SUPER-RESOLUTION STED AND LIGHTSHEET
WORKSHOP WITH HANDS-ON

DATE & LOCATION

OCTOBER 5-7/2016

BIOCEV, PRŮMYSLOVÁ 595, 252 50 VESTEC
IMG, VÍDEŇSKÁ 1083, 142 20 PRAGUE 4

ORGANIZERS

PAVEL HOZÁK (BIOLOGY OF THE CELL NUCLEUS & IMG MICROSCOPY CENTRE)
MARTIN KOPECKÝ (SALES REPRESENTATIVE, PRAGOLAB)

PAVEL TOMANČÁK
APPLICATIONS OF LIGHT SHEET MICROSCOPY
(RESEARCH GROUP LEADER AT THE MPI-CBG)

NATHALIE GARIN
SUPER-RESOLUTION TECHNIQUES AND SYSTEM STED 3X ALSO FOR LIVING CELLS
(EMEA TEAMLEADER APPLICATION MANAGEMENT)

JORGE BERNARDINO DE LA SERNA
LIPID AND PROTEIN MEMBRANE DYNAMICS STUDIES BY FCS AND STED-FCS
(RUTHERFORD APPLETON LABORATORY,SCIENCE AND TECHNOLOGY FACILITIES COUNCIL, HARWELL-OXFORD, UK)

DANIEL SMEETS
LEICA TCS SP8 DIGITAL LIGHT SHEET – THE VERTICAL TURN
(APPLICATION SPECIALIST CONFOCAL MICROSCOPY – EMEA)

REGISTER HERE

PROGRAMME

OCTOBER 5, WEDNESDAY

LOCATION FOR LECTURES: BIOCEV, VESTEC

08:30	Registration
08:45	Welcome by **Pavel Hozak** and **Ladislav Náměstek**
09:00- 09:45	Super-resolution techniques and system STED 3X also for living cells, **Nathalie Garin**
09:45- 10:30	Lipid and protein membrane dynamics studies by FCS and STED-FCS, **Jorge Bernardino de la Serna**
10:30- 11:00	Coffee break
11:00- 11:45	Applications of light sheet microscopy , **Pavel Tomančák**
11:45- 12:15	Leica TCS SP8 Digital Light Sheet – The vertical turn, **Daniel Smeets**
12:15- 12:30	General discussion
16:00- 19:00	Demonstration and Hands on session (each session 90 min. – registration obligatory)

LOCATION FOR HANDS ON: IMG, PRAGUE

LAB: STED		LAB: LightSheet	
16:00 – 17:30	Hands on session 1	16:00 – 17:30	Hands on session 1
17:30 – 19:00	Hands on session 2	17:30 – 19:00	Hands on session 2

OCTOBER 6, THURSDAY

LOCATION: IMG, PRAGUE

09:00 – 19:00 Demonstration and Hands on session (each session 90 min. – registration obligatory)

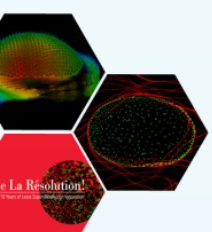
LAB: STED		LAB: LightSheet	
09:00 – 10:30	Hands on session 4	09:00 – 10:30	Hands on session 4
10:30 – 11:00	Rotation time / Coffee	10:30 – 11:00	Rotation time / Coffee
11:00 – 12:30	Hands on session 5	11:00 – 12:30	Hands on session 5
12:30 – 13:30	Rotation time / Coffee	12:30 – 13:30	Rotation time / Coffee
13:30 – 15:00	Hands on session 6	13:30 – 15:00	Hands on session 6
15:00 – 15:30	Rotation time / Coffee	15:00 – 15:30	Rotation time / Coffee
15:30 – 17:00	Hands on session 7	15:30 – 17:00	Hands on session 7
17:00 – 17:30	Rotation time / Coffee	17:00 – 17:30	Rotation time / Coffee
17:30 – 19:00	Hands on session 8	17:30 – 19:00	Hands on session 8

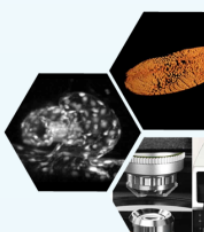
OCTOBER 7, FRIDAY

LOCATION: IMG, PRAGUE

09:00 – 13:30 Demonstration and Hands on session (each session 90 min. – registration obligatory)

LAB: STED		LAB: LightSheet	
09:00 – 10:30	Hands on session 9	09:00 – 10:30	Hands on session 9
10:30 – 11:00	Rotation time / Coffee	10:30 – 11:00	Rotation time / Coffee
11:00 – 12:30	Hands on session 10	11:00 – 12:30	Hands on session 10
12:30 – 13:30	End of the workshop	12:30 – 13:30	End of the workshop





REGISTRATION

IMPORTANT

PLEASE REGISTER AS SOON AS POSSIBLE, THE CAPACITY IS LIMITED!

REGISTRATION VIA WEBSITES: REGISTER HERE

INFO

The registration for demonstration and hands on sessions is obligatory. Each session- 90 min., max 5 people. Register for a particular time slot in the registration form. Please be present for the hands on session 15 minutes before.

IMPORTANT

You can bring your own samples but be aware that max. 2 samples can be done in 1 hands on session. Please you must send us precise sample description of your samples for STED 3X and LighSheet as well and follow the sample preparation guide for STED with 660 laser and LighSheet. Sample preparation guides are attached in email after registration.

Contact person: Martin Kopecký kopecky@pragolab.cz

Workshop abstract:

1. STED part:

It is less than 20 years since super-resolution arrived on the light microscopy scene, but it already plays an important role, particularly in life sciences. The term super-resolution refers to methods that surpass the so-called diffraction limit. Applications are wide ranging – from dynamic vesicle movements in the sub-100 nm range to fluorescence images of sub-cellular structures, allowing researchers to see details only previously possible with electron microscopy.

The introduction of the Leica TCS SP8 STED 3X in 2014 marks Leica Microsystems' 10th anniversary of leading innovations in super-resolution technology. In 2004, Leica Microsystems revolutionized light microscopy with the introduction of the first commercial super-resolution microscope, Leica TCS 4PI. During the last ten years, Leica Microsystems has continuously developed its super-resolution portfolio and today offers both confocal and widefield super-resolution technologies: STED (STimulated Emission Depletion) and GSDIM/dSTORM (Ground State Depletion followed by Individual Molecule return/direct Stochastic Optical Reconstruction Microscopy).

STED super-resolution meets the requirements of daily research and enables researchers to discover minute details with live cell imaging capabilities. The secrets of life and the causes of many diseases can only be fully explained if we understand the functions of the smallest components of organisms. Using the super-resolution STED microscope, scientists are now able to observe cellular proteins and molecular structures measuring less than 50 nanometers.

Underlining the impact of super-resolution microscopy, the 2014 Nobel Prize for Chemistry was awarded jointly to Eric Betzig, Stefan W. Hell and William E. Moerner "for the development of super-resolved fluorescence microscopy".

2. LightSheet part:

Selective plane illumination microscopy (SPIM) and other fluorescence microscopy techniques in which a focused sheet of light serves to illuminate the sample have become increasingly popular in developmental studies. Fluorescence light sheet microscopy bridges the gap in image quality between fluorescence stereomicroscopy and high-resolution imaging of fixed tissue sections. In addition, high depth penetration, low bleaching and high acquisition speeds make light sheet microscopy ideally suited for extended time-lapse experiments in live embryos. Light-sheet fluorescence microscopy enables relatively gentle imaging of biological samples with high resolution in three dimensions (3D) and over long periods of time. Especially when combined with high-speed cameras, it is fast enough to capture cellular or subcellular dynamics. For its potential for fast, relatively gentle, volumetric imaging of biological samples, light-sheet fluorescence microscopy has been chosen as the Nature Method of the Year 2014.

3. The last part will provide you with hands-on experience on the Leica SP8 STED 3X and on the Leica SP8 DLS Light Sheet systems. You are invited to bring your own samples but we kindly ask you to please register in advance.