



Online Summer School on

„Multiscale Modeling and Bone Pathologies“

with a particular focus on the following topics:

- (1) characterization of mechanical and fracture properties of bone; and
- (2) realistic computational models and the influence of molecular and biophysical mechanisms on mechanical behavior in the case of osteoporosis, fracture, and healing

organized by the

**Institute for Mechanics of Materials and Structures
TU Wien (Vienna University of Technology)**

from May 23-24, 2022,

as part of the project

Increasing scientific, technological and innovation capacity of Serbia as a widening country in the domain of multiscale modeling and medical informatics in biomedical engineering (SGABU)

funded by the European Commission
in the framework of Horizon 2020





May 23, 2022

- 9:55-10:00 **Welcome address - opening of summer school**
Prof. Christian Hellmich / Assoc. Prof. Stefan Scheiner
TU Wien (Vienna University of Technology), Austria
- 10:00-11:00 **Experimental bone fracture mechanics**
Prof. Philipp Thurner
TU Wien (Vienna University of Technology), Austria
- 11:00-12:00 **Multiscale modeling of bone fracture and damage**
Prof. Jean-Francois Ganghoffer
University of Lorraine, Nancy, France
- 12:00-13:00 **Lunch break**
- 13:00-14:00 **Variances and invariances in composition and microstructure across femoral tissues from different vertebrates**
Dr. Luis Zelaya-Lainez
TU Wien (Vienna University of Technology), Austria
- 14:00-15:00 **Multiscale characterization of mechanical properties of human cortical bone**
Prof. Marie-Christine Ho Ba Tho
University of Technology of Compiègne, France
- 15:00-15:15 **Coffee break**
- 15:15-16:15 **Finite Element modeling of bone, bone fractures, soft tissue and skeletal muscle**
Prof. Nenad Filipovic
University of Kragujevac, Serbia
- 16:15-16:20 **Closing of day 1**
Assoc. Prof. Stefan Scheiner
TU Wien (Vienna University of Technology), Austria



May 24, 2022

- 9:55-10:00 **Opening of day 2**
Assoc. Prof. Stefan Scheiner
TU Wien (Vienna University of Technology), Austria
- 10:00-11:00 **Advances in mechanistic pharmacokinetic-pharmacodynamic modeling of postmenopausal osteoporosis treatments**
Prof. Peter Pivonka
Queensland University of Technology, Australia
- 11:00-12:00 **Multiscale modeling of fracture healing**
Prof. Hans van Oosterwyck
KU Leuven, Belgium
- 12:00-13:00 **Lunch break**
- 13:00-14:00 **Experimental investigation of implant-bone anchorage of pedicle screws**
Prof. Werner Schmölz
Medical University of Innsbruck, Austria
- 14:00-15:00 **Mechanical stimuli potentially governing the mechanobiology of bone computed by means of micromechanics-based models**
Assoc. Prof. Stefan Scheiner
TU Wien (Vienna University of Technology), Austria
- 15:00-15:15 **Coffee break**
- 15:15-16:15 **Uncertainty quantification in multiscale modeling of bone elasticity**
Prof. Vittorio Sansalone
Université Paris-Est Créteil Val de Marne, France
- 16:15-16:20 **Closing of summer school**
Prof. Christian Hellmich / Assoc. Prof. Stefan Scheiner
TU Wien (Vienna University of Technology), Austria