

Finanziell unterstützt durch die



7th Baltic-Nordic School on Neuroinformatics BNNI 2019

Modeling Healthy and Diseased Brain: From Dendrites to Neurons and Networks

**FIAS, Frankfurt, Germany
Preliminary Program**

Program

25th August 2019 – Arrival

An afternoon trip to Frankfurt's reconstructed old town, dinner

26th August 2019 – Day 1 – FIAS, Lecture Hall

WELCOME

08:00 - 08:30 **Registration (Foyer)**

08:30 - 09:15 **Opening and Welcome**

**Introduction to neuroinformatics
and computational neuroscience**

**Prof. Dr. Marja-Lena Linne
Faculty of Medicine and
Health Technology, Tampere
University, Tampere, Finland**

I-A SESSION: INTRODUCTION TO COMPUTATIONAL MODELING METHODS IN NEUROSCIENCE

09:15 - 10:45 **From synapses and dendrites to
neurons and networks: Basics of
Computational Neuroscience**

**Prof. Dr. Bruce Graham
Division of Computing
Science and Mathematics,
University of Stirling, U.K.**

10:45 - 11:00 **Coffee**

11:00 - 11:30	Memory, learning and synaptic plasticity in dendrites	Prof. Aušra Saudargienė Neuroscience Institute, Lithuanian University of Health Sciences, Kaunas, Lithuania
11:30 – 12:30	Introduction to NEURON	Dr. Arnd Roth, Wolfson Institute of Biomedical Research, University College London, UK
12:30 – 13:30	Lunch (TBA)	
13:30 – 15:00	Theoretical models of memory	Prof. Dr. Misha Tsodyks, Department of Neurobiology, Weizmann Institute of Science, Israel
15:00 – 15:15	Coffee	
15:15 – 16:15	Building biophysical models - Practical experiences and tips	Prof. Dr. Dieter Jaeger, Biology Department, Emory University, Atlanta, USA
I-B SESSION: COMPUTER EXERCISES – COMPARTMENTAL MODELING OF NEURONS, DENDRITES AND SYNAPSES		
16:30 – 19:30	Hands on excercises: Simulating synapses and neurons (NEURON software)	Bruce Graham, Arnd Roth, Aušra Saudargienė
20:00 – 21:30	Dinner (traditional “Apple-wine Pub”)	

Program

27th August 2019 – Day 2 – FIAS, Lecture Hall

09:00 – 10:00	Neuroscience with both hands – bridging brain scales with mathematics	Prof. Dr. Gaute Einevoll Norwegian University of Life Sciences & University of Oslo, Norway
II-A SESSION: MORPHOLOGICAL AND COMPARTMENTAL MODELING OF DENDRITES		
10:00 – 11:00	Active properties of cortical dendrites	Prof. Dr. Matthew Larkum NeuroCure Cluster of Excellence, Humboldt University, Berlin, Germany
11:00 – 11:15	Coffee	
11:15 – 11:45	Extracellular electrophysiology from modeling perspective	Prof. Dr. Daniel Wojcik Nencki Institute, Warsaw, Poland
11:45 – 12:30	One rule to grow them all – A general theory of dendrite branching	Dr. Hermann Cuntz ESI & FIAS, Frankfurt, Germany
12:30 – 13:00	Modeling dendritic excitability and plasticity in healthy and diseased hippocampus	Prof. Dr. Peter Jedlička ICAR3R, Justus Liebig University Gießen, Germany
13:00 – 14:00	Lunch (TBA)	
II-B SESSION: HANDS-ON EXERCISES: MORPHOLOGICAL/COMPARTMENTAL MODELING OF DENDRITES, LFPs		
14:00 – 18:00	Hands on exercises: Matlab (TREES Toolbox, T2N)	Hermann Cuntz, Peter Jedlička
	Models of memory (Matlab software)	Misha Tsodyks
	Forward and inverse modeling of LFP (LFPy, kCSD-python)	Gaute Einevoll, Daniel Wojcik
18:30 – 19:30	Evening lecture: Discovering principles of circuit dynamics through comparative approaches	Prof. Dr. Gilles Laurent MPI for Brain Research, Frankfurt
19:30	Dinner and networking (Faculty Lounge)	

Program

28th August 2019 – Day 3 – FIAS, Lecture Hall

III-A SESSION: FROM NEURONS TO NETWORKS – PHYSIOLOGY & PATHOLOGY OF NEURONAL COMPUTATION

09:00 – 09:45	Neural oligarchy in normal and epileptic networks	Prof. Dr. Jochen Triesch FIAS, Frankfurt
09:45 – 10:30	How to understand normal and disrupted neural network dynamics via intracellular dynamics	Dr. Tatjana Tchumatchenko MPI for Brain Research, Frankfurt
10:30 – 11:00	Coffee	
11:00 – 11:45	Shaping developing circuits by patterned spontaneous and early sensory activity	Prof. Dr. Julijana Gjorgjieva MPI for Brain Research, Frankfurt
11:45 – 12:30	Network modeling of neurological disorders	Prof. Arvind Kumar KTH Royal Institute of Technology, Stockholm
12:30 – 13:00	From function to structure: Clinical neuropsychological perspective	Dr. Aistė Pranckevičienė Lithuanian University of Health Sciences, Kaunas, Lithuania
13:00 – 14:00	Lunch (TBA)	
14:00 – 14:45	Stability and instability in neural networks	Dr. Viola Priesemann MPI Göttingen
14:45 – 15:30	Circuit models of network interactions in developing neocortex	Prof. Dr. Matthias Kaschube FIAS, Frankfurt

III-B SESSION: MEET THE EXPERTS: EVERYTHING YOU ALWAYS WANTED TO KNOW ABOUT COMPUTATIONAL NEUROSCIENCE (BUT WERE AFRAID TO ASK)

15:30 – 15:45	Coffee	
15:45 – 17:45	Meet the Experts	Jochen Triesch, Tatjana Tchumatchenko, Viola Priesemann, Julijana Gjorgjieva, Arvind Kumar