

## BASIC COURSE ON LIGHT AND ELECTRON MICROSCOPY

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

**Time** May 21<sup>st</sup> to 23<sup>rd</sup>, 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 BiolImaging, 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.

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**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 1<sup>st</sup> of May 2025. Selected applicants will be informed by May 5<sup>th</sup>, 2025.

## PROGRAMME

**Wednesday, May 21<sup>st</sup>, 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 22<sup>nd</sup>, 2025**

8.45      Gathering in meeting room 487B (Kieppi Building 4<sup>th</sup> 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 <sup>st</sup> group	2 <sup>nd</sup> group	3 <sup>rd</sup> 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 23<sup>rd</sup>, 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