

April 22-24, 2009

BIOMECHANICAL MODELLING OF BONE AND CARTILAGE

(Version: January 23, 2009)

- Site and time: University of Kuopio, Yliopistonranta 1 E-F, 70211 Kuopio
April 22-24, 2009
- Organizer: Department of Physics, University of Kuopio
- Coordinator: Adjunct Professor Rami Korhonen. Phone: +358-40-355-3260.
E-mail: rami.korhonen@uku.fi
- Foreign speakers: Associate Professor Dieter Pahr, Vienna University of Technology, Austria
- Target groups: Students of the International Graduate School in Biomedical Engineering and Medical Physics (iBioMEP) and National Graduate School of Musculoskeletal Disorders and Biomaterials (TBGS), or anyone who is interested in biomechanical modeling.
- Aims:
- 1) Give insight into articular cartilage and bone biomechanics, structure and composition, and present imaging and mechanical testing techniques to characterize these properties.
 - 2) Present basic principles of biomechanical modeling of tissues, especially articular cartilage and bone, and show state-of-the-art techniques and computational models of articular cartilage and bone.
 - 3) Apply knowledge and techniques presented in aims 1 and 2 (day 1 and 2 in the program) and create simple biomechanical models of articular cartilage and bone.
- Disciplines: Biophysics, medical physics and engineering, biomechanics, public health science, biomedicine
- Language: English
- Structure: Lectures 16h, demonstrations/practices 4h, student presentations 4h
- Credits: Attendance in lectures and demonstrations/practices: 2.0 ECTS credits. 1.0 extra ECTS credit will be given to those who are willing to do a written examination (by email).
- Material: Written material (copies of powerpoint presentations) is provided for attendees in the first morning of the course. Further references will be provided by the lecturers.
- Registration: By April 8, 2009 (iBIOMEF: jari.viik@tut.fi; TBGS: terhi.j.heino@utu.fi)

Preliminary program (January 23, 2009):

Day 1

Wednesday, April 22, 2009. Seminar Hall S25, Snellmania building

7.45 – 8.15 Morning coffee

8.20 – 8.30 Welcome

Engineering aspects in bone research

8.30 – 9.10 Professor Timo Jämsä, University of Oulu

9.20 – 10.00 Professor Timo Jämsä, University of Oulu

Engineering aspects in articular cartilage research

10.10 – 10.50 Professor Juha Töyräs, University of Kuopio

11.00 – 11.40 Professor Juha Töyräs, University of Kuopio

Lunch (Amica Restaurant, Snellmania)

Imaging and data collection for modeling - bone

12.40 – 13.20 Adjunct Professor Harri Sievänen, UKK Institute, Tampere

13.30 – 14.10 Adjunct Professor Harri Sievänen, UKK Institute, Tampere

Coffee break (Amica Restaurant, Snellmania)

Imaging and data collection for modeling – articular cartilage

14.40 – 15.20 Professor Jukka Jurvelin, University of Kuopio

15.30 – 16.10 Professor Jukka Jurvelin, University of Kuopio

Day 2

Thursday, April 23, 2009. Seminar Hall S25, Snellmania building

7.45 – 8.25 Morning coffee (Amica Restaurant, Snellmania)

Fundamentals in biomechanical modelling

8.30 – 8.50 Adjunct Professor Rami Korhonen, University of Kuopio

8.50 – 9.10 Associate Professor Dieter Pahr, Vienna University of Technology, Austria

Modelling of articular cartilage and chondrocyte biomechanics

9.20 – 10.00 Adjunct Professor Rami Korhonen, University of Kuopio

10.10 – 10.50 Adjunct Professor Rami Korhonen, University of Kuopio

Modern techniques for biomechanical modelling of articular cartilage

11.00 – 11.40 PhD Petro Julkunen, University of Kuopio

April 22-24, 2009

Lunch (Amica Restaurant, Snellmania)

Computational bone biomechanics

12.40 – 13.20 Associate Professor Dieter Pahr, Vienna University of Technology, Austria

13.30 – 14.10 Associate Professor Dieter Pahr, Vienna University of Technology, Austria

Coffee break (Amica Restaurant, Snellmania)

Modelling of human bones – from CT to biomechanical models

14.40 – 15.20 Associate Professor Dieter Pahr, Vienna University of Technology, Austria

15.30 – 16.10 Associate Professor Dieter Pahr, Vienna University of Technology, Austria

Modeling of bone adaptation and repair

16.20 – 17.00 Post doctoral fellow Hanna Isaksson, University of Kuopio

Get-together in ??? - sauna, dinner etc.

19.00 -

Day 3

Friday, April 24, 2009. Seminar Halls MC9 and S25, Melania and Snellmania buildings

8.00 – 8.45 Morning coffee (Amica Restaurant, Snellmania)

Seminar Hall MC9

Workshop - How to create a biomechanical model?

9.00 – 10.25 Adjunct Professor Rami Korhonen, University of Kuopio

10.35 – 12.00 PhD Petro Julkunen, University of Kuopio

Lunch (Amica Restaurant, Snellmania)

Seminar Hall S25

13.00 – 15.30 **Student presentations**

15.30 End of course