HANDS-ON TRAINING COURSE FOR BEGINNERS IN CONFOCAL MICROSCOPY

May 22-24, 2023

Biomedicum, Ravila 19, Tartu, ESTONIA

(Introduction to Confocal Microscopy MVBS.02.002, 2 ECTS)

This 3-day course aims to provide basic knowledge of the working principles of confocal imaging and introduce the available confocal microscopes in the core facility. The course integrates theoretical lectures with hands-on experiments and practical experience with an emphasis on live-cell imaging. Training is free of charge and is open to PhD students and research staff of the University of Tartu and other research institutions from Estonia, Latvia and Lithuania. Applicants must have basic knowledge of microscopy and its applications.

Additional lectures are available online in Moodle and will be open to registered attendees.

PROGRAM

Monday, May 22 13.00-17.00 (1st floor, room 1024)

Theoretical session: Introduction to basics of the confocal microscopy

HEITI PAVES, PhD (Optika & Diagnostika, Zeiss)

- Principles of light microscopy. Anatomy of confocal microscopes: light sources, cameras, sensors and objectives.

- Zeiss LSM 780 and Zeiss LSM 980 microscopes. Advanced techniques in fluorescence confocal microscopy: Airyscan technology for super-resolution imaging.

ALLEN KAASIK, PhD (University of Tartu)

- Practicalities of confocal imaging. How to choose fluorophores. Genetically encoded fluorescent proteins and biosensors. From noise to photobleaching.

Tuesday, May 23 09.00-12.30

Practical session 1: Live-cell imaging

ANNIKA VAARMANN, PhD

Live-cell imaging. Multicolor sequential and simultaneous imaging techniques. Cell permeant small-molecule fluorescent indicators. Single fluorescent proteins versus ratiometric probes. FRET.

Hands-on activities for participants:

Imaging of intracellular signaling using specific fluorescence (i.e., Perceval HR for ATP/ADP measurements) sensors.

Tuesday, May 23 13.30-17.00

Practical session 2: Organelle imaging

VINAY CHOUBEY, PhD

Principles of co-localization studies. Markers for studying the intracellular organelles (lysosome, autophagosome and mitochondria) dynamics.

Hands-on activities for participants:

Imaging of autophagy, mitophagy and ER-phagy markers.

Wednesday, May 24 09.00-12.30

Practical session 3: Time-lapse imaging

ANNIKA VAARMANN, PhD

Time-lapse imaging.

Hands-on activities for participants:

Imaging of Ca^{2+} transients in cytosol, endoplasmic reticulum and mitochondria.

REGISTRATION

The registration deadline is May 10th. Due to space limits, hands-on training will accommodate a maximum of 10 participants, and lectures are open for up to 30 persons. Please note that we can only accept Ph.D.-level researchers and Ph.D. students.

For registration, e-mail annika.vaarmann@ut.ee, specifying your name, institution, PI-s name and whether you are interested in full training or lectures only.

You will receive the confirmation e-mail on May 12th as your registration is confirmed.

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