4th Euro

Bio-inspired Materials 2018

International School and Conference on Biological Materials Science

19 - 22 March 2018
Potsdam, Germany

Programme

https://bioinspired2018.dgm.de
Dear participants, colleagues and partners of the Bio-inspired 2018,

The focus of this 4th biennial conference is on the design of functional materials and systems inspired by principles found in living nature. The main aim is to establish an international and interdisciplinary forum for scientists from a variety of fields including biology, chemistry, materials science and engineering, physics and medicine to discuss current research and to identify future research directions in the field of bioinspired materials. Main topics include the formation, hierarchical structure and the properties of complex-shaped biological materials. Furthermore, contributions are invited dealing with propulsion and movement of biological objects.

The transfer of biological principles onto functional materials and systems made of organic and/or inorganic components represents a further main area, which is covered by this conference. Beside materials synthesis and formation, the conference topics also include research on the functional and mechanical properties thereof. Both experimental studies and theoretical modelling shall be considered. Furthermore, the interaction of bioinspired materials with living environments, e.g. tissues and organs, related to medical aspects and applications fit within the scope of this conference.

In addition to invited plenary lectures, the conference encompasses oral and poster presentations. Moreover, contributions related to the Priority Program 1569 (Generation of Multifunctional Inorganic Materials by Molecular Bionics) of the Deutsche Forschungsgemeinschaft will be included.

We look forward to seeing you in Potsdam!

J. Bill  
University of Stuttgart, Germany  
Chairman

P. Fratzl  
Max Planck Institute of Colloids and Interfaces, Potsdam-Golm, Germany  
Co-Chairman

T. Scheibel  
University of Bayreuth, Germany  
Co-Chairman
Conference Location
Kongresshotel Potsdam
Am Luftschiffhafen 1
14471 Potsdam (Germany)
www.kongresshotel-potsdam.com

Conference Chairs
Joachim Bill
Chairman
University of Stuttgart
(Germany)

Peter Fritzl
Co-Chairman
Max Planck Institute of Colloids and Interfaces, Potsdam-Golm
(Germany)

Thomas Scheibel
Co-Chairman
University of Bayreuth
(Germany)

Conference Fees
Young Researchers up to 30 years
DGM-members 250 EUR
DGM-basic members 280 EUR
Non-members 310 EUR

Expert Researchers 31-40 years
DGM-members 450 EUR
DGM-basic members 500 EUR
Non-members 560 EUR

Professionals University
DGM-members 600 EUR
DGM-basic members 650 EUR
Non-members 710 EUR

Industry
DGM-members 800 EUR
DGM-basic members 860 EUR
Non-members 900 EUR

Self paid Dinner Monday and Tuesday!
Dinner will be available on the 19th and 21st of March and has to be paid separately. Participants who are hotel guests, can add the costs to their hotel bill. Participants who do not stay at the hotel will have the possibility to pay in cash at the hotel restaurant.

Conference Dinner
On Wednesday 21st March 2018 all participants are invited to take part in the conference dinner at the Historische Mühle Potsdam. A bus transfer is organized at 19:30.

Poster Discussion Evening
The poster discussion evenings take place on Monday and Tuesday. Both will start after the last lecture session at about 21:00. They will give poster authors the opportunity to be available in front of their posters to discuss their subjects and respond to questions. Snacks and beverages will be offered.

Poster Award
The best three posters will be awarded a prize. The winners will be identified by a jury. The prizes will be announced on Wednesday evening during the conference dinner.

The conference fee includes Admittance to the scientific programme, coffee breaks, lunch buffet snacks and drinks during the poster discussion and the conference dinner.

Conference Language
The official conference language will be English.

Internet Access
It is possible to get a wireless access via the Kongresshotel.

General Information
Program Committee

J. Bill
University of Stuttgart (Germany)

Z. Burghard
University of Stuttgart (Germany)

H. Colten
University of Konstanz (Germany)

M. Eder
Max Planck Institute of Colloids and Interfaces, Potsdam-Golm (Germany)

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F. Marin
University of Bourgogne, Dijon (France)

O. Paris
University of Leoben (Austria)
### Overview Monday & Tuesday

**Monday 19 March 2018**
- **08:00** Conference Registration
- **09:00** Authors set up
- **10:00** Keynote Lecture: H. Lichtenegger
- **11:00** Coffee Break
- **12:00** Lunch Break
- **13:00** Opening Address
- **13:20** Keynote Lecture: A. del Campo Bécares
- **14:00** Lecture ID 48
- **14:20** Lecture ID 50
- **14:40** Lecture ID 63
- **15:00** Lecture ID 76
- **15:20** Coffee Break
- **15:40** Lecture ID 17
- **16:00** Lecture ID 117
- **16:40** Lecture ID 88
- **17:00** Lecture ID 41
- **17:20** Lecture ID 94
- **17:40** Lecture ID 97
- **18:00** Lecture ID 27
- **18:20** Lecture ID 108
- **18:40** Dinner (self paid)
- **20:00** Short Lecture Poster No. 75 / 100 / 85
- **20:20** Short Lecture Poster No. 64 / 66 / 101
- **20:40** Short Lecture Poster No. 112 / 90 / 19
- **21:00-23:00** Poster Discussion Evening

**Tuesday 20 March 2018**
- **08:00** Authors set up
- **09:00** Keynote Lecture: A. del Campo Bécares
- **09:40** Lecture ID 6
- **10:00** Lecture ID 95
- **10:20** Lecture ID 72
- **10:40** Lecture ID 102
- **11:00** Coffee Break
- **11:40** Lecture ID 79
- **12:00** Lecture ID 57
- **12:20** Lecture ID 68
- **12:40** Lecture ID 114
- **13:00** Poster Discussion
- **15:20** Coffee Break
- **16:00** Lecture ID 99
- **16:20** Lecture ID 107
- **16:40** Lecture ID 20
- **17:00** Lecture ID 80
- **17:20** Lecture ID 45
- **17:40** Lecture ID 60
- **18:00** Lecture ID 62
- **18:20** Lecture ID 44
- **18:40** Dinner (self paid)
- **20:00** Short Lecture Poster No. 56 / 35 / 81
- **20:20** Short Lecture Poster No. 52 / 91 / 15
- **20:40** Short Lecture Poster No. 43 / 87 / 98
- **21:00-23:00** Poster Discussion Evening

### Overview Wednesday & Thursday

**Wednesday 21 March 2018**
- **08:00** Authors set up
- **09:00** Keynote Lecture: N. Kotov
- **09:40** Lecture ID 14
- **10:00** Lecture ID 9
- **10:20** Lecture ID 32
- **10:40** Lecture ID 51
- **11:00** Lecture ID 21
- **11:20** Lecture ID 76
- **11:40** Coffee Break
- **12:00** Lecture ID 79
- **12:20** Lecture ID 57
- **12:40** Lecture ID 68
- **13:00** Lunch Break
- **13:20** Poster Discussion
- **15:20** Coffee Break
- **16:00** Lecture ID 99
- **16:20** Lecture ID 107
- **16:40** Lecture ID 20
- **17:00** Lecture ID 80
- **17:20** Lecture ID 45
- **17:40** Lecture ID 60
- **18:00** Lecture ID 62
- **18:20** Lecture ID 44
- **18:40** Dinner (self paid)
- **20:00** Conference Dinner

**Thursday 22 March 2018**
- **08:00** Authors set up
- **09:00** Keynote Lecture: S. Sasso
- **09:40** Lecture ID 123
- **10:00** Lecture ID 25
- **10:20** Lecture ID 103
- **10:40** Lecture ID 106
- **11:00** Coffee Break
- **11:40** Lecture ID 39
- **12:00** Lecture ID 40
- **12:20** Lecture ID 34
- **12:40** Lecture ID 22
- **13:00** Lecture ID 28
- **13:20** Lecture ID 113
- **13:40** Lecture ID 121
- **14:00** Closing Remarks
- **14:20** End of the Conference

**Special Session “Gender in Research and Innovation”**
- **16:00** Keynote Lecture: T. Brage
- **16:40** Lecture ID 155
- **17:30** End of the 3rd day
- **19:30** Bus transfer to the „Historische Mühle Potsdam“
- **20:00** Conference Dinner

09.03.2018 - The programme may be subject to alterations
### Lectures Monday 19 March 2018 (08:00 - 15:00)

<table>
<thead>
<tr>
<th>Time</th>
<th>ID</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00</td>
<td></td>
<td>Registration / Poster set up / Authors set up</td>
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<tr>
<td>Room</td>
<td>Kongress-Saal</td>
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<tr>
<td>13:00</td>
<td></td>
<td>Opening Address</td>
<td>J. Bill., University of Stuttgart (Germany)</td>
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<td>Room</td>
<td>Kongress-Saal</td>
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<tr>
<td>Keynote Lecture</td>
<td>Chair: P. Fratzl, Max Planck Institute of Colloids and Interfaces, Potsdam-Golm (Germany)</td>
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<tr>
<td>13:20</td>
<td>ID 82</td>
<td>The inner crystal beauty of biological and bio-inspired materials</td>
<td>H. Lichtenegger (Sp), University of Natural Resources and Life Sciences (Austria)</td>
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<tr>
<td></td>
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<td>Due to the well-controlled synthesis conditions and directional</td>
<td>Template in biological materials the crystal structure and crystallographic orientation of</td>
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<td>templating in biological materials the crystal structure and</td>
<td>their components are exquisitely controlled and often intricately organized to give</td>
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<td>crystallographic orientation of their</td>
<td>the materials their outstanding properties.</td>
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<tr>
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<td>components are exquisitely controlled and often intricately</td>
<td>In this talk I will present some examples ranging from teeth to morphologically</td>
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<td>organized to give the materials their outstanding</td>
<td>intriguing bio-inspired mineral structures and show how to reveal their inner</td>
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<td>properties.</td>
<td>structure by state of the art x-ray diffraction methods.</td>
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<td>14:00</td>
<td>ID 48</td>
<td>Shark teeth: Successful in the evolution and unchanged over</td>
<td>M. Eppe (Sp), J. Enax, K. Loza, A. Luebke, O. Prymak, University of Duisburg-Essen (Germany);</td>
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<td></td>
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<td>millions of years</td>
<td>H.-O. Fabritius, D. Raabe, Max-Planck-Institut für Eisenforschung GmbH (Germany); R. Patnaik,</td>
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<td>Panjab University (India); P. Gaengler, Witten/Herdecke University (Germany)</td>
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<td>The byssus of Pinnidae and Pteriidae mussels: a new paradigm in</td>
<td>D. Pasche (Sp), P. Fratzl, Max Planck Institute of Colloids and Interfaces, Potsdam-Golm</td>
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<td>protein fibers</td>
<td>(Germany); J.M. Choi, D.S. Hwang, Pohang University of Science and Technology (South Korea); G.</td>
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<td>Falini, Alma Mater Studiorum – Università di Bologna (Italy); M.J. Harrington, McGill</td>
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<td>University (Canada)</td>
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<td>Structural organization and dynamic phase transformations of the</td>
<td>B. Wu (Sp), Heinz Maier-Leibnitz Zentrum (Germany); H. Cölfen, C. Debus, University of</td>
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<td></td>
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<td>ultra-hard magnetic biominerals in chiton radula teeth</td>
<td>Konstanz (Germany); D. Faivre, Max Planck Institute of Colloids and Interfaces, Potsdam-Golm (</td>
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<td>Germany); D. Schwahn, Technical University of Munich (Germany); D. Zahn, Friedrich-Alexander-</td>
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<td>Universität Erlangen-Nürnberg (FAU) (Germany); V. Pipich, Forschungszentrum Jülich GmbH (Germany)</td>
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### Lectures Monday 19 March 2018 (15:00 - 18:40)

<table>
<thead>
<tr>
<th>Time</th>
<th>ID</th>
<th>Title</th>
<th>Authors</th>
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<tr>
<td>15:00</td>
<td></td>
<td>Hierarchical organization of mesocarp of Brazil nut (Bertholletia excelsa)</td>
<td>M. Sonego (Sp), L.A. Pessan, Federal University of Sao Carlos (Germany); C. Fleck, Technische</td>
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<td>Universität Berlin (Germany)</td>
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<tr>
<td>15:20</td>
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<td>Coffee Break</td>
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<td>Room</td>
<td>Kongress-Saal</td>
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<tr>
<td>Keynote Lecture</td>
<td>Chair: H. Cölfen, University of Konstanz (Germany)</td>
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<td>16:00</td>
<td>ID 17</td>
<td>Anti-icing approach inspired from penguin’s feather structure</td>
<td>N. Thanh-Binh (Sp), University of Science and Technology (South Korea); H. Lim, Korea Institute</td>
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<td>of Machinery and Materials/University of Science and Technology - Korea (South Korea)</td>
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<td>16:20</td>
<td>ID 117</td>
<td>Up-Scaling of Sea Urchin Spines without volume effect?</td>
<td>C. Lauer (Sp), G. Buck, K. Mück, K.G. Nickel, I. Zutterkirch, University of Tübingen (Germany)</td>
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<tr>
<td>16:40</td>
<td>ID 88</td>
<td>Nondestructive, three-dimensional (3D) visualization of the internal</td>
<td>I. Zglobicka (Sp), M. Plocinska, Warsaw University of Technology (Poland); J. Gluch, Q. Li, E.</td>
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<td>structure of diatom frustule</td>
<td>Zschech, Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Dresden (Germany); A. Wirkowski, University of Szczecin (Poland); K.J. Kurzydloowski, Bialystok University of Technology (Poland)</td>
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<tr>
<td>17:00</td>
<td>ID 41</td>
<td>Highly Porous Cuttlebone-like V2OS Scaffolds</td>
<td>Z. Burghard (Sp), J. Bill, A. Knöll, University of Stuttgart (Germany)</td>
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<td>17:20</td>
<td>ID 94</td>
<td>Modified Diatom Biosilica for Catalytic Applications</td>
<td>N. Pytlik (Sp), E. Kumari (SP), E. Brunner, C. Fischer, N. Kröger, Technische Universität</td>
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<td>Dresden (Germany)</td>
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<td>17:40</td>
<td>ID 97</td>
<td>Tuning the self-assembly of bulk supercrystalline biomimetic</td>
<td>B. Domenech (Sp), D. Benke, B. Bor, D. Giuntini, G.A. Schneider, Hamburg University of Technology</td>
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<td>materials with enhanced mechanical properties</td>
<td>(Germany)</td>
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<tr>
<td>18:00</td>
<td>ID 27</td>
<td>Common Principles in Synthetic Mechanophores and Mechanoresponsive</td>
<td>K. Blank (Sp), Max Planck Institute of Colloids and Interfaces, Potsdam-Golm (Germany)</td>
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<td>Biomolecules</td>
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<td>18:20</td>
<td>ID 108</td>
<td>Hierarchical organization in porous silica: Shear induced alignment and 3D printing</td>
<td>F. Putz (Sp), M. Elsässer, N. Hüsing, S. Scherer, Paris Lodron University of Salzburg (Austria); C. Balzer, S. Braxmeier, G. Reichenauer, Bavarian Center for Applied Energy Research (Germany); L. Ludescher, R. Morak, O. Paris, Montanuniversität Leoben (Austria)</td>
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<tr>
<td>18:40</td>
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<td>Dinner (self paid)</td>
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Short Poster Lectures Monday 19 March 2018

Room: Kongress-Saal

Chair: G. Santomauro, University of Stuttgart (Germany)

20:00 PO 75 Short Poster Lecture
Design and development of functional silica based glassy bioactive materials with antibacterial properties
I. Gonzalo de Juan (Sp), Technische Universität Darmstadt (Germany)

PO 100 Short Poster Lecture
Mechanical properties and constitutive behavior of 3-D supercrystalline nanocomposites
B. Bor (Sp), D. Benke, B. Domenech, D. Giuntini, G.A. Schneider, Hamburg University of Technology (Germany)

PO 85 Short Poster Lecture
Bio-inspired hierarchical composite based on carbon nanotube fibers and study on the interphases
X. Sui (Sp), H. Cohen, I. Greenfeld, H.D. Wagner, Weizmann Institute of Science, Rehovot (Israel); Q. Li, X. Zhang, Suzhou Institute of Nano-Tech and Nano-Bionics (China)

20:20 PO 109 Short Poster Lecture
Development and characterization of polydopamine coating on different surfaces
R. Tejido-Rastrilla (Sp), G. Baldi, Colorobbia Consulting s.r.l. (Italy); A.R. Boccaccini, R. Detsch, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) (Germany); C. Balagna, S. Ferraris, M. Miola, S. Spriano, Politecnico di Torino (Italy); D. Santella, S. Antonia, Thales Alenia Space – Italy S.p.A (Italy)

PO 66 Short Poster Lecture
Dual crosslinked alginate hydrogels with patterned mechanical properties and biomolecule presentation
A. Lueckgen (Sp), G.N. Duda, D.S. Garske, Charité Berlin (Germany); R.M. Desai, D.J. Mooney, Harvard University, Cambridge (USA); A. Cipitria, P. Fratzl, Max Planck Institute of Colloids and Interfaces, Potsdam-Golm (Germany)

PO 101 Short Poster Lecture
Nanostructure and mechanical properties of hair due to colour treatment
A. Müllner (Sp), H. Peterlik, TU Wien (Austria); D. Brandhuber, LIM Cosmetics GmbH (Austria)

20:40 PO 112 Short Poster Lecture
Lightweight, Mechanically Robust and Dual-Porous Silsesquioxane/Silk Fibroin-based Composite Aerogel Scaffolds for Bone Tissue Engineering
H. Maleki (Sp), N. Huesing, Paris Lodron University of Salzburg (Austria)

PO 90 Short Poster Lecture
Bio-inspired polymeric surfaces with controllable underwater adhesion properties
U. Sidoli (Sp), J. Mühlendorfer, I. Raguzin, A. Synytska, Leibniz Institute of Polymer Research Dresden IPF (Germany)

PO 19 Short Poster Lecture
3D printed PLA scaffolds for the mineralization of calcium phosphate
M. Schneider (Sp), C. Günter, A. Taubert, University of Potsdam (Germany)

21:00 Poster Discussion Evening

23:00 End of 1st conference day
Lectures Tuesday 20 March 2018 (09:00 - 12:40)

Room: Kongress-Saal

Keynote Lecture
Chair: T. Scheibel, University of Bayreuth (Germany)

09:00 ID 130 Optoregulated biomaterials
A. del Campo Bécares (Sp), INM Leibniz Institute for New Materials, Saarbrücken (Germany)

Living tissues undergo adaptive property changes during their lifetime or in response to external factors. In part, these changes are realized by embedded cells in form of active remodeling of their surrounding matrix, and interpreted by other cells in form of potent matrix-mediated regulatory signals. In order to recreate the characteristic evolutionary and adaptive character of natural tissues into modern man-made biomaterials, novel approaches to in situ regulate cell-material interactions and remodeling are necessary. This lecture will present light-triggers and optogenetic approaches for this purpose.

09:40 ID 6 A slippery slope: repellent surface coatings inspired by the Pitcher plant
N. Vogel (Sp), Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) (Germany)

10:00 ID 95 Bio-modification of Wood for an Advanced Application in Water Treatment
C. Goldhahn (Sp), I. Burgert, M. Chanana, M. Janser, ETH Zürich (Switzerland)

10:20 ID 72 Wood Composite Materials with Bioinspired Wettability Patterns Prepared by Selective Modification of a 3D Wood Scaffold
Y. Wang (Sp), E. Cabane, T. Tian, ETH Zürich (Switzerland)

10:40 ID 102 Engineering nanocellulose composites for increased toughness
M. Linder (Sp), P. Mohammad, Aalto University (Finland)

11:00 Coffee Break

Room: Kongress-Saal

Chair: C. Fleck, Technical University Berlin (Germany)

11:40 ID 79 Densified cellulose materials – superior performance by retaining the hierarchical structure of wood
M. Frey (Sp), I. Burgert, K. Casdorff, T. Keplinger, D. Widner, ETH Zürich (Switzerland)

12:00 ID 28 4D Biofabrication by Shape-Morphing Polymers
L. Ionov (Sp), University of Bayreuth (Germany)

12:20 ID 68 The crystallographic texture in biological skeletal materials and their relationship with their mechanical properties
A. Al Sawalmih (Sp), University of Jordan, Amman (Jordan)

Lectures Tuesday 20 March 2018 (12:40 - 18:40)

12:40 ID 114 Advanced synchrotron X-ray methods to understand the behaviour of biomaterials
T. Gruenewald (Sp), M. Burghammer, European Synchrotron Radiation Facility ESRF, Grenoble (France); A. Weinberg, Medical University of Graz (Austria); H. Lichtenegger, University of Natural Resources and Life Sciences, Vienna (Austria)

13:00 Lunch Break

13:40 Poster Discussion

15:20 Coffee Break

Room: Kongress-Saal

Chair: A. del Campo Bécares, INM Leibniz Institute for New Materials, Saarbrücken (Germany)

16:00 ID 99 Nacre-inspired toughening of photopolymers by 3D-printing
S. Baumgartner (Sp), J. Stampfl, TU Wien (Austria)

16:20 ID 107 Bio-Inspired Hybrid Structures with Enhanced Mechanical Performance Based on Topological Interlocking Geometry
Y. Estrin (Sp), L. Djumas, A. Molotnikov, G. Simon, Monash University (Australia)

16:40 ID 20 An unforeseen class of functionally graded materials improves damage and stress tolerance of a nacre-inspired bivalve shell
S. Wolf (Sp), C.F. Bühm, J. Harris, B. Meule, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) (Germany); L.N. Hansen, D. Wallis, University of Oxford (United Kingdom); F. Marin, Université de Bourgogne Franche-Comté, Dijon (France)

17:00 ID 80 Nano-indentation analysis of bio-composites in the vicinity of confined interfaces
Y. Shelef (Sp), B. Bar-On, Ben-Gurion University of the Negev, Beer-Sheva (Israel)

17:20 ID 45 Spinning of hierarchical hybrid fibers: bioinspired colloidal assembly
T. Kraus (Sp), D. Gerstner, L. González-Garcia, J.H.M. Maurer, B. Reiser, INM Leibniz Institute for New Materials, Saarbrücken (Germany)

17:40 ID 60 Bioinspired green biopolymers for fine dust filter applications
H. Bargel (Sp), S. Jokisch, M. Neuenfeldt, T. Scheibel, University of Bayreuth (Germany)

18:00 ID 62 Recombinant spider silk-based hydrogels as prolonged delivery system for therapeutic biologicals
S. Kumari (Sp), E. Desimone, G. Lang, T. Scheibel, University of Bayreuth (Germany); S. Lücker, Universitätsklinikum Gießen und Marburg GmbH, Gießen (Germany)

18:20 ID 44 Hybrid spider silk nanostructures
M. Humenik (Sp), T. Scheibel, University of Bayreuth (Germany)

18:40 Dinner (self paid)
**Short Poster Lectures Tuesday 20 March 2018**

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<td>Chair</td>
<td>M. Eder, Max Planck Institute of Colloids and Interfaces, Potsdam-Golm (Germany)</td>
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**20:00**

**PO 56**  
*Short Poster Lecture*  
Bio-inspired interphases for improved fibre/matrix adhesion and tensile properties of cellulose fibre-reinforced composites  
N. Graupner (Sp), J. Müssig, Hochschule Bremen - University of Applied Sciences (Germany)

**PO 35**  
*Short Poster Lecture*  
Mineralization of iron oxide induced by ferritin subunits immobilized on SiO2 nanoparticles  
M. Maas (Sp), University of Bremen (Germany); D. Carmona, L. Colombi Ciacchi, S. Lid, K. Rezwan, University of Bremen (Germany); L. Treccani, Petroceramics S.p.A. (Italy)

**PO 81**  
*Short Poster Lecture*  
Transmission electron microscopy on tobacco mosaic viruses and its heterostructures with ZnO  
F. Börmert (Sp), U. Kaiser, J. Renner, Ulm University (Germany)

**20:20**

**PO 52**  
*Short Poster Lecture*  
Reinforcing coiled coil building blocks with histidine-metal coordination  
I. Tunn (Sp), K. Blank, Max Planck Institute of Colloids and Interfaces (Germany); M.J. Harrington, Max Planck Institute of Colloids and Interfaces, Potsdam-Golm (Germany) / McGill University, Quebec (Canada)

**PO 91**  
*Short Poster Lecture*  
Diatom Biosilica and Carbon Replica Materials in the Adsorption of Heavy Metals  
C. Oschatz (Sp), M. Oschatz, Max Planck Institute of Colloids and Interfaces, Potsdam-Golm (Germany); R. Steudtner, Helmholtz-Zentrum Dresden-Rossendorf (Germany); E. Brunner, K.K.K. Kammerlander, S. Kaskel, L. Köhler, Technische Universität Dresden (Germany)

**PO 15**  
*Short Poster Lecture*  
Development of Gallium binding peptides using Phage Display Technology  
N. Schönberger (Sp), R. Braun, F. Lederer, S. Matys, K. Pollmann, Helmholtz-Zentrum Dresden-Rossendorf (Germany)

**21:00**  
Poster Discussion Evening

**23:00**  
End of 2nd conference day

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**Short Poster Lecture Tuesday 20 March 2018**

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<td>20:40</td>
<td>Short Poster Lecture</td>
<td>The hygroscopic movement in the seed dispersal units of wild oats (Avena sterilis)</td>
<td>T. Lindtner (Sp), Humboldt-Universität zu Berlin (Germany)</td>
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<td>20:40</td>
<td>Short Poster Lecture</td>
<td>3D templates from helically coiled elastomeric fibers mimicking heart tissue structure</td>
<td>M. El Fray (Sp), M. Michon, R. Sahay, P. Sobolewski, K. Stepień, A. Wcislo, West Pomeranian University of Technology, Szczecin (Poland)</td>
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<td>Short Poster Lecture</td>
<td>Processing of bulk supercrystalline nacre-mimetics with enhanced mechanical properties</td>
<td>D. Giuntini (Sp), D. Benke, B. Bor, B. Domenech, G.A. Schneider, Hamburg University of Technology (Germany)</td>
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**Time Table**

- **20:00**
  - PO 56: Bio-inspired interphases for improved fibre/matrix adhesion and tensile properties of cellulose fibre-reinforced composites
  - PO 35: Mineralization of iron oxide induced by ferritin subunits immobilized on SiO2 nanoparticles
  - PO 81: Transmission electron microscopy on tobacco mosaic viruses and its heterostructures with ZnO

- **20:20**
  - PO 52: Reinforcing coiled coil building blocks with histidine-metal coordination
  - PO 91: Diatom Biosilica and Carbon Replica Materials in the Adsorption of Heavy Metals
  - PO 15: Development of Gallium binding peptides using Phage Display Technology

- **21:00**
  - Poster Discussion Evening

- **23:00**
  - End of 2nd conference day
Inorganic nanoparticles (NPs) have the ability to self-organize into variety of structures. Analysis of experimental data for different types of NPs indicates a general trend of self-assembly under a wider range of conditions and having broader structural variability than self-assembling units from organic and biological matter. Remarkably, the internal organization of self-assembled NP systems rival in complexity to those found in some cellular organelles (Figure 1) which reflects the biomimetic behavior of inorganic NPs. The following questions will be addressed:

What are the differences and similarities of NP self-organization compared with similar phenomena involving organic and biological building blocks?
What are the forces and related theoretical assumptions essential for NP interactions?
What is the significance of NP self-assembly for understanding emergence of life?
What are the technological opportunities of NP self-organization?
Self-organization of chiral nanostructures will illustrate the importance of subtle anisotropies and their cumulative effects on from collective behavior of NPs and non-additivity of their interactions. The fundamental significance of studies in this area from this and other groups will be discussed in relation to the origin of homochirality on Earth and spontaneous compartmentalization (protocells). The practical significance of NP self-organization will be demonstrated in relation to charge storage technologies, DNA/protein biosensing, chiral catalysis, and polarization-based optical devices using, for instance chiromagnetic optical modulation.
What does Gender have to do with Physics?
T. Brage (Sp), Lund University (Sweden)

Physics is often seen, by Physicists not the least, as an objective Science and we believe we are surrounded by a “culture without culture”. At the same time our history, class- and board rooms are dominated by men. This is a clear paradox that should awaken the curiosity of anyone. In this talk I will give some examples on how you can approach the question on “what does gender have to do with Physics”. There have been several studies of Physicists and I will combine a discussion of these with some general theory and personal experiences, to paint a picture on how gender transgress Physics, like all other fields. By using the three levels of change introduced by Schiebinger, I refer to studies of e.g. Anthropologists and Psychologists. The bias against women, due to the fact that Physics is stereotypically male, combined with the “myth of meritocracy” could be one key to understand the lack of women in the field. The talk is intended as a translation of results from recent progress in Gender Science to an audience of non-experts in the field, especially people within STEM-fields. The aim is to give some answers to the question in the title, but also to show that this is an extremely interesting and active research field.

How to avoid bias in artefacts? Approaches to technology design and innovation
C. Bath, Technische Universität Braunschweig (Germany)

Durable algal biopolymers
S. Sasso (Sp), Friedrich Schiller University Jena (Germany)

Aquatic photosynthetic organisms, which primarily comprise eukaryotic microalgae and cyanobacteria, account for approximately half of the carbon fixation on earth. Some microalgae are endosymbionts of corals, whereas others cause toxic blooms with far-reaching effects on ecosystems and human health. Yet other microalgae thrive in extreme environments such as hot springs, polar ice or alpine snow fields.

In my talk, I will discuss selected cellular processes in microalgae that have the potential for biotechnological applications, with the main focus on Chlamydomonas reinhardtii. C. reinhardtii is a motile, unicellular green alga from soil and fresh water, and it has served as a model organism for more than 60 years. With the help of two anterior flagella, C. reinhardtii seeks out optimal light conditions by phototaxis. Light is detected by an array of photoreceptors, which regulate various steps of the algal life cycle. We recently discovered that an antagonistic soil bacterium, Pseudomonas protegens secretes secondary metabolites that induce a cytosolic calcium signal and deflagellation of the algal cells.

Under adverse environmental conditions, haploid gametes of C. reinhardtii (and many other microalgae) will fuse to form diploid zygotes. Over the course of several days, zygotes develop into dormant, highly resistant zygospores with the ability to survive unfavourable conditions for decades. Among other transformations occurring during zygospore development, zygospores form a durable, multilayered cell wall. While this cell wall protects the dormant cell against a variety of stresses such as desiccation, it still allows the cell to perceive the surrounding environment. Once the conditions improve, algal zygospores are able to sense, for example, an increase in nutrient concentrations to induce a germination program. As a result, the zygospore undergoes meiosis, and four haploid cells are released by degradation of the protective zygospore wall. Considering that some algal cell wall polymers are found in million year-old microfossils, the durable biopolymers produced by zygospores are potentially interesting for bioengineering.
Posters Monday 19 - Thursday 22 March 2018

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<td>PO 12</td>
<td>Plant Biomimetics: Surface-Structured Pollen Particles and Transparent Flower Petals</td>
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<td>PO 13</td>
<td>Micro-Ikebana by Biomimetic Crystallization of Alkaline Earth Carbonates</td>
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<td>PO 18</td>
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<td>PO 23</td>
<td>Structural optimization of biopolymer composite Cotton by variation of manufacturing parameters</td>
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<td>Light guided 3D-structuring of EPS produced by red algae</td>
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<td>PO 26</td>
<td>Coupling of polymers to tobacco mosaic virus: towards the production of amphiphilic virus tubes</td>
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<td>PO 29</td>
<td>Reagent-free modification of bio-hydrogels by electron irradiation towards biomedical applications</td>
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<td>PO 33</td>
<td>Mechanical stable sulfobetaine Hydrogels - A candidate for biomedical application</td>
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<td>Structuring V2OS Nanocomposites to Adapt the Sponge Spicules’ Architecture</td>
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<td>Cuttlebone-inspired Structures for Mechanical Damping</td>
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<td>PO 46</td>
<td>Multifunctional Layered Magnetic Composites</td>
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Lectures Thursday 22 March 2018 (10:20 - 14:20)

10:20  ID 103 Inchworm-inspired light-driven soft robot based on asymmetric friction
L. Xue (Sp), S. Liu, D. Tan, X. Wang, Z. Wang, Z. Wu, X. Xu, H. Yiu, D. Zhang, Wuhun University (China); A. del Campo Bécares, Leibniz Institute for New Materials INM, Saarbrücken (Germany)

10:40  ID 106 Plants in motion - How fire triggers opening in Banksia seed pods
J. Huss (Sp), M. Eder, P. Fratzl, Max Planck Institute of Colloids and Interfaces, Potsdam-Golm (Germany); D. Merritt, Botanic Gardens and Parks Authority (Australia)

11:00  Coffee Break

H. Gliemann (Sp), F. Farajollahi, Karlsruhe Institute of Technology (KIT) (Germany); K. Altintoprak, C. Wege, University of Stuttgart (Germany); O. Marti, A. Plett, A. Seidenstücker, P. Walther, P. Ziemann, Ulm University (Germany)

12:00  ID 40 ‘Viropore-Membranes’ - Talk II: Multifunctional plant virus-based nanopore-adapters for bionically ‘self-sealing’ high-performance bio-inorganic hybrid membranes
C. Wege (Sp), K. Altintoprak, University of Stuttgart (Germany); F. Farajollahi, H. Gliemann, Karlsruhe Institute of Technology (KIT) (Germany); O. Marti, A. Plett, A. Seidenstücker, P. Walther, P. Ziemann, Ulm University (Germany)

12:20  ID 34 Functional Nanostructured Hybrid Materials based on M13 phages
S. Kilper (Sp), J. Bill, Z. Burghard, D. Rothenstein, University of Stuttgart (Germany)

12:40  ID 22 Influence of process-related anisotropy on the fatigue behavior of the biopolymer composite Cotton
R. Scholz (Sp), F. Walther, TU Dortmund University (Germany); M. Langhans, C. Zollfrank, Technical University of Munich (Germany)

13:00  ID 57 Diffusion driven self-assembly of cellulose towards anisotropic aerogels
H. Renzhofer (Sp), H. Lichtenegger, F. Liebner, S. Plappert, University of Natural Resources and Life Sciences, Vienna (Austria)

13:20  ID 113 Mechanosensation through radicals in tensed collagen
C. Zapp (Sp), C. Daday, F. Gräter, A. Obarska-Kosinska, Heidelberg Institute for Theoretical Studies HITS gGmbH (Germany); R. Kapp, Saarland University Medical Center (Germany)

13:40  ID 121 Bioprospecting of modular protein-based mecano-structural elements for the defined construction of functional cellular environments and the creation of 3D processed biomaterial systems
S. Schiller (Sp), University of Freiburg (Germany)

14:00  Closing Remarks

14:20  End of 4th Euro Bio-inspired Materials
Growing bone-like tissues on negative Gaussian curvature surfaces
J. Dunlop (Sp), Paris Lodron University of Salzburg (Austria); P. Fratzl, K. Kommareddy, C. Bidan, S. Ehrig, K. Lam, C. Mueller, A. West, Max Planck Institute of Colloids and Interfaces, Potsdam-Golm (Germany); P. Tomcanak, Max Planck Institute of Molecular Cell Biology and Genetics, Dresden (Germany); P. Kollmannsberger, University of Würzburg (Germany); A. Petersen, Charité Berlin (Germany)

Cancer cells biomineralize ionic gold into nanoparticles-microplates via secreting defense proteins with specific gold-binding peptides
A.V. Singh (Sp), Max Planck Institute for Intelligent Systems, Stuttgart (Germany)

Damping behaviour of Bioinspired and natural fibre composites
W. Woigk (Sp), ETH Zurich (Switzerland); K. Masania, A. Studart, ETH Zürich (Switzerland); A.V. Singh (Sp), Max Planck Institute for Intelligent Systems, Stuttgart (Germany)

Transfer of surface properties of wheat leaves to technical surfaces
M. Huth (Sp), A. Huth, K. Koch, Hochschule-Rhein-Waak, Klevé (Germany)

Gradient porous materials for reliable structured adhesives
D. Tan (Sp), L. Xue, Wuhan University (China)

The fibrillar-level mechanisms of mutability in echinoderm connective tissue analysed using in situ synchrotron small-angle X-ray scattering
H.S. Gupta (Sp), L.M. Blouin, M. Egertova, M.R. Elphick, W. Wang, Queen Mary University of London (United Kingdom); J. Mo, University of Manchester (United Kingdom); S.F. Prevost, Institut Laue-Langevin, Grenoble (France); N.J. Terrill, Diamond Light Source, Oxfordshire (United Kingdom)

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About the SPP 1569

The Euro Bio-inspired conference also contains contributions related to the Priority Program 1569 (Generation of Multifunctional Inorganic Materials by Molecular Bionics) of the Deutsche Forschungsgemeinschaft.

The key objective of the SPP 1569 is to explore the principles of gene-regulated biomineralization for the production of multifunctional inorganic materials. The scientific aim is the application of biomolecules for the in vitro generation of inorganic functional materials as well as the biomineralization of these materials by living organisms in vivo. By using this route, materials with an enhanced property spectrum, which is not available via conventional processing techniques, shall be gained at ambient conditions by molecular architecture. The main objective is to generate materials with improved properties and novel property combinations by the conjunction of inorganic and organic components.

Chair SPP 1569
Prof. Dr. Joachim Bill
University of Stuttgart,
Institute for Materials Science
(Germany)

SPP 1569 Coordination Office
Juliane Kränzl
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For further information about SPP1569 please visit: www.uni-stuttgart.de/spp1569

Bio-inspired and interactive materials

This DGM technical committee is understood as an interface between materials and natural sciences and is therefore relevant to engineers as well as basic researchers from classical disciplines such as natural sciences. It aims to research the classification of models in nature as well as material-structure interactions or the processes of static or dynamic interfaces. This includes the transfer of genetic information to material formation processes and the establishment of bio-inspired materials as its task portfolio. To reach its goals, the committee hosts the international conference „Bio-Inspired Materials“ and organised the DFG-Strategy Workshop „What solutions does nature offer for materials science and technology?“ in 2011. Additionally, members of the committee were significantly involved, upon request, in the DFG- Priority Programmes: „Biomimetic Materials Research: Functionality by Hierarchical Structuring of Materials“ and „Generation of Multifunctional Inorganic Materials by Molecular Bionics“.

Chairman
T. Scheibel
University of Bayreuth
(Germany)

Biomaterials

The DGM-Fachausschuss is an interface between basic research and industrial development. His workgroups deal with bio-inspired, degradable and antimicrobial biomaterials, permanent implants, dental materials, interfaces, tissue engineering and modeling and simulations, certification, licensing, standardization and legal issues arising from the use of biomaterials. In the bodies of the expert committee, scientists, physicists, chemists, cell and microbiologists, physicians, dentists, and engineers from universities, university hospitals, companies and associations are given key national competences through their stakeholders. In order to network and to keep the community informed about the latest developments, the Technical Committee organizes the international conference „Euro BioMat“ and the further education „Biomaterials: Materials in Medicine“ every two years.

Do you have any questions or would you like to contribute actively to the committee?

Chairman
Klaus D. Jandt
Friedrich Schiller
University Jena
(Germany)

5th Euro BioMAT 2019
European Symposium on Biomaterials and Related Areas
08. - 09. May 2019
Weimar, Germany

Deadline Abstract submission: 12th November 2018

Do you have any questions or would you like to contribute actively to the committees? Send us your inquiry to:
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Travel Information

Convene Venue
Kongresshotel Potsdam
Am Templer See
14471 Potsdam (Germany)

By car and bus
from the north: coming from the A24, turn onto the A10 (‘Berliner Ring’), exit ‘Potsdam Nord’, direction of ‘Potsdam-Zentrum’ via ‘Zeppelinstrasse’, left before city limits
from the west: coming from the A2, turn onto the A10, exit ‘Groß-Kreutz’, direction ‘Potsdam-Zentrum’, right at city limits
from the south/east: coming from the A9/A13/A12, turn onto the A10, exit ‘Michendorf’, take B2 direction of ‘Potsdam-Zentrum’ via ‘Zeppelinstrasse’, left before city limits

By public transport
With the S-Bahn or regional train to ‘Potsdam Hauptbahnhof’ (main station) and with 91 tram to the end station ‘Bahnhof Pirschheide’. Please follow signs to the hotel, approx. 5 minutes by foot; or take the 631 bus in the direction of ‘Werder’, disembark at ‘Luftschiffhafen’ stop, left before the bridge, then also follow signs to hotel, approx. 5 minutes by foot; regional train to ‘Potsdam-Pirschheide’, from train station 5 minutes by foot to ‘Kongresshotel Potsdam’.

By plane
Berlin Schönefeld: You will take the RB 22 regional train from the ‘Berlin Schönefeld’ airport to the ‘Potsdam Charlottenhof’ train station and then take 91 tram to the last stop ‘Bahnhof Pirschheide’. Travel time is approx. 55 minutes. From the ‘Pirschheide’ station you will need approx. 5 minutes by foot to the ‘Kongresshotel Potsdam’, please follow the hotel signs.

Berlin Tegel: You will take the 109 bus in the direction of ‘Zoologischer Garten’ to S-Bahn station, Charlottenburg’. From there you will take the RE1 regional train to ‘Potsdam Hauptbahnhof’ (main station). Then you will take the 631 bus or the 91 tram to ‘Luftschiffhafen’. Travel time is approx. 60 minutes. From there it takes approx. 5 minutes by foot to the ‘Kongresshotel’, please follow the hotel signs.