MICROSCOPY APPLICATIONS FOR IMMUNOLOGICAL RESEARCH
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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)