

COURSE

Mechanical characterization of biological samples using correlative methods

November 26 - 27, 2024

- organized by the Institute of Physiology CAS (IPHYS BIF – Czech-BioImaging)
- suitable for Bc, MS or PhD students who want to extend their knowledge in correlative data acquisition, label-free light microscopy and biomechanics
- AFM imaging and mechanical testing, tensile tests, indentation test and advanced light microscopy techniques

Venue:



Institute of Physiology CAS, Laboratory of Biomathematics,
Krč CAS campus, building DaI, room 011,
Víteňská 1083, Prague 4, 14220

Short description of the course:

The two-day course consists of lectures and hands-on sessions which will demonstrate basic mechanical testing methods such as tensile test or atomic force microscopy tests and explain their biological relevance. To relate these mechanical tests to the most significant biomechanical structures such as collagen fibres, elastic fibres or fat, the participants will be taught how to link these mechanical properties to label-free microscopy techniques, for instance, pSHG, THG or CARS.

Emphasis is put on:

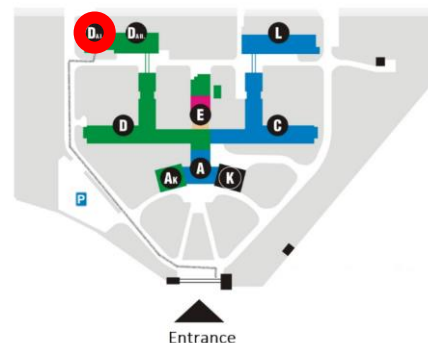
- experimental design and basic biomechanics theories
- sample preparation for correlative experiments
- correlative data acquisition and analysis

The course is free of charge.

Course coordinator: Ing. Mgr. Daniel Hadraba, PhD.
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<https://bioimaging.fgu.cas.cz/>

List of instructors:

Ing. Mgr. Daniel Hadraba, PhD.
Mgr. Jan Přebyl, PhD.
Ing. František Lopot, PhD.
Mgr. David Vondrášek



Location of Da I. building in the Krč CAS campus

Preliminary program

Tuesday – 26 November 2024

- 9:10 – 9:15 Welcome (Hadraba, IPHYS BIF)
Lecture (meeting room Dal)
- 9:15 – 9:45 Design of experiment in correlative biomechanics (Hadraba, IPHYS BIF)
Lecture (meeting room Dal)
- 9:45 – 10:15 Biomechanical concepts and basic mechanics (Lopot, CVUT)
Opening Lecture (meeting room Dal)
- 10:15 – 10:30 Coffee break*
- 10:30 – 11:00 Brillouin microscopy in biology (CellSense)
Lecture (meeting room Dal)
- 11:00 – 11:30 Introduction to Atomic Force Microscopy and Indentation (Pribyl, CEITEC)
Lecture (meeting room Dal)
- 11:30 – 12:00 Atomic Force Microscopy and Biological Applications (Bruker)
Lecture (meeting room Dal)
- 12:00 – 13:00 Lunch*

Four parallel sessions

- 13:00 – 15:00 Atomic Force Microscopy – practical introduction (Pribyl, CEITEC)
Hands-on (Dal) group I/II/III/IV
- 15:00 – 15:15 Coffee break*
- 15:15 – 17:15 Bi-axial mechanical testing and label-free microscopy (Vondrasek, IPHYS BIF)
Hands-on (Dal) group I/II/III/IV

Wednesday – 27 November 2024

- 9:00 – 11:00 Indentation test with label-free reflectance confocal microscopy (Lopot, CVUT)
Hands-on (Dal lab. 009) group I/II/III/IV
- 11:00 – 11:15 Coffee break*
- 11:15 – 13:15 Bruker Nanovizard 4XP biological applications and own samples (Bruker)
Hands-on (Dal lab. 002) group I/II/III/IV
- 13:15 – 14:00 Lunch*
- 14:00 – 15:00 Data analysis and processing in AFM microscopy (Pribyl, CEITEC)
Hands-on (Dal lab. 002) group I+II
- 15:00 – 16:00 Data analysis and processing in label-free microscopy and tensile tests (Hadraba, IPHYS BIF)
Hands-on (meeting room Dal) group III+IV