

Program

**Micro-Mechanical Properties
of
Biomaterials**

September 26-30, 2004

**Hotel dos Templários
Lg. Candido dos Reis, 1, 2300
Tomar, Portugal
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Conference Chairs

Peter Fratzl

Max-Planck-Institute of Colloids and Interfaces, Germany

Michael Swain

University of Sydney, Australia

Rizhi Wang

University of British Columbia

ECI

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Sunday, September 26, 2004

18:00 – 19:00	Registration
19:00 – 19:30	Reception
19:30 – 21:00	Dinner followed by Social Hour

NOTES

- ? **Speakers should reserve 10 minutes at the end of their presentation for questions and discussion.**
- ? **Please observe “No Smoking” at ECI technical sessions, meals and social hours.**
- ? **Please silence cell phones at all technical sessions.**

Monday, September 27, 2004

- 07:30 – 08:45 Breakfast
- 09:00 – 12:30 **Session I: Hard tissue deformation and fracture**
Session Chair: Peter Fratzl
- 09:00 – 09:50 GENERAL STRUCTURE OF BONE
Alan Boyde
University College London, UK
- 09:50 – 10:40 MICRO-MECHANICAL CHARACTERISATION OF ENAMEL AND DENTINE.
INFLUENCE OF CARIES AND ABNORMAL DEVELOPMENT
Michael V. Swain
University of Sydney, Australia
- 10:40 – 11:10 Coffee Break
- 11:10 – 12:00 NANO, MICRO, AND MACRO -INDENTATIONS TO STUDY DEFORMATION AND
FRACTURE OF BONE MATERIALS
Rizhi Wang
University of British Columbia, Canada
- 12:00 – 12:30 IN-SITU MEASUREMENT OF FIBRILLAR DEFORMATION IN PARALLEL FIBERED
BONE USING SYNCHROTRON RADIATION
H.S. Gupta
Potsdam, Germany
- 12:30 – 13:30 Lunch
- 13:30 Afternoon: Optional Excursion – guided tour of Convento de Cristo/ Free time
- 19:30 – 21:00 Dinner followed by Social Hour

Tuesday, September 28, 2004

Note: Poster Presenters should hang their posters today and remove them after tomorrow's poster session.

- 07:30 – 08:45 Breakfast
- 09:00 – 12:30 **Session II: Soft biomaterials, cells and molecules**
Session Chair: Allen Boyde
- 09:00 – 09:50 DESIGNING NOVEL SCAFFOLDS FOR SOFT TISSUE ENGINEERING
Swee-Hin Teoh
Singapore
- 09:50 – 10:20 NANOMECHANICAL CHARACTERISATION OF SOFT BIOLOGICAL MATERIALS
Isaac K.K. Liu, Ying Yang, Mark Ahearne, Kong Yong Then, Alicia J. El Haj
Keele University, UK
- 10:20 – 10:50 Coffee Break
- 10:50 – 11:20 VISCOELASTIC PROPERTIES OF POLYMERIC BIOMATERIALS AND ITS
RELEVANCE TO THE TISSUE COMPATIBILITY OF IMPLANTABLE SYSTEMS
João F. Mano, Rui L. Reis
Minho, Portugal
- 11:20 – 11:50 COMPOSITE SCAFFOLDS WITH CONTROLLED INTERNAL ARCHITECTURE
I. Manjubala
Potsdam, Germany
- 11:50 – 15:40 **Session III: Medical applications and tissue engineering**
Session Chair: Swee-Hin Teoh
- 11:50 – 12:40 STEM CELLS FOR BONE AND CARTILAGE REPAIR
Robert Bielby
Imperial College London, UK
- 12:40 – 14:00 Lunch
- 14:00 – 14:50 WHAT MAKES THE AGEING HIP SO FRAGILE? BIOMECHANICS, BIOLOGY AND
THE EFFECTS OF DISEASE
Jonathan Reeve
Cambridge University, UK
- 14:50 – 15:40 CHARACTERIZING BONE MATERIAL QUALITY WITH SCANNING PROBE
METHODOLOGY
Peter Fratzl, Himadri S. Gupta, Paul Roschger, Oskar Paris, E.P. Paschalis,
Klaus Klaushofer, MPI Potsdam, Germany

Tuesday, September 28, 2004 (continued)

15:40 – 19:30 Free time / ad hoc sessions

19:30 – 21:00 Dinner followed by Social Hour

Wednesday, September 29, 2004

- 07:30 – 08:45 Breakfast
- 09:00 – 12:30 **Session IV: New methods of investigation**
Session Chair: Michael Swain
- 09:00 – 09:30 CORRELATION OF NANOINDENTATION USING SPHERICAL INDENTERS AND
QBSE IMAGING IN MINERALISED TISSUES
Virginia L. Ferguson, Andrew J. Bushby, Alan Boyde
Queen Mary, University of London, UK
- 09:30 – 10:00 VALIDATION OF A NOVEL APPLICATION OF ACOUSTIC MICROSCOPY TO
QUANTIFY MECHANICALLY IMPORTANT STRUCTURAL PARAMETERS
N.M. Everitt, S. Rehman, S. Johnson, K. McKinlay, D.S. McNally
Nottingham UK
- 10:00 – 10:30 3D ORIENTATION OF MINERAL PARTICLES IN SINGLE OSTEON LAMELLAE
Wolfgang Wagermaier, Himadri S. Gupta, Paul Roschger, Manfred
Burghammer, Peter Fratzl
MPI Potsdam, Germany
- 10:30 – 11:00 Coffee Break
- 11:00 – 11:30 *IN-SITU* MICRO-MECHANICAL TESTING OF BIOLOGICAL MATERIALS
U.G.K. Wegst, S. Orso, E. Arzt
MPI Stuttgart, Germany
- 11:30 – 12:00 NANOINDENTATION OF BONE: COMPARISON OF SPECIMENS TESTED IN
LIQUID AND EMBEDDED IN PMMA
Andrew J. Bushby, Virginia L. Ferguson, Alan Boyde
Queen Mary, University of London, UK
- 12:00 – 12:30 MEASUREMENTS OF LOCAL MECHANICAL PROPERTIES OF HUMAN TEETH IN
A PHYSIOLOGICAL SOLUTION
Thomas Schöberl, Julia Denkmayr, Ingomar Jäger, Peter Fratzl
Eric Schmid Institute, Leoben, Austria
- 12:30 – 14:00 Lunch
- 16:30 – 18:30 Poster Session (with coffee service from 16:30 – 17:00)
- 19:30 – 21:00 Conference Dinner followed by Social Hour

Thursday, September 30, 2004

- 07:30 – 08:45 Breakfast
- 09:00 – 10:20 **Session V: Modelling the strength and toughness of biomaterials**
Session chair: Rizhi Wang
- 09:00 – 09:50 FLAW-TOLERANT BULK AND SURFACE NANOSTRUCTURES OF BIOLOGICAL SYSTEMS
Huajian Gao
Stuttgart, Germany.
- 09:50 – 10:20 COMPUTER SIMULATIONS OF TRABECULAR BONE REMODELING - STUDYING THE INFLUENCE OF DIFFERENT REMODEL LAWS
Markus A. Hartmann, Richard Weinkamer, Yves Brechet, Peter Fratzl
MPI Potsdam, Germany
- 10:20 – 10:50 Coffee break
- 10:50 – 12:30 **Session VI: Biomimetics**
Session Chair: Huajian Gao
- 10:50 – 11:20 MICRO-MECHANICS OF WOOD – STRUCTURE-PROPERTY RELATIONSHIPS AT THE CELL AND CELL WALL LEVEL
Ingo Burgert
Potsdam, Germany
- 11:20 – 11:50 SOLID FREEFORM FABRICATION OF CELLULAR MATERIALS - MECHANICAL PROPERTIES AND NEW PHOTOPOLYMERS
J. Stampfl
Vienna, Austria
- 11:50 – 12:30 FINAL DISCUSSION AND OUTLOOK
Michael Swain, Rizhi Wang, Peter Fratzl
- 12:30 – 14:00 Lunch and departure