



BASIC COURSE ON LIGHT AND ELECTRON MICROSCOPY

"Imaging across the scales, from electron microscopy to mesoscopic imaging"

- Time** May 21st to 23rd, 2025
- Place** BCO Light Microscopy (LM) and Electron Microscopy (EM) Core Facility Laboratories, the Main Building of the Medical Campus, University of Oulu, Aapistie 5A, 90220 Oulu, Finland
- Credits** 1 ECTS (DP00AS85-3001)
- Organisers** Health and Biosciences Doctoral Programme and Oulu BioImaging, Biocenter Oulu, University of Oulu, <https://www.oulu.fi/en/university/faculties-and-units/biocenter-oulu>
- Aim** To get acquainted with light and electron microscopy imaging methods of living and fixed specimens of different sizes. Learn how to apply suitable techniques for image analysis. LM introduction includes widefield and confocal fluorescence microscopy and examples of multiphoton techniques. EM part focuses on sample preparation and transmission and scanning electron microscopy. The course consists of lectures, microscopy demonstrations and computer-based image analysis workshops.
- Information** Veli-Pekka Ronkainen / Ilkka Miinalainen, Biocenter Oulu, tel: +358 294 486114 / +358 294 486145, e-mail: veli-pekka.ronkainen@oulu.fi / ilkka.miinalainen@oulu.fi
- Registration** Lectures are open for all without registration. Registration for the demonstrations is obligatory, and preference will be given to Ph.D. students and researchers whose project benefits the topics carried out during the course. Due to space limitations only 18 participants can be accepted. The application with a short description of the applicant's project should be submitted to Peppi by 1st of May 2025. Selected applicants will be informed by May 5th, 2025.

PROGRAMME

Wednesday, May 21st, 2025. Lecture hall F202

Lectures:

- 9.00-9.05 Opening words and introduction
9.05-10.00 Basics in light/fluorescence microscopy
Veli-Pekka Ronkainen, BCO
- 10.00-10.15 *Coffee break*
- 10.15-11.15 Basics in electron microscopy
Ilkka Miinalainen, BCO
- 11.15-12.15 *Lunch break*
- 12.15-13.15 Principles of advanced fluorescence microscopy techniques
Veli-Pekka Ronkainen
- 13.15-13.30 *Break*
- 13.30-14.30 Methods for preparing biological samples for electron microscopy analysis
Ilkka Miinalainen
- 14.30-14.45 Introduction to demonstrations
Veli-Pekka Ronkainen

Thursday, May 22nd, 2025

- 8.45 Gathering in meeting room 487B (Kieppi Building 4th floor, Aapistie 5A) for demonstrations.
- 9.00-16.00 Demonstrations, 3 groups
- Demo 1. Laser scanning confocal and multiphoton microscopy, Room 419A and 492B
Imaging of cells and 3D imaging of thick mesoscopic samples, Veli-Pekka Ronkainen
- Demo 2. Transmission electron microscopy and sample preparation, Room 467B and 488B
Imaging of tissue samples and negative staining and imaging of macromolecules,
Mika Kaakinen
- Demo 3. Scanning electron microscopy and sample preparation, Room 320A and 488B
Imaging of tissue and cell samples using different detectors and preparing samples for
sputter coating, Ilkka Miinalainen

Hours	1 st group	2 nd group	3 rd group
9.00-11.00	Demonstration 1	Demonstration 2	Demonstration 3
11.00-12.00	Lunch break	Lunch break	Lunch break
12.00-14.00	Demonstration 2	Demonstration 3	Demonstration 1
14.00-16.00	Demonstration 3	Demonstration 1	Demonstration 2

Friday, May 23rd, 2025. Room 338B and Computer Class KT285

- 9.00-10.00 Introduction to computer-based image processing and analysis, Room 338B,
Mika Kaakinen, BCO
- 10.00-10.15 *Coffee break*
- 10.15-11.45 Computer-based processing and analysis of light microscopy images, Computer Class
KT285
Veli-Pekka Ronkainen, Antti Viklund, Mika Kaakinen
- 11.45-12.45 *Lunch break*
- 12.45-14.15 Computer-based processing and analysis of electron microscopy images, Computer
Class KT285, Ilkka Miinalainen, Antti Viklund, Mika Kaakinen
- 14.15 Concluding remarks