

## PRACTICAL COURSE

### Mechanical characterization of biological samples using correlative methods

November 21 - 22, 2023

- 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 biomechanics
- working with AFM or tensile test device and advanced light microscopy techniques

#### Venue:



Institute of Physiology CAS, Laboratory of Biomathematics,  
Krč CAS campus, building DaI, room 011,  
Václavská 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.  
[daniel.hadraba@fgu.cas.cz](mailto:daniel.hadraba@fgu.cas.cz)  
<https://bioimaging.fgu.cas.cz/>

#### List of instructors:

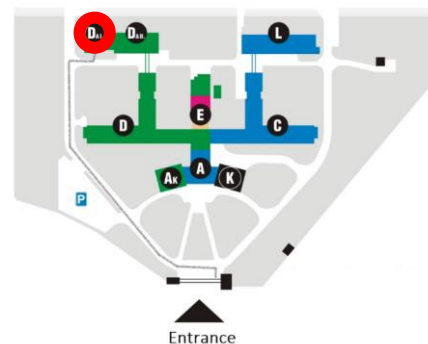
Ing. Mgr. Daniel Hadraba, PhD.

Mgr. Jan Přebyl, PhD.

Ing. František Lopot, PhD.

Mgr. David Vondrášek

Mgr. Davide Basello



Location of Da I. building in the Krč CAS campus

## Programme

### Tuesday – 21 November 2023

- 9:15 – 9:30 Welcome (Hadraba)  
*Lecture* (meeting room Dal)
- 9:30 – 10:30 Biomechanical concepts and basic mechanics (Lopot)  
*Opening Lecture* (meeting room Dal)
- 10:30 – 10:45 Coffee break*
- 10:45 – 11:45 Design of experiment in correlative biomechanics (Hadraba)  
*Lecture* (meeting room Dal)
- 11:45 – 12:30 Lunch*
- 12:30 – 13:30 Introduction to Atomic Force Microscopy and Indentation (Pribyl)  
*Lecture* (meeting room Dal)
- 13:30 – 15:30 Atomic Force Microscopy on biological samples – practical introduction (Pribyl)  
*Hands-on* (Dal lab. 002) group I/II
- 15:30 – 15:45 Coffee break*
- 15:45 – 17:45 Label-free methods suitable for biomechanical testing (Vondrasek)  
*Hands-on* (Dal lab. 009) group I/II

### Wednesday – 22 November 2023

- 9:30 – 10:30 Practical demonstration of label-free microscopy and tensile test (Vondrasek)  
*Hands-on* (Dal lab. 009) group I/II
- 10:30 – 10:45 Coffee break*
- 10:45 – 13:00 Practical demonstration of AFM on biological sample (Pribyl)  
*Hands-on* (Dal lab. 002) group I/II
- 13:00 – 14:00 Lunch*
- 14:00 – 15:00 Data analysis and processing in AFM microscopy (Pribyl)  
*Hands-on* (Dal lab. 002) group I/II
- 15:00 – 16:00 Data analysis and processing in label-free microscopy and tensile tests (Hadraba)  
*Hands-on* (meeting room Dal) group I/II