

MICROSCOPY APPLICATIONS FOR IMMUNOLOGICAL RESEARCH

SUPPORTED BY THE PHD SPECIALIZATION CUTTING EDGE MICROSCOPY, WWW.MIC.UNIBE.CH.

*Lecture and practical Course at the IRB, Bellinzona for
PhD students of the GCB (University of Bern) and at the IRB*

Responsible Prof. Marcus Thelen, UNI-BE + IRB – marcus.thelen@irb.usi.ch

Date: 11.11.2020 – 13.11.2020

**Due to COVID-19 the course will be virtual without practical part.
An updated program will be available soon.**

11. 11. 2020

9:00 – 13:30 (30 min break) Marcus Thelen / Diego Morone

Welcome and course introduction.

Physics light: Light refraction, diffraction, interference resolution, excitation and emission (Jablonski, Frank-Condon), lifetime and quantum yield, polarization and anisotropy.

General introduction into optics, lenses and objectives (chromatic correction, Plan Apo meanings), long distance and short distance, confocal and bright field microscopy, including microscope essentials, light path, optics, lenses and lens definitions, objectives, transmitted light and fluorescence at microscope (light sources, detector...), PSF, crosstalk, computer assisted deconvolution.

Lunch Break

15:00-18:30 Marcus Thelen / Diego Morone

In two groups practical instruction on microscopes: Hands on wide-field and confocal fluorescence Microscope (Light sources, detectors, filters, AOBS, pinhole...).

12.11.2020

9:00 – 12:30 (30 min break) Marcus Thelen / Diego Morone

Fluorescence Microscopy Application: Fluorescent protein, Tags, Fluorophores Ca²⁺, FRET, Structured illumination, FLIM, FRAP, Photoactivation and Photoswitching, 2 photon microscopy.

Lunch Break

14:30-18:00 Marcus Thelen / Diego Morone

In two groups practical measurements with confocal and wide field microscopes (Calcium, FRAP, 3D reconstruction).

12.11.2020

9:00-11:00 Diego Morone

Digital images, Image analysis with ImageJ / Cell profiler (one group in conference room).

Coffee

11:30-12:30 Mariagrazia Uguccioni/ Marcus Thelen

IHC: sample preparation, immunohistochemistry, staining protocols.

Lunch Break

13:30-16:00 Santiago Fernández González

Multi-photon microscopy, introduction, tissue preparation, visit of instrument, technical aspects.

16:00-18:00

Written Exam – 1.5 ECTS (to be discussed for virtual course)