zurich, University of Zurich and Eidgenössische Technische Hochschule Zurich, Zurich, Switzerland

Group Leader: ROGER GASSERT/ OLIVIER LAMBERCY


Group Leader: LARS MICHELS


39 Voluntary control over attention using real-time fMRI neurofeedback (rtfMRInf); Multimodal imaging during conscious and unconscious perception: R. Mazloum, J. Popovova, G. Macauda, P. Stämpfli, S. Frühholz, P. Vuilleumier, F. Scharnowski, V. Menon, R. Gassert, L. Michels

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Group Leader: RUTH TUURA O’GORMAN


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Group Leader: JOHANNES SARNTHEIN

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Group Leader: ANITA RAUCH

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Group Leader: RAFAEL POLANIA / LUKAS IMBACH


Group Leader: RAFAEL POLANIA

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Group Leader: MICHAEL L. MEIER

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Group Leader: MICHÈLE HUBLI


Group Leader: PETRA SCHWEINHARDT

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Group Leader: PATRICK FREUND

58 Structural changes in the cervical cord of episodic migraine patients: Involvement of the spinothalamic tracts: S. Schading, L. Farner, H. Pohl, L. Michels, P. Freund
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Group Leader: MARTIN E. SCHWAB

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²Neuroscience Centre Zurich, ETH Zurich and University of Zurich, 8057 Zürich, Switzerland

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Group Leader: RAFAEL POLANIA

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Group Leader: CHRISTOPHER PRYCE

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Group Leader: SILVIA BREM

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Group Leader: LINARD FILLI

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Group Leader: HANS-GEORG WIRSCHING

Group Leader: DOMINIK STRAUMANN

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Group Leader: BORIS QUEDNOW


Group Leader: KATHARINA HENKE

91  Tracking hippocampal memory traces in healthy humans using 7T fMRI: T. Willems, K. Henke

Group Leader: JOHANNES SARNTHEIN

92  Information flows from hippocampus to cortex during replay of verbal working memory items: V. Dimakopoulos¹, P. Mégevand²,³, L. Stieglitz¹, L. Imbach⁴,⁵, J. Sarnthein¹,⁵

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93 Investigate the genetic and molecular landscape of the hnRNP K cellular essentiality by performing unbiased CRISPR screens: S. Sellitto, D. Careddio, L. Frick, E. Lemes, S. Neupane, D.L. Vena, A. Aguzzi


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96 Fabrication of multilayer microfluidic-based tissue-mimicking phantom for optical methods: T. Li\textsuperscript{a,b}, A. Kalyanov\textsuperscript{b}, M. Wolf\textsuperscript{b}, M. Ackermann\textsuperscript{b}, E. Russomanno\textsuperscript{b}, J. Jiang\textsuperscript{b} and A. Di Costanzo Mata\textsuperscript{b}

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97 Localization of penetrating ultraflexible polymer electrodes by MRI: E. Özil, M. Marks, T.B. Yasar, P. Gombkoto, W. von der Behrens, M.F. Yanik

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98 Motivating mice to learn difficult tasks in the IntelliCage without water restriction: B. Schildknecht, X. Ma, M. Nigri, I. Amrein, D.P. Wolfer
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103 Predicting hydration status using machine learning models from physiological and sweat biomarkers during endurance exercise: S. Wang¹, C. Lafaye², M. Saubade², C. Besson², J.M. Margarit-Taulé³, V. Gremeaux², S-C. Liu¹

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³Instituto de Microelectrónica de Barcelona (IMB-CNM), CSIC, Barcelona, Spain
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