

ZNZ Annual Symposium 2024

Thursday, 12 September 2024

ETH Zurich Main Building, Lecture Hall F7, Rämistrasse 101, 8092 Zurich

- 08:30 – 08:45 **Introduction**
Prof. Fritjof Helmchen, Director ZNZ
- 08:45 – 09:30 Volker Henn Lecture
Learning principles of neuroscience from the "vulgar" Hydra
Prof. Rafael Yuste, Columbia University
- 09:30 – 10:15 Coffee Break
- 10:15 – 11:45 Parallel Workshops
- From neurons to networks: Advancing multimodal imaging for brain function studies**
Lecture Hall F7, Organization: Prof. Patrick Freund and Prof. Daniel Razansky
- Epileptic networks: From basic science to clinics**
Lecture Hall F5, Organization: PD Dr. Lukas Imbach and PD Dr. Marian Galovic
- Promising biomarkers for tinnitus and speech/voice in different medical fields**
Lecture Hall F3, Organization: Prof. Tobias Kleinjung and Prof. Nathalie Giroud
- 11:45 – 14:15 **Poster Session** (E-Main Hall), Lunch at 12:45 (Foyer EO Süd)
12:00 **General Assembly of ZNZ group leaders** (Lecture Hall F7)
- 14:15 – 14:30 **ZNZ Award for the Best PhD Thesis 2024**
- Short Talks of New Members
- 14:30 – 14:50 **Induced PSCs and genome editing tools to understand human neuronopathic lysosomal storage disorders**
Prof. Isaac Canals, University Children's Hospital and UZH
- 14:50 – 15:10 **Selective recruitment of CA1 pyramidal cells during sharp-wave ripples**
Prof. Xiaomin Zhang, Brain Research Institute, UZH
- 15:10 – 15:30 **Coordination of cognitive processes by neural synchronisation**
Prof. Paul Sauseng, Department of Psychology, UZH
- 15:30 – 15:50 **The endocannabinoid system and addiction**
Dr. Sara Kroll, Psychiatric University Hospital Zurich and UZH
- 15:50 – 16:30 Coffee Break
- 16:30 – 17:15 Plenary Lecture
Genetics of Parkinson's disease: From basic mechanisms to novel treatments
Prof. Thomas Gasser, Universitätsklinikum Tübingen
- 17:15 – 18:00 Apéro

Parallel Workshops, 10:15 – 11:45

From neurons to networks: Advancing multimodal imaging for brain function studies

(Lecture Hall F7)

Leading researchers will discuss the latest advancements in imaging technologies for studying brain function. This will include innovative techniques in optoacoustic imaging and their potential applications in neuroscience, whole-brain coding of emotion states in mice using functional ultrasound imaging, and the development of PET tracers for neuroimaging from rodents to humans. Additionally, advancements in functional magnetic resonance imaging of the spinal cord, the potential of high-resolution MRI for in vivo histology, and cutting-edge techniques for capturing neuromagnetic fields from the brain and spinal cord with optically pumped magnetometers will be explored.

Introduction and moderation

Prof. Patrick Freund, Spinal Cord Injury Center, University Hospital Balgrist

Prof. Daniel Razansky, Institute for Biomedical Engineering, ETH/UZH

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| 10:15 – 10:30 | Advancing multimodal optoacoustic imaging for brain function studies
Dr. Zhenyue Chen, Institute of Biomedical Engineering, ETH/UZH |
| 10:30 – 10:45 | Whole-brain coding of emotion states in mice using functional ultrasound imaging
Dr. Bradley Edelman, Max-Planck Institute of Psychiatry, Martinsried |
| 10:45 – 11:00 | Development of PET tracers for neuroimaging: From rodents to humans
Dr. Linjing Mu, Institute of Pharmaceutical Sciences, ETH |
| 11:00 – 11:15 | Functional magnetic resonance imaging of the spinal cord
Dr. Gergely David, Spinal Cord Injury Center, Balgrist University Hospital & UZH |
| 11:15 – 11:30 | Towards in vivo histology using 7T MRI
Prof. Martina Callaghan, Department of Imaging Neuroscience, UCL |
| 11:30 – 11:45 | Imaging neuromagnetic fields from the brain and spinal cord with OPMs
Dr. Stephanie Mellor, Department of Imaging Neuroscience, UCL |

Parallel Workshops, 10:15 – 11:45

Epileptic Networks: From Basic Science to Clinics

(Lecture Hall F5)

This workshop focuses on the complex topic of epileptic networks and lies at the interface between basic sciences and their clinical implications. Starting from an understanding of epilepsy as a network disorder involving cortical and subcortical structures, we will address different aspects of epileptic network dysfunction. We will discuss epileptic brain networks in animal models, optogenetics, neuromodulation in humans and implications for brain imaging.

Introduction and moderation

Pd Dr. Lukas Imbach, Swiss Epilepsy Center

PD Dr. Marian Galovic, Dep. of Neurology, USZ

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| 10:15 – 10:35 | Personalized virtual brain models in epilepsy
Pd Dr. Lukas Imbach, Swiss Epilepsy Center |
| 10:35 – 10:55 | Modulation of epileptic brain networks in rodents by optogenetics
Prof. Denis Burdakov, Neurobehavioural Dynamics Lab, ETH |
| 10:55 – 11:15 | Long-term network effects of epilepsy in neuroimaging
PD Dr. Marian Galovic, Dept. of Neurology, USZ |
| 11:15 – 11:25 | Modulation of epileptic brain networks in humans by DBS
Giovanna Aiello, D-HEST, ETH |
| 11:25 – 11:35 | Modulation of epileptic brain networks in humans by anti-seizure medications
Robert Terziev, Dept. of Neurology, USZ |

Parallel Workshops, 10:15 – 11:45

Promising biomarkers for tinnitus and speech/voice in different medical fields

(Lecture Hall F3)

The workshop will consist of two parts of about 45 minutes each. The first part will focus on hearing-related pathology, in particular tinnitus, and the second part will address speech and language disorders/changes in psychiatry.

Part 1: Tinnitus is an alteration of the auditory system in which neuroplastic changes in auditory and non-auditory areas of the brain lead to the perception of sounds that do not correspond to a real sound source. There is no objective evidence for this condition, nor is there a curative therapy. Objective parameters that could characterize the auditory symptom would be a great help in developing better treatment methods.

This workshop will present two promising methods that are currently in the focus of international research: Genetics (C. Cederroth, 10 min.) and electrophysiology (P. Neff, 10 min.) Subsequently, the potential of these techniques and further options will be discussed in a roundtable (25 min.).

Participants:

Prof. Dr. Christopher R. Cederroth, University Hospital of Tübingen
PD Dr. Patrick Neff, Dept. of Otorhinolaryngology, Head and Neck Surgery, USZ
Prof. Dr. Martin Meyer, Dept. of Comparative Language Science, UZH
Prof. Dr. Tobias Kleinjung, Dept. of Otorhinolaryngology, Head and Neck Surgery, USZ

Part 2: Speech and voice parameters are increasingly used as biomarkers in a variety of medical contexts with promising results even outside the traditional field of speech and language pathology. An example from psychiatry highlights that lower speech rate and less pitch variability has been shown to be frequent in major depression (Koops et al., 2023) and variability in fundamental frequency and shimmer are related to neurocognitive decline in older adults suggesting relevance in neurology (Santos Revilla et al., in prep). However, there is no consensus across fields and medical disciplines as well as no guidelines on how to record, store, transcribe and analyze speech data, especially in low-resource language varieties such as Swiss German.

The podium discussion (30 min.) will bring together researchers from neuropsychiatry, speech signal processing, aging neuroscience, and speech and language pathology. They will introduce their research areas (each 3 min.) and then discuss the pros and cons of speech and voice as biomarkers in their respective fields including options on how to overcome current challenges.

Participants:

Prof. Volker Dellwo, Dept. of Computational Linguistics, UZH
PD Dr. Meike Brockmann-Bauser, Dept. of Otorhinolaryngology, Head and Neck Surgery, USZ
Roya Hüppi, PhD student TRUSTING Project, Psychiatric University Hospital
Prof. Nathalie Giroud, Dept. of Computational Linguistics, UZH
Prof. Sebastian Olbrich, Psychiatric University Hospital