

CONFERENCE SCHEDULE

MONDAY, 6. November 2017 (DAY 1)

10.00-12.00

REGISTRATION

Venue:
Courtyard Hotel

12.00-12.30

OPENING CEREMONY

Venue:
Salon 5

PLENARY LECTURES

Venue:
Salon 5

12.30

A Multi-Technique Approach to Identifying and Mitigating the Limitations on Hearing by Cochlear Implant Users
Robert P. Carlyon

13.00

Modelling the Microstructure and Mechanics of Human Artery Walls
Gerhard A. Holzapfel

13.30-14.30

LUNCH

TECHNICAL SESSIONS

COMPUTATIONAL MODELLING OF NEUROPROSTHETICS

Invited Session organized by Waldo Nogueira

Venue:
Salon 5

14.30

The Bremen Neurotechnology Initiative "I-See": Striving towards an Intracortical Visual Prosthesis by Combining Computational Approaches with Electrophysiology and Engineering
Udo Ernst, Federica Capparelli, Klaus Pawelzik, David Rotermund

14.50

The Retina Implant
Karsten Hufendiek, Helmut Sachs, Carsten Framme

15.10

Hearing the Light: Optogenetic Stimulation of the Auditory Pathway
Tamas Harczos

15.30

Deep Brain Stimulation: Clinical and Experimental Approaches
Kerstin Schwabe, Mesbah Alam, Joachim K. Krauss

15.50

Optimizing Signals for a Novel Hearing Prosthesis
Karl-Heinz Dyballa, Hubert Lim, Ursula Schlanstedt-Jahn, Thilo Rode, Andreas Büchner, Thomas Lenarz

16.10 **Distributed Multiplexing System for ECoG**
Juan Pablo Marcoleta, Waldo Nogueira, Theodor Doll

MODELLING OF SOFT TISSUES

Venue:
Salon 6

14.30 **A Bilinear Structural Constitutive Model for Strain Rate Dependent Behaviour of Human Heart Tissue**
Khyati Verma, Piyush Gaur, Mohit Jain, Anoop Chawla, Sudipto Mukherjee, Sanjeev Lalwani, Rajesh Malhotra

14.50 **Study of the Cooling Effect of Large Blood Vessels in Radio-Frequency Ablation of Liver Tumours**
Nikhil Vaidya, Marco Baragona, Valentina Lavezzo, Ralph Maessen, Karen Veroy-Grepl

15.10 **In Vitro Characterisation of Human Aortic Tissue Under Uniaxial Tension**
Piyush Gaur, Khyati Verma, Anoop Chawla, Sudipto Mukherjee, Sanjeev Lalwani, Rajesh Malhotra, Christian Mayer, Pronoy Ghosh, Ravi Kiran Chitteti

16.30-17.00

COFFEE BREAK

TECHNICAL SESSIONS

SIMULATIONS FOR CARDIOVASCULAR DIAGNOSIS AND TREATMENT: FROM COMPUTER THROUGH DEVICES TO BESIDE I

Invited Session organised by Ferdinando Auricchio, Michele Conti, Sotirios Korossis, Michele Marino, Peter Wriggers

Venue:
Salon 5

17.00 **Integrating Vascular Biomechanical Simulation in the Work-Flow of Aneurysm Patient Treatment**
T. Christian Gasser, Christopher Miller

17.20 **Potential of a Generalized Micromorphic Approach for the Modelling of Soft Biological Tissues**
Markus von Hoegen, Sebastian Skatulla, Jörg Schröder

17.40 **Modelling Residual Stresses in Arteries based on Growth and Remodelling**
Anna Zahn, Daniel Balzani

18.00 **A Novel Flow-Tissue Multiscale Formulation for the Computational Modelling of Aneurysms**
Daniele Bianchi, Alessio Gizzi, Michele Marino, Giuseppe Vairo

SIMULATION AND MODELLING APPROACHES WITHIN CARDIOVASCULAR MEDICINE I

Venue:
Salon 6

17.00 **Mesh Sensitivity Analysis for Quantitative Shear Stress Estimation in Blood Recirculating Devices using Computational Fluid Dynamics**
Sascha Groß-Hardt, Ulrich Steinseifer, Thomas Schmitz-Rode, Tim Kaufmann

17.20 **A Computational Fluid-Structure Modelling of the Mitral Regulation**
Kamran Hassani, Ali Dehghani, Alireza Karimi

17.40	A Novel Semi-Automated Framework to Include the Patient-Specific Thickness of Mitral Valve Leaflets in Finite Element Models
	<i>Matteo Selmi, Omar A. Pappalardo, Francesco Sturla, Martina Gava, Alberto Redaelli, Giuseppe Faggian, Emiliano Votta</i>

TUESDAY, 7. November 2017 (DAY 2)

PLENARY LECTURE

Venue:
Salon 5

8.30 **Three-Dimensional Continuum-Mechanical Modelling of the Musculoskeletal System**
Oliver Röhrle

9.00-9.10 **BREAK**

TECHNICAL SESSIONS

SIMULATIONS FOR CARDIOVASCULAR DIAGNOSIS AND TREATMENT: FROM COMPUTER THROUGH DEVICES TO BESIDE II

Invited Session organised by Ferdinando Auricchio, Michele Conti, Sotirios Korossis, Michele Marino, Peter Wriggers

Venue:
Salon 5

9.10 **Designing a Device for Suppressing Unsteady Flow in Arterio-Venous Fistulae**
L. Grechy, F. Iori, R. W. Corbett, S. Shurey, W. Gedroyc, N. Duncan, C. G. Caro, P. E. Vincent

9.30 **Numerical Investigation of External Ventricular Assist Device Concept**
Thomas Kummer, Patrick Jenny

9.50 **Fluid-Structure Interaction Modelling of Cardiovascular Applications using Lattice-Boltzmann, Immersed Boundary Method and Vector Based Discrete Element Method**
Benjamin Owen, Joseph O'Connor, Nicholas Bojdo, Bernard Keavney, Alistair Revell

10.10 **Red Blood Cell Simulation in Stenosed Vessels Using a Coupled Shell-Fluid Analysis Purely Based on the SPH Method**
Meisam Soleimani, Peter Wriggers

IMPLANT DESIGN

Venue:
Salon 6

9.10 **Simulation of the Degradation of Bone Implants using Finite Element Method**
Ann-Kathrin Krüger, Stefan Julmi, Christian Klose, Silke Besdo, Hans Jürgen Maier, Peter Wriggers

9.30 **Experimental Method to Determine Anisotropic Permeability of Hollow Fiber Membrane Bundles**
Peter C. Schlanstein, Alexander Limper, Felix Hesselmann, Thomas Schmitz-Rode, Ulrich Steinseifer, Jutta Arens

9.50 **Simulation of Additive Manufacturing Processes for Medical Silicone**
Philipp Hartmann, Christian Weißenfels, Peter Wriggers

10.30-11.00 **COFFEE BREAK**

TECHNICAL SESSIONS

SIMULATIONS FOR CARDIOVASCULAR DIAGNOSIS AND TREATMENT: FROM COMPUTER THROUGH DEVICES TO BESIDE III

Invited Session organised by Ferdinando Auricchio, Michele Conti, Sotirios Korossis, Michele Marino, Peter Wriggers

Venue:
Salon 5

11.00	In Silico Stent-Graft Deployment in Patient-Specific Abdominal Aortic Aneurysm Models <i>Andre Hemmler, Brigitta Lutz, Christian Reeps, Günay Kalender, Michael W. Gee</i>
11.20	Virtual Endograft Deployment in the Thoracic Aorta as a Predictor of Post-TEVAR Hemodynamics <i>Rodrigo M. Romarowski, Elena Faggiano, Michele Conti, Simone Morganti, Santi Trimarchi, Ferdinando Auricchio</i>
11.40	A Semi-Automatic Method for Computational Simulations of pre-TPVR Procedures <i>Puneet Bhatla, Doff McElhinney, Vittoria Flamini</i>
12.00	An Integrated Framework for a new Patient-Specific Metral Annuloplasty Procedure: From Medical Images to Numerical Simulation <i>Emanuele Gasparotti, Giorgia Vivoli, Alfredo Giuseppe Cerillo, Vincenzo Positano, Sergio Berti, Luigi Landini, Simona Celi</i>
12.20	Patient-Specific FSI Modelling of the Left Heart for Pre-Operative Planning of Valve Surgery <i>Panagiotis Kalozoumis, Michele Marino, Dagmar Hartung, Samir Sarikouch, Igor Tudorache, Sergei Cebotari, Axel Haverich, Sotirios Korossis</i>
12.40	Design of Embolic Protection during Transcatheter Aortic Valve Implant (TAVI): Integration of In-Vitro and In-Silico Analysis <i>Michele Conti, Stijn Vandenbergh, Rodrigo Romarowski, Stefania Marconi, Simone Morganti, Enrico Ferrari, Stefanos Demertzis, Ferdinando Auricchio</i>

SIMULATIONS IN DENTISTRY: FROM MODELLING AND SIMULATION TO THE VIRTUAL DENTAL PATIENT

Invited Session organised by Meike Stiesch, Peter Behrens, Andreas Greuling

Venue:
Salon 6

11.00	Towards the Coarse-Grained Modelling of Dimethacrylate-Based Biomaterials <i>Lauritz T. Bußfeld, Peter Behrens, Andreas M. Schneider</i>
11.20	Mathematical Model and Numerical Simulation of the Formation of a Streptococcus sp.-Veillonella sp. Symbiosis Biofilm System <i>Dianlei Feng, Insa Neuweiler, Udo Nackenhorst, Meike Stiesch</i>
11.40	Application of an Iterative Bone Remodelling Algorithm to investigate Unexpected Complications during Orthodontic Retention <i>Ludger Keilig, Thomas Eßer, Jan Raiman, Christoph Bourauel</i>
12.00	A Numerical Study on Augmentation of Dental Implant Osseointegration via Piezo-Electric Coating <i>Udo Nackenhorst, Alireza Beheshtiha</i>
12.20	Effect of Occlusal Concept, Friction Coefficient and Cusp Inclination on Peri-Implant Bone Stress in Case of Indirect Force Transmission <i>Annike Rand, Meike Stiesch, Michael Eisenburger, Andreas Greuling</i>
12.40	Determining Realistic Dynamic Loading Conditions on Human Molars During Biting by means of Finite Element Simulations <i>Oliver Röhrle, Harnoor Saini, Peter Vee Sin Lee, David C. Ackland</i>

13.00-14.00

LUNCH

PLENARY LECTURES

Venue:
Salon 5

14.00 **Robotic Cochlear Implantation: A Reality**
Marco-Domenico Caversaccio

14.30 **Speech Coding and Electrode Design for Cochlear Implants:
Insights from Computational Modelling**
Johan H.M. Frijns

15.00-15.30

COFFEE BREAK

TECHNICAL SESSIONS

**BEHIND PATHOGENESIS AND BIOCOMPATIBILITY: MODELLING AND
EXPERIMENTS LINKING BIOMECHANICS TO BIOLOGY**

*Invited Session organised by Antonella Camaioni, Alessio Gizzi, Michele Marino,
Giuseppe Vairo*

Venue:
Salon 5

15.30 **Homeostatic Ensemble for Cells**
Vikram S. Deshpande, Siamak S. Shishvan, Andrea Vigliotti

16.10 **A Multi-Scale Approach to Volumetric Growth in Soft Biological Tissues**
Christian J. Cyron, Fabian A. Braeu

16.30 **Arterial Physiopathological Remodelling: A Framework for Investigating the Role
of Molecular Transport and Multiscale Constitutive Response**
Michele Marino, Daniele Bianchi, Giuseppe Vairo, Peter Wriggers

16.50 **A Coupled Agent-Based and Soft Tissue Model of Left Ventricle Post Myocardial
Infarction**
Xin Zhuan, Xiaoyu Luo, Hao Gao, Ray Ogden

17.10 **Determining Input Data for Simulating the Porcine Eye**
Stefan Münch, Daniel Balzani, Mike Röllig, Eberhard Spörl

17.30 **Pore Space-Specific Bone Mechanosensation studied by means of a Multiscale
Systems Biology Approach**
Maria-Ioana Pastrama, Stefan Scheiner, Peter Pivonka, Christian Hellmich

17.50 **Risk Assessment of Femur Failure: A Computational Model Accounting for the
Influence of Metastatic Lesion**
Cristina Falcinelli, Alessio Gizzi, Giuseppe Vairo

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- 15.30** **Pathological Fracture Risk Assessment in Patients with Femoral Metastases using CT-based Finite Element Methods. A Retrospective Clinical Study**
Zohar Yosibash, Nir Trabelsi, Moshe Salai, Amir Sternheim
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- 15.50** **Identification of a Constitutive Law of Trabecular Bone Samples under Remodelling in the Framework of Irreversible Thermodynamics**
Zineeddine Louna, Ibrahim Goda, Jean-Francois Ganghoffer
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- 16.10** **Personalized Simulation of a Bone-Implant System including the Mechanobiological Response of the Callus**
Michael Roland, Thorsten Tjardes, Bertil Bouillon, Stefan Diebels
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- 16.30** **The Influence of Different Implant Materials on the Interfragmentary Move**
Michael Roland, Thorsten Tjardes, Frank Reinauer, Benjamin Probst, Bertil Bouillon, Stefan Diebels
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- 16.50** **A Matrix-Free Method for the Mechanical Simulation of Bone-Implant Systems based on Clinical Computed Tomography**
Tim Dahmen, Christian Schlinkmann, Michael Roland, Stefan Diebels, Philipp Slusallek
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- 17.10** **From Experimentation and Modelling to Clinical Applications... or Vice Versa? Considerations Regarding the Pitfalls on the Interface between Clinical Medicine and Engineering in Personalized Orthopedic Trauma Surgery**
Thorsten Tjardes, Michael Roland
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- 17.30** **3D Mapping of Bone Adaption on the Cellular Level with Tissue Level Remodelling**
Annette I. Birkhold, Pouyan A. Zahdeh, Lydia Farack, Oliver Roehrle, Sara Checa, Paul Zasklansky, Bettina M. Willie
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- 19.30** **BANQUET AT THE RESTAURANT "GARTENSAAL" AT THE NEW TOWN HALL**

WEDNESDAY, 8. November 2017 (DAY 3)

PLENARY LECTURE

Venue:
Salon 5

8.30

Mini Bioreactor System for Patient-Specific Production of Small-Caliber Biohybrid Vascular Grafts

Thomas Schmitz-Rode, Frederic Wolf, Petra Mela, Ulrich Steinseifer, Markus Obdenbusch, Werner Herfs, Christian Brecher, Stefan Jockenhoevel

9.00-9.10

BREAK

TECHNICAL SESSIONS

CONTACT IN SOFT TISSUES: EXPERIMENTAL, THEORETICAL & COMPUTATIONAL TOOLS

Invited Session organised by Marco Paggi, Alessio Gizzi and Jose Reinoso

Venue:
Salon 5

9.10

Multi-Field Contact Modelling of Excitable Biological Cells: A Computational Framework

Pietro Lenarda, Alessio Gizzi, Marco Paggi

9.30

Modelling Cell-Substrate Interaction to investigate the Influence of Collagen Density and Stiffness on Cell Spreading

Eoin McEvoy, Siamak S. Shishvan, Vikram S. Deshpande, Patrick McGarry

9.50

Spatiotemporal Dynamics of Line Defects in Cardiac Tissue

Marcel Hörning, Francois Blanchard, Akihiro Isomura, Kenichi Yoshikawa

MULTI-X MODELLING OF ORGANS AND TISSUE

Invited session organised by Tim Ricken and Navina Waschinsky

Venue:
Salon 6

9.10

Multi-Level Modelling of Angioarchitectural Alterations during Liver Cirrhogenesis in Rats

Charlotte Debbaut, Geert Peeters, Diethard Monbaliu, Wim Laleman, Patrick Segers

9.30

Modelling Cardiac Mechanics and Electrophysiology of a Rat Left Ventricle: A Case Study

Minh Tuan Duong, Theresa Wenger, Ludwig Herrnböck, Theresa Ach, David Holz, Anika Kreipp, Svea Vanessa Binnewitt, Hedwig Stegmann, Sven Dittrich, Muhannad Alkassar, Sigrid Leyendecker

9.50

On a Tri-Scale and Multiphase Model for the Description of Perfusion coupled to Growth Effects in the Human Liver

Navina Waschinsky, Tim Ricken

10.30-11.00

COFFEE BREAK

TECHNICAL SESSIONS

MECHANICS OF HEARING*Invited Session organised by Hannes Maier*Venue:
Salon 5

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- 11.00 **Influence of Outer Hair Cell Stiffness on Thermoviscous Acoustic Waves in the Cochlea**
Frank Böhnke, Christian Scheunemann
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- 11.20 **Lumped Model Based Ear Impedances in Normal Human Temporal Bones**
Darcy Frear, Xiyang Guan, Christof Stieger, Hideko Heidi Nakajima
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- 11.40 **Mechanical Tuning of the Tectorial Membrane in the Cochlear Apex**
Pierre Hakizimana, Anders Fridberger
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- 12.00 **Inertial Properties of the Middle Ear: Comparison between Human and Sheep**
Dominik Péus, Ivo Dobrev, Flurin Pfiffner, Jae Hoon Sim
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- 12.20 **Modelling Bone Conduction Hearing**
Stefan Stenfelt, You Chang, Namkeun Kim
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SIMULATION AND MODELLING APPROACHES WITHIN CARDIOVASCULAR MEDICINE IIVenue:
Salon 6

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- 11.00 **Computational Analysis of Ventricular Assist Devices: Significance of Exposure Time in Red Blood Cell Damage**
Lutz Pauli, Stefan Hassler, Marek Behr
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- 11.20 **FE Simulation of Stenting in Obstructed Pulmonary Artery Conduits: Searching for a Trade-Off between Numerical Accuracy and Clinical Needs**
Alessandro Caimi, Francesco Sturla, Andreea L. Eva, Francesca Pluchinotta, Luca Giugno, Emiliano Votta, Mario Carminati, Alberto Redaelli
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- 11.40 **A Meshfree Model for Blood Clot Detachment in Veins**
Mohammadreza Hojjati, Peter Wriggers
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- 12.00 **Modelling of a Neck with Stenosed Common Carotid Artery**
Huseyin Enes Salman, Yigit Yazicioglu
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13.00-14.00

LUNCH

PLENARY LECTURES

Venue:
Salon 5

14.00 **Modelling the Collagen Architecture of the Cornea**
Anna Pandolfi

14.30 **Biological Interaction between Inner Ear and Cochlear Implant**
Manuel Manrique Rodríguez

15.00

CLOSING CEREMONY

Venue:
Salon 5