Advanced Microscopy Course 2005

Nov. 15.-17.
Organizers:
Gregory Harms, Peter Friedl
Rudolf Virchow Center

Location: Seminar Room 3 and Microscopy Core Facility
Rudolf Virchow Center, Versbacher Str. 9

Four rotating groups (max. 9 people each)
Course topics (120 min)

Topic A Single molecule imaging
(Gregory Harms, Ralf Steinmeyer, Andrey Noskov)

Location: Room 013, Institute for Microscopy
System: Zeiss wide-field microscopes

Topics:
-Single-molecule properties and microscope systems
-Fluorophores for single-molecule microscopy: GFP Varaints, Artifical Organics, and Nanocrystals (Quantum Dots)
-Wide-Field Single Molecule Studies: Tracking, Co-localization, Stoichiometry, and Function
-Considerations for "in vivo" situations
-Analysis

Topic B Dynamic confocal microscopy
(Peter Friedl, Katarina Wolf)

Location: Department of Pathology
System: Leica SP2 AOBS

Topics:
- Confocal reflection imaging for tissue reconstruction
- 3D reconstruction of collagen degradation
- Principles of 4D imaging and image reconstruction
- Live invasion of cancer cells in 3D collagen lattices
- Multiple-color simultaneous imaging

Topic C Multiphoton microscopy and second harmonic generation imaging
(Peter Friedl, Julian Storim)

Location: Room 009, Institute for Microscopy
System: Lavision Trimscope/Verdi-Miro/APE OPO
Topics:
- Tuning the laser

- Second harmonic generation imaging of connective tissue
- 3D reconstruction of dermis and dermis vessels
- 4D Live cell imaging of GFP-actin cytoskeleton in melanoma cells migrating in 3D collagen
- High-speed imaging of calcium transients

Topic D Photoactivation and Photobleaching (FRAP)
(Gregory Harms, Geoffery Lambright)

Location: Labor 009 and Kurssaal 3, Rudolf-Virchow Center
System: Zeiss LSM 410

Topics:
- The essentials for FRAP, FLIP, and Photoactivation
- Characterization through control experiments
- Qualitative vs. Quantitative FRAP with artificial membrane staining on living cells
- Qualitative vs. Quantitative FRAP with GFP fusion proteins on Living Cells
- Two-color FRAP

Optionsl Topics E System Demonstrations by Exhibitors (60 – 90 min)

Systems and topics to be completed

Schedule – November 15, 2005

8:30 - 9:00	**Organization and Coffee** **Kurssaal 1 – 3, Rudolf-Virchow-Zentrum**
9:00 - 10:45	**First Rotating Group Session**
10:45 - 11:15	**Coffee Break and Vendor Demonstrations** **Kurssaal 1-3**
11:15-11:30	**Introduction to Confocal Fluorescence, Confocal Reflection, and Multi-photon Microscopy and Imaging** **-Industrial Partner Introduction to Leica, Nikon, Olympus, and Zeiss** ***by Peter Friedl***
11:30 – 12:45	**Second Rotating Group Session**

13:15 – 14:00	**Lunch and Vendor Demonstrations** **Kurssaal 1-3** **Introduction to Single Molecule Imaging, Single Molecule-Tracking, and FCS** **-Industrial Partners: Chromaphore, Till Photonics, Visitron Systems, BFiOptiLas, and ibidi** ***by Gregory Harms and Carey Johnson***
14:15 – 16:00	**Third Rotating Group Session**
16:00 – 16:30	**Coffee Break and Vendor Demonstrations** **Kurssaal 1-3**
16:30 – 16:45	**Introduction to Fluorescence Recovery After Photobleaching** ***by Gregory Harms and Geoffrey Lambright***
16:45 – 18:30	**Fourth Rotating Group Session**
18:30	**Farewell Coffee**

Schedule – November 16, 2005

"Demonstrator Day"

- State of the art demonstrations by industrial partners.
Possibility to test your samples on the demonstration units.
The Vendors available are:

BFiOptiLas
Chromaphore
Leica
Nikon
Till Photonics
Visitron
Zeiss
ibidi

The second day will be held in Kurssaal 2+ 3 of the Rudolf-Virchow-Zentrum. Later appointments with the individual companies are possible but need to be made separately with them. Please make the individual appointments with the vendors on Nov. 15th.

Coffee and other refreshments will be served.

November 17, 2005

17:00 Prof. Dr. Uli Kubitschek, Bonn

"Nucleocytoplasmic and intranuclear transport at the single-molecule level"

Kurssaal 3 - Rudolf-Virchow-Zentrum

No registration required!