

NWG Course: Imaging of the Synaptic Organization

September 25th – 29th, 2017, Leibniz Institute for Neurobiology

Schedule

(Sept 7, 2017)

Monday, September 25th

Matthies conference room

- 9:00 General remarks + Introduction into work program
- 9:30 Introduction into topics
- 9:30 Imaging synaptic activity (Martin Heine / Jennifer Heck / Anna Ciuraszkiewicz)
- 10:00 Confocal, light sheet & STED imaging (Werner Zuschratter)
- 10:30 Coffee break
- 11:00 Fluorescence lifetime imaging (Werner Zuschratter)
- 11:30 Image analysis starts with image acquisition (Torsten Stöter / Oliver Kobler)
- 12:00 Lunch break
- 13:00 Hands-on experiments in work groups

Tuesday, September 26th

Matthies conference room

- 09:00 Questions & feedback
- 09:30 Rotation 1: Hands-on experiments in work groups
- 12:00 Lunch break
- 13:00 Hands-on experiments in work groups

- 19:00 Sightseeing tour through Magdeburg with joint dinner

Wednesday, September 27th

Room 363

- 09:00 Questions & feedback
- 09:30 Rotation 2: Hands-on experiments in work groups
- 12:00 Lunch break
- 13:00 Hands-on experiments in work groups and demonstration of light sheet imaging

Thursday, September 28th

Hebb conference room

- 9:00 Questions & feedback

Workshop on Image Processing and data analysis

- 9:30 – 11:30 Introduction to ImageJ/Fiji
Torsten Stöter

NWG Course: Imaging of the Synaptic Organization

September 25th – 29th, 2017, Leibniz Institute for Neurobiology

11:30 – 12:30 Lunch break

12:30 – 14:30 Deconvolution with Huygens & 3D image processing (Imaris)
Oliver Kobler, Torsten Stöter

14:30 – 15:00 Coffee break

15:00 – 16:00 Analysis of synaptic activity data
Martin Heine

16:00 – 17:30 Analysis of FLIM data
André Weber

Friday, September 29th

Symposium with external speakers

Ebbinghaus lecture hall

09:00 – 09:05 a.m.

Welcome

Ines Kaiser, CNI, Leibniz Institute for Neurobiology

09:05 – 09:40 a.m.

illuminating viral lifecycles with sheets of light

Jens Bosse, University of Hamburg, Heinrich Pette Institute, Subunit Quantitative Virology

09:40 – 10:15 a.m.

New roles of DNA: higher resolution and quantification of nanoscopy

Philip Tinnefeld, TU Braunschweig – BRICS, Institute for Physical and Theoretical Chemistry

10:15 – 10:50 a.m.

Applying advanced imaging to quantify the outcome of infection defense and autoimmunity on three functional scales

Matthias Gunzer, University Essen

10:50 – 11:15 a.m.

Coffee break

11:15 a.m. – 11:50 p.m.

Long-range ensemble diffusion FRAP measurements: using protein mobility for mapping protein-interaction sites

Thorsten Lang, University of Bonn, Life & Medical Sciences (LIMES) Institute, Membrane Biochemistry

...

NWG Course: Imaging of the Synaptic Organization

September 25th – 29th, 2017, Leibniz Institute for Neurobiology

11:50 a.m. – 12:25 p.m.

Lateral Diffusion of a plasma membrane ion transporter, Na⁺/K⁺-ATPase, by FCS, FRAP) or FRAS

Thomas Friedrich, Technical University of Berlin, Institute for Chemistry, Section Physical Chemistry/Bioenergetics

12:25 – 1:20 p.m.

Lunch break

1:20 – 1:55 p.m.

Wide-field time-correlated single photon counting FLIM

Klaus Suhling, Kings College London, Department of Physics

1.55 – 2:30 p.m.

Fast 3D imaging of whole mouse brains and human tumors by breaking the diffraction limit

Hans-Ulrich Dodt, TU Vienna, Chair of Bioelectronics

Discussion and concluding remarks

NWG Course: Imaging of the Synaptic Organization

September 25th – 29th, 2017, Leibniz Institute for Neurobiology

Topic	Supervisor	Monday	Tuesday	Wednesday	Thursday	Friday
ISA & SPT	Martin Heine/Jennifer Heck/Anna Ciuraszkewicz/ Anita Heine/ Arthur Bikbaev	Group 1	Group 3	Group 2	All groups: Image Processing + Data Evaluation	Symposium
CLSM & STED	Oliver Kobler / Werner Zuschratter	Group 2	Group 1	Group 3		
FLIM	André Weber / Werner Zuschratter	Group 3	Group 2	Group 1		

ISA = Imaging Synaptic Activity

SPT = Single Particle Tracking

CLSM= Confocal Laserscanning Microscopy

LS = Lightsheet

PALM= Photo activated localization microscopy

STED = Stimulated Emission Depletion

FLIM = Fluorescence Lifetime Imaging Microscopy

Topics of the practical course (Monday – Wednesday)

- Imaging of synaptic activity: (i) sptPALM (ii) Calcium Imaging (Supervisor: Martin Heine)
- LSM, LS + STED Imaging: (i) STED Imaging of immunostained neuronal cell cultures and *Drosophila* larvae (Supervisors: Werner Zuschratter, Oliver Kobler)
- FLIM imaging of biosensors in living cells (Supervisors: André Weber, Werner Zuschratter)

Topics of the image processing and data analysis workshop (Thursday)

- Introduction in ImageJ/Fiji (Torsten Stöter)
- Deconvolution (Huygens) & 3D Image processing (Imaris), (Oliver Kobler)
- Image Analysis of SPT and ISA data (Martin Heine)
- Analysis of FLIM data (André Weber)