

Strategic Workshop

Final Programme

Principles and Development of Bio-inspired Materials

13-15 April 2010 – Vienna, Austria

Chair: Stefanie Tschegg, BOKU - University of Natural Resources and Applied Life Sciences, Vienna, AT

Co-Chair: Robin Seidel, University of Freiburg, DE

Steering Committee:

Francesca Cosmi, Università di Trieste, IT

Rainer Erb, BOKON, DE

George Jeronimidis, University of Reading, UK

Julián Martínez Fernández, Universidad de Sevilla, ES

Thomas Rosenau: BOKU, AT

Lennart Salmen, Innventia, SE

Thomas Speck, University of Freiburg, DE

Sybrand van der Zwaag, Delft University of Technology, NL



DAY 1 – Tuesday 13 April 2010

08:00 *Registration*

09:00 **Opening and welcome addresses**

Martin Gerzabek	Rector, University of Natural Resources and Applied Life Sciences, Vienna, AT
Hartmut Kahlert	Scientific Board, Christian Doppler Research Association (CDG), Vienna, AT Member of the Council of the University of Natural Resources and Applied Life Sciences, Vienna, AT
Andreas Blust	Representative of the Federal Ministry of Transport, Innovation and Technology, AT
Stefanie Tschegg	Professor, University of Natural Resources and Applied Life Sciences, Vienna, AT Chair of Strategic Workshop

10:00 **Introduction to COST European Cooperation in Science and Technology**

10:00 **Caroline Whelan** COST European Cooperation in Science and Technology, BE

10:30 *Coffee Break*

11:00 **Session 1 – Structure-Property Relations**

Chaired by: **George Jeronimidis**, University of Reading, UK

11:00 Robert Ritchie	University of California Berkeley, US Development of bio-inspired ceramic composites
11:30 Peter Fratzl	Max Planck Institute of Colloids and Interfaces, DE Hierarchical nanocomposites and mechanical function – Learning from nature’s materials
12:00 Lorna Gibson	MIT Massachusetts Institute of Technology, US Mechanically efficient cellular microstructures in plants

12:30 **Open Discussion**

13:00 *Lunch*

14:00 **Session 2 – Surfaces and Self-repair**

Chaired by: **Thomas Speck**, University of Freiburg, DE

14:00 Eduard Arzt	INM - Leibniz-Institute for New Materials, DE Bio-inspired adhesive surfaces
14:30 Ernst Wolner	Medical University of Vienna, AT Bioartificial surfaces
15:00 Sybrand van der Zwaag	Delft University of Technology, NL Self healing man-made engineering materials: Bio-inspired but respecting their intrinsic character

15:30 **Open Discussion**

16:00 *Coffee Break*

16:30 **Movie: Nature Tech – How engineers are inspired by nature’s top designs**

Chaired by: **Thomas Rosenau**, University of Natural Resources and Applied Life Sciences, Vienna, AT

Alfred Vendl University of Applied Arts Vienna, AT

17:30 *End of Workshop Sessions*

19:30 *Bus transfer from Hotel Modul to City Hall Vienna*

20:00 *Reception at City Hall Vienna*

DAY 2 – Wednesday 14 April 2010

08:15 *Registration*

08:45 **Session 3 – Nature vs. Man-made**

Chaired by: Francesca Cosmi, Università di Trieste, IT

- 08:45 **Patrick Flammang** University of Mons, BE
COST ACTION TD0908 Marine adhesives: From biology to biomimetics
- 09:15 **Mao See WU** Nanyang Technological University, SG
Challenges and strategies for the mechanical modelling of bio-inspired materials
- 09:45 **David Taylor** Trinity College Dublin, IE
Things that we can't learn from nature
- 10:05 **Helmut Kirchner** INM - Leibniz Institute for New Materials, DE
Are natural materials better than man-made ones?
- 10:25 **Open Discussion**

10:55 *Coffee Break*

11:25 **Session 4 – Composites & Nanomaterials**

Chaired by: Sybrand van der Zwaag, Delft University of Technology, NL

- 11:25 **Dierk Raabe** Max-Planck Institute for Iron Research, DE
Structure, properties, and modeling of the anthropod cuticle: example of lobster Homarus Americanus
- 11:55 **Yuri Estrin** Monash University, AU
Topological interlocking as a materials design concept
- 12:25 **José Pérez-Rigueiro** Universidad Politécnica de Madrid, ES
Bio-inspiration from spider's silks
- 12:45 **Open Discussion**

13:15 *Lunch*

14:15 **Poster Session & Coffee break**

Chaired by: Rainer Erb, BIONIKON, DE

- 14:15 **Camille Carcouet** Eindhoven University of Technology, NL
Nature-inspired superhydrophobic surfaces from raspberry-like particles
- 14:25 **Sebastian Fischer** RWTH Aachen University, DE
Bio-inspired precision-cast structural elements: Development, evaluation and production
- 14:35 **Bjoern Melzer** University of Freiburg, DE
Functionalising the façade: Lessons from English Ivy (Hedera helix L.)
- 14:45 **Individual poster presentations**

16:30 **Session 5: Sensing & Actuation**

Chaired by: Robin Seidel, University of Freiburg, DE

- 16:30 **Cecilia Laschi** Scuola Superiore Sant'Anna, Pisa
Bio-inspiration in robotics: Towards a new generation of soft-bodied robots
- 17:00 **Friedrich Barth** University of Vienna, AT
The biological application of physics in sensory organs
- 17:30 **Viola Vogel** ETH Zurich
Mechanisms how mechanical forces can be exploited to switch function
- 18:00 **Open Discussion**

- 18:30 *End of Workshop Sessions*
 19:40 *Bus transfer from Hotel Modul to Heuriger Restaurant am Pfarrplatz*
 20:00 *Workshop Dinner*

DAY 3 – Thursday 15 April 2010

- 08:30 *Registration*
- 09:00 Session 6 – International Cooperation**
 Chaired by: **Caroline Whelan**, COST Office, BE
- 09:00 **Catherine Foley** CSIRO Materials Science and Engineering, AU
CSIRO's research activities
- 09:20 **Kathryn McGrath** MacDiarmid Institute, Victoria University of Wellington, NZ
Learning from biomineralisation
- 09:40 **Francois Prinsloo** ESASTAP European - South African Scientific and Technological Advancement Programme
European/South African cooperation in scientific and technical research
- 10:00 **Open Discussion**
- 10:30 *Coffee Break*
- 11:00 Session 7 – Cellular Materials**
 Chaired by: **Lennart Salmen**, Innventia, SE
- 11:00 **Ming Dao** MIT Massachusetts Institute of Technology, US
Cell mechanics and human diseases
- 11:30 **Yasumitsu Uraki** Hokkaido University, JP
Fabrication of honeycomb-patterned cellulose material mimicking woody cell wall formation
- 11:50 **Stefanie Tschegg,** University of Natural Resources and Applied Life Sciences, Vienna, AT
Thomas Rosenau
Falk Liebner
Wood as a bio-inspiration material
- 12:10 **Open Discussion**
- 12:40 *Lunch Break*
- 13:40 Session 8 – Bio-resorbable & Applications**
 Chaired by: **Julian Martinez Fernandez**, Universidad de Sevilla, ES
- 13:40 **Takuya Kitaoka** Kyushu University, JP
Synthesis and bio-applications of carbohydrate-gold nanoparticle conjugates
- 14:10 **Anja Haenzi** ETH Zurich, CH
Magnesium-alloys for bio-resorbable implants
- 14:30 **Loredana Moimas** Inion Oy, FI
Development of three-dimensional porous bioactive glass scaffolds, from bench testing to clinical investigation
- 14:50 **Open Discussion**
- 15:20 Closing Remarks**
- 15:30 *Coffee Break*
- 16:00 *End of Workshop*