

E 01 - GGNB Extended Methods Course

ADVANCED LIGHT MICROSCOPY

Date: **14-19 March 2010**

Participants: **approx. 30 (for hands-on courses)**

The main course will take place in the Department of NanoBiophotonics at the Max Planck Institute for Biophysical Chemistry under Prof. Dr. Stefan W. Hell and Dr. Alexander Egner. It is divided into two parts, a first part of lectures and a second part of hands-on experiments.

Part I – Lectures (Sunday, March 14 – Tuesday, March 16, 2010)

For all participants!

The first part consists of lectures on the basics and theory of all topics covered in the different modules of the extended course. These lectures are given both by GGNB faculty members and external experts in the field of light microscopy. Venue: MPI-bpc, Prandtl Lecture Hall.

Part II – Hands-on courses (2 days between Wed, March 17 and Fri, March 19, 2010)

3-5 students per course!

In the second part, hands-on advanced course units (3-5 students each) will be offered in the laboratories of the participating faculty members. Each of these course units will take two days (Wed/Thu or Thu/Fri). Each participant in the extended methods course will have the opportunity to participate in one of these course units.

Topics for 10 hands-on advanced course units:

- 2-3 * Confocal microscopy (Bodenschatz, Rehfeldt, Schu)
- 1 * FCS/FLIM (Eggeling)
- 1 * FRET (Wouters/Bunt)
- 1 * Calcium imaging (Moser, postponed by 1 week)
- 2 * STED (Rizzoli, Egner)
- 1 * STED (Hell)
- 1 * Single molecule localization (Egner)

GGNB Extended Methods Courses: March– August 2010

Lecturers (in chronological order)

Dr. Alexander Egner, MPI for Biophysical Chemistry, Dept. of NanoBiophotonics, Göttingen

Dr. Andreas Schönle, MPI for Biophysical Chemistry, Dept. of NanoBiophotonics, Göttingen

Prof. Dr. Stefan Hell, MPI for Biophysical Chemistry, Dept. of NanoBiophotonics, Göttingen

Prof. Dr. Fritjof Helmchen, Brain Research Institute, Dept. of Neurophysiology, Zurich, Switzerland

Dr. Christian Eggeling, MPI for Biophysical Chemistry, Dept. of NanoBiophotonics, Göttingen

Prof. Dr. Thorsten Lang, LIMES Institute, Membrane Biology & Lipid Biochemistry, Bonn

PD Dr. Stefan Jakobs, MPI for Biophysical Chemistry, Mitochondrial Structure and Dynamics Group, Dept. of NanoBiophotonics, Göttingen

Dr. Gertrude Bunt, University of Göttingen, Physiological Institute, Dept. of Neuro- and Sensory Physiology, Cellular Biophysics Group, Göttingen

Dr. David DiGregorio, Head of the Unit of Dynamic Neuronal Imaging, Dept. of Neuroscience, Institut Pasteur, Paris, France

Prof. Dr. Fred Wouters, Physiological Institute, Dept. of Neuro- and Sensory Physiology, Laboratory for Molecular and Cellular Systems, Göttingen

Prof. Dr. Jürgen Klingauf, Institute for Medical Physics and Biophysics, University of Münster, Dept. of Cellular Biophysics, Münster

Prof. Jörg Enderlein, University of Göttingen, III. Physical Institute, Göttingen

Mark Bates, Harvard School of Engineering and Applied Sciences, Division of Engineering and Applied Sciences, Cambridge, MA, USA

Dr. Michael Hilbert, ZEISS, Jena

Dr. Silvio Rizzoli, European Neuroscience Institute, STED Microscopy of Synaptic Function Group, Göttingen

Dr. Marcus Dyba, Leica Microsystems CMS GmbH, Mannheim

Prof. Dr. Dr. Detlev Schild, University of Göttingen, Physiological Institute, Dept. of Neurophysiology and Cellular Biophysics, Göttingen

GGNB Extended Methods Courses: March– August 2010

Course Supervisors (in alphabetical order)

Prof. Dr. Eberhard Bodenschatz, MPI for Dynamics and Self-Organization, Dept. of Fluid Dynamics, Pattern Formation and Nanobiocomplexity, Göttingen

Dr. Gertrude Bunt, University of Göttingen, Physiological Institute, Dept. of Neuro- and Sensory Physiology, Cellular Biophysics Group, Göttingen

Dr. Christian Eggeling, MPI for Biophysical Chemistry, Dept. of NanoBiophotonics, Göttingen

Dr. Alexander Egner, MPI for Biophysical Chemistry, Dept. of NanoBiophotonics, Göttingen

Prof. Dr. Stefan Hell, MPI for Biophysical Chemistry, Dept. of NanoBiophotonics, Göttingen

Prof. Dr. Tobias Moser, University of Göttingen, Dept. of Otorhynolaryngology, Göttingen

Dr. Florian Rehfeldt, University of Göttingen, III. Physical Institute, Göttingen

Dr. Silvio Rizzoli, European Neuroscience Institute, STED Microscopy of Synaptic Function Group, Göttingen

Prof. Dr. Peter Schu, University of Göttingen, Center for Biochemistry and Molecular Cell Biology, Dept. of Biochemistry II, Göttingen

Prof. Dr. Fred Wouters, Physiological Institute, Dept. of Neuro- and Sensory Physiology, Laboratory for Molecular and Cellular Systems, Göttingen

Schedule						
Time	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
9:00		2-Photon Imaging (in vivo) <i>Fritjof Helmchen</i>	TIRF Microscopy <i>Jürgen Klingauf</i>	exact starting time will be announced by course supervisors		
10:00				Single Molecule Detection / Spectroscopy <i>Jörg Enderlein</i>	Hand-on courses	Hand-on courses
11:00		Fluorescence / FCS <i>Christian Eggeling</i>	Confocal (Bodenschatz)		Confocal (Bodenschatz)	Confocal (Rehfeldt)
12:00			Confocal (Schu)	Confocal (Rehfeldt)	FRET (Wouters/Bunt)	
13:00		History of Fluorescent Proteins <i>Thorsten Lang</i>	STORM <i>Mark Bates</i>	FCS/FLIM (Eggeling)	Single Molecules (Egner)	
14:00		Switchable Fluorescent Proteins <i>Stefan Jakobs</i>		STED (Rizzoli)	STED (Egner)	
15:00	Fundamentals of Microscopy <i>Alexander Egner</i>	Labelling Techniques <i>Gertrude Bunt</i>	ELYRA / PALM / Structured Illumination <i>Michael Hilbert</i>	STED (Hell)	FRET (Wouters/Bunt)	
16:00			STED Microscopy of Synaptic Function <i>Silvio Rizzoli</i>	STED (Rizzoli)	STED (Egner)	
	Fundamentals of Microscopy <i>Andreas Schönle</i>	Calcium / Voltage Dye Imaging <i>David DiGregorio</i>		STED (Hell)	STED (Hell)	
17:00				STED (Hell)	Single Molecules (Egner)	
18:00	Far Field Optical Nanoscopy <i>Stefan W. Hell</i>	FRET & FLIM <i>Fred Wouters</i>	LEICA TCS STED <i>Marcus Dyba</i>			
19:00			Fundamentals of Microscopy <i>Detlev Schild</i>			