

ESMC-2012

**8th European
Solid Mechanics Conference**

Institute of Biomechanics
Graz University of Technology
Austria

July 9-13, 2012

PROGRAMME

Schedule: Thematic Order

Minisymposium MS-1

Adaptive and Smart Structures

Session	Day	Time	Room
MS-1.1	Thursday	16:00 – 18:00	K5
MS-1.2	Friday	10:15 – 12:15	K5

MS-1.1 Adaptive and Smart Structures
K5

Thursday, 16:00 - 18:00
Chair: St. Vidoli, P.M. Weaver

16:00 *Reduced Models of Foppl-von Karman Shells*

Stefano Vidoli

16:20 *Pseudo-Bistable Pre-Stressed Morphing Composites*

Alex Brinkmeyer, **Matthew Santer**, Alberto Pirerra, Paul Weaver

16:40 *Refined Modelling of Multistable Paraboloidal Shells for Morphing Applications*

Alberto Pirerra, Broderick Coburn, **Paul Weaver**

17:00 *Effect of the Environment on the Deformation Behaviour of Multistable 0/90 Unsymmetric Composite Plates*

M. Gigliotti, **Yannick Pannier**, M. Minervino, M.C. Lafarie-Frenot, J.C. Grandidier

17:20 *Computational Modeling of Prestressed Shape Memory Alloy Fiber - Matrix Composites*

Sven Klinkel, Benedikt Kohlhaas

17:40 *Multi-Stability of Orthotropic Shells: Reduced Uniform-Curvature Models and Finite-Element Validation*

Corrado Maurini, Stefano Vidoli, **Angela Vincenti**

MS-1.2 Adaptive and Smart Structures
K5

Friday, 10:15 - 12:15
Chair: St. Vidoli, P.M. Weaver

10:15 *Morphing Composite Structure as a Piezoelectric Strain Amplifier*

Xavier Lachenal, Paul Weaver

10:32 *A Free-Standing, Doubly-Curved Tristable Shell*

Evripides Loukaides, Keith A. Seffen

10:49 *Compliant Shell Mechanisms*

V.R. Seereeram, K.A. Seffen

11:06 *Inhomogeneous Pull-In in Dielectric Thin Films*

Domenico De Tommasi, Giuseppe Puglisi, Giuseppe Zurlo

11:23 *Composite Dielectric Energy Harvesters*

Massimiliano Gei

11:40 *Balanced Design of Resonant Shunted Piezoelectric Vibration Control*

Jan Høgsberg, Steen Krenk

11:57 *Optimization of Electroviscoelastic Systems with External Electric Circuits*

Nataliya Alekseevna Yurlova, Valeriy Pavlovich Matveenko, Evgeniy Petrovich Kligman, Maksim Aleksandrovich Yurlov

Minisymposium MS-2

Advanced Composite Materials

Session	Day	Time	Room
MS-2.1	Tuesday	10:15 – 12:15	AU3
MS-2.2	Tuesday	14:45 – 15:45	AU3
MS-2.3	Tuesday	16:00 – 17:30	AU3

MS-2.1 Advanced Composite Materials AU3		Tuesday, 10:15 - 12:15 Chair: P. Camanho, J. LLorca
10:15	<i>Non-Conventional Laminates: Expanding the Design Envelope and Improving the Structural Performance of Advanced Composites (Keynote)</i> Cláudio S. Lopes , Zafer Gurdal, Pedro P. Camanho	
10:55	<i>Orientation Distribution of Fibres in Short-Fibre Reinforced Concrete: Evaluation and Introduction to Constitutive Relations</i> Marika Eik , H. Herrmann, Jari Puttonen	
11:15	<i>Folding and Strain Softening of Carbon Fiber Composites with an Elastomeric Matrix</i> Francisco Lopez Jimenez , Sergio Pellegrino	
11:35	<i>Three-Dimensional Failure Criteria for Fiber-Reinforced Laminates</i> Giuseppe Catalanotti , Pedro P. Camanho	
MS-2.2 Advanced Composite Materials AU3		Tuesday, 14:45 - 15:45 Chair: J. LLorca
14:45	<i>The Elasto-Viscoplasticity and Damage Behaviour of RTM6 Epoxy Resin</i> Xavier P. Morelle , Simon André, Maxime A. Melchior, Frédéric Lani, Christian Bailly, Thomas Pardoën	
15:05	<i>Experimental Comparison of Friction in Four Different Thermoplastics During Thermo Forming</i> Ulrich Sachs , Sebastiaan P. Haanappel, Rene H. W. ten Thijsse, Remko Akkerman	
15:25	<i>High-Strain-Rate Response of Titanium Matrix Composites Reinforced with Titanium Carbide Particles at Elevated Temperatures</i> Weidong Song , Jianguo Ning	

MS-2.3 Advanced Composite Materials
AU3

Tuesday, 16:00 - 18:00
Chair: P. Camanho, J. LLorca

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- 16:00 *A Study on the Influence of Carbon Nanotubes on the Thermal and Mechanical Properties of Epoxy Nanocomposites*
Ariful Rahaman, Gilles Lubineau, **Isaac Enrique Aguilar Ventura**
-
- 16:20 *A Study on the Development of Nanolayer HA-Ti Composite Coating through Superplastic Deformation Method for Implant Materials*
Siti Nur Hasan, **Iswadi Jauhari**
-
- 16:40 *Improving CO₂ Sorption Rate by a Ca(OH)₂/nano-SiO₂ Composite in a Fluidized Bed*
J.M. Valverde, **Carlos Soria-Hoyo**, M.A.S. Quintanilla, F.J. Duran, F. Pontiga, H. Moreno, M.J. Espin
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- 17:00 *Experimental Fatigue Damage Evaluation of Short Glass Fiber Reinforced Polyamide Composites*
Muhamad Fatikul Arif, Fodil Meraghni, Nicolas Saintier, Joseph Fitoussi, Gilles Robert
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Minisymposium MS-3

Advances in Applied Mechanics for Vehicle Concept Modelling

Session	Day	Time	Room
MS-3.1	Monday	16:00 - 18:00	Maybach
MS-3.2	Tuesday	10:15 - 12:15	Maybach
MS-3.3	Tuesday	14:45 - 15:45	Maybach

MS-3.1 Advances in Applied Mechanics for Vehicle Concept Mod. Monday, 16:00 - 18:00
Maybach Chair: H. Kühnelt, B. Pluymers

- 16:00 *Use of Beams, Joints and Panels for Vehicle Body Concept Modelling*
Giambattista Stigliano, Domenico Mundo, Tommaso Tamarozzi, Marco Gubitosa, Stijn Donders, Leonardo Pagnotta
-
- 16:20 *Surrogate-Based Optimization of the Global Static and Dynamic Performance of a Vehicle Body*
Pavlina Georgieva Mihaylova, Alessandro Pratellesi, Niccolò Baldanzini, Marco Pierini
-
- 16:40 *Energy Flow in Car Structure NVH Treatment*
Jakub Antoni Korta, Rosario Manlio Raniolo, Marco Danti, Tadeusz Uhl
-
- 17:00 *Car Body Concept Modeling for NVH Optimization in the Early Design Phase at BMW: a Critical Review and New Advanced Solutions*
Alessio Moroncini, Luc Cremers
-
- 17:20 *Concept Modelling Techniques for the Development of a Novel Energy Harvesting Device for Car Suspension Systems*
Tommaso Tamarozzi, Dieter Opheide, Jef Cambre, Luc Cremers, Wim Desmet
-
- 17:40 *Concept Modeling with the Use of Multi-Body Simulations of Suspension system for City Bus*
Izabela Kowarska, Krystian Kuczek, Tadeusz Uhl
-

MS-3.2 Advances in Applied Mechanics for Vehicle Concept Mod. Tuesday, 10:15 - 12:15
Maybach Chair: N. Baldanzini, St. Donders

- 10:15 *Finite Element Analysis on Solid-Shell Structures Using Enhanced Assumed Strain Method*
Nickil Srivatsan Mukunthamani, M.P.L. Parente, A.A. Fernandes, R.M. Natal Jorge
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10:35	<i>Numerical Assessment of Crashworthiness and Occupants Injury in Rollover Crashes</i> Rogério Jose Marczak , Anderson Lima
10:55	<i>Occupant Safety and Crashworthiness Assessment of Paratransit Buses</i> Bronislaw Gepner, Jerry Wekezer , Cezary Bojanowski, Leslaw Kwasniewski
11:15	<i>Design Assistance System (DASY)</i> Sergii Bogomolov , Antonin Mikulec, Jan Macek
11:35	<i>Analysis of Stresses in Vehicle Driveline Systems Using a Flexible Multibody Approach</i> Geoffrey Stéphane Virlez , Olivier Bruls, Nicolas Poulet, Emmanuel Tromme, Pierre Duysinx
11:55	<i>Derivation of a Conceptual Model for the Estimation of Vehicle Body Operational Excitation Profiles</i> Marco Gubitosa, Jan Anthonis, Stijn Donders
MS-3.3 Advances in Applied Mechanics for Vehicle Concept Mod. Tuesday, 14:45 - 15:45 Maybach Chair: H. Kühnelt, B. Pluymers	
14:45	<i>Assessment of Numerical Methodologies for Airborne Noise Prediction, Theoretical Approaches and Applications</i> Michele De Gennaro , Helmut Kuehnelt
15:05	<i>Electric Vehicle Concept Model for Hardware-in-the-Loop Simulation. An Application Example: Battery Testing</i> Riccardo Bartolozzi , Björn Haffke, Thomas Bruder
15:25	<i>Applied Eulerian-Lagrangian Spray Atomization Model to Simulate the Effects of In-Nozzle Cavitation on Fuel Atomization in High-Pressure Spray</i> Dung Khuong-Anh , Sergio Hoyas, Xandra Margot, Frederic Ravet

Minisymposium MS-4

Advances in Numerical Methods for Flexible Multibody Mechanics

Session	Day	Time	Room
MS-4.1	Friday	10:15 - 12:15	K7

MS-4.1 Advances in Numerical Methods for Flexible Multibody Mech. Friday, 10:15 - 12:15
K7 Chair: A. Cardona, Jari Mäkinen

10:15 *Contact and Wear Prediction in Internal Combustion Engine Valves* (Keynote)
Federico Cavalieri, **Alberto Cardona**

10:55 *Conservative Time-Integration of Rigid Body Motion with Implicit Constraints by Quaternion Parameters*
Martin Bjerre Nielsen, Steen Krenk

11:15 *Hydro-Mechanical Simulation Model of a Hydraulic Cylinder*
Heikki Marjamäki, Jari Mäkinen, Antti Ylinen

11:35 *Collapse Simulations of Flexible Multibody Systems*
Jari Mäkinen, Heikki Marjamäki

Minisymposium MS-5

Biomechanics from Cells to Tissues

Session	Day	Time	Room
MS-5.1	Monday	10:15 - 12:15	K1
MS-5.2	Monday	14:45 - 15:45	K1
MS-5.3	Monday	16:00 - 18:00	K1
MS-5.4	Tuesday	10:15 - 12:15	K1
MS-5.5	Tuesday	14:45 - 15:45	K1
MS-5.6	Tuesday	16:00 - 18:00	K1

MS-5.1 Biomechanics from Cells to Tissues K1

Monday, 10:15 - 12:15
Chair: P. Chabrand, D. Lacroix

- 10:15 *Mechanobiology of Bone Revisited: A Coupled Systems Biology-Micromechanical Approach* (Keynote)
Stefan Scheiner, Peter Pivonka, **Christian Hellmich**, David Smith
-
- 10:55 *A Two-Solids Mixture Model for the Bio-Mechanical Interactions between Living Tissue and Bio-Resorbable Graft after Bone Reconstructive Surgery*
Angela Madeo, Tomasz Lekszycki, **Francesco dell'Isola**
-
- 11:15 *An Anisotropic Discrete Fiber Model Based on a Generalized Strain Invariant with Application to Soft Biological Tissues*
Cormac Flynn, **M.B. Rubin**
-
- 11:35 *Determination of the Soft Tissue Mechanical Properties Based on the Indentation Test*
I. Goryacheva, A. Morozov, **Anastasia Lyubicheva**, Yu. Martynenko, F. Antonov
-
- 11:55 *Continuum Elasticity of Hydrating Collagen: a Multiscale Approach*
Claire Morin, Peter Henits, Christian Hellmich
-

MS-5.2 Biomechanics from Cells to Tissues K1

Monday, 14:45 - 15:45
Chair: Ch. Hellmich

- 14:45 *Modeling of Stress-Softening in Collagenous Soft Tissues*
Thomas Schmidt, Daniel Balzani, Gerhard A. Holzapfel
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- 15:05 *In Vivo Mechanical Properties of Arteries: a Novel Identification Method Based on FEA and Image Registration*
Alexandre Franquet, Stéphane Avril, Rodolphe Le Riche, Pierre Badel, Fabien Schneider, Christian Boissier, Jean-Pierre Favre
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- 15:25 *Mechanical Response of the Human Aortic Arch: Experiments, Modelling and Simulation*

Claudio García-Herrera, Diego Celentano

MS-5.3 Biomechanics from Cells to Tissues
K1

Monday, 16:00 - 18:00
Chair: P. McGarry, K.W. Müller

- 16:00 *Theoretical and Experimental Investigation on Cell-Seeded Articular Cartilage Replacement Materials*

Jeong-Hun Yi, Marcus Stoffel, Sven Nebelung, Björn Rath

- 16:20 *Prestress Controls Forces of Adherent Cells and it is Dependent on the Extracellular Tissue Stiffness*

Sara Barreto, Cécile M. Perrault, Damien Lacroix

- 16:40 *Towards Modeling Mechanical Effects Arising During Cyclic Adenosine Monophosphate Release in Cells*

Luca Deseri, **Laura Lunghi**

- 17:00 *Computational Approach to the Simulation of the Viscoelastic Behaviour of the Cytoskeleton Using Finite Beam Elements*

Kei Wieland Müller, Christoph Meier, Christian C. Cyron, Andreas R. Bausch, Wolfgang A. Wall

- 17:20 *Simulating the Active Response of Cells to Cyclic Stretching*

Patrick McGarry, R.M. McMeeking, V.S. Deshpande

MS-5.4 Biomechanics from Cells to Tissues
K1

Tuesday, 10:15 - 12:15
Chair: St. Reiter, J. Stålhand

- 10:15 *Understanding the Multi-Scale Structure and Mechanical Behavior of Cortical Veins*

Mathieu Nierenberger, Rania Abdel Rahman, **Daniel George**, Daniel Baumgartner, Yves Rémond, Saïd Ahzi

- 10:35 *Association of Thrombus Age with the Dissection Properties of the Intraluminal Thrombus and the Thrombus-Covered Wall in Abdominal Aortic Aneurysms*

Jianhua Tong, Tina Cohnert, Peter Regitnig, Gerhard A. Holzapfel

- 10:55 *Effect of Perivascular Support on the In-Situ Mechanical Behavior of the Coronary Artery - An Experimental Investigation*

Ruoya Wang, Julia Raykin, Luke Brewster, Rudolph L. Gleason

- 11:15 *Coronary Atherosclerotic Plaque Rupture via an Inherent Pulsatile Fatigue Mechanism*

Steven Reiter, Rosaire Mongrain, Maria Abdelali, Jean-Claude Tardif

- 11:35 *Mathematical Modeling and Simulation of the Formation and Evolution of Plaques in Blood Vessels*

Yifan Yang, Maria Neuss-Radu

MS-5.5 Biomechanics from Cells to Tissues
K1

Tuesday, 14:45 - 15:45
Chair: H. Weisbecker

- 14:45 *Layer-Specific Modeling of Damage Induced Softening in the Human Aorta and the Influence of Residual Stretches*
Hannah Weisbecker, David M. Pierce, Gerhard A. Holzapfel
-
- 15:05 *Fibrous Cap Buckling in Atherosclerotic Plaque: Numerical and Analytical Studies*
Maria Abdelali, Steven Reiter, Rosaire Mongrain, Michel Bertrand, Jean-Claude Tardif
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MS-5.6 Biomechanics from Cells to Tissues
K1

Tuesday, 16:00 - 18:00
Chair: K.M. Meyers, M.B. Rubin

- 16:00 *Coupling Cell Mechanics and Function in Traumatic Brain Injury*
Julián Andrés García, Jose María Peña, **Antoine Jerusalem**
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- 16:20 *Biomechanical and Microstructural Properties of Common Carotid Arteries in Fibulin-5 Null Mice During Maturation*
William Wan, **Ruoya Wang**, Rudolph L. Gleason
-
- 16:40 *Model-Based Identification of Motion Sensor Placement for Tracking Propulsion and Elongation of the Tongue*
Yikun K. Wang, Martyn P. Nash, Jules A. Kieser, **Oliver Röhrle**
-
- 17:00 *Modeling of Dispersed Fibers in Continua*
Andreas J. Reinisch, Andreas J. Schriefl, Gerhard A. Holzapfel
-
- 17:20 *Indentation Response of Human Cervical Tissue*
Kristin M. Myers, Michelle L. Oyen, Kyoko Yoshida
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Minisymposium MS-6

Cardiac Mechanics

Session	Day	Time	Room
MS-6.1	Thursday	10:15 - 12:15	K5
MS-6.2	Thursday	14:15 - 15:45	K5

MS-6.1 Cardiac Mechanics
K5

Thursday, 10:15 - 12:15
Chair: E. Kuhl, N. Trayanova

- 10:15 *Recruitment of Stretch-Activated Channels Suppresses Spiral Wave Breakup*
Yuxuan Hu, Viatcheslav Gurev, Jason Constantino, **Natalia Trayanova**
-
- 10:35 *Mechanisms Underpinning the Changes in Regional Work Following Cardiac Resynchronization Therapy*
Steven Alexander Niederer, Pablo Lamata, Gernot Plank, Matthew Ginks, Kawal Rhode, Aldo Rinaldi, Reza Razavi, Nic Smith
-
- 10:55 *Pacing Hearts with Light: Multiscale Modeling of the Photoelectrochemistry of Living Systems*
Jonathan Wong, Oscar J. Abilez, **Ellen Kuhl**
-
- 11:15 *Mechano-Electric Model for the Study of Atrial Arrhythmias*
Elena S. Di Martino, Alessandro Satriano, Chiara Bellini, **Edward J. Vigmond**
-
- 11:35 *Finite Element Analysis of the Beating Heart within the Pericardium: A Frictionless Contact Problem*
Thomas Fritz, Olaf Dössel
-
- 11:55 *Mechanical Models of the Porcine Atria in Healthy Condition and After Ventricular Tachypacing*
Chiara Bellini, Elena S. Di Martino, Salvatore Federico
-

MS-6.2 Cardiac Mechanics
K5

Thursday, 14:15 - 15:45
Chair: G. Plank, E.J. Vigmond

- 14:15 *Application of Advanced Bidomain Solver Techniques to Cardiac Electromechanics*
Christoph Augustin, Elena Hoetzel, Thomas S.E. Eriksson, Anton J. Prassl, Gerhard A. Holzapfel, Olaf Steinbach, **Gernot Plank**
-
- 14:33 *A Structurally Motivated Model for Myocardial Fiber and Sheet Disarray*
Thomas Eriksson, Gernot Plank, Gerhard A. Holzapfel
-
- 14:51 *Finite Strain Modelling of Human Left Ventricle in Diastole*
Xiao Yu Luo, H.M. Wang, H. Gao, Ray W. Ogden, Colin Berry, T.J. Wang
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15:09 *An Orthotropic Active Strain Formulation in Cardiac Biomechanics*

Simone Rossi, Ricardo Ruiz-Baier, Luca Pavarino, Alfio Quarteroni

15:27 *Numerical Simulation of Biological Tissues Using Finite Element Tearing and Interconnecting Techniques*

Christoph Michael Augustin, Olaf Steinbach

Minisymposium MS-7

Computational Strategies for Waves in Solids: Direct and Inverse Problems

Session	Day	Time	Room
MS-7.1	Tuesday	16:00 - 18:00	AU1
MS-7.2	Wednesday	10:15 - 12:15	AU1
MS-7.3	Thursday	10:15 - 12:15	AU1

MS-7.1 Computational Strategies for Waves in Solids
AU1

Tuesday, 16:00 - 18:00
Chair: G. Degrande, M. Schanz

- 16:00 *High-Order Long-Time Stable Absorbing Boundary Conditions for Elastodynamics*
(Keynote)
D. Baffet, J. Bielak, **Dan Givoli**, T. Hagstrom, D. Rabinovich
- 16:40 *Wave Propagation in Fluid-Filled Open-Cell Foams*
Holger Steeb, Erik H. Saenger, Ralf Jänicke, David Uribe, Oscar Ruiz
- 17:00 *On the Numerical Simulation of the Dispersion of Elastic Waves in MEMS*
Attilio Frangi, P.T. Savadkoobi
- 17:20 *FEM-BEM Coupling for Poro-Elastodynamics with Non-matching Grids*
Franz Rammerstorfer, Martin Schanz

MS-7.2 Computational Strategies for Waves in Solids
AU1

Wednesday, 10:15 - 12:15
Chair: M. Bonnet, M. Schanz

- 10:15 *Formulation and Fast Evaluation of the Multipole Expansions of the Elastic Half-Space Fundamental Solutions*
Stéphanie Chaillat, Marc Bonnet
- 10:35 *Fast Computations of Wave Propagation in Highly Heterogeneous Media*
Pierre-David Letourneau, Eric Darve
- 10:55 *Solving the Lamé-Navier Equations Using the Convolution Quadrature Method and the Directional Fast Multipole Method*
Thomas Traub, Martin Schanz
- 11:15 *The Use of H-Matrices in the Numerical Prediction of Railway Induced Vibrations and Re-Radiated Noise*
Pieter Coulier, Stijn Francois, Geert Lombaert, **Geert Degrande**

11:35 *H-Matrix Approximation to Time-Domain BEM in Elastodynamics*

Bernhard Kager, Martin Schanz

11:55 *Fast Solution of the Heat Equation with a Boundary Element Method*

Michael Messner, Martin Schanz, Johannes Tausch

MS-7.3 Computational Strategies for Waves in Solids
AU1

Thursday, 10:15 - 12:15
Chair: M. Bonnet, G. Degrande

10:15 *Some Examples of the Use of a Spectral-Element Method for Forward and Inverse Problems in Solid or Fluid-Solid Media*

Dimitri Komatitsch, Paul Cristini

10:35 *A Second Degree Newton Method in Inverse Scattering Problem for a Crack*

Kuo-Ming Lee

10:55 *An Error in Constitutive Equation Approach for Transient Inverse Elastodynamics*

Wilkins Aquino, Marc Bonnet

11:15 *Microelastic Wavefield Signatures and their Implications for Microstructural Identification*

Stefano Gonella, M. Steven Greene, Wing Kam Liu

11:35 *Simulation of Railway Vibrations in Horizontally Layered Anisotropic Soil*

Holger Waubke, Wolfgang Kreuzer, Georg Rieckh

11:55 *The Effects of Noise on Identification of Material Parameters by Magnetic Resonance Elastography*

Nathanael Connesson, E.H. Clayton, P.V. Bayly, F. Pierron

Minisymposium MS-8

Constitutive Modelling of Articular Cartilage

Session	Day	Time	Room
MS-8.1	Wednesday	10:15 - 12:15	K1
MS-8.2	Thursday	14:15 - 15:45	K4

MS-8.1 Constitutive Modelling of Articular Cartilage
K1

Wednesday, 10:15 - 12:15
Chair: D.M. Pierce, T. Ricken

10:15 *Large Deformation Model of Elasticity and Permeability of Articular Cartilage*
Salvatore Federico, **Alfio Grillo**

10:35 *Importance of the Collagen and Proteoglycan Distribution for Cartilage Function in a Knee Joint*
Rami K. Korhonen, Kimmo Halonen, Mika Mononen, **Jukka Sakari Jurvelin**

10:55 *Predicting the Sample-Specific Structural and Diffusional Response of Cartilage Using DT-MRI*
David M. Pierce, Tim Ricken, Gerhard A. Holzapfel

11:15 *An Outline of Growth Phenomena Based on Structural Optimization*
Franz-Joseph Barthold

MS-8.2 Constitutive Modelling of Articular Cartilage
K4

Thursday, 14:15 - 15:45
Chair: D.M. Pierce, T. Ricken

14:15 *On Growth and Remodeling of Biological Tissue*
Tim Ricken

14:35 *A Biphase Transverse Isotropic FEM Model for Cartilage*
Daniel Albrecht, Tim Ricken, David Pierce, Gerhard A. Holzapfel

14:55 *3D Quantitative Structural Analysis of Second Harmonic Generation Images of Cartilage*
Elisabeth Inge Romijn, Catharina de Lange Davies, David M. Pierce, Gerhard A. Holzapfel, **Magnus Lilledahl**

Minisymposium MS-9

Contact and Adhesion: Cohesive Zone Model

Session	Day	Time	Room
MS-9.1	Monday	10:15 - 12:15	Casineum
MS-9.2	Monday	14:15 - 15:45	Casineum
MS-9.3	Monday	16:00 - 18:00	Casineum
MS-9.4	Tuesday	10:15 - 12:15	Casineum
MS-9.5	Tuesday	14:45 - 15:45	Casineum
MS-9.6	Tuesday	16:00 - 18:00	Casineum

MS-9.1 Contact and Adhesion: Cohesive Zone Model
Casineum

Monday, 10:15 - 12:15
Chair: St. Roth, V. Tvergaard

10:15 *Adhesive Contact: a Survey and a Unified Formulation*

Michel R. Raous, Gianpietro Del Piero

10:35 *Variational Formulation of a Dynamic Surface Interaction Problem in Viscoelasticity*

Marius Cocou

10:55 *Derivation of an Asymptotic Model Describing the Non-Linear Mechanical Behaviour of Steel Reinforcements*

Martin David, Jean-Jacques Marigo, Eric Lorentz, Sylvie Michel-Ponnelle

11:15 *Predicting Crack Velocity Instabilities with Rate-Dependent Cohesive-Zone Models*

Giulio Alfano, Marco Musto

11:35 *Gradient of Damage Enhancement for Cohesive Interface Laws*

Nunziante Valoroso, Michel Raous

MS-9.2 Contact and Adhesion: Cohesive Zone Model
Casineum

Monday, 14:45 - 15:45
Chair: M. Raous, C. Sarrado

14:45 *Material Size Effects on Crack Growth along Patterned Wafer-Level Cu-Cu Bonds*

Viggo Tvergaard, Christian F. Niordson, John W. Hutchinson

15:05 *Paris-Like Fatigue Laws and Cohesive Force Models*

Jean-Jacques Marigo

15:25 *Simulation of Local Instabilities During Crack Propagation with Competing Damage Mechanisms*

Gerald Hütter, Thomas Linse, Uwe Mühlich, Meinhard Kuna

MS-9.3 Contact and Adhesion: Cohesive Zone Model
Casineum

Monday, 16:00 - 18:00
Chair: G. Alfano, G. Hütter

- 16:00 *Robust Implementation of Non-Smooth Cohesive Laws in the X-FEM*
Guilhem Ferte, Patrick Massin, Nicolas Moës
-
- 16:20 *Some Numerical and Mechanical Issues when Using Intrinsic Cohesive Approaches*
Nawfal Blal, Loic Daridon, Yann Monerie, Stephane Pagano
-
- 16:40 *Implementation of the Discontinuous Galerkin Method in Abaqus to Tend Towards Initially Rigid Cohesive Zones*
Yann Charles
-
- 17:00 *Numerical Study on Interfacial Fatigue Crack Growth Modelled with Cohesive Zone Elements*
Stephan Roth, Meinhard Kuna
-
- 17:20 *A Cohesive Element Model for Mixed Mode Loading Applied to Meso-Scale Concrete Specimens*
Leonardo Snozzi, J.F. Molinari
-

MS-9.4 Contact and Adhesion: Cohesive Zone Model
Casineum

Tuesday, 10:15 - 12:15
Chair: N. Carrere, K.L. Nielsen

- 10:15 *Strength of Adhesively Joined Structures – an Integrated Approach*
Ulf Stigh
-
- 10:35 *Comparison of Cohesive Zone Model and Coupled Criterion to Predict the Onset of Failure – Application to Bonded Structures*
Nicolas Carrere, Azalia Moradi, Eric Martin, Dominique Leguillon
-
- 10:55 *Reliability of Cohesive Zone Models in Terms of Energy Dissipation during Mixed-Mode Delamination Growth*
Carlos Sarrado, I. Llanos, I. Urresti, A. Turon
-
- 11:15 *Proposition of a Framework for the Development of a Cohesive Zone Model Adapted to CFRP Laminates*
Thomas Vandellos, Nicolas Carrère, Cédric Huchette
-
- 11:35 *Numerical Study of the Fracture Behaviour of an Electron Beam Welded Steel Joint by Cohesive Zone Modeling*
Haoyun Tu, Siegfried Schmauder, Ulrich Weber
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MS-9.5 Contact and Adhesion: Cohesive Zone Model
Casineum

Tuesday, 14:45 - 15:45
Chair: M. Cocou, J. Neggers

- 14:45 *Implementing Identification of Cohesive Interface Laws*
Nunziante Valoroso, **Roberto Fedele**, Salvatore Sessa
-
- 15:05 *Contact Behaviour of Adhesive Particles Including Viscous Damping*
Katja Mader, J. Tomas
-

15:25 *Analysis and Development of Cohesive Zone Models for Mixed Mode Separation and Overclosure*

Patrick McGarry, E. O'Mairtin, G. Parry, G.E. Beltz

MS-9.6 Contact and Adhesion: Cohesive Zone Model
Casineum

Tuesday, 16:00 - 18:00
Chair: U. Stigh, N. Valoroso

16:00 *A Novel Viscoelastic Cohesive-Zone Model: Formulation, Validation and Enrichment through Process-Zone Micromechanics*

Marco Musto, Giulio Alfano

16:20 *Analysis of Micro-Scale Dissipation Mechanisms of Ductile Interfaces*

Jan Neggers, Johan Hoefnagels, Olaf van der Sluis, Bart Vossen, Marc Geers

16:40 *A Novel Method to Measure Tensile Properties of Fibres*

Anders Biel

17:00 *Patterned Interface Adhesion for MEMS Encapsulation by Transferred Caps: Measurements and Modelling*

Coraly Cuminatto, G. Schelcher, M. Braccini, G. Parry

17:20 *Cohesive Traction-Separation Laws for Tearing of Ductile Metal Plates*

Kim Lau Nielsen, J.W. Hutchinson

Minisymposium MS-10

Dynamics of Solid Systems with Friction

Session	Day	Time	Room
MS-10.1	Monday	16:00 - 18:00	AU1
MS-10.2	Tuesday	10:15 - 12:15	AU1
MS-10.3	Tuesday	14:45 - 15:45	AU1

MS-10.1 Dynamics of Solid Systems with Friction
AU1

Monday, 16:00 - 18:00
Chair: A. Kireenkov, A. Steindl

16:00 *Numerical Calculation of Slip-Stick Rotating Waves Caused by Coulomb Friction*
Alois Steindl

16:20 *Theory of the Multi-Component Dry Friction (Keynote)*
Alexey Albertovich Kireenkov

17:00 *Thermoelastic Instabilities in Layered Structures: Semianalytical Modelling Strategy*
Matthias Graf, Georg-Peter Ostermeyer

17:20 *Force and Moment of a Friction in the Case of Flat Elliptic Contact of a Body with a Supported Plane*
Mariya A. Munitsyna

17:40 *A Finite Element Contact Implementation for Viscoelastic Solids on Rough Surfaces*
Thang Xuan Duong, Roger Andrew Sauer

MS-10.2 Dynamics of Solid Systems with Friction
AU1

Tuesday, 10:15 - 12:15
Chair: K.R. Hedrih, M.A. Munitsyna

10:15 *Main Landing Gear's Shimmy Models Based on Poly-Component Dry Friction*
Sergey Igorevich Zhavoronok, **Anatoly Alexandrovich Zagordan**, Natalya Sergeevna Bernikova

10:35 *Free Nonlinear Dynamics of a Heavy Mass Particle along Rotating Rough Curvilinear Lines with Amontons-Coulomb*
Katica R. (Stevanovic) Hedrih

10:55 *Free Puck on a Rough Horizontal Plane*
Tatiana Salnikova, Dmitrii Treschev

11:15 *Walking Robot Dynamics on a Rough Inclined Cylinder*
Yury Filippovich Golubev, **Elena Vadimovna Melkumova**

11:35 *On the Dynamics of a Homogeneous Circular Cylinder on an Inclined Plane with Friction*

Anna Rusinova

11:55 *Dynamics of Sphere on a Horizontal Plane with Friction*

Olga Sentemova

MS-10.3 Dynamics of Solid Systems with Friction
AU1

Tuesday, 14:45 - 15:45
Chair: A. Kireenkov, E.V. Melkumova

14:45 *On the Stability of the Motion of Railway Wheels with Dry Friction*

Grigoriy Markovich Rozenblat

15:05 *Vibro-Impact System Based on Oscillator, with Two Heavy Mass Particles Moving along a Rough Circle*

Srdjan V. Jović, Vladimir Raičević

Minisymposium MS-11

Experimental Micromechanics and Nanomechanics

Session	Day	Time	Room
MS-11.1	Tuesday	14:45 - 15:45	K8
MS-11.2	Tuesday	16:00 - 18:00	K8
MS-11.3	Thursday	10:15 - 12:15	K8
MS-11.4	Thursday	14:15 - 15:45	K8

MS-11.1 Experimental Micromechanics and Nanomechanics K8		Tuesday, 14:45 - 15:45 Chair: G. Dehm
14:45	<i>Variable Temperature, In-Situ Nanomechanical Testing Methods to Explore Fracture and Plastic Deformation Mechanisms of Semiconductors and Metals</i> (Keynote) J. Wheeler, R. Ghisleni, C. Niederberger, R. Raghavan, Johann Michler	
15:25	<i>Effect of Tilt on the Micropillar Compression of Plastically Anisotropic Single-Crystals</i> R. Soler, Jon M. Molina-Aldareguia , J. Segurado, Javier LLorca	
MS-11.2 Experimental Micromechanics and Nanomechanics K8		Tuesday, 16:00 - 18:00 Chair: J. Molina-Aldareguía, J.R. Greer
16:00	<i>Dislocation Source Strengthening of Sub-Micron Al Fibers</i> (Keynote) Marc Legros , Frédéric Momprou, Daniel Caillard, Daniel S. Gianola, Andreas Sedlmayr, Oliver Kraft	
16:40	<i>Size Effects on Plasticity in Hard Materials</i> Sandra Korte , W. J. Clegg	
17:00	<i>SIZE MATTERS: Mechanical Properties of Hierarchical Materials - from Nano to Micro to Macro</i> Julia R. Greer , A.T. Jennings, D. Jang, J. Lian, S. Hutchens	
17:20	<i>Twin Stability of Nanotwinned Cu Under Various Loading Conditions</i> Andrea Maria Hodge , Timothy A. Furnish, Carla Shute, Julia R. Weertman	
17:40	<i>Influence of Grain Size to Surface Ratio on the Yield Stress of Micron-Sized Polycrystalline Copper Wires</i> Bo Yang, Christian Motz, Gerhard Dehm	

MS-11.3 Experimental Micromechanics and Nanomechanics K8	Thursday, 10:15 - 12:15 Chair: G. Dehm, J. Molina-Aldareguía
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| 10:15 | <i>On the Reversibility of Dislocation Pile-Ups at the Micron Scale: A Synchrotron μLaue Diffraction Study</i>
Christoph Kirchlechner , Marlene W. Kapp, Christian Motz, Wolfgang Grosinger, Jean-Sebastien Micha, Olivier Ulrich, Gerhard Dehm | |
| 10:35 | <i>Stress Evolution and Cracking of Crystalline Diamond Thin films on Ductile Titanium Substrate: Analysis by Micro-Raman Spectroscopy and Analytical Modelling</i>
Furqan Ahmed, Karsten Durst | |
| 10:55 | <i>Fracture Toughness Testing at the Nanoscale by Microcantilever Bend Tests and Bulge Tests on Thin Membranes</i>
Mathias Göken , Karsten Durst, Benoit Merle, Farasat Iqbal, Johannes Ast | |
| 11:15 | <i>High Temperature Micro-Mechanical Fracture Testing</i>
David Edward John Armstrong , Steve G. Roberts, Angus J. Wilkinson | |
| 11:35 | <i>Deformation of Metallic Glasses: Influence of Structural Inhomogeneities</i>
Oliver C. Franke , Christopher A. Schuh, Horst Hahn, Andrea M. Hodge | |
| 11:55 | <i>Low Temperature Deformation in Complex Metallic Alloys</i>
Claudia Walter , Volker Schnabel, Joshua D. Weston, Sandra Korte, William J. Clegg | |

MS-11.4 Experimental Micromechanics and Nanomechanics K8	Thursday, 14:15 - 15:45 Chair: Ch. Tromas
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| 14:15 | <i>Influence of Pre-Existing Dislocations on the Pop-In Phenomenon During Nanoindentation in MgO</i>
Christophe Tromas , Alex Montagne, Valérie Audurier | |
| 14:33 | <i>The Nanomechanics of Ion-Induced Grain Rotation in Thin Metal Films</i>
Ralph Spolenak , Alla Sologubenko, Matteo Seita | |
| 14:51 | <i>Towards Full-Field Stress and Strain Measurement in Structured Membranes</i>
Johan Hoefnagels , Jan Neggers, Stephane Roux, Francois Hild, Marc Geers | |
| 15:09 | <i>Micromechanical Characterization of Glass/Epoxy Interfaces during Hygrothermal Ageing</i>
Marco Lai , John Botsis, Joel Cugnoni | |
| 15:27 | <i>Deformation Mechanisms in Metallic Nanowires</i>
Lisa Y. Chen, Daniel J. Magagnosc, Mo-rigen He, Daniel S. Gianola | |

Minisymposium MS-12

Generalized Models of Continuum Mechanics

Session	Day	Time	Room
MS-12.1	Thursday	10:15 - 12:15	K4
MS-12.2	Thursday	16:00 - 18:00	K4
MS-12.3	Friday	10:15 - 12:15	K4

MS-12.1 Generalized Models of Continuum Mechanics K4		Thursday, 10:15 - 12:15 Chair: C.B. Hirschberger, P. Steinmann
10:15	<i>Formulation and Computational Exploitation of Mixed Variational Principles for the Evolution Problem of Gradient-Extended Solids</i> (Keynote) Christian Miehe	
10:50	<i>Porous Media as Microstructured Mixtures</i> Vittorio Sansalone , Salah Naili, Antonio DiCarlo	
11:07	<i>Semi-Inverse Solutions for the Deformation of Porous Cylinders</i> Ionel-Dumitrel Ghiba	
11:24	<i>Global and Local Approaches to Fracture: Convergence Through Non Local Damaging</i> Paul Sicsic , Jean-Jacques Marigo	
11:41	<i>A Scale-Dependent Plasticity–Damage Theory for Hardening and Softening</i> Ron H.J. Peerlings , Leong Hien Poh, Marc G.D. Geers	
11:58	<i>A Self-Similar Laplacian in n Dimensions and Some Applications to Dynamic Problems</i> Thomas Michael Michelitsch , Gérard A. Maugin, Andrzej F. Nowakowski, Franck C.G.A. Nicolleau, Shahram Derogar	
MS-12.2 Generalized Models of Continuum Mechanics K4		Thursday, 16:00 - 18:00 Chair: D. Reddy, R.H.J. Peerlings
16:00	<i>On the Calculation of Geometrically Necessary Dislocation Densities in Gradient-Extended Crystal Plasticity</i> Swantje Bargmann , Magnus Ekh, Bob Svendsen	
16:20	<i>An Extension of Korn's First Inequality to $H(\text{Curl})$ Motivated by Gradient Plasticity with Plastic Spin</i> Patrizio Neff , Dirk Pauly, Karl-Josef Witsch	
16:40	<i>On Softening and Damage in Gradient-Based Multifield Formulations</i> Heiko Clasen , C. Britta Hirschberger	

- 17:00 *An Asymptotic Second Gradient Reissner-Mindlin Plate Model*
Michele Serpilli, Francoise Krasucki, Giuseppe Geymonat
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- 17:20 *On the Computational Modelling of Multifield Single-Crystal Gradient Plasticity Formulations*
C. Britta Hirschberger, B. Daya Reddy
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- 17:40 *Variationally Consistent Homogenization of Subscale Gradient Plasticity Applied to Polycrystals*
Kenneth R. Runesson, Magnus Ekh, Fredrik Larsson
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MS-12.3 Generalized Models of Continuum Mechanics
 K4

Friday, 10:15 - 12:15
 Chair: S. Bargmann, K.R. Runesson

- 10:15 *Generalized Continua: a Cautionary Note*
Antonio DiCarlo
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- 10:35 *Diffeomorphism Invariance for Lagrangian Density: Applications to Gradient Continuum and Gravitation*
Lalaonirina Rakotomanana, Nirmal Antonio Tamarasselvame
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- 10:55 *Numerical Determination of Material Parameters for Cosserat Continua via Homogenization*
Dominik Branke, Jörg Brummund, Georg Haasemann, Volker Ulbricht
-
- 11:15 *A Comparison of Atomistic and Enhanced Continuum Approaches for Modelling Surface Effects in Solids*
Denis Davydov, Ali Javili, Andrew McBride, Paul Steinmann
-
- 11:35 *Wave Propagation in Micro Heterogeneous Materials by Extended Continuum Approaches*
Ralf Jänicke, Holger Steeb
-
- 11:55 *Extended Seth-Hill Generalized Strain for Orthotropic Continua*
David Conrad Kellermann, Mario M. Attard
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Minisymposium MS-13

Growth and Remodelling of Soft Tissues: Theoretical Frameworks and Numerics

Session	Day	Time	Room
MS-13.1	Thursday	10:15 - 12:15	S2
MS-13.2	Thursday	14:15 - 15:45	S2

MS-13.1 Growth and Remodelling of Soft Tissues
S2

Thursday, 10:15 - 12:15
Chair: G.A. Maugin, L. Yoshihara

10:15 *Thermo-Mechanics of Mass Diffusion and Biological Growth*

P. Ciarletta, L. Preziosi, **Gerard A. Maugin**

10:35 *A Computational Approach for Transport in Biological Fluid-Structure-Systems as a Basis for Advanced Growth Modeling*

Lena Yoshihara, Mirella Coroneo, Wolfgang A. Wall

10:55 *Growth and Remodeling of Arterial Tissue: One-Dimensional Constrained Mixture Theory*

Ganarupan Satha, Stefan B. Lindström, Anders Klarbring

11:15 *Biomechanics and Mechanobiology of Growing Skin*

Alexander M. Zöllner, Adrian Buganza Tepole, **Ellen Kuhl**

MS-13.2 Growth and Remodelling of Soft Tissues
S2

Thursday, 14:15 - 15:45
Chair: I. Karšaj

14:15 *Interaction of Intraluminal Thrombus and Aortic Wall - 3-D Numerical Model*

Lana Virag, Igor Karšaj, Jay D. Humphrey

14:35 *Theoretical and Numerical Study of Evolution Processes in Blood Vessels*

Pablo Saez, Estefanía Peña, Miguel Ángel Martínez, Ellen Kuhl

14:55 *Successful Recapitulation of the Benninghoff Architecture in Tissue Engineered Cartilage is Predicted to Depend on Construct Composition at the Time of Implantation*

Thomas Nagel, Daniel J. Kelly

15:15 *A 3-D Finite Element Constrained Mixture Model of Aortic Growth and Remodeling: Theoretical and Numerical Considerations*

Arturo Valentín, Jay D. Humphrey, Gerhard A. Holzapfel

Minisymposium MS-14

Homogenization Strategies for Multiphase Materials

Session	Day	Time	Room
MS-14.1	Monday	10:15 - 12:15	K8
MS-14.2	Monday	16:00 - 18:00	K8
MS-14.3	Tuesday	10:15 - 12:15	K8

MS-14.1 Homogenization Strategies for Multiphase Materials Monday, 10:15 - 12:15
K8 Chair: M. Geers, P.M. Suquet

10:15 *Size-Dependent Homogenization of Polycrystals* (Keynote)

Samuel Forest, Nicolas Cordero, Esteban P. Busso

10:55 *Linear Elastic Trusses Leading to Continua with Exotic Mechanical Interactions*

Jean-Jacques Alibert, **Francesco dell'Isola**, Pierre Seppecher

11:15 *Prolongation Conditions for FE^2 -Analysis of Coupled Consolidation*

Fang Su, Kenneth Runesson, Fredrik Larsson

11:35 *Multiscale Simulations of Composites with Non-Local Damage-Enhanced Mean-Field Homogenization*

Ling Wu, Ludovic Noels, Laurent Adam, Issam Doghri

11:55 *A Micromechanical Modeling of Shear-Coupling Grain Boundary Migration in FCC Bi-Crystals*

Stephane Berbenni, Bhasker Paliwal, Mohammed Cherkaoui

MS-14.2 Homogenization Strategies for Multiphase Materials Monday, 16:00 - 18:00
K8 Chair: I. Doghri, P.P. Castañeda

16:00 *Different Strategies to Model Microstructural Effects on the Dilatational Plastic Behavior of Porous Polycrystalline Materials* (Keynote)

Ricardo Lebensohn

16:40 *Yield Surfaces of a Hosford Material Containing a Hollow Sphere*

Georg Falkinger

17:00 *A Two-Scale Approach for the Transition from Homogenization to Localization in Multi-Phase Materials* (Keynote)

Marc Geers, Erica Coenen, Emanuela Bosco, Varvara Kouznetsova

17:40 *A Study on Ductile Failure Using nonlinear Homogenization Models for Porous Materials*

Kostas Danas, Pedro Ponte Castaneda, Nick Aravas

MS-14.3 Homogenization Strategies for Multiphase Materials
K8

Tuesday, 10:15 - 12:15
Chair: S. Forest, P.M. Suquet

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- 10:15 *Constitutive Models for Magneto-Elastic Composites at Finite Strains: The Effects of Particle Shape and Anisotropy* (Keynote)
Pedro Ponte Castañeda, Evan Galipeau
-
- 10:50 *Effective Response and Field Statistics in Elasto(visco)plastic Composites under Complex Loadings*
Pierre M. Suquet, N. Lahellec
-
- 11:07 *Self-Consistent Estimates of 3-Phases Non Ageing Linear Viscoelastic Heterogeneous Media Formulated as an Internal Variables Formulation*
Renaud Masson, V. Blanc
-
- 11:24 *Effects of Grain Size Distribution and Stress Heterogeneity on the Yield Stress of Polycrystals: A Numerical Approach*
Francis Lavergne, **Renald Brenner**, Karam Sab
-
- 11:41 *Microstructural-Based Three-Dimensional Homogenization Modeling of Deformation in as-Soldered and Aged SnAgCu Lead-Free Solder*
Milad Maleki, **Joel Cugnoni**, John Botsis
-
- 11:58 *A Multiscale Damage Model for Fiber-Reinforced Polymer Materials*
Johannes Spahn, Heiko Andrae, Ralf Müller
-

Minisymposium MS-15

Mechanics of Biological Membranes

Session	Day	Time	Room
MS-15.1	Thursday	14:15 - 15:45	K1
MS-15.2	Thursday	16:00 - 18:00	K1

MS-15.1 Mechanics of Biological Membranes
K1

Thursday, 14:15 - 15:45
Chair: L. Deseri

14:15 *Biomembrane Structural Model*

Gerald Rolf Kress, Raoul Hopf, Arabella Mauri, Edoardo Mazza

14:33 *Homogenized Mechanical Properties of Biomembranes Considering Cauchy and Cosserat Equivalent Continua*

Jean-François Ganghoffer, Mohamed Assidi, Francisco Dos Reis

14:51 *Modeling the Mechanical Behavior of Fetal Membranes*

Edoardo Mazza, Wilfried Bürzle, Claudia Haller, Martin Ehrbar

15:09 *Experimental Investigations of Fetal Membrane Mechanics*

Wilfried Bürzle, Edoardo Mazza, Claudia Haller, Martin Ehrbar

15:27 *Construction of a Damage Model for a Fibrous Membrane – Identification on Human Liver Capsule*

Aline Brunon, **Michel Coret**, Karine Bruyère-Garnier, Alain Combescure

MS-15.2 Mechanics of Biological Membranes
K1

Thursday, 16:00 - 18:00
Chair: J.-F. Ganghoffer, E. Mazza

16:00 *Finite Indentation of Curved Biological Membranes, Modelling and Comparison to Experiments*

Simon Peter Pearce, John R. King

16:20 *Robust Identification of Soft Tissues Constitutive Law Using Digital Image Correlation*

Jean Gillibert, Muriel Braccini, Guillaume Parry, Julien Rethore, Rafael Estevez

16:40 *Membranal Effects During Cyclic Adenosine Monophosphate Pathway in Human Trophoblast Cells*

Luca Deseri, Laura Lunghi

17:00 *Membrane Fusion Based on the Stalk Model*

Mariana Tsvetanova Hadzhilazova, Jean-Francois Ganghoffer, Ivailo Milachkov Mladenov

17:20 *Biological Membranes from the Perspective of Smart Materials - a Theoretical Study*

Lior Atia, Sefi Givli

Minisymposium MS-16

Mechanics of Biomedical Implants and Devices and their Interaction with Tissues and Cells

Session	Day	Time	Room
MS-16.1	Thursday	14:15 - 15:45	K3
MS-16.2	Thursday	16:00 - 18:00	K3

MS-16.1 Mechanics of Biomedical Implants and K3 Thursday, 14:15 - 15:45
Chair: J.M. García-Aznar

14:15 *Stress Intensity on Crack Tip in Carbon Nanotube Reinforced Bone Tissue*

Kaveh PourAkbar Saffar, Leszek J. Sudak, Salvatore Federico

14:33 *Bone Remodeling Simulation of the Scapula*

Carlos Quental, **João Folgado**, Paulo Fernandes, Jacinto Monteiro

14:51 *Multiobjective Optimization of Scaffolds For Bone Tissue Engineering*

Marta R. Dias, **Paulo Rui Fernandes**, Jose Miranda Guedes, Scott J. Hollister

15:09 *Moving Boundary-Type Bone Formation During Endosseous Healing*

Pavel Prokharau, Fred Vermolen, Jose Manuel García-Aznar

15:27 *A Non-Linear Biphasic Model for the Periodontal Ligament: Modeling and Simulation*

Marco Favino, Rolf Krause, Christoph Bourauel, Marcel Drolshagen

MS-16.2 Mechanics of Biomedical Implants and K3 Thursday, 16:00 - 18:00
Chair: P. McGarry, C.A. Sweeney

16:00 *Experimental Determination of Circumferential Mechanical Properties of Fresh and Frozen Carotid Plaques*

John Joseph Mulvihill, Michael T. Walsh

16:20 *Reconstruction of Stent Induced Loading Forces on the Aortic Valve Complex*

Raoul Michael Hopf, M. Gessat, V. Falk, E. Mazza

16:40 *Micromechanical Modelling of Fatigue Damage and Crack Nucleation in Cardiovascular Stents*

Caoimhe A. Sweeney, Peter E. McHugh, Sean B. Leen

17:00 *Size Effects and Biodegradation in Metals for Coronary Stent Applications*

J.A. Grogan, S.B. Leen, Peter McHugh

17:20 *Mechanical Biocompatibility of Medical Mesh Implants*

Barbara Röhrnbauer, Gerald Kress, Edoardo Mazza

Minisymposium MS-17

Mechanics of Granular Media

Session	Day	Time	Room
MS-17.1	Monday	10:15 - 12:15	Blauer Salon
MS-17.2	Monday	14:45 - 15:45	Blauer Salon
MS-17.3	Monday	16:00 - 18:00	Blauer Salon
MS-17.4	Tuesday	10:15 - 12:15	Blauer Salon
MS-17.5	Tuesday	14:45 - 15:45	Blauer Salon
MS-17.6	Tuesday	16:00 - 18:00	Blauer Salon
MS-17.7	Wednesday	10:15 - 12:15	Blauer Salon
MS-17.8	Thursday	10:15 - 12:15	Blauer Salon

MS-17.1 Mechanics of Granular Media
Blauer Salon

Monday, 10:15 - 12:15
Chair: E. Bauer, J.D. Goddard

10:15 *Particle Size Segregation in Poly-Disperse Granular Flows* (Keynote)

John Mark Nicholas Timm Gray

10:55 *Hopper Flow Predicted Using a Constitutive Model with Microstructure Evolution*

Jin Sun, Sankaran Sundaresan

11:15 *A Model for the Crestline Dynamics of Dunes*

Hiraku Nishimori, Hirofumi Niiya, Akinori Awazu

11:35 *Characteristics of Sandpile Formed in Water*

Jidong Zhao, Tong Shan

11:55 *Nonharmonicity in Vibrated Granular Solids*

Carl Schreck, Thibault Bertrand, Corey OHern, Mark Shattuck

MS-17.2 Mechanics of Granular Media
Blauer Salon

Monday, 14:45 - 15:45
Chair: A. Dyskin, N. Kruyt

14:45 *Dissipation Potentials in the Visco-Plasticity of Granular Media*

Joe D. Goddard

15:05 *A Novel Elasto-Plastic Model for the Deformation and Flow of Granular Materials*

David Harris

15:25 *On Shear Strength and Fabric of Granular Materials*

Niels Kruyt, L. Rothenburg

MS-17.3 Mechanics of Granular Media
Blauer Salon

Monday, 16:00 - 18:00
Chair: J.M.N.T. Gray, C. Schreck

16:00 *Incremental Response of a Model Granular Material*

Francesco Froiio, **Jean-Noel Roux**

16:20 *Insight into the Strength of Granular Materials from Particle Scale*

Xia Li, Hai-Sui Yu

16:40 *Micromechanics of Dilatancy, Critical State and Shear Bands in Dense Granular Materials*

Sinisa Mesarovic, Jagan M. Padbidri, Balasingam Muhunthan

17:00 *Bifurcation in Rolling of Non-Spherical Grains and Fluctuations in Macroscopic Friction*

Arcady Dyskin, Elena Pasternak

17:20 *DEM-Simulation of Zeolite 4A Granules*

Peter Mueller, Juergen Tomas

17:40 *Mechanics of a Crushable Pebble Assembly Using Discrete Element Method*

Ratna Kumar Annabattula, Yixiang Gan, Marc Kamlah

MS-17.4 Mechanics of Granular Media
Blauer Salon

Tuesday, 10:15 - 12:15
Chair: E. Pasternak, A. Tordesillas

10:15 *A Multi-Scale Approach for Modelling Internal Erosion Effects in Soils* (Keynote)

Pierre-Yves Hicher, Luc Scholtès, Luc Sibille

10:55 *Size Effects Due to Grain Crushing in Granular Materials*

Etienne Frossard, **Carlos Ovalle**, Li Gang, Wei Hu, Christophe Dano, Pierre-Yves Hicher, Siegfried Maiolino

11:15 *Multiscale Characterisation of Diffuse Granular Failure*

Antoinette Tordesillas, Sebastian Pucilowski, Luc Sibille, Francois Nicot, Felix Darve

11:35 *The Influences of Heterogeneities of Material Properties or Boundary Conditions on Shear Localization in a Micro-polar Material*

Babak Ebrahimian, Erich Bauer

MS-17.5 Mechanics of Granular Media
Blauer Salon

Tuesday, 14:45 - 15:45
Chair: C. Ovalle, A. Singh

14:45 *A 2D Constitutive Model with Anisotropy for Granular Materials*

Vanessa Magnanimo, Stefan Luding

15:05 *Simple Shear of Granular Matter*

Diego Berzi

15:25 *Analysis of the Components of a Hypoplastic Constitutive Model*
Nishant Kumar, Fatih Goncu, Vanessa Magnanimo, Stefan Luding

MS-17.6 Mechanics of Granular Media
 Blauer Salon

Tuesday, 16:00 - 18:00
 Chair: K. Bagi, St. Luding

16:00 *From Particles Towards Continuum Theory: Dilatancy and Anisotropy*
A. Singh, T. Weinhardt, V. Magnanimo, Stefan Luding

16:20 *A Virtual Experimental Investigation of Shear Localization in Granular Media*
Wenxiong Huang, Liya Huang

16:40 *Investigation of Grain Crushing of an Ensemble of Randomly Shaped Particles Using the Discrete Element Method*
Imre Laufer, Katalin Bagi, Erich Bauer

17:00 *Characterization of the Influence of Relative Humidity on the Behavior of Granular Media*
Iñaki Gomez Arriaran, Irene Ippolito, Ricardo Chertcoff, Rosario De Schant, J.A. Millán

17:20 *Mirco-Scale Study on Specimen Size Effect in Discrete Element Simulations of Granular Assemblies*
Xin Huang, Catherine OSullivan, Fiona C. Y. Kwok

MS-17.7 Mechanics of Granular Media
 Blauer Salon

Wednesday, 10:15 - 12:15
 Chair: P. Guo, D. Harris

10:15 *Density Waves in Tapped, Monodisperse Granular Systems*
Anthony D. Rosato, Denis L. Blackmore, Xavier Tricoche, Vishagan Ratnaswamy

10:35 *Micromechanics of Seismic Wave Propagation in Granular Materials*
John O'Donovan, George Marketos, Catherine O'Sullivan

10:55 *Transient Dynamics of a Finite Harmonic Atomic Chain Modelled from an Accurately Derived Enhanced Continuum*
Miguel Charlotte

11:15 *On a Possibility of Reconstruction of Cosserat Moduli in Particulate Materials Using Long Waves*
Elena Pasternak, Arcady Dyskin

11:35 *Anisotropic Effect of Capillary Suction on the Shear Strength of Sand*
Peijun Guo

11:55 *Influence of the Grain Size Distribution on Critical State of Granular*
Gang Li, Christophe Dano, Carlos Ovalle, Pierre-Yves Hicher

MS-17.8 Mechanics of Granular Media
Blauer Salon

Thursday, 10:15 - 12:15
Chair: E. Bauer, R. Conti

10:15 *Study of the Behavior of the Internally Unstable Soils Using DEM*

Abbas Soroush, Mojtaba Farahnak Langroudi

10:35 *Viscous Regularization for Cam-Clay Plasticity: How to Handle Subcritical Softening*

Riccardo Conti, Claudio Tamagnini, Antonio DeSimone

10:55 *The Influence of the Degradation of the Solid Hardness on Pressure Dependent Limit Void Ratios*

Erich Bauer

11:15 *Cyclic Elasto-Viscoplastic Constitutive Model for Soils Considering the Nonlinear Kinematic Hardening Rules and Strain-Induced Degradation*

Sayuri Kimoto, B. Shahbodaghkha, M. Mirjalili, **Fusao Oka**

Minisymposium MS-18

Mechanics of Nanoindentation

Session	Day	Time	Room
MS-18.1	Monday	10:15 - 12:15	K7
MS-18.2	Monday	14:45 - 15:45	K7
MS-18.3	Monday	16:00 - 18:00	K7
MS-18.4	Tuesday	10:15 - 12:15	K7
MS-18.5	Tuesday	16:00 - 18:00	K7

MS-18.1 Mechanics of Nanoindentation
K7

Monday, 10:15 - 12:15
Chair: B. Derby, A.S. Schneider

10:15 *Nanoindentation Versus Microcompression: How Loading Geometry Affects Size Effects*
Erica Lilleodden

10:35 *The Hardness and Strength of Metal Tribofilms: an Apparent Contradiction between Nanoindentation and Pillar Compression*
Corbett C. Battaile, **Brad L. Boyce**, Christopher R. Weinberger, Somuri V. Prasad, Joseph R. Michael, Blythe G. Clark

10:55 *Revealing Nanoindentation Deformation Mechanisms by Advanced Characterization and In-Situ Methods*
Daniel Kiener, Megan J. Cordill

11:15 *Dislocation Nucleation and Size Effects for Indentations in CaF₂ Single Crystals: Quantification of Dislocation Structure and Molecular Dynamics Simulations*
Karsten Durst

11:35 *Micro and Nanomechanical Testing under Simulated Environmental Conditions*
Afroz Barnoush

MS-18.2 Mechanics of Nanoindentation
K7

Monday, 14:45 - 15:45
Chair: A.S. Schneider

14:45 *Modulus Mapping – State Of The Art*
Ude Dirk Hangen, Syed Asif, Oden Warren

15:05 *Using Nano-Indentation Technique to Measure the Out-of-Plane Young's Moduli of Laminated Fibrous Composites*
Luoyu Roy Xu, R. Martinez

- 15:25 *Failure Analysis of Materials Subjected to Indentation by Means of ADLO*
Sebastian Bauer, Roman Lackner
-

MS-18.3 Mechanics of Nanoindentation
 K7

Monday, 16:00 - 18:00
 Chair: K. Durst, E. Lilleodden

- 16:00 *Indentation Characterization of Hydrated Gels and Tissues*

Michelle L. Oyen

- 16:20 *Asymptotic Solution of the Frictionless Contact Problem for a Punch with a Small Cylindrical Probe: Implications for Improvement of the Arthroscopic Micro- and Nano-Indentation Technique*

Ivan Argatov

- 16:40 *Temperature Dependent Visco-Elastic Properties of Polymer Thin Films Using Nanoindentation*

Diana Courty, Ralph Spolenak

- 17:00 *Experimental Challenges Related to Nanoindentation of Soft Materials*

Marc Farine, Jiri Nohava, Philippe Kempe, Edoardo Mazza

- 17:20 *Anisotropic Elastic Viscoplastic Damage Model for Simulation of Nanoindentation in Bone Tissue*

Johann Jakob Schwiedrzik, Philippe Kurt Zysset

- 17:40 *Sensibility Analysis of the Identification of Elastoplastic Parameters Using a Finite Element Simulation of the Instrumented Indentation Test*

Julie Marteau, Benjamin Hagege, Salima Bouvier

MS-18.4 Mechanics of Nanoindentation
 K7

Tuesday, 10:15 - 12:15
 Chair: A. Barnoush, M. Oyen

- 10:15 *Combining AFM Nanoindentation and Acoustic Wave Velocity Measurement to Determine the Stiffness of Cells*

Brian Derby, Nadja Njenhuis, Christoph Ballestrem

- 10:35 *Modelling the Elastic and Plastic Response in Confined Metal Layers Tested by Nanoindentation*

Steve Bull

- 10:55 *TEM Investigations of Martensite Formation during Nanoindentation of a NiTi Shape Memory Alloy*

Janine Pfetzing-Micklich, Nikolai Wiczorek, Tobias Simon, Burkhard Maaß, Gunther Eggeler

- 11:15 *One-Way and Two-Way Shape-Memory Effects Induced by Vickers Indentation in Austenitic Matrix NiTi*

Andreas Simon Schneider, Enwei W. Qin, Mareike Frensemeier, Carl P. Frick, Eduard Arzt

11:35 *High Temperature Nanoindentation Behavior of Al/SiC Nanoscale Multilayers*
 S. Lotfian, J.M. Molina-Aldareguía, K.E. Yazzie, **Javier LLorca**, N. Chawla

MS-18.5 Mechanics of Nanoindentation
 K7

Tuesday, 16:00 - 18:00
 Chair: D. Kiener, B.L. Boyce

16:00 *The Indentation Size Effect and Its Relation to Other Length Scale Phenomena*
Andy Bushby

16:20 *Nanoindentation Long-Term Creep and Strain-Rate Jump Tests for the Determination of Time- and Temperature-Dependent Materials Behavior*
Verena Maier, Benoit Merle, Mathias Göken, Karsten Durst

16:40 *Experimental Determination of the Effective Indenter Shape and Epsilon Factor for Nanoindentation*
Benoit Merle, Verena Maier, Mathias Göken, Karsten Durst

17:00 *Beyond the Limits - Alternative Testing Concepts in Nano Mechanics*
Holger Pfaff, Jennifer Hay

17:20 *Elevated Temperature Nanoindentation for Non-Noble Metals*
Oliver Franke, Andrea Maria Hodge, Juergen Biener, Monika Biener

Minisymposium MS-19

Mechanics of (Nano)Porous, Fibrous and Cellular Materials

Session	Day	Time	Room
MS-19.1	Monday	10:15 - 12:15	K2
MS-19.2	Monday	14:45 - 15:45	K2
MS-19.3	Monday	16:00 - 18:00	K2
MS-19.4	Tuesday	10:15 - 12:15	K2
MS-19.5	Tuesday	14:45 - 15:45	K2
MS-19.6	Tuesday	16:00 - 18:00	K2
MS-19.7	Wednesday	10:15 - 12:15	K2

MS-19.1 Mechanics of (Nano)Porous, Fibrous and Cellular Materials Monday, 10:15 - 12:15
K2 Chair: K. Bertoldi, Ch. Santangelo

- 10:15 *Mechanical Modelling of Hollow-Tube Stackings: from the Microscopic Scale to the Macroscopic One*
Vincent Marcadon, Alexandre Iltchev, Alain Rafray, Serge Kruch
- 10:35 *Modelling of Auxetic Materials with Periodic Microstructures*
Justin Dirrenberger, Samuel Forest, Dominique Jeulin
- 10:55 *Dispersion and Band Gaps in Binary Ordered Structures*
Fatih Goncu, Stefan Luding, Katia Bertoldi
- 11:15 *Mechanics of Structured Shells*
Katia Bertoldi
- 11:35 *Collective Mechanical Behavior of Multilayer Colloidal Arrays of Hollow Nanoparticles*
Jie Yin, Markus Retsch, Edwin L. Thomas, Mary C. Boyce
- 11:55 *Experimental and Numerical Investigation of Quasi-Static and Dynamic Response of Micro-Structured Truss Materials*
Zuhal Ozdemir, Everth Hernández Nava, Andrew Tyas, Terry Bennett, Harm Askes

MS-19.2 Mechanics of (Nano)Porous, Fibrous and Cellular Materials Monday, 14:45 - 15:45
K2 Chair: M. Demkowicz

- 14:45 *Rolling and Folding from Composite Polymer Gels*
Jungwook Kim, James Hanna, Myunghwan Byun, Ryan Hayward, **Christian Santangelo**
-
- 15:05 *In Silico Characterization of Constrained Swelling in Materials at Two Length Scales: Relevance for the Performance of Natural/Artificial Water Driven Actuators*
Lorenzo Guiducci, Marco G. Mazza, Martin Schoen, John W.C. Dunlop, Peter Fratzl, Yves J.M. Brechet
-
- 15:25 *New Variational Estimates for the Effective Behavior of Viscoplastic Porous Media*
Michalis Agoras, P. Ponte Castaneda
-

MS-19.3 Mechanics of (Nano)Porous, Fibrous and Cellular Materials Monday, 16:00 - 18:00
K2 Chair: St. Luding, D. Poquillon

- 16:00 *Quantification of the Effects of Process Induced Anisotropy on the Mechanical Behavior of a Cross-Linked Network of Fibers*
Dominique Poquillon, Guillaume Kerviel, Christophe Bouvet
-
- 16:20 *Aramid Nanofiber Networks with Tailored Hierarchical Nanostructure*
Keqin Cao, Carlos Pons Siepermann, Ming Yang, Anthony M. Waas, Nicholas A. Kotov, M.D. Thouless, Ellen Arruda
-
- 16:40 *Discrete Element Method Simulation of the Mechanics of Fibrous Entangled Materials*
David Rodney, Carine Barbier, Benjamin Gadot, Rémy Dendievel
-
- 17:00 *Mechanical Properties of Monofilament Entangled Materials*
Loic Courtois, Eric Maire, Michel Perez, Yves Brechet, David Rodney
-
- 17:20 *Crack Propagation in Random Fibrous Networks*
Ching Theng Koh, Michelle L. Oyen
-
- 17:40 *Elasticity of Complex Networks*
H.C. Bastiaan Florijn, Henk Imthorn, Martin van Hecke
-

MS-19.4 Mechanics of (Nano)Porous, Fibrous and Cellular Materials Tuesday, 10:15 - 12:15
K2 Chair: D. Rodney, J.F. Rodríguez

- 10:15 *Protein Biopolymers: Nature's Designer Soft Materials*
Baldomero Alonso-Latorre
-
- 10:35 *Modeling Inelastic Effects in Reconstituted Crosslinked F-Actin Networks*
Jose Felix Rodríguez, Horacio Lopez-Menendez
-
- 10:55 *Strain-Stiffening in Actin Networks: Where Statistical Mechanics and Solid Mechanics Meet*
Goran Zagar, **Patrick Onck**, Erik Van der Giessen
-
- 11:15 *Semi-Flexible Filament Networks Viewed as Fluctuating Beam Frames*
Prashant Kishore Purohit, Tianxiang Su
-

11:35 *Mechanosensing: from a Discrete to a Continuum Approach*

Jose Manuel García-Aznar, Carlos Borau, TaeYoon Kim, Roger D. Kamm

MS-19.5 Mechanics of (Nano)Porous, Fibrous and Cellular Materials Tuesday, 14:45 - 15:45
K2 Chair: Ch. Linder

14:45 *The Maximal Advance Path Constraint for the Elastic Homogenization of Soft Matter*

Christian Linder, Mykola Tkachuk

15:05 *Sensitivity Study for Void Closure relative to Macroscopic Mechanical Loadings, Using Finite Element Simulations at a Meso-Scale*

Michel Saby, Marc Bernacki, Pierre-Olivier Bouchard, Emile Roux

MS-19.6 Mechanics of (Nano)Porous, Fibrous and Cellular Materials Tuesday, 16:00 - 18:00
K2 Chair: K. Bertoldi, D. Poquillon

16:00 *Relation between Morphology and Mechanical Behavior of Nanoporous Metal Foams*

Antonia Antoniou, Yuan Li, Ran Liu

16:20 *Coarsening by Network Restructuring in Model Nanoporous Gold*

Kedarnath Kolluri, **Michael Demkowicz**

16:40 *Monte Carlo Simulation of Au/Ag Electrochemical Dealloying*

Oleksandr Zinchenko, H. De Raedt, E. Detsi, P. Onck, J. De Hosson

17:00 *The Charge-Induced Actuation of Nanoporous Metals*

Siva Shankar Reddy Saane, Patrick R. Onck

17:20 *Influence of Morphology on the Mechanical Properties of Nanoporous Gold*

Kodanda Ram Mangipudi, E. Epler, S. Jagsch, Lorenz Holzer, C.A. Volkert

17:40 *Universal Scaled Strength of Metallic Nanopillars and Nanoporous Metals*

Brian Derby, **Rui Dou**

MS-19.7 Mechanics of (Nano)Porous, Fibrous and Cellular Mater. Wednesday, 10:15 - 12:15
K2 Chair: P. Onck, P.K. Purohit

10:15 *Predicting the Transversely Isotropic Behaviour of Closed-Cell Foam Subjected to Compressive Loading*

Qusai Jebur, Philip Harrison, Zaoyang Guo

10:35 *Elastic Behaviour of Cellular Polyurethane Materials: Experimental and Modelling Work*

Bart Buffel, Frederik Desplentere, Kris Bracke, Maarten Moesen, Ignaas Verpoest

10:55 *Crushing of Open-Cell Random Foams*

Stavros Gaitanaros, Stelios Kyriakides, Andrew Kraynik

11:15 *Effect of Contact and Boundary Conditions on the Large Strain Compression of Random Cellular Structures*

Jafar Alsayednoor, Philip Harrison, Zaoyang Guo

11:35 *Synthesis of Two-Dimensional Lattices Free of Stress Concentrators*

Sajad Arabnejad Khanoki, Ehsan Masoumi Khalil Abad, **Damiano Pasini**

Minisymposium MS-20

Mechanics of Textile Composite Reinforcements and Fibrous Materials

Session	Day	Time	Room
MS-20.1	Tuesday	16:00 - 18:00	AU2
MS-20.2	Wednesday	10:15 - 12:15	AU2
MS-20.3	Thursday	10:15 - 12:15	AU2
MS-20.4	Thursday	16:00 - 18:00	AU2

MS-20.1 Mechanics of Textile Composite Reinforcements
AU2

Tuesday, 16:00 - 18:00
Chair: Ph. Harrison, St. Lomov

- 16:00 *3D In Situ Observation of the Bending of a Fibre Bundle* (Keynote)
Pierre Latil, Sabine Rolland du Roscoat, **Laurent Orgéas**, Chrisitan Geindreau, Pierre J.J. Dumont, Steven Le Corre
- 16:40 *Finite Element Modelling of Textile and Fibrous Materials at Microscopic Scale*
Damien Durville
- 17:00 *Transverse Mechanics of Fibrous Materials: from the Fiber to Linear Assemblies*
Stephane Fontaine, Christiane Wagner-Kocher, Salsabil Jeguirim
- 17:20 *Geometrical and Mechanical Modelling of Braided and Warp Knitted Multifilament Structures*
Yordan Kyosev

MS-20.2 Mechanics of Textile Composite Reinforcements
AU2

Wednesday, 10:15 - 12:15
Chair: Ph. Boisse, V. Carvelli

- 10:15 *Modelling the Shear-Tension Coupling of Engineering Fabrics*
Farag Abdiwi, Philip Harrison, Woong-Ryeol Yu, Zaoyang Guo
- 10:35 *A Constitutive Model for the Tensile Behavior of Nonwovens*
Alvaro Ridruejo, Carlos Gonzalez, Javier LLorca
- 10:55 *Mesosopic Finite Elements for Woven Fabrics: which Model for which Application – From 3D Fine to Coarse Shell Modelling*
Emmanuelle Vidal-Salle, Audrey Wendling, Andrea Bareggi
- 11:15 *Virtual Stitches in Formability Studies of NCF Preforms*
Daniel Leutz, Francois Dumont, Maximilian Kluepfel, Alexane Margossian, Christian Weimer, Roland Hinterhoelzl, Sylvain Bel

11:35 *Normalisation of Biaxial Bias-Extension Test Results Considering Shear-Tension Coupling*

Philip Harrison

11:55 *Finite Element Modeling of a Scaffold for Anterior Cruciate Ligament Tissue Engineering: from Cellular to Physiological Scale*

Cédric P. Laurent, Damien Durville, Rachid Rahouadj, **Jean-François Ganghoffer**

MS-20.3 Mechanics of Textile Composite Reinforcements
AU2

Thursday, 10:15 - 12:15
Chair: J.-F. Ganghoffer, Y. Kyosev

10:15 *Mechanics of Cross-Linked and Entangled Semiflexible Random Fiber Networks*
(Keynote)

Catalin Picu

10:55 *Modeling Compression of a Random Assembly of Carbon Nanotubes*

Stepan Lomov, Larissa Gorbatiikh, Ignaas Verpoest

11:15 *Generation of Voxel-FE Models for Complex 3D Composite Architectures*

Gaetan Hello, Julien Schneider, Zoheir Aboura

11:35 *Automated Modelling of Textile Composites With Application of Boundary Conditions Resulting Truly from Periodicity and other Generic Symmetries*

Laurent F.C. Jeanmeure, Shuguang Li

11:55 *Shear Behavior of a Non-Crimp 3D Orthogonal Weave E-Glass Composite Reinforcement*

J. Pazmino, **Valter Carvelli**, S.V. Lomov, I. Verpoest

MS-20.4 Mechanics of Textile Composite Reinforcements
AU2

Thursday, 16:00 - 18:00
Chair: G. Hivet, P. Potluri

16:00 *Numerical Modelling of 3D Woven Preform Deformations*

Steven Daniel Green, Andrew C. Long, Stephen R. Hallett

16:17 *Simulation of Forming and Wrinkling of Textile Composite*

Philippe Boisse, Nahiene Hamila, Peng Wang, Pierre Pineau

16:34 *Characterization and Forming Simulation of PP Wood Composites*

Hong-Ling Yin, **Xiongqi Peng**, Xue Liu

16:51 *From the Mechanical Behaviour to the Forming of Textiles*

Gilles Hivet, Samir Allaoui, Pierre Ouagne, Damien Soulat, Christophe Tephany, Sylvain Chatel

17:08 *Simulation of the Bend-Over-Sheave Behaviour of Braided Synthetic Ropes*

Thanh Do Vu, Damien Durville, Peter Davies

17:25 *Shell Element Based Homogenization of Textile Composites*

Jakob Gager, Heinz E. Pettermann

17:42 *Modeling Yarn Sliding in the Weave Continuum*

Ethan Moore Parsons, **Simona Socrate**

Minisymposium MS-21

Metal Forming

Session	Day	Time	Room
MS-21.1	Tuesday	10:15 - 12:15	S2
MS-21.2	Tuesday	16:00 - 18:00	S2

MS-21.1 Metal Forming
S2

Tuesday, 10:15 - 12:15
Chair: R. Valente, P. Van Houtte

- 10:15 *Material Characterization and FSW Process Optimization Using Neural Networks*
Carlos Agelet de Saracibar, Roberto López, Michele Chiumenti, Bruno De Meester
-
- 10:35 *Numerical Simulation and Experimental Validation of Sheet Laser Forming Processes Using Single S-Shape Scanning Paths*
Diego Celentano, Geoffroy Kieffer, Jorge Ramos-Grez, Magdalena Walczak
-
- 10:55 *Influence of Hydrostatic Pressure on Porosity of Die-Cast Mg Alloys: Experimental and Numerical Studies*
Ana María Fernández, Federico Sket, Jon M. Molina-Aldareguia, M. Teresa Pérez-Prado, Antoine Jerusalem
-
- 11:15 *An Algorithm to Determine a Suitable Friction Coefficient for Numerical Deep Drawing Simulations*
Sascha Döhler, Kai Uwe Schröder, Martin Schagerl, Thomas Waltenberger
-

MS-21.2 Metal Forming
S2

Tuesday, 16:00 - 18:00
Chair: C. Agelet de Saracibar, D. Celentano

- 16:00 *Hierarchical Multi-Scale Modelling of the Heterogeneous Evolution of Texture and Anisotropy in Metal Forming*
Paul Van Houtte, Jerzy Gawad, Philip Eyckens, Albert Van Bael, Giovanni Samaey, Dirk Roose
-
- 16:20 *Temperature-Induced Phase Transformations in Finite-Strain Plasticity Applied to Wear Resistant Coatings*
Reza Kebriaei, Ivaylo Vladimirov, Jan Frischkorn, Stefanie Reese
-
- 16:40 *A New Shell-Solid and Solid-Shell Concept Using Full 3D Constitutive Laws*
B. Bassa, **Francis Sabourin**, Michel Brunet
-
- 17:00 *Application of a Tensorial Framework for Ductile Damage to the Analysis of Metal Forming Processes*
Maksim Zapara, Nikolai Tutyshkin, Wolfgang H. Müller, Ralf Wille
-

- 17:20 *Experiment and Simulation of Inner Fracture Defect in Drawing of Carbon Steels for Machine Structural Use*
Kazutake Komori
-
- 17:40 *Enhanced Formability of Dual Phase 980 Steels by Controlled Local Softening Using Laser Heating Technology*
Constantin Chiriac, Changquin Du, Dajun Zhou, Ching-Kuo Hsiung
-

Minisymposium MS-22

Methods to Predict the Structural and Mechanical Properties of Dense Granular Media

Session	Day	Time	Room
MS-22.1	Monday	10:15 - 12:15	S1
MS-22.2	Monday	14:45 - 15:45	S1
MS-22.3	Monday	16:00 - 18:00	S1
MS-22.4	Tuesday	10:15 - 12:15	S1
MS-22.5	Tuesday	14:45 - 15:45	S1
MS-22.6	Tuesday	16:00 - 18:00	S1
MS-22.7	Wednesday	10:15 - 12:15	S1

MS-22.1 Methods to Predict the Properties of Dense Granular Media Monday, 10:15 - 12:15
S1 Chair: L. Kondic, W. Losert

10:15 *Sheared Granular Materials near Jamming*

Robert P. Behringer, Dapeng Bi, Jie Zhang, Bulbul Chakraborty

10:35 *Experimental Study of Silo Collapse in Static and Discharging States*

Ramon Peralta-Fabi, Eric Clément, Gustavo Gutiérrez, Francisco Melo

10:55 *A Local View on Dilatancy Onset in Sheared Granular Media*

Annika Döring, Jean-Francois Métayer, Mario Scheel, **Matthias Schröter**

11:15 *Measuring the Mechanical Properties of a Sedimenting Granular Suspension*

Chih-Wei Peng, Matthias Schröter

11:35 *Probing Deformations of a Granular Material with Diffusive Wave Spectroscopy: Application to the Formation of Shear Band*

Axelle Amon, Van Bau Nguyen, Ary Bruand, **Jérôme Crassous**, Eric Clément

MS-22.2 Methods to Predict the Properties of Dense Granular Media Monday, 14:45 - 15:45
S1 Chair: St. Luding, P. Umbanhowar

14:45 *Shear Thickening and Migration in Granular Suspensions*

Abdoulaye Fall, **Anael Lemaitre**, François Bertrand

15:05 *GSH: Elasto-Plastic Rheology of Granular Media*

Mario Liu

- 15:25 *Particle-Based Continuum Theory: Stress-Strain-Anisotropy Relations for Shear-Bands, Jamming and Dilatancy*
Stefan Luding
-

MS-22.3 Methods to Predict the Properties of Dense Granular Media Monday, 16:00 - 18:00
 S1 Chair: B. Chakraborty, O. Sano

- 16:00 *Frontal Dynamics of Powder Snow Avalanches*
Michel Y. Louge, Cian S. Carroll, Barbara Turnbull
-
- 16:20 *Onset of Reversibility in Cyclic Shear of Granular Packings*
Wolfgang Losert, Mitch Mailman, Steven Slotterback
-
- 16:40 *Impact, Drag, and the Granular Critical State*
Paul B. Umbanhowar, Nick Gravish, Daniel I. Goldman
-
- 17:00 *Wavelength Selection of Ripples in Vertically Vibrating Thicker Granular Layer due to Density Wave Refraction*
Osamu Sano
-
- 17:20 *New Insights into Shear Failure of Crushable Granular Soils by DEM*
Jianfeng Wang, Haibin Yan
-
- 17:40 *A DEM-Based Study on the Uniaxial Deformation of Frictional Polydisperse Spheres*
Olukayode Isaiah Imole, Nishant Kumar, Vanessa Magnanimo, Stefan Luding
-

MS-22.4 Methods to Predict the Properties of Dense Granular Media Tuesday, 10:15 - 12:15
 S1 Chair: R. Behringer, R. Blumenfeld

- 10:15 *Vortex Structures and Macroscopic Response in Dense Granular Shear*
Amy Rechenmacher, Andres Orlando
-
- 10:35 *Creep Response of Nearly Isostatic Spring Networks*
Brian P. Tighe
-
- 10:55 *Geometrical and Physical Interpretations of the Properties of Disordered Granular Packings*
Gary William Delaney, James E. Hilton, Paul W. Cleary
-
- 11:15 *On Microstructure of Particulate Matter Exposed to Impact and Compression*
Lou Kondic, Arnaud Goulet, Miroslav Kramar, Konstantin Mischaikow, Robert Behringer
-
- 11:35 *The Dynamics of Granular Material*
Miroslav Kramar, Konstantin Mischaikow, Lou Kondic, Arnaud Goulet, Robert Behringer
-
- 11:55 *Computing Persistence Diagrams*
 Miroslav Kramar, **Konstantin Mischaikow**, Vidit Nanda
-

MS-22.5 Methods to Predict the Properties of Dense Granular Media Tuesday, 14:45 - 15:45
S1 Chair: R. Behringer

- 14:45 *How External Vibration Affects Stick-Slip Dynamics in Sheared Granular Layers: the Micro- and Meso-Mechanics of Dynamic Earthquake Triggering*
Michele Griffa, **Behrooz Ferdowsi**, J. Carmeliet, E.G. Daub, R.A. Guyer, P.A. Johnson, C. Marone
-
- 15:05 *Geometrically Cohesive Granular Materials*
Scott Victor Franklin
-
- 15:25 *Local and Nonlocal Continuum Modeling for Dense Granular Flow*
Ken Kamrin, Georg Koval
-

MS-22.6 Methods to Predict the Properties of Dense Granular Media Tuesday, 16:00 - 18:00
S1 Chair: A. Lemaitre, M.Y. Louge

- 16:00 *Shear-Jammed States: Stress-Induced Nematic Ordering in Force Space*
Bulbul Chakraborty, Dapeng Bi
-
- 16:20 *Response Theory of Sheared Granular Particles around a Nonequilibrium Steady State*
Hisao Hayakawa, Kuniyasu Saitoh
-
- 16:40 *Density of Vibrational Modes in Partially Crystalline Granular Packings*
Thibault Bertrand, Carl F. Schreck, Corey S. OHern, Mark D. Shattuck
-
- 17:00 *Characterization of Basin Volumes in Mechanically Stable Packings*
Mark D. Shattuck, S.S. Ashwin, Jerzy Blawdziewicz, Corey S. OHern
-

MS-22.7 Methods to Predict the Properties of Dense Granular M. Wednesday, 10:15 - 12:15
S1 Chair: M. Liu, M.D. Shattuck

- 10:15 *Da Vinci Fluid Model for Couette Flow of Dense Granular Matter*
Rafi Blumenfeld, Simon Nathan, Moshe Schwartz
-
- 10:35 *Statistical Mechanical Characteristics of Dense Planar Granular Matter*
Joseph Jordan, Rafi Blumenfeld
-
- 10:55 *The Glass Transition in a Driven Granular Fluid*
Till Kranz, A. Fiege, I. Gholami, Matthias Sperl, Annette Zippelius
-
- 11:15 *Elementary Volumes Distribution and Cell Structural Stability in 2D Granular Assemblies*
Takashi Matsushima, Raphael Blumenfeld
-
- 11:35 *Secondary Flows and Supported Steady States for Channeled Granular Flows with Flat Frictional Surfaces*
Nicolas Brodu, **Renaud Delannay**, Patrick Richard
-

Minisymposium MS-23

Modelling and Computation of Inelastic Microstructures

Session	Day	Time	Room
MS-23.1	Thursday	14:15 - 15:45	AU1
MS-23.2	Thursday	16:00 - 18:00	AU1

MS-23.1 Modelling and Computation of Inelastic Microstructures Thursday, 14:15 - 15:45
AU1 Chair: K. Hackl, B. Svendsen

14:15 *Construction of Statistically Similar RVEs for 3D Microstructures*

Daniel Balzani, Joerg Schroeder, Lisa Scheunemann, Dominik Brands

14:35 *A Micromechanical Model for Creep and Microstructure Evolution of Single Crystal Superalloys*

Bach Tuyet Trinh, Klaus Hackl

14:55 *Full Field Multiscale Simulation of the Local Behaviour and Failure Accounting for Dwell Effect in Ti Alloys*

Konstantin A. Kuzmenkov, Farida Azzouz, **Georges Cailletaud**

15:15 *To the Optimization in Fatigue of the Microstructure of a Nickel Base Superalloy for Turbine Disc Application*

Franck Gallerneau, G. Boittin, P. Kanouté, D. Locq, C. Cailletaud

MS-23.2 Modelling and Computation of Inelastic Microstructures Thursday, 16:00 - 18:00
AU1 Chair: K. Hackl, B. Svendsen

16:00 *Analytical and Numerical Aspects of Relaxation in Finite Crystal Plasticity*

Georg Dolzmann

16:20 *A Viscosity-Limit Approach to the Evolution of Microstructures in Finite Plasticity*

Christina Günther, Klaus Hackl

16:40 *Rate Variational Thermodynamic Formulation And Application of Models for Non-Convex Twinning and Dislocation Glide in TWIP Steels*

Bob Svendsen, Benjamin Klusemann

17:00 *Microstructure-Based Study of Boundary Effects in FCC Crystals Using a Dislocation Based Continuum Model*

Katrin Schulz, Stefan Sandfeld, Peter Gumbsch

17:20 *Dislocation Emission from Nanovoids under Tension at Finite Temperature in Copper*

Pilar Ariza, M. Ponga, I. Romero, Michael Ortiz

Minisymposium MS-24

Modelling and Simulation of Aneurysm Mechanics

Session	Day	Time	Room
MS-24.1	Monday	10:15 - 12:15	AU2
MS-24.2	Monday	14:45 - 15:45	AU2
MS-24.3	Monday	16:00 - 18:00	AU2
MS-24.4	Tuesday	10:15 - 12:15	AU2
MS-24.5	Tuesday	14:45 - 15:45	AU2

MS-24.1 Modelling and Simulation of Aneurysm Mechanics
AU2

Monday, 10:15 - 12:15
Chair: A. Robertson, P. Watton

10:15 *Abdominal Aortic Aneurysms: Assessment of Structural and Fluid-Structure Interaction Simulation Strategies*

Alessandro Satriano, Elena S. Di Martino

10:35 *Computational Analysis of Flow and Stress Patterns in Patient Specific Thoracic Aortic Aneurysm Models*

Alessandro Borghi, F.P.P. Tan, N.B. Wood, R.H. Mohiaddin, X.Y. Xu

10:55 *Towards New Aortic Tissues Analogue Materials: Micro-Mechanical Modelling and Experiments*

Lucie Bailly, Audrey Lemercier, Christian Geindreau, Laurent Orgéas, Valérie Deplano

11:15 *On Modeling Failure of Soft Anisotropic Materials*

Konstantin Volokh

11:35 *Mathematical Modelling of Aortic Dissection*

Nicholas A. Hill, Steven Roper, Xiaoyu Luo, Beibei Li, Lei Wang

11:55 *A Thick-Walled Fluid-Solid-Growth Model of Abdominal Aortic Aneurysm Evolution*

Andrii Grytsan, Paul N. Watton, Gerhard A. Holzapfel

MS-24.2 Modelling and Simulation of Aneurysm Mechanics
AU2

Monday, 14:45 - 15:45
Chair: P. Watton

14:45 *Interactive Decomposition and Mapping of Saccular Cerebral Aneurysms Using Harmonic Functions with Applications in "Patient-Specific" Computational Fluid Dynamics (CFD) Simulations*

Jingfeng Jiang, Charles Strother

15:05 *PIV Measurement of Inflow through Cerebral Aneurysmal Neck of PVA-H Biomodel with Compliant Wall*
Shuya Shida, **Makoto Ohta**

15:25 *Hemodynamics in Cerebral Arteries before Aneurysm Formation: Influence of Flow Input Waveform Shapes*
Yuji Shimogonya, Hiroshige Kumamaru, Kazuhiro Itoh

MS-24.3 Modelling and Simulation of Aneurysm Mechanics
AU2

Monday, 16:00 - 18:00
Chair: A. Brawanski, N. Hill

16:00 *Detailed Modeling of Abdominal Aortic Stent Grafts: from Device to Computational Mechanics*
Sander De Bock, F. Iannaccone, M. De Beule, F. Vermassen, B. Verhegghe, P. Segers

16:17 *A New Rupture Potential Index for Abdominal Aortic Aneurysms Based on Patient-Specific Wall Strength and Thickness Distribution*
Andreas Maier, Michael W. Gee, Sebastian Kehl, Christian Reeps, Hans-Henning Eckstein, Wolfgang A. Wall

16:34 *Uncertainty Quantification in Patient Specific Assessment of AAA Rupture Risk*
Jonas Biehler, Michael W. Gee, Wolfgang A. Wall

16:51 *Development of a Porous Biomaterial for the Treatment of Intracranial Aneurysms*
Jonathan Pieter Vande Geest, Greg Johnson, P. Daniel Warren, Robert Slazas

17:08 *A Novel Thin Film NiTi (TFN) Device for Cerebral Aneurysm Treatment*
Youngjae Chun, Daniel S. Levi, K.P. Mohanchandra, Colin P. Kealey, Haithem Babiker, David Frakes, Soojung C. Hur, Allan W. Tulloch, David A. Rigberg, Dino Di Carlo, Fernando Vinuela, Gregory P. Carman

17:25 *Investigating the Haemodynamic Environment Prior to Aneurysm Formation: Novel Methodology and Study of 22 Clinical Cases*
Haoyu Chen, Yiannis Ventikos, Paul Nicholas Watton

17:42 *Growth and Remodelling Hypotheses for Patient-Specific Models of Cerebral Aneurysm Evolution*
Alisa Selimovic, Yiannis Ventikos, Paul Nicholas Watton

MS-24.4 Modelling and Simulation of Aneurysm Mechanics
AU2

Tuesday, 10:15 - 12:15
Chair: J. Bernsdorf, M. Ohta

10:15 *Is Aspect Ratio Sufficient to Classify Intra-Aneurysmal Hemodynamics?*
Michael J. Durka, **Anne M. Robertson**

10:35 *A Mechanism for the Rapid Development of Intracranial Aneurysms: A Case Study*
Christian Doenitz, Karl-Michael Schebesch, Roland Zoephel, **Alexander Brawanski**

10:55 *Towards Multiscale Simulation of Early Stage Aneurysm Formation*
Joerg Bernsdorf, Jiaying Qi, Sabine Roller

11:15 *The Design Characteristics Extracted from an Optimal Flow Diverter in an Ideal Side-Wall Aneurysm Using Lattice Boltzmann Method*

Hitomi Anzai, Jean-Luc Falcone, Bastien Chopard, Makoto Ohta

11:35 *Modelling Intracranial Aneurysms Treated with Flow Diverters: Correlation of Intra-Aneurysm Sac Flow Dynamics with Thrombus Evolution*

Daniel Zajarias-Fainsod, K. Spranger, E. Holland, A. Selimovic, H. Chen, M. Ngoepe, T. Peach, T. Baptista, A. Chiarini, J. Penrose, J. Byrne, P.N. Watton, Y. Ventikos

MS-24.5 Modelling and Simulation of Aneurysm Mechanics
AU2

Tuesday, 14:45 - 15:45
Chair: A. Robertson

14:45 *Database of Intracranial Aneurysms Using Patient-Specific Geometries and Inlet Conditions*

Akira Takahashi, Shin-ichiro Sugiyama, Teiji Tominaga

15:05 *AIMA: A Planning Software Suite for Intracranial Aneurysms Treatment with Flow Diverters*

Alessandro Chiarini

15:25 *Clinical Utility of Computational Modelling for Treatment of Cerebral Aneurysms - The Road from Virtual to Reality*

Paul Nicholas Watton, H. Ho, P.J. Hunter, A.M. Robertson

Minisymposium MS-25

Multiphase Models for Concrete and Soils

Session	Day	Time	Room
MS-25.1	Monday	10:15 - 12:15	AU3
MS-25.2	Monday	16:00 - 18:00	AU3

MS-25.1 Multiphase Models for Concrete and Soils
AU3

Monday, 10:15 - 12:15
Chair: G. Hofstetter, T. Jefferson

- 10:15 *Modeling Chemical Degradation of Cement Based Materials with Mechanics of Multiphase Porous Media*
Dariusz Gawin, Francesco Pesavento, Marcin Koniorczyk, Witold Grymin
-
- 10:35 *Modeling Damage of Concrete Caused by Corrosion of Reinforcement*
Josko Ozbolt, Filip Orsanic, Gojko Balabanic
-
- 10:55 *Computational Modeling of Hydraulic Fracturing in Partially Saturated Porous Materials Using X-FEM*
Dirk Leonhart, **Günther Meschke**
-
- 11:15 *Multiphase Modeling and Experimental Validation of the Behavior of Concrete Structures Subjected to Combined Thermal and Mechanical Loading*
Thomas Ring, Matthias Zeiml, Roman Lackner
-
- 11:35 *Numerical Predictions of Autogenous Drying in Concrete*
Tony Jefferson, Adriana Chitez, Paul Lyons
-
- 11:55 *Comparison of Different Approaches for Modeling Shrinkage of Concrete*
Matthias Aschaber, Günter Hofstetter
-

MS-25.2 Multiphase Models for Concrete and Soils
AU3

Monday, 16:00 - 18:00
Chair: G. Hofstetter, T. Jefferson

- 16:00 *Definition of Stress in Constitutive Modelling of Partially Saturated Soils and Granular Media*
Wojciech Tomasz Sołowski, Scott W. Sloan
-
- 16:20 *Thermo-Elasto-Plastic Consolidation Analysis with Water Phase Change*
Lorenzo Sanavia, Loris Luisson, Lyesse Laloui
-
- 16:40 *A Hysteretic Water Retention Model for Deformable Porous Materials*
Domenico Gallipoli
-

- 17:00 *A 3D Numerical Model for Simulating the Effect of Orthotropic Permeability on Hydraulic Fracturing Processes*
Han Wang, H. Liu, H.A. Wu, X.X. Wang
-

Minisymposium MS-26

Multiscale Mechanics of Interfaces

Session	Day	Time	Room
MS-26.1	Thursday	10:15 - 12:15	S3
MS-26.2	Thursday	14:15 - 15:45	S3
MS-26.3	Thursday	16:00 - 18:00	S3

MS-26.1 Multiscale Mechanics of Interfaces S3		Thursday, 10:15 - 12:15 Chair: M. Geers, S. Schmauder
10:15	<i>Polymer Adhesion: How to Extract a Cohesive Law from MD Simulations (Keynote)</i> Mathieu Solar, Erik Van der Giessen	
10:55	<i>Influence of Microcracking on the Interface Crack in FGM/Homogeneous Bimaterials Subjected to Thermal and Mechanical Loading</i> Vera Petrova , Siegfried Schmauder	
11:15	<i>Length Scale Effects in Generalised Continuum Crystal Plasticity</i> Esteban P. Busso , Nicolas Cordero, Samuel Forest	
11:35	<i>Interface Controlled Plastic Flow Modeled by Strain Gradient Plasticity Theory</i> Thomas Pardoen , Thierry J. Massart	
11:55	<i>New Insight into Crack Formation during Corrosion in Zirconium-Based Metal-Oxide Systems</i> Natasha Vermaak , Rafael Estevez, Guillaume Parry	
MS-26.2 Multiscale Mechanics of Interfaces S3		Thursday, 14:15 - 15:45 Chair: E.P. Busso, W.A. Curtin
14:15	<i>Mixed Mode Cohesive Laws Derived from Potential Functions (Keynote)</i> Bent F. Sørensen	
14:51	<i>Discretisation and Model Error Estimation within 3D Multiscale XFEM for Cracks</i> Corinna Prange , Stefan Loehnert, Peter Wriggers	
15:11	<i>Size Effect in the Damage Behaviour of Short Fibre Reinforced Composites – Insights in the Interface Design of Materials</i> Norbert Huber , Ingo Scheider, Yongjun Chen, Jörn Mosler	
15:29	<i>Multi-Scale Modeling of Layered Materials with Damaging Interfaces</i> Andrea Bacigalupo , Luigi Gambarotta	

MS-26.3 Multiscale Mechanics of Interfaces
S3

Thursday, 16:00 - 18:00
Chair: V. Petrova, Th. Pardoën

-
- 16:00 *Dislocation Shielding and Crack-Tip Decohesion at the Atomic Scale* (Keynote)
William A. Curtin, J. Song
-
- 16:40 *In-Situ Experimental-Numerical Characterization of Interface Delamination*
Johan Hoefnagels, Murthy Kolluri, Hans Dommelen van, Marc Geers
-
- 17:00 *On the Relation between Interface Roughening and Damage in Metal-Polymer Laminates*
Jeroen van Beeck, Piet J.G. Schreurs, Marc G.D. Geers
-
- 17:20 *Modelling the Micromechanics of Fibrillation in Copper-Rubber Interfaces*
Bart Vossen, Piet Schreurs, Olaf van der Sluis, Marc Geers
-
- 17:40 *Consistent Computational Homogenisation with Reference to Triaxiality Effects in Cohesive Fracture*
Joris J.C. Remmers, Clemens V. Verhoosel, Rene de Borst
-

Minisymposium MS-27

Multiscale Mechanics of Smart Material Systems and Structures

Session	Day	Time	Room
MS-27.1	Thursday	13:45 - 15:45	AU3
MS-27.2	Thursday	16:00 - 18:00	K8

MS-27.1 Multiscale Mech. of Smart Material Systems and Structures Thursday, 13:45 - 15:45
AU3 Chair: M. Kamlah, Y. Shindo

13:45 *Dynamic Fatigue of Three-Point Bending PZT Ceramics with a Crack under AC Electric Fields*

Yasuhide Shindo, Fumio Narita, Yu Morikawa

14:05 *Effective Electric Permittivity of Cracks in Piezoelectric Ceramics*

Peter Neumeister, Martin Jurisch, Hans A. Jelitto, Andrea R. Engert, Gerold A. Schneider, Herbert Balke

14:25 *Computational Modelling of Ferroelectric Polycrystals with Three-Dimensional Polygonal Finite Elements*

Jayabal Kaliappan, **Andreas Menzel**

14:45 *Variational Scale Bridging in Dissipative Electro-Mechanics*

Dominic Zäh, Christian Miehe

15:05 *Multiscale Modeling of Magnetoactive Composite Materials*

Christian Spieler, Markus Kästner, Joseph Goldmann, Jörg Brummund, Volker Ulbricht

15:25 *Bio-Inspired Microfluidic Propulsion through Magnetic Artificial Flagella*

Sandeep K. Namdeo, S.N. Khaderi, J.M.J. den Toonder, P.R. Onck

MS-27.2 Multiscale Mech. of Smart Material Systems and Structures Thursday, 16:00 - 18:00
K8 Chair: A. Benjeddou, M. Kamlah

16:00 *Finite Element Characterization of d15 Shear Piezoelectric Macro-Fibre Composites Poled in Longitudinal Direction*

Burkhard Kranz, Benoit Gajewski, Ayech Benjeddou, Welf-Guntram Drossel

16:20 *Characterization and Analysis of the Nonlinear Behaviour of Piezoelectric Macro-Fibre Composites*

Marcelo A. Trindade, Ayech Benjeddou

- 16:40 *Static and Dynamic Response of Smart Composite Structures with Piezoelectric d15 Shear-Response-Based Torsion Actuation*
Michael Krommer, Pelin Berik, Yury Vetyukov, Ayeche Benjeddou
-
- 17:00 *Fatigue Lifetime Study of Piezoceramic Patch Transducers*
Monika Gall, Bärbel Thielicke
-
- 17:20 *Experimental and Theoretical Studies on Non-Linear Characterization of 1-3 Piezocomposites*
Jayendiran Raja, Arockiarajan Arunachalakasi
-
- 17:40 *Experimental Study on Tunable Magneto-Reological LCD System to Vibration Mitigation of Structures*
Hsien Hua Lee, C.-W. Cheng, Y.-Z. Lo
-

Minisymposium MS-28

Multiscale Modelling of Bones

Session	Day	Time	Room
MS-28.1	Friday	10:15 - 12:15	K6

MS-28.1 Multiscale Modelling of Bones
K6

Friday, 10:15 - 12:15
Chair: J.-M. Crolet , J.P. McGarry

10:15 *Bone Remodeling: A New Law from the Sinupros Model*

Jean Marie Crolet, M. Racila

10:35 *A Bone Remodelling Model Including Mechano-Chemical Coupling*

Vaclav Klika, Maria Angeles Perez, František Maršík, Manuel Doblaré, José Manuel García-Aznar

10:55 *A Two-Scale Approach for Finite Element Method Cancellous Bone Microstructure Remodeling Simulation*

Marcin Wierszycki, Krzysztof Szajek, Tomasz Łodygowski, Michał Nowak

11:35 *On the Numerical Solution of a Bioregulatory Model for Bone Fracture Healing*

Alexander Sapotnick, Udo Nackenhorst

11:15 *A Second Gradient Model Accounting for the Effect of Micro-Structure on Bone Remodeling*

Daniel George, Tomasz Lekszycki, **Angela Madeo**, Yves Rémond

11:55 *Mechanical Testing and Constitutive Modelling of the Multi-Axial Yield Behaviour of Trabecular Bone*

N. Kelly, D. Nolan, Patrick McGarry

Minisymposium MS-29

Multiscale Modelling of Polycrystalline Plasticity

Session	Day	Time	Room
MS-29.1	Thursday	10:15 - 12:15	K6
MS-29.2	Thursday	14:15 - 15:45	K6

MS-29.1 Multiscale Modelling of Polycrystalline Plasticity
K6

Thursday, 10:15 - 12:15
Chair: A. Butz, J. Segurado

10:15 *Towards an Effective Material Model for Elastoplastic Polycrystalline Materials through Homogenisation*

Eva Lehmann, Stefan Loehnert, Peter Wriggers

10:35 *Multiscale Simulations of Multiphase Steels*

Sergio Turteltaub, Sourena Yadegari, Akke Suiker

10:55 *Microstructural Analysis and Process Chain Simulation of Copper-Ribbons for Solar Cell Interconnections*

Alexander Butz, Dirk Helm, Rico Meier

11:15 *Multiscale Modeling of Accumulative Roll Bonding (ARB) Process*

Javier Segurado, Alvaro Ridruejo, Javier LLorca

11:35 *Multiscale Representation of the Microstructure Evolution and the Mechanical Properties of Steel Grade DC04 during the Production Process (Keynote)*

Dirk Helm, Maria Baiker, Pierre Bienger

MS-29.2 Multiscale Modelling of Polycrystalline Plasticity
K6

Thursday, 14:15 - 15:45
Chair: A. Butz, J. Segurado

14:15 *Microstructural Influence on the Strain Hardening Response of Two-Phase (α^2 γ) TiAl Polycrystal Investigated Using Crystal Plasticity and FE2 Multi-Level Modeling Approach*

Mohammad Rizviul Kabir, Liudmila Chernova, Marion Bartsch, Janine Schneider

14:35 *Numerical Multiscale Simulations of the Mechanical Behavior of Beta-Metastable Titanium Alloys Ti5553 and Ti17*

Guillaume Martin, L. Nazé, G. Cailletaud

14:55 *Plastic Strain Gradient Induced Internal Stress and Geometrically Necessary Dislocation Density in Grain Boundary Regions*

Anxin Ma, Alexander Hartmaier

15:15 *Continuum Modeling of Dislocation Starvation and Subsequent Nucleation in Nano-Pillar Compressions*

Antoine Jerusalem, Ana Fernandez, Allison Kunz, Julia R. Greer

Minisymposium MS-30

Multiscale Muscle Mechanics: Theory and Experiment

Session	Day	Time	Room
MS-30.1	Monday	16:00 - 18:00	K4
MS-30.2	Tuesday	10:15 - 12:15	K4

MS-30.1 Multiscale Muscle Mechanics: Theory and Experiment Monday, 16:00 - 18:00
K4 Chair: T. Leonard, W. Herzog

16:00 *Three-Dimensional Skeletal Muscle Modelling - Experiment and Simulation*

Markus Böhl, Maïke Sturmat, Christine Weichert, Tobias Siebert

16:20 *Myosin-Myosin Interactions Cause Differences Between Ensemble and Single Molecule Actomyosin Interactions*

Sam Walcott, Edward P. Debold

16:40 *Skeletal Muscle Myofibril Force Production During Lengthening*

Tim Leonard, Walter Herzog

17:00 *The Tilting Lever Arm Model of the Working Stroke of Muscle Myosin II Verified in Situ*

Massimo Reconditi, Elisabetta Brunello, Marco Linari, Gabriella Piazzesi, Malcolm Irving, Vincenzo Lombardi

17:20 *Force Enhancement in Skeletal Muscles: A Role for Titin?*

Walter Herzog, Tim Leonard, Michael DuVall, Jens Herzog

MS-30.2 Multiscale Muscle Mechanics: Theory and Experiment Tuesday, 10:15 - 12:15
K4 Chair: A. DiCarlo, G. Schappacher-Tilp

10:15 *Sarcomere Modeling and Sarcomere Dynamics: a Short Review*

Jachen Denoth, **Fabian Dettwiler**, Irina Agarkova

10:35 *A Structural Model of Force Generation in Single Myofibrils Aimed at Explaining Force Regulation in the Absence of Cross-Bridge Interaction*

Gudrun Schappacher-Tilp, Tim T. Leonard, Gertrud Desch, Walter Herzog

10:55 *Chemomechanical Coupling in Sarcomere Dynamics*

Lena Rebecca Zastrow, Antonio DiCarlo

11:15 *Towards Multi-Scale Modeling of Muscle Fibers with Sarcomere Non-Uniformities*

Sefi (Josef) Givli, Gregory Domeshek

11:35 *A Constitutive Model for Skeletal Muscle Contraction*

Babak Sharifimajd, Jonas Stalhand

11:55 *Electromechanical Coupling in Cardiac Dynamics: Constitutive Issues and Numerical Experiments*

Simone Pezzuto, Davide Ambrosi

Minisymposium MS-31

Nonlinear Elasticity

Session	Day	Time	Room
MS-31.1	Monday	10:15 - 12:15	K3
MS-31.2	Monday	16:00 - 18:00	K3
MS-31.3	Tuesday	10:15 - 12:15	K3
MS-31.4	Tuesday	16:00 - 18:00	K3
MS-31.5	Wednesday	10:15 - 12:15	K3
MS-31.6	Thursday	10:15 - 12:15	K3

MS-31.1 Nonlinear Elasticity
K3

Monday, 10:15 - 12:15
Chair: G. deBotton, Y. Fu

- 10:15 *On Axisymmetric Motions of a Finitely Deformed Magnetoelastic Thick-Walled Circular Cylindrical Tube*
Prashant Saxena, Raymond W. Ogden
-
- 10:35 *Long Wave Models for an Incompressible, Pre-Stressed Elastic Layer with Elastically Restrained Boundaries*
Graham Anthony Rogerson, Rinat Mukhomodyarov
-
- 10:55 *The Elastic and the Corresponding Dislocated Material: Definition, Strong Ellipticity, Solvability*
Dimitris Sfyris
-
- 11:15 *On Weakly Non-Linear Elastic Plane Waves in Anisotropic Materials*
Wlodzimierz Domanski
-
- 11:35 *Acoustic Radiation Force in Tissue-Like Solids Due to Modulated Sound Field*
Bojan B. Guzina, Egor V. Dontsov
-

MS-31.2 Nonlinear Elasticity
K3

Monday, 16:00 - 18:00
Chair: G. Rogerson, M.H.B.M. Shariff

- 16:00 *On Loss of Ellipticity in Second-Gradient Hyper-Elasticity of Fibre-Reinforced Materials*
Kostas P. Soldatos
-
- 16:20 *Buckling of a Supported Annular Plate with a Non-Euclidean Metric*
Michael Schwarzbart, Alois Steindl
-
- 16:40 *Imperfection Sensitivity of Elastic Localizations*
Yibin Fu
-

- 17:00 *Annular Shear Driven Periodic Bifurcation Patterns for a Compressible Elastic Tube*
Roger Fosdick, P. Foti, **Aguinaldo Fraddosio**, S. Marzano, M.D. Piccioni
-
- 17:20 *New Lower Bound Estimates of Critical Loads for Incompressible Elastic Solids*
Roger Fosdick, **Pilade Foti**, Aguinaldo Fraddosio, Salvatore Marzano, Mario Daniele Piccioni
-
- 17:40 *Electrostrictive Effects on the Stability of Dielectric Elastomer Actuators*
Massimiliano Gei, **Roberta Springhetti**, Stefania Colonnelli
-

MS-31.3 Nonlinear Elasticity
K3

Tuesday, 10:15 - 12:15
Chair: S. Federico, G. Schubert

- 10:15 *On Constructing Analytical Solutions for Large Localized States in a Blatz-Ko Cylinder*
Hui-Hui Dai, Xiaochun Peng
-
- 10:35 *Damage and Shape Transitions in Spherical Membranes*
Domenico De Tommasi, Salvatore Marzano, Giuseppe Puglisi, **Giuseppe Zurlo**
-
- 10:55 *Nonlinear Fracture Theory for Propellant Materials*
Panayiotis Kakavas, N.K. Anifantis
-
- 11:15 *The Mullins Effect and Transverse Isotropy*
Luis Dorfmann, Francesco Pancheri
-
- 11:35 *Constitutive Modeling of a Cast-Calendar SEBS: Large Strain, Compressibility and Anisotropic Damage Induced by the Process*
Anne-Sophie Caro-Bretelle, Patrick Ienny, Romain Leger, Jose-Marie Lopez-Cuesta
-
- 11:55 *Modelling of the Induced Anisotropy by Mullins Effect*
Guilherme Machado, Marie Rebouah, **Grégory Chagnon**, Denis Favier
-

MS-31.4 Nonlinear Elasticity
K3

Tuesday, 16:00 - 18:00
Chair: R. Bustamante, K.P. Soldatos

- 16:00 *On the Formulation of the Spatial and Material Motion Problem in Nonlinear Electro-Elastostatics*
Duc Khoi Vu, Paul Steinmann
-
- 16:20 *Notes on Metric Independent Aspects of Electromagnetism*
Reuven Segev, Lior Falach
-
- 16:40 *Characterisation of the Magneto-Rheological Effect of Silicone Rubber - Iron Particle Composites Under Large Strains*
Gerlind Schubert, Philip Harrison, Zaoyang Guo
-
- 17:00 *Ogden-Type Energies for Nematic Elastomers*
Virginia Agostiniani, Antonio DeSimone
-
- 17:20 *Non-Linear Modeling of Magneto-Sensitive Elastomers within a Mixed-Finite-Element Framework*
Franziska Anna Vogel, Paul Steinmann
-
- 17:40 *Inverse Form Finding for Incompressible Electroelasticity*
Anna Ask, Ralf Denzer, Andreas Menzel, Matti Ristinmaa
-

MS-31.5 Nonlinear Elasticity
K3

Wednesday, 10:15 - 12:15
Chair: L. Dorfmann, D. Sfyris

- 10:15 *Nonlinear Elasticity of Single Clusters in Colloidal Systems*
Khiêm Ngoc Vu, Roozbeh Dargazany, Mikhail Itskov
-
- 10:35 *Covariant Tensor Algebra in Non-Linear Elasticity*
Salvatore Federico
-
- 10:55 *On a New Class of Elastic Bodies: Some Theoretical Issues and Applications*
Roger Bustamante, Kumbakonam Rajagopal
-
- 11:15 *Notes on the Mechanics of Irregular Bodies*
Lior Falach, Reuven Segev
-
- 11:35 *Hyperelasticity Based upon Anisotropic Strain Measures*
Paweł Dłużewski
-
- 11:55 *Finite Deformation of Elastic Solids Reinforced with Fibers Resistant to Extension, Flexure and Twist*
David J. Steigmann
-

MS-31.6 Nonlinear Elasticity
K3

Thursday, 10:15 - 12:15
Chair: H.-H. Dai, D.K. Vu

- 10:15 *Principal Axis Formulations for Anisotropic Soft Tissue Materials*
M.H.B.M. Shariff
-
- 10:35 *Nonlinear Elasticity in the Interaction of Living Cells with their Mechanical Environment*
Yair Shokef, Samuel A. Safran
-
- 10:55 *Finite Element Implementation of a 3D Fung-Type Model*
Tuan Minh Duong, Huynh Nhu Nguyen, Manfred Staat
-
- 11:15 *A Micromechanics Approach for Estimating the Behavior of Soft Collagenous Tissues*
Gal H. deBotton, Gal Shmuel, Tal Oren
-
- 11:35 *The Mechanics of Indentation and Penetration of a Flat Membrane*
Djenane C. Pamplona, Guilherme R. Sampaio, Hans I. Weber
-
- 11:55 *Characterizing the Material Properties of Intestinal Tissues*
T.N. Tran, V. Novacek, F. Turquier, U. Klinge, R. Tolba, D. Bronson, A. Miesse, J. Whiffen, **Manfred Staat**
-

Minisymposium MS-32

Nonlinear Guided Waves in Solids: Theory and Experiments

Session	Day	Time	Room
MS-32.1	Thursday	10:15 - 12:15	AU3
MS-32.2	Thursday	16:00 - 18:00	AU3

MS-32.1 Nonlinear Guided Waves in Solids
AU3

Thursday, 10:15 - 12:15
Chair: K. Khusnutdinova, A. Samsonov

10:15 *Laser-Based Nonlinear Guided Acoustic Waves Propagating at Surfaces (2D) and Edges (1D)* (Keynote)

Alexey M. Lomonosov, Andreas P. Mayer, **Peter Hess**

10:55 *Nonlinear Modulation of Extensional Waves in an Elastic Layer*

Mevlut Teymur, Ali Demirci

11:15 *Torsional Wave Propagation in a Pre-Stressed Incompressible Mooney-Rivlin Annular Cylinder*

Tom Shearer, William James Parnell, **Ian David Abrahams**

11:35 *Cauchy Problem for Nonlinear Waves in Layered Waveguides: Extension of d'Alembert's Formula*

Karima Khusnutdinova, Kieron Moore

MS-32.2 Nonlinear Guided Waves in Solids
AU3

Thursday, 16:00 - 18:00
Chair: K. Khusnutdinova, A. Samsonov

16:00 *Bulk Strain Solitons as the Delamination Detection Instrument* (Keynote)

Alexander M. Samsonov, G.V. Dreiden, K.R. Khusnutdinova, I.V. Semenova

16:40 *Observations of Intrinsic Localized Modes and Dynamical 'Superlattices' in the High-Temperature Lattice Vibrations of Materials*

Michael E. Manley

17:00 *Shock Wave Propagation in Random Media*

David I. Ketcheson

17:20 *The Role of Nonlinearity and Dispersion on Wave Motion in Microstructured Solids*

Kert Tamm, Tanel Peets

Minisymposium MS-33

Nonlinear Waves in Modern Materials and Acoustodiagnosics

Session	Day	Time	Room
MS-33.1	Thursday	10:15 - 12:15	S1
MS-33.2	Thursday	14:15 - 15:45	S1
MS-33.3	Friday	10:15 - 12:15	S1

MS-33.1 Nonlinear Waves in Modern Mater. and Acoustodiagn. Thursday, 10:15 - 12:15
S1 Chair: V.I. Erofeev, A. Porubov

10:15 *Strong Energy Exchanges and Nonlinear Breathers in Weakly Coupled Granular Chains*
Yuli Starosvetsky, Md Arif Hasan, **Alexander Vakakis**, Leonid I. Manevitch

10:35 *Linear and Nonlinear Waves in Discrete Structures: Continualization and Discrete Effects*
Igor Vasilievich Andrianov, Vladislav V. Danishevs'kyi, Dieter Weichert

10:55 *Searching for Local Contact Constraints in the Finite Element Analysis of Contact-Impact Problems*
Jiri Plešek, Jan Kopacka, Dusan Gabriel

11:15 *Interaction of Bursts for Acoustodiagnosics of Functionally Graded Materials*
Arvi Ravasoo

11:35 *Explicit Example of Non-Unique Extensional Edge Waves in Pre-Stressed Incompressible Plates*
Aleksey V. Pichugin, Graham A. Rogerson

11:55 *Shear Viscosity from Angular Momentum Relaxation at Hydrodynamical Description*
German Maximov, Vladimir Larichev

MS-33.2 Nonlinear Waves in Modern Mater. and Acoustodiagn. Thursday, 14:15 - 15:45
S1 Chair: I.V. Andrianov

14:15 *Localization of Nonlinear Strain Waves in Composites*
Alexey Porubov, Igor Andrianov, Dieter Weichert

14:35 *Elastic Waves in a Structurally-Nonlinear Fibrous Composite Material. 2D Anti-Plane Shear Problem*
Igor V. Andrianov, **Vladyslav V. Danishevskyy**, Oleksandr I. Ryzhkov, Dieter Weichert

14:55 *The Formation of Localized Magnetoelastic Waves under the Influence of the Magnetic Field*

Vladimir Ivanovich Erofeyev, Alexey Olegovich Malkhanov

15:15 *The Riemann Magnetoelastic Wave in a Rod*

Alexey Olegovich Malkhanov, Vladimir Ivanovich Erofeyev

MS-33.3 Nonlinear Waves in Modern Mater. and Acoustodiagn.
S1

Friday, 10:15 - 12:15
Chair: C. Boutin, V.V. Danishevskyy

10:15 *Harmonic Bursts of Ultrasonic Frequency in Exponentially Graded Materials*

Andres Braunbrück

10:35 *On Elastic Composite with Non-Local Space and Time Effects at the Leading Order*

Claude Boutin, Stephane Hans, Celine Chesnais, Jean Soubestre

10:55 *Dynamics of Phase Transition in Solids*

Dmitry Sergeevich Vavilov

11:15 *High Frequencies Modes of Large Correlation Length in Reticulated Media*

Antoine Rallu, Stéphane Hans, Claude Boutin

11:35 *Wave Propagation Control via Internal-Degree-of-Freedom Engineering*

Alessandro Spadoni

Minisymposium MS-34

Optimization in Nonlinear Solid Mechanics

Session	Day	Time	Room
MS-34.1	Tuesday	16:00 - 18:00	K6
MS-34.2	Wednesday	10:15 - 12:15	K6

MS-34.1 Optimization in Nonlinear Solid Mechanics
K6

Tuesday, 16:00 - 18:00
Chair: H. Rodrigues, J. Stålhand

16:00 *Geometric Constraints in Structural Optimization via a Level-Set Method*

Gregoire Allaire, Francois Jouve, **Georgios Michailidis**

16:20 *A Modified Extended Finite Element Approach - Structural and Sensitivity Analysis*

Daniel Materna, Franz-Joseph Barthold

16:40 *Shape Optimization of Interfaces of Layered Structures*

Masatoshi Shimoda

17:00 *Enhancing the Damping Properties of Viscoelastic Composites by Topology Optimization*

Casper Schousboe Andreassen, Erik Andreassen, Ole Sigmund, Jakob Søndergaard Jensen

17:20 *Simultaneous Optimization of Orientation and Constituent Volume of Piezoelectric Composite Laminates*

K.P. Jayachandran, J.M. Guedes, H.C. Rodrigues

MS-34.2 Optimization in Nonlinear Solid Mechanics
K6

Wednesday, 10:15 - 12:15
Chair: H. Rodrigues, J. Stålhand

10:15 *Topology Optimization of Elastic Multibody Systems Using the Floating Frame of Reference Formulation*

Alexander Held, Robert Seifried

10:32 *Parameter Free Shape Optimization Including Nonlinear Kinematics*

Helmut Masching, Michael Fischer, Matthias Firl, Kai-Uwe Bletzinger

10:49 *Topology Optimization of Flexible Components in Multibody Systems: Application to the Housing of an Automotive Differential*

Emmanuel Tromme, Olivier Brûls, Geoffrey Virlez, Pierre Duysinx

11:06 *Shape Optimization of a Balloon Expandable Coronary Stent*

Nelson Ribeiro, João Folgado, Helder Rodrigues

11:23 *On In Vivo Parameter Identification in Soft Tissue*

Jonas Stalhand

11:40 *Coupling Partially Converged Computations and Multiparametric Strategy for Structural Optimization of Assemblies*

Bruno Soulier, P.A. Boucard

11:57 *Optimal Control of Quasistatic Evolution - Elastoviscoplastic Contact Problems*

Gonzalo Alduncin

Minisymposium MS-35

Phase Transformations

Session	Day	Time	Room
MS-35.1	Monday	10:15 - 12:15	K5
MS-35.2	Tuesday	14:45 - 15:45	K5
MS-35.3	Tuesday	16:00 - 18:00	K5

MS-35.1 Phase Transformations
K5

Monday, 10:15 - 12:15
Chair: A. Menzel, M. Peigney

10:15 *A Microelastic-Plastic Phase-Field Model for Phase Transformations* (Keynote)

Heike Emmerich

10:55 *Phase Field Simulation as Part of Multiscale Modeling for PZT Ferroelectrics: Identification of the Free Energy and Domain Effective Small and Large Signal Properties*

Benjamin Völker, **Marc Kamlah**

11:15 *Inertia Dominated Criticality in Martensites*

Alphonse Finel, Oguz Umut Salman, Lev Truskinovsky

11:35 *On the Structure of Impact Induced Interphase Layers - A Heat Conducting Maxwellian Rate-Type Approach to Solid-Solid Phase Transitions*

Cristian Fiacu, Alain Molinari

11:55 *On Kinetics of Interphase Boundaries and Chemical Reactions Fronts in Elastic Solids*

Alexander B. Freidin, Elena N. Vilchevskaya, Igor K. Korolev, Daria O. Volkova

MS-35.2 Phase Transformations
K5

Tuesday, 14:45 - 15:45
Chair: St. Stupkiewicz

14:45 *Experimental Analysis of Fe-Based Shape Memory Alloy Behavior under Thermo-Mechanical Loading*

Walid Khalil, Luc Saint-Sulpice, Shabnam Arbab Chirani, Céline Bouby, Alain Mikolajczak, **Tarak Ben Zineb**

15:05 *A Large-Strain Model for Phase-Transformation-Plasticity-Interactions in Steels*

Thorsten Bartel, Andreas Menzel

15:25 *Elasto-Visco-Plasticity Involved During Diffusive Phase Transformation of Polycrystals. Focus on Viscosity in Steels*

Fabrice Barbe, Romain Quey, Lakhdar Taleb

MS-35.3 Phase Transformations
K5

Tuesday, 16:00 - 18:00
Chair: Th. Bartel, T. Ben Zineb

-
- 16:00 *The Role of the Microstructure on the Kinetics of Phase Transformations in Cu-Sn Reaction Couple*
Franz Dieter Fischer, J. Svoboda
-
- 16:20 *Energy-Minimizing Strains in Martensitic Microstructures*
Michael Peigney
-
- 16:40 *Modelling of Incompatible Martensitic Microstructures*
Stanislaw Stupkiewicz, Anna Górzynska-Lengiewicz
-
- 17:00 *A Thermomechanical Mesoscopic Model for Shape-Memory Alloys*
Barbora Benesova
-
- 17:20 *Phase Transformations Limiting Surfaces and Exact Energy Lower Bounds Construction for Elastic Solids*
Mikhail A. Antimonov, Andrey V. Cherkaev, Alexander B. Freidin
-
- 17:40 *Phase Transitions of a SMA Wire: Analytical Formulas and the Determination of Material Constants*
Zilong Song, Hui-Hui Dai
-

Minisymposium MS-36

Refined Theories of Plates and Shells

Session	Day	Time	Room
MS-36.1	Wednesday	10:15 - 12:15	Casineum
MS-36.2	Thursday	10:15 - 12:15	Casineum
MS-36.3	Thursday	14:15 - 15:45	Casineum
MS-36.4	Thursday	16:00 - 18:00	Casineum
MS-36.5	Friday	10:15 - 12:15	Casineum

MS-36.1 Refined Theories of Plates and Shells
Casineum

Wednesday, 10:15 - 12:15
Chair: D. Hodges, L. Noels

10:15 *A Definition of Polyconvex Stored Energy Functions for Nonlinearly Elastic Shells*
(Keynote)

Philippe G. Ciarlet

10:50 *One-Dimensional Model for the Combined Bending, Stretching, Shearing and Torsion of Laminated Rods Derived from Three-Dimensional Elasticity*

Erick Pruchnicki

11:07 *Basic Modelling for Large Deformation on Plates*

Jens Rückert, Arnd Meyer

11:24 *2D Models of Plates and Shells Made of an Anisotropic Material*

Petr Evgen'evich Tovstik, Tatiana Petrovna Tovstik

11:41 *Analysis of 2-Dimensional Non-Homogeneous Residual Stress State in Plates*

Rostislav Dmitrievich Nedin, Alexander Ovanesovich Vatulyan

11:58 *Some Considerations on the Plastic Buckling of Cylindrical Shells*

Federico Guarracino

MS-36.2 Refined Theories of Plates and Shells
Casineum

Thursday, 10:15 - 12:15
Chair: V.A. Eremeyev, W. Pietraszkiewicz

10:15 *Comparison of Different Shell Theories for Nonlinear Vibrations of Laminated Circular Cylindrical Shells*

Marco Amabili

- 10:35 *Extension of Koiter's Linear Shell Theory to Materials Exhibiting Arbitrary Symmetry*
David J. Steigmann
-
- 10:55 *A One-Field Formulation of Elasto-Plastic Shells with Fracture Applications*
Gauthier Becker, **Ludovic Noels**
-
- 11:15 *Deformations of Transversely Accreted Plates*
Sergey Alexandrovich Lychev
-
- 11:35 *A Vekua-Type Thick Shells' Theory*
Sergey Igorevich Zhavoronok
-
- 11:55 *C1 Continuous Finite Element Approximation for Modeling Finite Deformations of Kirchhoff-Love Shells as Material*
Yury M. Vetyukov
-

MS-36.3 Refined Theories of Plates and Shells
Casineum

Thursday, 14:15 - 15:45
Chair: H. Altenbach, E. Ivanova

- 14:15 *A Modified Energy Method for the Buckling of Thin Plates in Tension*
Xiang Liu, **Ciprian Coman**
-
- 14:33 *Effect of "Static Resonance" in Cylindrical Shells with Periodical Geometrical Imperfections*
Maksym Kolesnikov, Vasily L. Krasovsky, Ruediger Schmidt
-
- 14:51 *On the Unsymmetrical Wrinkling of Heterogeneous Circular and Annular Plates*
Eva Voronkova, Svetlana Bauer, Anders Eriksson
-
- 15:09 *On the Stability of the Cylindrical Shell under the Axial Compression with Use of Non-Classical Theories of Shells*
Andrei Ermakov
-
- 15:27 *Theory of Micropolar Orthotropic Elastic Thin Shells*
A.J. Farmanyany, **Samvel Hovhannes Sargsyan**
-

MS-36.4 Refined Theories of Plates and Shells
Casineum

Thursday, 16:00 - 18:00
Chair: G. Dhondt, E. Pruchnicki

- 16:00 *Efficient High-Fidelity Multiphysics Modeling of Composite Plates Using the Variational Asymptotic Method* (Keynote)
Dewey Hodges, Chang-Yong Lee, Dewey H. Hodges
-
- 16:35 *Automatic Expansion of Shell Elements into 3D by Use of Expandable Rigid Bodies*
Guido Dominique Dhondt
-
- 16:52 *Nonlinear Stability Analysis of Functionally Graded Shells Using the Invariant-Based Triangular Finite Element*
Stanislav Levyakov, V.V. Kuznetsov
-
- 17:09 *Enhanced FGM Shell Finite Elements*
Stephan Kugler, Peter Fotiu, Justin Murin
-

17:26 *Elastoplastic Thin Plate Finite Elements in Absolute Nodal Coordinate Formulation*

Peter Gruber, Yury Vetyukov, Johannes Gerstmayr

17:43 *Derivation of Thermoelastic Shell Theory by Means of Continuum with Internal Degrees of Freedom*

Elena Ivanova

MS-36.5 Refined Theories of Plates and Shells
Casineum

Friday, 10:15 - 12:15
Chair: F. Guarracino, D. Steigmann

10:15 *On Refined Constitutive Equations of the Resultant Non-Linear Thermomechanics of Shells*

Wojciech Pietraszkiewicz

10:35 *Asymmetric Thermo-Elastic Analysis of a Long Functionally Graded Piezoelectric Cylindrical Shell by DQM*

Reza Akbari Alashti, Mohammad Khorsand

10:55 *On the Theories of Shells with Surface Stresses*

Victor A. Eremeyev, Holm Altenbach

11:15 *A Shell Theory for Chiral Carbon Nanotubes*

Antonino Favata, Paolo Podio-Guidugli

11:35 *Governing Equations for Multi-Walled Carbon Nanotubes Derived from Theories of Orthotropic Cylindrical Shells and Nonlocal Elasticity*

Gennadi Mikhasev

11:55 *On the Bending of Plates in the Electromagnetic Theory of Microstretch Elasticity*

Catalin Bogdan Gales

Minisymposium MS-37

Shape Memory Alloys and Functional Materials

Session	Day	Time	Room
MS-37.1	Monday	16:00 - 18:00	K5
MS-37.2	Tuesday	10:15 - 12:15	K5

MS-37.1 Shape Memory Alloys and Functional Materials
K5

Monday, 16:00 - 18:00
Chair: Th. Antretter, P. Šittner

- 16:00 *Phase Field Theory and Simulations for Stress-Induced Phase Transformations*
(Keynote)
Valery I. Levitas
-
- 16:40 *Finite Element Analysis of a Fishplate in Fe-Based Shape Memory Alloy*
Alain Mikolajczak, Walid Khalil, Celine Bouby, Tarak Ben Zineb
-
- 17:00 *A Microstructural Model of the Reversible and Irreversible Deformation of Shape Memory Alloy with Deformation Defects*
Margarita E. Evard, **Aleksandr E. Volkov**, Natalia A. Volkova
-
- 17:20 *Three Dimensional Thermomechanical Model for Shape Memory Alloys Exhibiting R-Phase Transformation and Material Anisotropy*
Petr Sedlák, **Miroslav Frost**, Barbora Benešová, Tarak Ben Zineb, Petr Šittner
-
- 17:40 *Mechanical Vibrations of Shape Memory Alloy Wires and Rods: Mathematical and Constitutive Modelling*
Mario Leindl, Eduard Roman Oberaigner
-

MS-37.2 Shape Memory Alloys and Functional Materials
K5

Tuesday, 10:15 - 12:15
Chair: Th. Antretter, P. Šittner

- 10:15 *On the Young's Modulus of Austenite and Stress Induced Martensite in Superelastic NiTi Wires*
Petr Šittner, Caroline Curfs, Thierry Alonso, Jan Pilch, Ludek Heller
-
- 10:35 *Effect of High Strain Rate on TiNi Shape Memory Alloys*
A. Galieva, V. Grigorieva, A. Gruzdkov, S. Krivosheev, E. Ostropiko, A. Motorin,
Alexander Igorevich Razov
-
- 10:55 *Measurement by DMA in Tension of Elastic Moduli and Transformation Behaviour of Fine Nitinol Medical Wires as Function of Stress and Temperature*
Thierry Alonso, **Denis M. Favier**, Gregory Chagnon, Petr Šittner
-
- 11:15 *Micromorphology and Mobility of Macro-Twin Boundaries in Ni-Mn-Ga 10M Martensite*
Hanus Seiner, Ladislav Straka, Oleg Heczko
-

11:35 *Experiments and Modeling of Smart Silicone Elastomer Membranes Reinforced with Shaped NiTi Textiles*

François Tissot, Thierry Rey, Ludek Heller, Nathanael Connesson, Gregory Chagnon, Yohan Payan, Denis M. Favier, Petr Šittner

11:55 *Functional Plain Weft Knitted NiTi Textiles and Elastomeric Composites*

Ludek Heller, **Bohdana Marvalova**, Jarmil Vlach, Katerina Janouchova, David Vokoun

Minisymposium MS-38

Stability and Nonlinear Behavior of Steel Structures

Session	Day	Time	Room
MS-38.1	Wednesday	10:15 - 12:15	K7
MS-38.2	Thursday	10:15 - 12:15	K7
MS-38.3	Thursday	14:15 - 15:45	K7
MS-38.4	Thursday	16:00 - 18:00	K7

MS-38.1 Stability and Nonlinear Behavior of Steel Structures Wednesday, 10:15 - 12:15
K7 Chair: L. Gardner, A. Taras

10:15 *Interactive Buckling in Structural Components: Analytical Modelling*

Mohammad Ahmer Wadee

10:35 *Towards a Uniform Stability Design Procedure for Steel Beam-Columns with Compact, Semi-Compact and Slender Cross-Sections*

Andreas Taras

10:55 *The Application of Plastic Flow Theory to Bifurcation Problems*

Jurgen Becque

11:15 *Non-Linear Elastic Response of Shallow Fixed-Pinned Arches*

Yong-Lin Pi, **Mark A. Bradford**

11:35 *A Semi-Analytical Model for the Post-Buckling Analysis and Ultimate Strength Prediction of Stiffened Plates Used in Steel Bridges*

Pedro Salvado Ferreira, Francisco Virtuoso

11:55 *Consistent Stiffness Matrices for the Semi-Analytical Finite Strip Method*

Dávid Visy, Sándor Ádány

MS-38.2 Stability and Nonlinear Behavior of Steel Structures Thursday, 10:15 - 12:15
K7 Chair: D. Camotim, M. Knobloch

10:15 *Influence of Strain Hardening on the Behaviour and Design of Steel and Steel-Concrete Composite Structures*

Leroy Gardner, Lorenzo Macorini, Merih Kucukler

10:55 *Experimental and Numerical Investigations towards Lateral Torsional Buckling of Cellular Steel Beams*

Moussa Lo, Joanna Nseir, Hugues Somja, **Nicolas Boissonnade**

11:15 *Yield Slenderness Limits for Cold-formed High Strength Carbon and Stainless Steel Tubes*

Tak Ming Chan, Xiao-Ling Zhao, Ben Young

11:35 *Structural Stability of Steel Members in Fire*

Markus Knobloch

MS-38.3 Stability and Nonlinear Behavior of Steel Structures
K7

Thursday, 14:15 - 15:45

Chair: M.A. Bradford, M.A. Wadee

14:15 *Finite Element Analysis of Columns with Semi-Elliptical Hollow Section*

Nuno Silvestre, Tiago Pires

14:35 *Prediction of the Collapse Mode of Axially Crushed Steel Profiles*

Bernhard Müller, Martin Schagerl, Kai-Uwe Schröder

14:55 *Strength of Hollow Tubular Flange Plate Girders with Slender Webs Containing Square Openings*

Mostafa Fahmi Hassanein

15:15 *Buckling Collapse of Tank Wagon in Consequence of Pressure Difference*

Dmitry Nesterenko, **Dmitry Nesterenko**

MS-38.4 Stability and Nonlinear Behavior of Steel Structures
K7

Thursday, 16:00 - 18:00

Chair: G. Ranzi, N. Silvestre

16:00 *Shell-Model-Based Analytical Solutions for Column Buckling with Considering Shear Deformations*

Sándor Ádány

16:20 *A Semi-Discretization Approach to Generalized Beam Theory and Analytical Solutions of the Generalized Column Equations*

Jeppe Jönsson, Michael Joachim Andreassen

16:40 *A New Approach for the GBT Analysis of Thin-Walled Members*

Gerard Taig, **Gianluca Ranzi**, Angelo Luongo

17:00 *Design of Steel Storage Rack Columns against Distortional Buckling: Investigating Possible Improvements to the EN15512*

Miquel Casafont, Maria Magdalena Pastor, Francesc Roure, Jordi Bonada

17:20 *Numerical Investigation on the Distortional-Global Interaction in Fixed-Ended and Pin-Ended Thin-Walled Lipped Channel Columns*

Dinar Camotim, Pedro B. Dinis

Minisymposium MS-39

Surface and Interface Acoustic Waves in Solids

Session	Day	Time	Room
MS-39.1	Monday	10:15 - 12:15	S2
MS-39.2	Monday	16:00 - 18:00	S2

MS-39.1 Surface and Interface Acoustic Waves in Solids
S2

Monday, 10:15 - 12:15
Chair: S. Nair, D. Sotiropoulos

10:15 *Health Monitoring of Composite Structures Using Ultrasonic Waves*

Ajit K. Mal, Fabrizio Ricci, Harsh K. Baid

10:35 *Joint Analysis of Surface Waves*

Giancarlo Dal Moro

10:55 *Propagation, Transmission and Reflection of Acoustic Waves in Second Gradient 3D Continua*

Francesco dell'Isola, Angela Madeo, **Luca Placidi**

11:15 *The Areolar Strain Approach for Elastic Waves*

Ihor Kotcherenko

11:35 *Rayleigh Wave Scattering from a Sinusoidal Perturbation of a Flat Surface in an Incompressible Monoclinic Medium*

Sudhakar Nair, Dimitrios A. Sotiropoulos

MS-39.2 Surface and Interface Acoustic Waves in Solids
S2

Monday, 16:00 - 18:00
Chair: S. Nair, D. Sotiropoulos

16:00 *On Propagation of Singular Surfaces in Thermo-Piezoelectricity*

Adriano Montanaro

16:20 *Acoustic Propagation along a Fluid-Solid Interface*

Piotr Borejko

16:40 *Damage Detection in Plate-Like Structures Using a Beam-Forming Technique*

Fabrizio Ricci, Ernesto Monaco, Simone Tancredi, Domenico Caporrino, Ajit K. Mal

17:00 *Using Embedded PZT Transducers to Determine the Elastic Constants of Concrete Structures*

Costas Providakis, Vagelis Liarakos, Stelios Providakis

17:20 *Interaction of Elastic Waves with a Disbond in a Honeycomb Composite*

Harsh K. Baid, Fabrizio Ricci, **Ajit K. Mal**

17:40 *Characterizing Anisotropic Solids from a Linearized Surface Acoustic Wave Equation*

Dimitrios A. Sotiropoulos, Sudhakar Nair

Minisymposium MS-40

Surface Effects in Nano-Mechanics

Session	Day	Time	Room
MS-40.1	Thursday	10:15 - 12:15	K2
MS-40.2	Thursday	16:00 - 18:00	K2
MS-40.3	Friday	10:15 - 12:15	K2

MS-40.1 Surface Effects in Nano-Mechanics
K2

Thursday, 10:15 - 12:15
Chair: H. Altenbach, J. Povstenko

10:15 *Mathematical Modeling of Phenomena Caused by Non-Uniform Surface Tension in Solids* (Keynote)

Yuriy Povstenko

10:50 *On Modeling of Surface and Interface Elastic Effects in Case of Eigenstrains*

Konstantin B. Ustinov, Robert V. Goldstein, Valentin A. Gorodtov

11:07 *On Mechanical Properties of Materials Considering Surface Effects*

Holm Altenbach, Victor A. Eremeyev, Nikita F. Morozov

11:24 *Influence of Surface Stress on Stability of Nanoscale Plate with a Circular Hole*

Nikita F. Morozov, **Stanislava V. Kashtanova**

11:41 *Surface Stress in an Elastic Plane with a Near-Circular Hole*

Mikhail Grekov, Anna Yazovskaya

11:58 *Mathematical Models of Continuous Growth*

Alexander V. Manzhirv

MS-40.2 Surface Effects in Nano-Mechanics
K2

Thursday, 16:00 - 18:00
Chair: S.A. Lurie, Z.-P. Huang

16:00 *Interface Energy Theory and its Application for Thermo-Elastic Nanocomposites*

Zhu-Ping Huang, Yongqiang Chen, Lizhi Sun

16:17 *Glass Spheres - Functionalization and Surface Modification*

Zinaida Ivanova Kutelova, H. Mainka, K. Mader, W. Hintz, J. Tomas

16:34 *Surface Mechanics and Full-Field Measurements: Investigation of the Electro-Elastic Coupling*

Fabien Amiot, Cécile Flammier, Frédéric Kanoufi, Sorin Munteanu, Jean Paul Roger, Gilles Tessier

16:51 *Surface Chemical Reactions Kinetics in Elastic Solids*

Elena Vilchevskaya, Alexander Freidin, Igor Korolev

17:08 *Elastic Properties of Ideal Crystals: From Macro to Micro*

Anton Krivtsov, Olga Loboda, Ekaterina Podolskaya

17:25 *Reassessing the Bending Stiffness of Graphene and the Applicability of Continuum Mechanics*

Fengpeng Zhao, Yongkuan Shen, Hengan Wu

17:42 *Bounding Wall Structure Effect on Buckling of a Carbon Nanotube and on a Fluid Flow*

Andrei Karenovitch Abramian, L.V. Mirantsev

MS-40.3 Surface Effects in Nano-Mechanics
K2

Friday, 10:15 - 12:15
Chair: I. Berinskii, P. Steinmann

10:15 *The Admissibility of Negative Material Parameters for Surface Elasticity Theory*

Ali Javili, Andrew McBride, **Paul Steinmann**, B. Daya Reddy

10:35 *Tunable Bending Stiffness, Natural Frequency and Buckling Force of Nanowires and Nanoplates*

Hanxing Zhu

10:55 *Generalized Continuum Model of Adhesion: Adhesion Phenomena for Solids, and Micro/Nanostructures*

Sergey Albertovich Lurie, Natalia P. Tuchkova, Jury O. Soliaev

11:15 *Models of Graphene Crystal Lattice Based on Discrete and Continuous Approaches*

Igor Berinskii, Anton Krivtsov

11:35 *Stability and Structural Transitions in Crystal Lattices*

Ekaterina Podolskaya, Anton Krivtsov, Artem Panchenko

11:55 *Effect of a Type of Loading on Stresses at a Planar Boundary of a Nanomaterial*

Mikhail Grekov, **Yulia Vikulina**

Minisymposium MS-41

Surface Effects in Nano-Mechanics

Session	Day	Time	Room
MS-41.1	Tuesday	10:15 - 12:15	K6
MS-41.2	Tuesday	14:45 - 15:45	K6

MS-41.1 Theor. and Numerical Modelling of the Function of the Eye Tuesday, 10:15 - 12:15
K6 Chair: H.J. Burd, A. Pandolfi

- 10:15 *Assessment of the Ocular Response Analyzer as a Tool for Measuring Intraocular Pressure and Corneal Biomechanical Properties*
Ahmed Elsheikh, David F. Garway-Heath
- 10:35 *A Molecular-Level Model of Collagen-Proteoglycan Structural Interactions in the Cornea Stroma: A New Theory for Swelling Pressure*
Xi Cheng, **Peter M. Pinsky**
- 10:55 *Testing and Modeling the Behavior of Porcine Cornea*
Federica Boschetti, **Anna Pandolfi**
- 11:15 *The Complex Biomechanical Analysis of the Human Eye*
Zoltán Bocskai, Imre Bojtár
- 11:35 *A Multi-Scale Model for the Mechanics of the Human Lens Capsule*
Harvey John Burd

MS-41.2 Theor. and Numerical Modelling of the Function of the Eye Tuesday, 14:45 - 15:45
K6 Chair: A. Elsheikh, P.M. Pinsky

- 14:45 *A Model of Posterior Vitreous Detachment and Generation of Traction on the Retina*
Amabile Tatone, Rodolfo Repetto
- 15:05 *Effect of the Scleral Collagen Structure on the Biomechanical Response of the Optic Nerve Head*
Baptiste Coudrillier, Thao D. Nguyen
- 15:25 *Fiber Distributed Hyperelastic Modeling of Biological Tissues*
Marcello Vasta, Anna Pandolfi

Minisymposium MS-42

Trends in Phase-Field Modelling

Session	Day	Time	Room
MS-42.1	Thursday	16:00 - 18:00	S2
MS-42.2	Friday	10:15 - 12:15	S2

MS-42.1 Trends in Phase-Field Modelling
S2

Thursday, 16:00 - 18:00
Chair: S. Forest, B. Markert

16:00 *Study of Three Dimensional Crack Instabilities Using a Phase Field Model*
Hervé Henry

16:20 *Diffusive Porous Media Fracture*
Bernd Markert

16:40 *Configurational Forces in the Context of a Phase Field Fracture Model*
Charlotte Kuhn, R. Müller

17:00 *Relaxed Phase Field Modeling for Compressible Media*
Christian Rohde

17:20 *Continuous Modeling of Microstructure Evolution Coupled with Plastic Activity*
Maeva Cottura, Yann Le Bouar, Alphonse Finel, Benoît Appolaire, Samuel Forest

17:40 *A Phase Field Approach to Reactive Systems*
Kerstin Weinberg, Denis Anders

MS-42.2 Trends in Phase-Field Modelling
S2

Friday, 10:15 - 12:15
Chair: S. Forest, B. Markert

10:15 *Phase-Field Modelling Coupled with Micro-Elasticity Applied to Ageing in Sn-Cu/Cu and Sn-Ag-Cu/Cu Lead-Free Solder Joints*
Durga Ananthanarayanan, Patrick Wollants, Nele Moelans

10:35 *Interface Stress in Phase Field Models with Elasticity*
Benoît Appolaire, Yann Le Bouar, Alphonse Finel, Elisabeth Aeby-Gautier

10:55 *Coupling Diffusion and Mechanics within a Multiscale Material Modelling Framework*
Aurelien Villani, E.P. Busso, S. Forest, B. Appolaire

11:15 *Modeling of Dislocations at an Atomic Scale within a Continuum Framework and Coupling with a Phase Field Model*
Pierre-Antoine Geslin, Benoît Appolaire, Alphonse Finel

- 11:35 *Antiphase Boundaries in Rafted Structures: Experimental Investigation and Phase Field Modeling*
Adèle Lyprendi, **Yann Le Bouar**, Alphonse Finel, Jean-Sébastien Mérot, Loïc Patout, Francois Brisset
-
- 11:55 *Phase-Field Formulation for Heterogeneous Systems and its Implementation into the OpenPhase Library*
Ingo Steinbach, Oleg Shchyglo
-

Minisymposium MS-43

Virtual Testing of Composites

Session	Day	Time	Room
MS-43.1	Monday	10:15 - 12:15	K6
MS-43.2	Monday	14:45 - 15:45	K6
MS-43.3	Monday	16:00 - 18:00	K6

MS-43.1 Virtual Testing of Composites
K6

Monday, 10:15 - 12:15
Chair: C. González, St. Hallett

10:15 *Virtual Tests for High-Temperature Ceramic Composites* (Keynote)

Brian Cox, Hrishikesh Bale, Renaud Rinaldi, Matthew Blacklock, Rob Ritchie, Matthew Begley, Frank Zok, Dave Marshall, Qingda Yang

10:50 *Micromechanical Study of the Failure of Fiber-Reinforced Polymers*

Luis Pablo Canal, Carlos González, Javier Segurado, Javier LLorca

11:07 *Micro-Level Simulation of Fracture in Laminated Composite Materials*

David Mollenhauer, Tim Breitzman, **Endel Iarve**, Kevin Hoos, Michael Swindeman, Eric Zhou

11:24 *The Effect of Micro-Scale Matrix Nonlinearity on Composite Strength under Combined Transverse and Shear Loads*

Martin Hirsekorn, Gaël Grail

11:41 *Mode I Single Z-Pin Pull-Out from a Cured Unidirectional Laminate*

Fabrice Hélénon, James K. Lander, Giuliano Allegri, **Stephen R. Hallett**, Michael R. Wisnom

11:58 *A Generalized Finite Element Method for Fiber Composites*

Adriaan Sillem, A. Simone, L.J. Sluys

MS-43.2 Virtual Testing of Composites
K6

Monday, 14:45 - 15:45
Chair: C. González, St. Hallett

14:45 *Isogeometric Analysis of Thin-Walled Composite Structures*

Saman Hosseini, Clemens V. Verhoosel, Joris J.C. Remmers, René de Borst

15:05 *A Level Set Model for Delamination in Shells*

Frans van der Meer, Bert Sluys

15:25 *A-FEM Based Multiscale Models with Discrete Microscopic Damage Evolution for Virtual Testing of Composites*

Qingda Yang, Brian Cox, Mark Spearing

MS-43.3 Virtual Testing of Composites
K6

Monday, 16:00 - 18:00
Chair: C. González, St. Hallett

-
- 16:00 *Discrete Damage Modeling Methods for Laminated Composite Strength Prediction*
Endel Iarve, Michael Swindeman, Kevin Hoos, David Mollenhauer, Stephen Hallett
-
- 16:20 *A Study on Matrix Crack Induced Delamination in Laminated Composites*
Lierni Zubillaga, Albert Turon , Josep Costa, Stephane Mahdi, Peter Linde
-
- 16:40 *Scaled Tests as Validation Tools: the Case of Low Velocity Impact Applied to a Mesomodel for Laminates*
Emmanuelle Abisset, Federica Daghia, Pierre Ladevèze, Michael R. Wisnom, Stephen R. Hallett
-
- 17:00 *Modelling of the Low-Velocity Impact Behaviour of 3D Orthogonal Hybrid Woven Composites*
Raúl Muñoz, Rocío Seltzer, Francisca Martínez, Carlos González, Javier LLorca
-

Minisymposium MS-44

Viscoelastic Behavior of Soft Tissues and Polymers

Session	Day	Time	Room
MS-44.1	Thursday	16:00 - 18:00	Blauer Salon
MS-44.2	Friday	10:15 - 12:15	Blauer Salon

MS-44.1 Viscoelastic Behavior of Soft Tissues and Polymers Thursday, 16:00 - 18:00
Blauer Salon Chair: S. Govindjee, V. Nguyen

16:00 *A Coupled Theory for Thermally Responsive Polymeric Gels* (Keynote)

Shawn A. Chester, Lallit Anand

16:40 *Application of Statistical Mechanics in Thermo-Mechanics and its Effects on Free-Energy Structure*

Sanjay Govindjee, Sunny Mistry, Aurelie Azoug

17:00 *The Role of Evolving Anisotropy and Physical Aging in Deformation and Fracture of Glassy Polycarbonate*

Mehrdad Negahban, Shawn Meagher, Laurent Delbreilh, Jean-Marc Saiter, Derek Peterson, Zheng Li

17:20 *Nonlinear Viscoelastic Contribution to the Tensile Cyclic Behavior of High Density Polyethylene: Experiments and Modeling*

Song Thanh Thao Nguyen, Sylvie Castagnet, Jean-Claude Grandidier

MS-44.2 Viscoelastic Behavior of Soft Tissues and Polymers Friday, 10:15 - 12:15
Blauer Salon Chair: S. Govindjee, V. Nguyen

10:15 *Heating and Stretching of Magneto-Sensitive and Mechanically Active Polymer Composites*

Karl kratz, Muhammad Yasar Razzaq, Marc Behl, **Karl Kratz**, Andreas Lendlein

10:35 *Modeling the Shape Memory Behavior of Amorphous Polymers*

Thao Nguyen

10:55 *Multi-Scale Modeling of the Viscoelastic Behavior of Cross-Linked F-Actin Networks*

Michael J. Unterberger, Gerhard A. Holzapfel

11:15 *Influence of Cryopreservation on the History Dependent Mechanical Response of Tissue Engineered Vascular Grafts*

Arabella Mauri, Steffen M. Zeisberger, Simon P. Hoerstrup, Edoardo Mazza

11:35 *Finite Element Model for the Frequency Response of Poroelastic Tissues under Dynamic Spherical Indentation Tests*

Matteo Taffetani, Emanuele Bertarelli, Riccardo Gottardi, Roberto Raiteri, Pasquale Vena

Minisymposium MS-45

Wave Propagation in Saturated and Partially Saturated Porous Media

Session	Day	Time	Room
MS-45.1	Thursday	10:15 - 12:15	Maybach
MS-45.2	Thursday	14:15 - 15:45	Maybach

MS-45.1 Wave Propagation in Saturated Porous Media
Maybach

Thursday, 10:15 - 12:15
Chair: B. Albers, K. Wilmanski

- 10:15 *Acoustics of Partially Saturated Rocks: Experiment, Theory and Simulation*
Tobias M. Mueller, Sofia Correia Lopes, German Rubino, Eva Caspari, Maxim Lebedev, Boris Gurevich
-
- 10:35 *Wave Propagation in Residual-Saturated Porous Media with Trapped Fluids*
Patrick S. Kurzeja, Holger Steeb
-
- 10:55 *The Effect of Fluid Streams in Porous Media on Acoustic Compression Wave Propagation, Transmission and Reflection*
Angela Madeo, Irini Djeran-Maigre, Giuseppe Rosi, Claire Silvani
-
- 11:15 *Two-Phase Finite Element Investigation of Vibrations due to Bankside Shipping Traffic*
Bettina Albers, Stavros A. Savidis
-

MS-45.2 Wave Propagation in Saturated Porous Media
Maybach

Thursday, 14:15 - 15:45
Chair: B. Albers, K. Wilmanski

- 14:15 *A General Two-Phase Debris Flow Model: Benchmark Simulations for Subaerial and Submarine Flows, Complex Wave Generation and Interactions*
Shiva P. Pudasaini
-
- 14:35 *Monitoring of Fabric Change in Multi-Phase Granular Material by Use of Coda-Wave Interferometry*
Frank Wuttke, Tom Schanz
-
- 14:55 *Sound Propagation in Particulate Systems with Disorder and Friction*
Lisa de Mol, Brian P. Lawney, Vanessa Magnanimo, Stefan Luding
-
- 15:15 *Acoustics and Anisotropic Diffusion in Poroelastic Media*
Bettina Albers, **Krzysztof Wilmanski**
-

General Session GS-CM

Continuum Mechanics

Session	Day	Time	Room
GS-CM.1	Monday	10:15 - 12:15	K4
GS-CM.2	Monday	14:15 - 15:45	K4
GS-CM.3	Monday	14:15 - 15:45	AU1
GS-CM.4	Tuesday	16:00 - 18:00	K4
GS-CM.5	Wednesday	10:15 - 12:15	K4
GS-CM.6	Wednesday	10:15 - 12:15	S3
GS-CM.7	Thursday	14:15 - 15:45	K2
GS-CM.8	Thursday	16:00 - 18:00	Maybach
GS-CM.9	Friday	10:15 - 12:15	K1

GS-CM.1 Continuum Mechanics
K4

Monday, 10:15 - 12:15
Chair: M. Amabili, W.J. Parnell

10:15 *Slip Dynamics at Frictional Interfaces: Influence of Viscoelasticity and Energetic Analysis*

David S. Kammer, Vladislav A. Yastrebov, Jean-François Molinari

10:32 *Scattering of Compressional Waves from a Spherical Void in a Pre-Stressed Non-Linear Elastic Host Medium*

Tom Shearer, William James Parnell, Ian David Abrahams

10:49 *Shear Wave Propagation in an Elastic Layer Containing Void Pores*

Prakash Chandra Pal, Banti Sen, Lalan Kumar

11:06 *Reflected Waves from a Solid Half Space in the Context of the Two-Temperature Theory*

Khaled A. Elsibai

11:23 *Physically and Geometrically Nonlinear Vibrations of Thin Rectangular Plates*

Ivan Breslavskyi, Marco Amabili, Mathias Legrand

GS-CM.2 Continuum Mechanics
K4

Monday, 14:45 - 15:45
Chair: H. Welemane

14:45 *Three-Parameter Damage Model for Quasi-Brittle Solids*

Ji Zhang, Jie Li

15:05 *Micromechanical Modeling of Brittle Damage in Composite Materials: Primary Anisotropy, Induced Anisotropy and Opening-Closure Effects*

Hélène Welemane, Cristina Goidescu, Olivier Pantalé, Floran Barelli, Olivier Dalverny

15:25 *A Stochastic Continuum Damage Mechanics Based Methodology for Residual Life Assessment against Creep Damage*

Y. Appalanaidu, Yash Vyas, **Sayan Gupta**

GS-CM.3 Continuum Mechanics
AU1

Monday, 14:45 - 15:45
Chair: I. Guz

14:45 *Buckling of an Elastic Hemispherical Shell with an Obstacle*

Alberto Maria Bersani, Ivan Giorgio, Giovanna Tomassetti

15:05 *Thermal Fatigue Life Prediction for a Sandwich Beam Containing Piezoactive Layers*

Igor Guz, Yaroslav Zhuk, Maria Kashtalyan

15:25 *Prediction of the Nonlinear Load and Unload Pressure-Volume Curves of a Complex Microsphere Composite including Buckling Effects*

I.D. Abrahams, **Riccardo De Pascalis**, W.J. Parnell

GS-CM.4 Continuum Mechanics
K4

Tuesday, 16:00 - 18:00
Chair: G. Parry, H. Petryk

16:00 *Continuous and Discrete Symmetries for Defective Crystals Related to a Class of Nilpotent Groups*

Gareth Parry, Rachel Nicks

16:20 *Symmetries of Crystals with Defects Related to Classes of Solvable Lie Groups*

Rachel Nicks, Gareth Parry

16:40 *Crystal Plasticity Using the Principle of Maximum Dissipation*

Markus Orthaber, Thomas Antretter, Werner Ecker

17:00 *Modelling of Deformation Banding by Incremental Energy Minimization in Crystal Plasticity*

Henryk Petryk, Michal Kurska

17:20 *A Strain Gradient Plasticity Model for the Finite Element Simulation of Lüders Band Propagation*

Matthieu Mazière, Anthony Marais, Samuel Forest

17:40 *On the Atomistic Definition of Local Stress in Continuum Mechanics*

Manfred H. Ulz, Kranthi K. Mandadapu, Panayiotis Papadopoulos

GS-CM.5 Continuum Mechanics
K4

Wednesday, 10:15 - 12:15
Chair: V. Monchiet, E. Starostin

- 10:15 *Representations of Fourth-Order Cartesian Tensors of Solid Mechanics*
András Lengyel, Tibor Tarnai
-
- 10:32 *Equilibria of Elastic Knots*
Eugene Starostin, Gert van der Heijden
-
- 10:49 *Thermodynamic Approach to Generalized Mechanics*
Peter Ván, Christina Papenfuss
-
- 11:06 *Rheology, Plasticity, and Thermal Expansion in a Nonequilibrium Thermodynamical Framework*
Attila Csátár, **Tamás Fülöp**, Péter Ván
-
- 11:23 *Solution of Coupled Thermomechanical Problems Using p-FEM*
Balázs Pere
-
- 11:40 *Algebra, Irreducible Bases and Compact Representations for Higher-Order Tensors*
Vincent Monchiet, Guy Bonnet
-
- 11:57 *Ghost Forces in Non-Local-to-Local Continua Coupling by the Morphing Method*
Yan Azdoud, Gilles H. Lubineau, Fei Han, Abe Askari
-

GS-CM.6 Continuum Mechanics
S3

Wednesday, 10:15 - 12:15
Chair: J. Sanahuja, P. Harrison

- 10:15 *Two Dimensional Deterministic Model of a Thin Body with Micro High Stiffness Fibers Randomly Distributed*
Azdine Nait-Ali, Gérard Michaille, Stéphane Pagano
-
- 10:35 *Homogenization of Ageing Linear Viscoelastic Random Composite Materials: an Efficient Approach*
Julien Sanahuja
-
- 10:55 *Homogenization for Modal Purposes*
Daniel Christopher Kreuter, M. Beitel Schmidt
-
- 11:15 *A Hyperelastic Model for Incompressible Particle-Reinforced Neo-Hookean Composite*
Zaoyang Guo, Xiaohao Shi, Xiongqi Peng, Philip Harrison
-
- 11:35 *Application of a Multi-Scale Homogenization Technique to Nonlinear Composites*
Andreas Brandmair, Wolfgang H. Müller
-
- 11:55 *Two-Scale Simulation of Piezoelectric Materials Using Configurational Force Theory*
Md Khalaquzzaman, Ralf Müller, Baixiang Xu
-

GS-CM.7 Continuum Mechanics
K2

Thursday, 14:15 - 15:45
Chair: M.N. da Silva

- 14:15 *Analytical Solution of an Inverse Elastostatic Problem for Ellipsoidal Defect in Anisotropic Elastic Solid*
Efim Il'ich Shifrin, P.S. Shushpannikov
-

14:35 *Influence of Coating on Stress Intensity Factor at the Tip of Transverse Crack*

Boris Sobol, Alexander Krasnoschekov

14:55 *Cyclic Loading of a Cracked Sheet: Approaches and Results*

Larisa Valentinovna Stepanova, Pavel S. Roslyakov

15:15 *A Phase-Field Based Theory as a Regularization of a Sharp Theory for Crack Propagation*

Milton Nogueira da Silva, Fernando P. Duda, Eliot Fried

GS-CM.8 Continuum Mechanics
Maybach

Thursday, 16:00 - 18:00
Chair: A. Bertram, J.-B.M. Leblond

16:00 *On the Introduction of Thermoplasticity*

Albrecht Bertram, Arnold Krawietz

16:20 *Multiaxial Constitutive Model of Discontinuous Plastic Flow at Cryogenic Temperatures*

Jan Bielski, Błażej Skoczen

16:40 *Plastic Flow at a Crack Tip. Energy Fracture Criterion and its Relation to the J-Integral*
Alexander I. Khromov, **Anastasia A. Bukhanko**

17:00 *The Strain Rate Intensity Factor in Plasticity*

Sergei Alexandrov

17:20 *Three-Dimensional Continuum Dislocation Microplasticity FE-Simulation*

Stephan Wulfinghoff, Thomas Böhlke

17:40 *A Gurson-Type Model for Porous Ductile Materials Containing Arbitrary Ellipsoidal Voids*

Jean-Baptiste M. Leblond, Komlanvi Madou

GS-CM.9 Continuum Mechanics
K1

Friday, 10:15 - 12:15
Chair: R. Huang, G. Marini

10:15 *Coupling of Mechanical and Physical-Chemical Models to Predict the Lifetime of Self-Healing Ceramic Matrix Composite Structure*

Elen Hemon, M. Kaminski, F. Laurin, J.-F. Maire, F. Bouillon

10:35 *On the Finite Strain Constitutive Modelling of Plant Cell Wall Growth*

Ruoyu Huang, A.A. Becker, I.A. Jones

10:55 *The Interaction of Mechanics and Solvent Uptake: Theory and Applications*

Fernando Pereira Duda, Angela Cristina C. Souza, Eliot Fried

11:15 *Determination of Material Constants of Hyperelastic Fung-Type Model from Molecular Calculations*

Marcin Gajewski, **Marcin Maździarz**

11:35 *Influence of the Swelling Pressure in a Bottom-Up Description of the Intervertebral Disc*

Giacomo Marini, Harald Studer, Stephen J. Ferguson

General Session GS-CoM

Computational Mechanics

Session	Day	Time	Room
GS-CoM.1	Monday	10:15 - 12:15	Saal Steiermark
GS-CoM.2	Monday	14:45 - 15:45	S3
GS-CoM.3	Monday	14:45 - 15:45	AU3
GS-CoM.4	Tuesday	10:15 - 12:15	Saal Steiermark
GS-CoM.5	Tuesday	14:45 - 15:45	Saal Steiermark
GS-CoM.6	Tuesday	14:45 - 15:45	S3
GS-CoM.7	Tuesday	16:00 - 18:00	Saal Steiermark
GS-CoM.8	Wednesday	10:15 - 12:15	K5
GS-CoM.9	Wednesday	10:15 - 12:15	Maybach
GS-CoM.10	Thursday	14:15 - 15:45	Blauer Salon
GS-CoM.11	Thursday	16:00 - 18:00	S1

GS-CoM.1 Computational Mechanics
Saal Steiermark

Monday, 10:15 - 12:15
Chair: W. Fenz, D.M. Pierce

10:15 *An Efficient Finite Element Model for Hip Joint Contact*

Kristin Fietz, Udo Nackenhorst

10:35 *Model Reduction for Nonlinear Biomechanics Based on the Proper Orthogonal Decomposition Method*

Annika Radermacher, Stefanie Reese

10:55 *Finite Element Simulation of Blood Flow through Intracranial Aneurysms including Fluid-Structure Interaction*

Wolfgang Fenz, Johannes Dirnberger

11:15 *Effectiveness of the Edge-Based Smoothed Finite Element Method Applied to Soft Biological Tissues*

Ralf Frotscher, Manfred Staat, Hans-Jürgen Raatschen

11:35 *Mathematical Modelling and Numerical Methods of the Feedbacks between Tree Growth and Biomechanics*

Thomas Guillon, Yves Dumont, Thierry Fourcaud

- 11:55 *A Method for Incorporating Residual Stresses into Finite Element Simulations with an Application to Abdominal Aortic Aneurysms*

Thomas E. Fastl, David M. Pierce, Hannah Weisbecker, Gerhard A. Holzapfel

GS-CoM.2 Computational Mechanics
S3

Monday, 14:45 - 15:45
Chair: T.L. Nguyen

- 14:45 *Integrated Implementation of an Extended Kalman Filter within Finite Element Analysis for Material Parameter Identification*

Thanh Luan Nguyen, Tamara Nestorovic

- 15:05 *On the Prediction of Anisotropy Evolution in Polycrystalline Multiphase Materials*

Erik Lindfeldt, Magnus Ekh

- 15:25 *Prediction of Fractures by Gravimetric Interference Method*

Matheus Alves Laranjeira Neri, Lurimar Smera Batista

GS-CoM.3 Computational Mechanics
AU3

Monday, 14:45 - 15:45
Chair: R. Patho

- 14:45 *Approximation of Anisotropic Trajectories of Elasticity of Human Bone from a 3D-Profile Based on Volumetric Visualization of CT Images*

Cornelia Kober, Christoph Mueller, Philippe Young, Andreas Fritsch, Christian Hellmich

- 15:05 *Shape Optimization for Ergonomy and Comfort Based on Minimum Contact Stress Variance*

Damir Vučina, Igor Pehnec, Marko Banić

- 15:25 *Shape Optimization in Discretized Contact Problems with Friction and a Solution-Dependent Coefficient of Friction*

Robert Patho, Jaroslav Haslinger, Jiri V. Outrata

GS-CoM.4 Computational Mechanics
Saal Steiermark

Tuesday, 10:15 - 12:15
Chair: S. Datoussaid, F. Dirksen

- 10:15 *On the Design of Compliant Thermal Mechanisms Using Evolutionary Topology Optimization*

Ruben Ansola, **Estrella Veguería**, Javier Canales, José Antonio Tárrago

- 10:35 *Optimization of Composite Structures - A Comparison of Two Approaches*

Dženan Hozić, Anders Klarbring, Bo Torstenfelt

- 10:55 *Stress and Fatigue Constrained Topology Optimization*

Erik Holmberg, Bo Torstenfelt, Anders Klarbring

- 11:15 *The Relationship between Optimal Periodic Structures and Optimal Material Microstructures*

Yi Min Xie, Zhi Hao Zuo, Xiao Ying Yang, Xiaodong Huang, Jian Hua Rong

- 11:35 *Structural Optimization of Large-Displacement, Path-Following Compliant Mechanisms with Optimally Designed Flexure Hinges*

Frank Dirksen, Rolf Lammering, Tarek I. Zohdi

- 11:55 *Multicriteria Optimal Design of Multibody Systems by Using Evolutionary Strategies*

Selim Datoussaid, Jérôme Noël, Thierry Descamps

GS-CoM.5 Computational Mechanics
Saal Steiermark

Tuesday, 14:45 - 15:45
Chair: H. Wu

- 14:45 *Molecular Configuration and Flow of Water in Graphene Nanochannels*

Hengan Wu

- 15:05 *Segregation in Horizontally Vibrated Granular Mixture*

Ashish Bhateja, Ishan Sharma, Jayant K. Singh

- 15:25 *Numerical Modeling of the Boundary Value Problems Using the R-Function Method and Atomic Basis Functions*

Nives Brajčić, Blaž Gotovac, Vedrana Kozulić

GS-CoM.6 Computational Mechanics
S3

Tuesday, 14:45 - 15:45
Chair: K. Bagi

- 14:45 *Computational Comparison of the Mechanical Behavior of Two Stent-Grafts within a Tortuous Abdominal Aortic Aneurysm*

Nicolas Demanget, **Pierre Badel**, Stéphane Avril, Laurent Orgéas, Christian Geindreau, Jean-Noel Albertini, Jean-Pierre Favre

- 15:05 *Heat Generation and Residual Stresses Analysis in External Cylindrical Grinding Process*

Haifa Sallem, Hédi Hamdi

- 15:25 *DEM Analysis of Masonry Domes with Oval Plan*

József Simon, **Katalin Bagi**

GS-CoM.7 Computational Mechanics
Saal Steiermark

Tuesday, 16:00 - 18:00
Chair: J. Eberhardsteiner, G. Meschke

- 16:00 *Influence of Different Knot Groups on Effective Mechanical Properties of Solid-Wood Based Products Determined by Means of 3D Finite-Element Simulations*

Markus Lukacevic, Karin de Borst, Josef Füssl, **Josef Eberhardsteiner**

- 16:20 *Jump Conditions at Discontinuities in Solids: Numerical Implementation*

Arkadi Berezovski

- 16:40 *Residual Stress Analysis of an Oil Distillation Tower's Lining with Sysweld*

Davi Mário Cunha de Souza, Diego Jullian de Moraes Lopes, Danielle Mariano Espíndola da Silva, **Francisco Ilo Bezerra Cardoso**

- 17:00 *An Edge-Based Imbricate Finite Element Method*

Fabien Cazes, Günther Meschke

17:20 *Cohesive Zone Modelling of Spot Weld Fracture for Crash Simulation*

Thomas Carlberger, Jonas Jonsson Holm, Ulf Stigh

17:40 *Flexibility Based Beam Element Based on Large Increment Method*

Ali Biglari, Philip Harrison, Zaoyang Guo

GS-CoM.8 Computational Mechanics
K5

Wednesday, 10:15 - 12:15
Chair: K.G.F. Janssens, H. Schmidt

10:15 *Extended Finite Element Model Prediction of Cyclic Thermal Shock Induced Crack Initiation and Short Crack Propagation Using a Cyclic Damage Model*

Koenraad G.F. Janssens, Giacomo Facheris

10:35 *Large Scale, Massively Parallel Implementation of eXtended Finite Element Method (XFEM) for Fracture Simulations*

Denny Dharmawan Tjahjanto, G. Houzeaux, M. Vázquez, Antoine Jerusalem

10:55 *A New Intrinsic Enrichment in Meshless Methods for Arbitrary and Non-Planar Multiple Cracks in Linear Elasticity*

Ettore Barbieri, Nik Petrinic

11:15 *An Adaptive Mixed Finite Element Method for Nonlinear Elastic Incompressibility with Large Deformations*

Martina Balg, Arnd Meyer

11:35 *Evaluation of Different Level Set Update Schemes for 3D X-FEM Mixed Mode Crack Propagation*

Daniele Colombo, **Patrick A. Massin**

11:55 *On Adaptive FEM for Viscoelasticity at Large Strain Deformations*

Hansjörg Schmidt, Arnd Meyer

GS-CoM.9 Computational Mechanics
Maybach

Wednesday, 10:15 - 12:15
Chair: M. Hammer, E. Mazza

10:15 *An Internal Parameter Dependent Cyclic Plastic Material Description for Finite Element Modeling of Ratcheting in Low Cycle Fatigue*

Giacomo Facheris, Koenraad Janssens, Edoardo Mazza

10:35 *Warm-Start Strategy in Implicit Reformulation Method for Frictionless Contact Problems*

Yoshihiro Kanno, Makoto Ohsaki

10:55 *Bonding and Debonding of Wavy Adhesive Elastic Thin Film*

Ravi Dalmeya, Ishan Sharma, Chandrashekhar Upadhyay

11:15 *Damage Detection Through Wavelet Transform and Inverse Analysis*

Anna Knitter-Piatkowska, Tomasz Garbowski, Andrzej Garstecki

11:35 *Bursting of a Circular Plate Subjected to Blast Loads Field Test – Computational Modelling*

Herbert Linsbauer

11:55 *Non-Regularized Frictional Mortar Contact for Finite Deformation Problems – Synthetic Contact Kinematics*

Michael Hammer

GS-CoM.10 Computational Mechanics
Blauer Salon

Thursday, 14:15 - 15:45
Chair: M. Weise

14:15 *Boundary Element Analysis of Unsymmetric Laminated Plates*

Chyanbin Hwu, Hanwen Chang

14:33 *On Alternative Numerical Frameworks for a New Conservation Law Formulation in Structural Dynamics*

C.H. Lee, A.J. Gil, J. Bonet, M. Aguirre, Hean Chun Lee

14:51 *Analysis of Bar Structures by the Use of Stochastic Work Hardening and/or Softening Constitutive Models*

Sandor Kaliszky, Janos Logo, **Daniel B. Merczel**

15:09 *Multi-Field Subregion BEM for Analysis of Effective Properties of Composites*

Grzegorz Dziatkiewicz, Piotr Fedeliński

15:27 *Adaptive FEM for Layered Anisotropic Plates*

Arnd Meyer, **Michael Weise**

GS-CoM.11 Computational Mechanics
S1

Thursday, 16:00 - 18:00
Chair: M.J. Mikl, V. Vavourakis

16:00 *Evaluation of the CNT and CNT Network Morphological Parameters' Impact on the Mechanical Properties of CNT-Reinforced Composites*

Willy Leclerc, Philippe Karamian, Alexandre Vivet, Alain Campbell

16:20 *A Coupled Fluid/Solid Approach for Numerical Simulation of Welding*

Hussein Amin el Sayed, Thomas Heuze, Eric Feulvarch, Jean Baptiste Leblond, Jean Michel Bergheau

16:40 *Development of Techniques for Rock Cutting Applications*

Markus Johannes Mikl, Thomas Antretter, Gerhard Pittino

17:00 *Borderless Numerical Scheme between Incompressibility/Compressibility in Solid and Fluid Analyses Based on Helmholtz-Decomposition*

Junya Imamura, Takahiko Tanahashi

17:20 *Large Deformation Analysis of Geotechnical Problems Through a Non-Linear Finite Element Approach*

Vasileios Vavourakis, D. Loukidis, D. Charmpis, P. Papanastasiou

17:40 *A Runge-Kutta-Chebyshev-Projection Immersed Structural Potential Method for Fluid Structure Interaction*

A. Arranz Carreno, **Antonio Javier Gil**, J. Bonet, O. Hassan

General Session GS-DY

Dynamics

Session	Day	Time	Room
GS-DY.1	Tuesday	16:00 - 18:00	Maybach
GS-DY.2	Wednesday	10:15 - 12:15	AU3
GS-DY.3	Friday	10:15 - 12:15	Maybach

GS-DY.1 Dynamics Maybach	Tuesday, 16:00 - 18:00 Chair: E. Hacker, K. Yunt
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16:00 *The Impulsive Action Integral***Kerim Yunt**16:20 *Vibrational Stabilization of Statically Unstable Multi-Degrees-of-Freedom Systems***Inga M. Arkhipova**, Angelo Luongo, Alexander P. Seyranian17:00 *Nonlinear Dynamics of Hybrid Cantilevers for Scanning Probe Microscopy***Evyatar Hacker**, John Saffury, Oded Gottlieb17:20 *Exploring Global Stability in a Nonsmooth Dynamical Model of Hydraulic Cylinders***Bálint Magyar**, Gábor Stépán

GS-DY.2 Dynamics AU3	Wednesday, 10:15 - 12:15 Chair: I. Tanabe
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10:15 *Digital Evaluation of Control Factors with Complex Noise Factors Using Inverse Analysis of Taguchi Methods***Ikuo Tanabe**10:35 *Numerical Methods for Analysis of Integrability of Dynamical Systems***Vladimir Salnikov**10:55 *Three-Dimensional Numerical Analysis on Wheel/Rail Adhesion under Contamination of Oil with Surface Roughness***Bing Wu**, Zefeng Wen, Hengyu Wang, Xuesong Jin11:15 *Modelling and Simulation of Brake System Based on Matlab/SimMechanics***Ehsan Zamani Shandiz**, Daniel Wallner11:35 *Transverse Vibrations of Nonhomogeneous Rectangular Plates on Winkler Foundation Using DQM***Roshan Lal**, Yajuvindra Kumar

GS-DY.3 Dynamics
Maybach

Friday, 10:15 - 12:15
Chair: E. Manoach, M.V. Shamolin

-
- 10:15 *Variety of the Cases of Integrability in Dynamics of a 2D-, and 3D-Rigid Body Interacting with a Resisting Medium*
Maxim V. Shamolin
-
- 10:35 *The Paradox of Nicolai and Related Effects*
Alexander P. Seyranian, Alexei A. Mailybaev
-
- 10:55 *Shock Compression of Monocrystalline Copper: the Effects of Vacancy Defects and Crystal Orientations*
Enqiang Lin, Lisha Niu, Huiji Shi
-
- 11:15 *A Short Note on the Dynamical Behaviour of Composite Materials under Special Consideration of Interphase Thicknesses*
Wolfgang Weber, Bernd W. Zastrau
-
- 11:35 *Dynamics and Fault Localization of Composite Beams with Delamination*
Emil Manoach, Sylwester Samborski, Andrzej Mitura, Jerzy Warminski
-

General Session GS-EM

Experimental Mechanics

Session	Day	Time	Room
GS-EM.1	Monday	10:15 - 12:15	AU1
GS-EM.2	Thursday	10:15 - 12:15	K1
GS-EM.3	Friday	10:15 - 12:15	AU1

GS-EM.1 Experimental Mechanics
AU1

Monday, 10:15 - 12:15
Chair: E. Charkaluk, K. Uenishi

- 10:15 *Experimental Study on Fatigue Damage Evolution and its Effect on Structural Response*
Ding Ding He, Zhao Xia Li
- 10:32 *Structural Degradation and Variation of Mechanical Properties Determined by Means of Magnetic Non-Destructive Techniques*
Katarzyna Makowska, Z.L. Kowalewski
- 10:49 *On Some Crack Dynamics in Inhomogeneous Solid Materials*
Koji Uenishi
- 11:06 *Damage Detection in Thin-Walled Tubes by Circumferential Waves*
Zheng Li, Yu Liu
- 11:23 *A New Method for Determination of Normal-Shear Bonding Strength Envelope of Bi-Material Interface*
Zihui Xia, M. A. K. Chowdhuri
- 11:40 *Thermomechanical Determination of the Granular Yield Stress in a Polycrystal*
Rian Seghir, **Eric Charkaluk**, Jean-Francois Witz, Philippe Dufrenoy
- 11:57 *Fatigue Cracks in Natural Rubber: In-Situ Synchrotron WAXD Experiments*
Pierre Rublon, Bertrand Huneau, Erwan Verron, Stephanie Beurrot, Adrien Leygue, Nicolas Saintier, Daniel Berghezan, Dominique Thiaudière, Cristian Mocuta

GS-EM.2 Experimental Mechanics
K1

Thursday, 10:15 - 12:15
Chair: E. Peronnet, A.J. Schriebl

- 10:15 *Characterization of Tissue Deformation and Wrinkles in the Forehead*
Johannes Weickenmeier, Michael Wyss, Edoardo Mazza
- 10:32 *Identification of Orthotropic Material Properties Using Displacement Field Measurements*
Elodie Peronnet, O. Dalverny, H. Weleman, S. Mistou

- 10:49 *Tensile Stress Variation Due to Stepwise Increase of Cyclic Torsion Amplitude*
Tadeusz Szymczak, Zbigniew L. Kowalewski
-
- 11:06 *Damping Properties of Random Fibre Networks Used as Sandwich Core Material*
Elsa Piolet, Guilhem Michon, Dominique Poquillon
-
- 11:23 *Exploring the Formation of Different Lamination Configurations within the Orientation Space*
Anahita Khorashadizadeh, Dierk Raabe
-
- 11:40 *Roles of Thrombus and Collagen Remodeling in Intramural Dissecting Aortic Aneurysms*
Andreas J. Schriefl, Gerhard A. Holzapfel, Jay D. Humphrey
-
- 11:57 *Aspects of Cyclic Loading on Intervertebral Discs*
Aurica Truta, Aurora Felicia Pop, Mariana Arghir, Gerhard A. Holzapfel
-

GS-EM.3 Experimental Mechanics
 AU1

Friday, 10:15 - 12:15
 Chair: A. Yuda, Y. Demmouche

- 10:15 *Study on the Bulge Test applied to Sandwich Plates with Metal Foam Core*
Helder Mata, Renato Natal Jorge, A.D. Santos, R.A.F. Valente, M.P.L. Parente, A.A. Fernandes
-
- 10:32 *Global and Local Mechanical Behavior of Similar 2050-T851, 7449-T79 and Dissimilar 7449-T79/ 2050-T851 Friction Stir Welded Aluminum Alloys Joints*
Younes Demmouche, Nicolas Saintier, Thierry Palin-Luc
-
- 10:49 *Investigation of Engine Casing Containment Using of Blade Releasing Method*
Alexandr Roaldovich Lepeshkin
-
- 11:06 *Entrained Air Voids Characterization of Hardened Cement Paste Using Ultrasonic Wave Attenuation*
Hong Jae Yim, Hyo-Gyoung Kwak, Jae Hong Kim
-
- 11:23 *A Study of the Effect of Linear and Rotational Speed of Tool on Tensile Strength of Polypropylene in FSW Process*
 Behrooz Asadi Boroujeni, **Hadi Homaei**, A.M. Rezavand
-
- 11:40 *Variability of Wetting Behaviour with Change in Time of 316L Stainless Steel Laser Irradiation*
Ayaka Yuda, Ryo Honda, Masayoshi Mizutani, Jun Komotori, Masaki Matsumoto, Ichiro Katsuyama
-
- 11:57 *DIC as an Evaluation Tool for In-Vitro Coronary Stent Implantation*
 Lukáš Horný, **Jan Veselý**, Hynek Chlup, Rudolf Žitný
-

General Session GS-MM

Material Mechanics

Session	Day	Time	Room
GS-MM.1	Monday	10:15 - 12:15	S3
GS-MM.2	Monday	14:45 - 15:45	K3
GS-MM.3	Monday	14:45 - 15:45	K8
GS-MM.4	Monday	16:00 - 18:00	Saal Steiermark
GS-MM.5	Monday	16:00 - 18:00	S3
GS-MM.6	Tuesday	10:15 - 12:15	S7
GS-MM.7	Tuesday	14:45 - 15:45	K3
GS-MM.8	Tuesday	14:45 - 15:45	K7
GS-MM.9	Tuesday	14:45 - 15:45	K4
GS-MM.10	Tuesday	16:00 - 18:00	S3
GS-MM.11	Wednesday	10:15 - 12:15	K8
GS-MM.12	Wednesday	10:15 - 12:15	Saal Steiermark
GS-MM.13	Thursday	10:15 - 12:15	Saal Steiermark
GS-MM.14	Thursday	14:15 - 15:45	AU2
GS-MM.15	Thursday	16:00 - 18:00	K6
GS-MM.16	Thursday	16:00 - 18:00	Saal Steiermark
GS-MM.17	Friday	10:15 - 12:15	AU2
GS-MM.18	Friday	10:15 - 12:15	K3

GS-MM.1 Material Mechanics
S3

Monday, 10:15 - 12:15
Chair: A. Lemaitre, M. Muhibullah

10:15 *Mechanical Behavior of Ductile Materials Based on an Elasto-plastic Model Dependent on the Second and Third Invariants*

João V. Sahadi, Lucival Malcher

- 10:35 *Elementary Mechanisms of Plastic Deformation in Amorphous Materials*
Anael Lemaitre
-
- 10:55 *Robust Identification of Elasto-Plastic Constitutive Law Parameters from Digital Images Using 3D Kinematics*
Muhibullah Muhibullah, Julien Réthore, Thomas Elguedj, Michel Coret, Philippe Chaudet, Alain Combescure
-
- 11:15 *Processing and Properties of Three-Layer Al-Si/Al-Mn/Al-Si Clad Sheets by Using Various Cold Rolling Conditions*
 Yu-Sung Koo, **Mok-Soon Kim**
-
- 11:35 *Frequency Impacts on Mechanisms of Microplasticity under Fatigue Loading – Case of Polycrystalline Pure Copper*
Nicolas Marti, Nicolas Saintier, Véronique Favier, Fabienne Grégori, Nicolas Ranc
-
- 11:55 *Temporal Scaling in the Mechanoluminescence of Shocked Quarz Rods*
Sergey Uvarov, Marina Davydova
-

GS-MM.2 Material Mechanics
K3

Monday, 14:45 - 15:45
Chair: I. Schmidt

- 14:45 *Numerical Homogenisation of the Yield-behaviour of Metal Powders*
Ingo Schmidt, Andreas Trondl
-
- 15:05 *Mechanisms of Plastic Deformation of Synthetic Salt Polycrystals: Experimental Observations and Finite Element Modeling*
Jean Raphanel, Mathieu Bourcier, Alexandre Dimanov, Michel Bornert
-
- 15:25 *Poroelastic Behavior of Saturated Unidirectional Fibrous Reinforcements during Consolidation of Composite Parts: Identification of the Biot Coefficients*
Christophe Binetruy, Sébastien Comas-Cardona
-

GS-MM.3 Material Mechanics
K8

Monday, 14:45 - 15:45
Chair: G. Sommer

- 14:45 *Coatings Durability of the Femoral Heads*
Liliana-Laura Badita, Lucian Capitanu, Virgil Florescu
-
- 15:05 *Passive Mechanical Response and Residual Deformations of Ovine Esophagus: Impact on Esophagus Tissue Engineering*
Gerhard Sommer, Georg Zeindlinger, Andreas Katzensteiner, Andreas J. Schriebl, Herwig Ainödhofer, Amulya Saxena, Gerhard A. Holzapfel
-
- 15:25 *An Energetic Model for the Unfolding of Titin Macromolecules*
 Domenico DeTommasi, Nicola Millardi, **Giuseppe Puglisi**, Giuseppe Saccomandi
-

GS-MM.4 Material Mechanics
Saal Steiermark

Monday, 16:00 - 18:00
Chair: N. Billon, H.L. Schreyer

- 16:00 *New Constitutive Modelling for Visco Hyper Elastic Polymers*
Noëlle BILLON, Jérôme BIKARD
-

- 16:20 *Indentation of Pre-Stressed Rubber-Like Incompressible Materials*
Antonios E. Giannakopoulos, Vassiliki Zaphiropoulou
-
- 16:40 *Closed-Form Formulas of Effective Stiffness and Engineering Constants of Laminate Composites with Auxetic Constituents*
Mirella Ramírez, Gerardo G. Nava-Gómez, Federico J. Sabina, Héctor Camacho-Montes, Raúl Guinovart-Díaz, Reinaldo Rodríguez-Ramos, Julian Bravo-Castillero
-
- 17:00 *Effect of Swelling on Large Strain Properties of Gels: a General Framework*
Violette Bruliard, Erwan Verron, Steven Le Corre
-
- 17:20 *Constitutive Models for Joints and Wave Propagation through Rock with Joints*
Howard Linn Schreyer, Tyler Baker, Deborah Sulsky
-

GS-MM.5 Material Mechanics
S3

Monday, 16:00 - 18:00
Chair: J. Bonet, J.-Q. Tarn

- 16:00 *Some Unsolved Problems of Anisotropic Elasticity and Piezoelectricity are Solvable by the Hamiltonian State Space Approach*
Jiann-Quo Tarn
-
- 16:20 *Fracture in Ferroelectric Ceramics and Single Crystals under Electromechanical Loading*
Daining Fang, Bin Liu
-
- 16:40 *Experimental Study of Martensite Reorientation in Ni-Mn-Ga Ferromagnetic Shape Memory Alloys under Biaxial Compression*
Xue Chen, Yongjun He, Ziad Mourni
-
- 17:00 *Finite Element Calculation of the Effective Properties for Porous Piezoceramics Considering the Non-Homogeneous Polarization and Cluster Models*
A.V Nasedkin, V.V Remizov, **Maria Sergeevna Shevtsova**
-
- 17:20 *Nonlinear Dynamic Stability of Laminated Plates with Piezoelectric Actuators Subjected to Thermo-Electro-Mechanical Loadings*
Pradyumna Sathyasimha, Abhishek Gupta
-
- 17:40 *On the Development of Constitutive Laws for Large Strain Hyperelastic Piezoelectric Materials*
R. Ortigosa, A.J. Gil, **Javier Bonet**
-

GS-MM.6 Material Mechanics
S7

Tuesday, 10:15 - 12:15
Chair: M. Pawlikowski

- 10:15 *Rheological Constitutive Modeling of Polyurethane Nanocomposite*
Marek Pawlikowski
-
- 10:35 *Multiscale Modeling of Mechanoresponsive Polymers*
Meredith N. Silberstein, Cassandra M. Kingsbury, Kyoungmin Min, Lee D. Cremer, Todd J. Martinez, Narayan R. Aluru, Scott R. White, Nancy R. Sottos
-

10:55 *Numerical Simulation and Experimental Validation of Polymer Foams Subjected to Low-Speed Impact Loading*

Martin Herrenbrück, Marcus Maier, Roland Wüchner, Wenjia Wang, Fabian Duddeck, Kai-Uwe Bletzinger, Roman Lackner

GS-MM.7 Material Mechanics
K3

Tuesday, 14:45 - 15:45
Chair: A. Krasnikovs

14:45 *Mechanical Properties of Structural Element with Non-Homogeneous Fibers Distribution in Concrete*

Andrej Krasnikovs, Olga Kononova, Edgar Machanovsky, Videvuds-Arijs Lapsa, Vitaly Lusia

15:05 *Sound Energy Harvesting Using Macro Fiber Composites*

Ananya Renuka Balakrishna, Dineshkumar Harursampath

15:25 *Mechanical Behavior of Structural Hierarchy of Amyloid Fibrils*

Jae In Kim, Gwonchan Yoon, Kyungwoo Kim, Sungsoo Na, Kilho Eom

GS-MM.8 Material Mechanics
K7

Tuesday, 14:45 - 15:45
Chair: T. Linse

14:45 *Evaluation of General Elasticity of Textured and Microstructured Materials*

Michal Landa, Hanus Seiner, Petr Sedlak, Lucie Bodnarova, Jan Zidek

15:05 *Modelling the Mechanical Behavior of Adaptive Textile-Reinforced Composites*

Thomas Linse, Volker Ulbricht

15:25 *Identification of Non Uniform Thermal Contact Resistance in Tape Placement Process*

A. Barasinski, A. Leygue, E. Soccard, **Arnaud Poitou**

GS-MM.9 Material Mechanics
K4

Tuesday, 14:45 - 15:45
Chair: J. Sweeney

14:45 *The Flow Rule for Polymers at Large Deformations*

John Sweeney, C.P.J. OConnor, P.E. Spencer, H. Pua, P. Caton-Rose, P.J. Martin

15:05 *Void Growth in a Mineral-Filled PVC – Experimental and Numerical Study*

Anne Serine Ognedal, Thomas Seelig, Odd Sture Hopperstad, **Arild H. Clausen**

15:25 *Determination of the Mechanical Properties of Amorphous Materials through Instrumented Indentation*

Marcos Rodríguez, Jon M. Molina-Aldareguía, Carlos D. González, Javier Llorca

GS-MM.10 Material Mechanics
S3

Tuesday, 16:00 - 18:00
Chair: G.A. Volkov, M. Zaccariotto

16:00 *Micromechanical Modeling of Ductile Fracture in Nodular Cast Iron*

Lutz Zymbell, Gerafl Hütter, Thomas Linse, Uwe Mühlich, Meinhard Kuna

- 16:20 *Energy Aspects of Vibration Fracture of Rocks*
Grigory A. Volkov, Yuri V. Petrov, Evgeniy N. Dolmatov
-
- 16:40 *Prediction of the Fatigue Life in the Friction Stir Welds with Welding Flaws Based on Nondestructive Testing*
Toshifumi Kakiuchi, Yoshihiko Uematsu, Eisuke Kondoh, Ichinori Shigematsu, Takahiko Nomura, Yuichiro Yamamoto, Naoki Imai, Toshihiko Fukuda
-
- 17:00 *Free Vibration of Functionally Graded Materials with Crack by a BEM*
Yang Yang, Kun Pang Kou, Chi Chiu Lam, Vai Pan Iu
-
- 17:20 *Modeling of Fatigue Crack Propagation with a Peridynamics Approach*
Mirco Zaccariotto, Ugo Galvanetto
-

GS-MM.11 Material Mechanics
 K8

Wednesday, 10:15 - 12:15
 Chair: M. Davydova, R. Kouhia

- 10:15 *Spatial and Temporal Scaling of Brittle Fragmentation*
Marina Davydova, Sergey Uvarov
-
- 10:35 *Thermal-Structural Finite Element Analysis of a Ductile Material at High Strain Rates Using an Improved Material Model for Ductile-to-Brittle Failure Mode Transition*
Ladislav Ecsi, Pavel Élesztős
-
- 10:55 *Influence of Static Strain Ageing on the Ductile to Brittle Transition in a C-Mn Steel*
Anthony Marais, M. Mazière, S. Forest, A. Parrot, P. Le Delliou
-
- 11:15 *Ultra-High Strain Rate Deformation of Nano-Structured FCC and BCC Metals*
Dariusz Seif, Giacomo Po, Ryan Crum, Suneel Kodambaka, Vijay Gupta, Nasr Ghoniem
-
- 11:35 *Modelling Strain-Rate Dependent Ductile-to-Brittle Transition*
 Juha Hartikainen, Kari Kolari, **Reijo Kouhia**
-
- 11:55 *Multiscale Approach for Modelling the Thermomechanical Behaviour of Functionally Graded Materials*
 Ralf Müller, **Natalia Konchakova**, Oliver Goy
-

GS-MM.12 Material Mechanics
 Saal Steiermark

Wednesday, 10:15 - 12:15
 Chair: A. Dyskin, R. Martinez

- 10:15 *Mechanical Behavior of Graphene-Epoxy Nanocomposites*
 Catalin Picu, Ardavan Zandiatashbr, **Dan Constantinescu**
-
- 10:35 *Effect of Mesoscale Defects on the Strength Properties of Structural Glass*
Gergely Molnár, Imre Bojtár
-
- 10:55 *Relation of Microstructural Condition to the Evolution of Internal Stresses during Cyclic Loading of AISI 316L*
Minh-Son Pham, Stuart R. Holdsworth
-
- 11:15 *A Microstructure-Informed Model Describing Aging in 319 Aluminium Alloy and the Associated Residual Stress Evolution*
R. Martinez, I. Guillot, Georges Cailletaud
-

11:35 *Micromechanics of Ferromagnetic Solids with Weak Magnetocrystalline Anisotropy: A Case Study of Ni-Mn-Ga FSMA Austenite*
 Hanus Seiner, **Petr Sedlák**, Michal Landa, Oleg Heczko

11:55 *Hybrid Materials with Internal Architecture*
Yuri Estrin, Elena Pasternak, Arcady Dyskin

GS-MM.13 Material Mechanics
 Saal Steiermark

Thursday, 10:15 - 12:15
 Chair: M. Fourmeau, D.A. Nguyen

10:15 *Experimental Characterization and Cohesive Zone Modeling of Rate-Dependent Interfacial Fracture in Lead-Free Solder Joints*
Milad Maleki, Joel Cugnoni, John Botsis

10:35 *Characteristics of Single Damage Variable Models for Fatigue*
Elisha Rejovitzky, Eli Altus

10:55 *Cumulative Damage Reconstruction in Composites - Different Perspectives Based on the Inverse Problem*
Manuel Chiachio, Juan Chiachio, Guillermo Rus

11:15 *Effects of Temperature and Frequency on Fatigue Behavior of Metastable Type 304 Stainless Steel*
Yuki Nakamura, Masaki Nakajima, Kenta Isono, Toshihiro Shimizu, Yoshihiko Uematsu

11:35 *Anisotropic Failure of Aluminium Alloy AA7075-T651*
Marion Fourmeau, T. Børvik, A. Benallal, O.S. Hopperstad

11:55 *Anisotropic Gradient-Damage Model for Viscoplastic Thin-Shell Structures*
Danh An Nguyen, Marcus Stoffel, Dieter Weichert

GS-MM.14 Material Mechanics
 AU2

Thursday, 14:15 - 15:45
 Chair: C.L. Martin

14:15 *On the Toughness of Highly Porous Ceramics: Added Value of Discrete Element Simulations*
David Jauffres, Denis Roussel, Christophe L. Martin, Aaron Lichtner, Rajendra K. Bordia

14:33 *New Phase Domains Growth around Inclusions in Materials Undergoing Stress-Induced Phase Transformations*
Roman Filippov, Alexander B. Freidin, E.N. Vilchevskaya

14:51 *Cohesive Parameter Determination: Experiments and Simulations*
Faizan Md. Rashid, Anuradha Banerjee

15:09 *Modeling of Large Radius Curvature Ring Rolling Process by an Analytical Method*
 G.L. Petrosyan, A.G. Petrosyan, **Seyed Reza Motallebi**

15:27 *A Saddle-Node Ghost Arising in High Cycle Fatigue Life-Predictions*
Stefano Bosia, Andrei Constantinescu, Maurizio Grasselli

GS-MM.15 Material Mechanics
K6

Thursday, 16:00 - 18:00
Chair: K. Agbessi, D.A. Vajari

- 16:00 *Effects of Uneven Interfacial Strength on Damage Evolution in Composites*
Danial Ashouri Vajari, Brian Nyvang Legarth, Christian Frithiof Niordson
-
- 16:20 *Plastic Deformation and Fatigue Damage Mechanisms in Copper Polycrystal under Multiaxial Fatigue Loadings*
Komlan Agbessi, Nicolas Saintier, Thierry Palin-Luc
-
- 16:40 *A Global Constitutive Model of Reinforced Concrete Plates coupling Damage and Plasticity for Structures Subjected to Cyclic Solicitations*
Christelle Combescure, François Voldoire, Hélène Dumontet
-
- 17:00 *Modelling of Coupling between Damage and Phase Transformation in Two-Phase Metallic Materials at Cryogenic Temperatures*
Halina Egner, Błażej Skoczeń, Maciej Ryś
-
- 17:20 *Experimental and Numerical Investigations of the Damage and Ductile Fracture Mechanisms in TRIP Steel Sheets*
Matthieu Dunand, Dirk Mohr
-
- 17:40 *Elastic Analysis of a Sandwich Composite with a Functionally Graded Core*
Roberta Sburlati
-

GS-MM.16 Material Mechanics
Saal Steiermark

Thursday, 16:00 - 18:00
Chair: G. Mejak, W. Ochsenberger

- 16:00 *Fatigue Strength Evaluation of Spot Welded Joints under Different Loading Modes*
Kodai Hayashida, Ryota Tanegashima, Hiroyuki Akebono, Masahiko Kato, Atsushi Sugeta
-
- 16:20 *Study of Solid Strengthening of Nickel by Transition Metal Solutes Using Diffusion Couples and Nanoindentation*
Hamad ur Rehman, Mathias Göken, Karsten Durst
-
- 16:40 *An Application of the Equivalent Eigenstrain Method to a Problem with a Nonconstant Eigenstrain*
George Mejak
-
- 17:00 *Mesosopic Surface Roughening in Polycrystalline Steel under Uniaxial Tension*
Olga Zinovieva, Varvara Romanova
-
- 17:20 *Phase Field Simulation of Static Recrystallization for Deformed Mg Alloy*
Gao Yingjun
-
- 17:40 *The Configurational Forces Concept in Elastic-Plastic Fracture Mechanics: An Investigation to Cyclic Loading*
Walter Ochsenberger, Otmar Kolednik
-

GS-MM.17 Material Mechanics
AU2

Friday, 10:15 - 12:15
Chair: M. Ryvkin, B. El Zoghbi

- 10:15 *Nucleation of Brittle Cracks in Open-Cell Kelvin Foam*
Michael Ryvkin, Leonid Kucherov
-
- 10:35 *Separation of the Effects of the Lode Angle and Stress Triaxiality on Ductile Fracture: Experiments and Modeling*
Jessica Papasidero, Véronique Doquet, Dirk Mohr
-
- 10:55 *Quantitative Analysis of Fracture Surface Induced by Plug Formation in Metallic Samples*
Elena Lyapunova, A.N. Petrova, I.G. Brodova, V.V. Chudinov, M.A. Sokovikov, S.V. Uvarov, O.B. Naimark
-
- 11:15 *Effects of Constitutive Model and Fracture Criteria on Ductile Crack Propagation in Dual-Phase Steel*
Gaute Gruben, Odd Sture Hopperstad, Tore Børvik
-
- 11:35 *Cohesive Zone Model for Intergranular Slow Crack Growth in Zirconia and Ceramic: Influence of the Moisture, Temperature and Microstructure*
Bassem El Zoghbi, Rafael Estevez, Christian Olagnon
-

GS-MM.18 Material Mechanics
K3

Friday, 10:15 - 12:15
Chair: N.-C. Fahlbusch, A. Moradi

- 10:15 *Analysis of the Strength of Bonded Joints in Composite Structures*
Azalia Moradi, Nicolas Carrere, Cédric Huchette, Dominique Leguillon
-
- 10:35 *Postbuckling Analysis of Closed-Cell Foams with an FE-Model Based on Image Processing*
Nina-Carolin Fahlbusch, Wilfried Becker
-
- 10:55 *On the Sensitivity of Creasing Force to Parameters in Constitutive Models of Paperboard*
Aleksander Marek, Tomasz Garbowski
-
- 11:15 *Analysis of Load-Deflection Characteristics of Composite Belleville Springs*
Watcharapong Patangtalo, Sontipee Aimmanee, Surachate Chutima
-
- 11:35 *A Numerical Study on the Fracture Resistance of Multi-Layered Composites*
Masoud Sistaninia, O. Kolednik
-

General Session GS-MP

Multifield Problems

Session	Day	Time	Room
GS-MP.1	Wednesday	10:15 - 12:15	S2
GS-MP.2	Friday	10:15 - 12:15	Saal Steiermark

GS-MP.1 Multifield Problems
S2

Wednesday, 10:15 - 12:15
Chair: M. Klassen, H.M. Youssef

10:15 *Fractional Order Generalized Thermoelasticity of Piezoelectric Materials*

Hamdy Mahmoud Youssef

10:35 *Phase Diagram of Martensite Reorientation in Magnetic Shape Memory Alloys under Three-Dimensional Magnetomechanical Loadings*

Yongjun He, Xue Chen Chen, Ziad Moumni

10:55 *Continuum Modeling of Plastic Deformation Coupled to Diffusion in Silicon Electrodes During Lithiation-Delithiation Cycles*

Laurence Brassart, Kejie Zhao, Matt Pharr, Zhigang Suo

11:15 *Coupling Between Mass Density and Director Arrangement in Nematic Liquid Crystals*

Giuseppe Rosi, Luciano Teresi, Francesco dell Isola, Antonio DiCarlo

11:35 *Curved Timoshenko-Euler-Bernoulli Beam Coupled to its Analog Electromagnetic Waveguide via Piezoelectric Transducers*

Roberto Paccapeli, **Giuseppe Rosi**, Ugo Andreaus

11:55 *3D Optimization of Dielectric Elastomer Actuators with Inhomogeneities*

Markus Klassen, Baixiang Xu, Ralf Müller

GS-MP.2 Multifield Problems
Saal Steiermark

Friday, 10:15 - 12:15
Chair: S. Castagnet, Y.G. Pronina

10:15 *Prediction of Failure for an Ideal Elastoplastic Tube Subjected to Uniform Mechanochemical Corrosion*

Yulia Grigorievna Pronina

10:35 *Modelling of Elastic Properties of Sintered Porous Materials*

Anton Manoylov, F.M. Borodich, H.P. Evans

10:55 *One-Dimensional Response of Submerged Plates to Underwater Blast*

Andreas Schiffer, Vito L. Tagarielli

11:15 *Experimental Characterization and Numerical Simulation of Cavitation upon Fast Decompression in a Gas-Saturated Rubber*

Julien Jaravel, **Sylvie Castagnet**, Jean-Claude Grandidier

- 11:35 *Fatigue Life Prediction of Thermally Stressed Copper Vias and Plated-Through Holes in Electronic Printed Circuit Boards (PCB)*
Abdellah Salahouelhadj, Marion Martiny, Sebastien Mercier, Laurent Bodin, David Manteigas
-
- 11:55 *Thermodynamically Consistent Modeling of a Multifunctional Structure plus Battery System*
H. Sreedhara, **Dineshkumar Harursampath**
-

General Session GS-SM

Structural Mechanics

Session	Day	Time	Room
GS-SM.1	Monday	10:15 - 12:15	Maybach
GS-SM.2	Monday	14:45 - 15:45	S2
GS-SM.3	Monday	14:45 - 15:45	K5
GS-SM.4	Tuesday	14:45 - 15:45	S2
GS-SM.5	Thursday	14:45 - 15:45	Saal Steiermark
GS-SM.6	Friday	10:15 - 12:15	AU3
GS-SM.7	Friday	10:15 - 12:15	S3

GS-SM.1 Structural Mechanics
Maybach

Monday, 10:15 - 12:15
Chair: H. Herrmann, S. Neukirch

- 10:15 *Analytical Description of Fibre Orientation Distributions in Short Fibre Reinforced Materials Based on μ CT Imaging*
Heiko Herrmann, M. Eik
- 10:35 *Large Displacement Analysis of Flexibly Connected Framed Structures*
Goran Turkalj, Edin Merdanović, Josip Brnić
- 10:55 *Vibrations of Post-Buckled Rods: the Singular Inextensible Limit*
Sebastien Neukirch, Joel Frelat, Alain Goriely, Corrado Maurini
- 11:15 *Bio-Inspired Distributed Actuation of Rods*
Sébastien Turcaud, John Dunlop, Peter Fratzl, Yves Brechet
- 11:35 *Evaluation of Progressive Collapse Resisting Capacity of the Transfer Girder System*
MinJung Kim, SungSoo Park

GS-SM.2 Structural Mechanics
S2

Monday, 14:45 - 15:45
Chair: D. Lanc

- 14:45 *Nonlinear Buckling Analysis of Thin-Walled Laminated Composite Beams*
Igor Pesic, **Domagoj Lanc**, Goran Turkalj
- 15:05 *An Analytical Approach for Buckling Analysis of an Inflatable Beam Made of Orthotropic Technical Textiles*
Nguyen Thanh Truong, Sylvie Ronel, Michel Massenzio, Dinh-Huan Phan, K.L. Apedo, Eric Jacquelin

15:25 *Trivial Path after Bifurcation: from Unstable back to Stable Configuration*

Francesco Dal Corso, Davide Bigoni, Federico Bosi, Diego Misseroni

GS-SM.3 Structural Mechanics
K5

Monday, 14:45 - 15:45
Chair: K. Tajs-Zielinska

14:45 *Robust Population-Based Heuristics in Structural Optimization: Dream or Reality*

Aniko Csebfalvi

15:05 *Optimum Reinforcement Design of Concrete Shell Elements by Means of a Genetic Algorithm*

Simona Mancini, Gabriele Bertagnoli, Luca Giordano

15:25 *On Equivalence of Stress and Compliance Based Topologies*

Bogdan Bochenek, **Katarzyna Tajs-Zielinska**

GS-SM.4 Structural Mechanics
S2

Tuesday, 14:45 - 15:45
Chair: M.M. Attard

14:45 *Buckling of Funicular Arches*

Mario M. Attard, David Kellermann

15:05 *Finite Element Analysis of Buckling of Laminated Struts Based on a Variational Formulation*

Christina Völlmecke, Stylianos Yiatros, Wolfgang H. Müller

15:25 *Buckling of Laminated Plates Considering Pre-Buckled Stress State*

Alfia Bano, P.M. Mohite, Ashwini Kumar

GS-SM.5 Structural Mechanics
Saal Steiermark

Thursday, 14:15 - 15:45
Chair: A.I. Oleinikov

14:15 *Models of Anisotropic Heterogeneous Creep in Integrated Design of Wing Panel Manufacture Processes*

Alexander Ivanovich Oleinikov

14:35 *Numerical Analysis of a Composite Beam under Cyclic Loading Condition Considering the Bond-Slip Effect along Material Interface*

Jin-Wook Hwang, Hyo-Gyoung Kwak

14:55 *Orientational Averaging in Modeling the Elastic Properties of Highly Porous Plastic Foams*

Aivars Lagzdins, Alberts Zilaucs, **Ilze Beverte**, Janis Andersons

15:15 *Image-Based Damage Evaluation in Drilled Carbon/Epoxy Laminates*

Luís Miguel Durão, João Manuel R. S. Tavares, Victor Hugo C. de Albuquerque, Daniel J. S. Gonçalves

GS-SM.6 Structural Mechanics
AU3

Friday, 10:15 - 12:15
Chair: L.A. Mihai, P. Le Grogne

10:15 *Limit Load Analysis of Elastic Multibody Structures with Friction*

L. Angela Mihai

10:35 *Special Mathematical Model for Laminated Shells*

Denys Volchok, Eduard Kvasha, Ruediger Schmidt

10:55 *Energy Transfer Analysis of an Elastically Connected Circular Double-Membrane Compound System*

Milan Slavoljub Cajić, Danilo Karličić

11:15 *Buckling Analysis of Reinforced Sandwich Panels under Through-Thickness Compression*

Cyril Laine, **Philippe Le Grogne**, Sébastien Comas Cardona, Christophe Binetruy

11:35 *Delamination Studies on Composite Laminates - An Asymptotic Approach*

Gottimukkula Venkatesh, Sathiskumar Anusuya Ponnusami, **Dineshkumar Harursampath**

11:55 *Viscoelastic Impact Response of a Spherical Shell*

Yury A. Rossikhin, **Marina V. Shitikova**

GS-SM.7 Structural Mechanics
S3

Friday, 10:15 - 12:15
Chair: J. Kratochvil, J. Kreutz

10:15 *Augmented Beam Element Based on Unit Deflection Shapes of the Cross Section*

Johannes Kreutz, Gerhard Müller

10:35 *Modal Analysis Applied to Transient Thermal Problems*

Evert Cente Hooijkamp, F. van Keulen, J. van Eijk

10:55 *Asymptotic Analysis of Load Transfer by Bolted Double-Lap Joints of Isotropic Plates*

Jan Kratochvil, Wilfried Becker

11:15 *Nonlinear Finite Element Analysis for Un-Bonded Tendon Behaviors in Containment Building*

Yang Soo Kwon, Hyo-Gyoung Kwak

11:35 *Mindlin's Problem for a Surface Stiffened Transversely Isotropic Medium*

Morteza Eskandari, **Hamed Naghib**

PS

Poster Session

PS Poster - Wednesday, 10:15 - 13:45

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- 10:15 *Time-Discrete Geometrical Integration of Finite Deformations*
Zdenek Fiala
-
- 10:15 *Development of New Active Bioreactor to Biomechanical Characterization of Engineered Tissue Cartilage*
Antonio Godinho Completo, Joana Pereira, Carlos Relvas, Antonio Ramos, Jose Simoes, Alexandrina Mendes
-
- 10:15 *Singularly Perturbed Problems in Mechanics (Theoretical and Applied Aspects)*
Lyudmila Kuzmina
-
- 10:15 *Mathematical Model of Micropolar Orthotropic Elastic Thin Plates*
Gayane Sokrat Hayrapetyan, **S.H. Sargsyan**
-
- 10:15 *Deformable Body Oscillations on Layer with Visco-Elastic and Inertia Properties*
Katica (Stevanovic) Hedrih, **Marija (Branislav) Stamenković**
-
- 10:15 *Temperature-Dependent Materials in a Pad/Disc Brake System*
Aleksander Yevtushenko, **Piotr Grzes**
-
- 10:15 *Optimal Design of Annular Disks with Respect to Mixed Creep Rupture Time*
Aneta Ustrzycka, Krzysztof Szuwalski
-
- 10:15 *Barodesy - A Constitutive Model Based on Two Rules by Goldscheider*
Dimitrios Kolymbas, **Gertraud Medicus**
-
- 10:15 *Three-Dimensional Finite Element Model of the Radiocarpal Joint: Load Transfer Analysis through the Normal Wrist*
Susana Meireles, **Antonio Godinho Completo**, Jose Simoes, Carlos Relvas, Antonio Ramos
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- 10:15 *The FE Simulation of Vibrations Attenuation via Mass Reconfiguration*
Walerian Szyszkowski, Ehsan Sharbati
-
- 10:15 *Comparison of Optimum Topologies Obtained by Using Different Functions for Young's Modulus*
Ting-Yu Chen, Yen-Jui Li
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- 10:15 *Modeling and Simulation of Dynamic Debonding Propagation in Sandwich Plates*
Vyacheslav Nikolayevich Burlayenko, Tomasz Sadowski
-
- 10:15 *Damping Effect in Dynamic Buckling of Thin-Walled Plate Structures*
Radoslaw Mania, Zbigniew Kolakowski
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- 10:15 *FE Analysis of the Elastomeric Artificial Disc in the Lumbar Spine*
Pawel Borkowski, G. Krzesinski, P. Marek, B. Wasniewski, P. Wymyslowski, T. Zagrajek
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- 10:15 *Nonlinear Interaction of Co-Directional SH Waves in a Plate*
Esra Akman, Semra Ahmetolan
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- 10:15 *Dynamic Buckling of Thin-Walled Beams Subjected to Bending*
Tomasz Kubiak, Mariusz Urbaniak
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- 10:15 *Adaptive Mesh Refinement for Geomaterials*
Claire E. Heaney, Ronald B.J. Brinkgreve, Paul G. Bonnier, Michael A. Hicks
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- 10:15 *Nonlinear Oscillations of a Membrane on the Elastic Foundation*
Nikola Nesic
-
- 10:15 *Numerical Evaluation of Mechanical Parameters in Cerebral Aneurysm Formation at Bifurcations*
Robert Nagy, Imre Bojtár
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- 10:15 *Exact Geometry Based Quasi-Conforming Analysis*
Yang Xia, Ping Hu
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- 10:15 *Non-Stationary Frictional Heat Problem for Two Plane-Parallel Strips*
Aleksander Yevtushenko, **Michal Kuciej**
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- 10:15 *Modified Predictir-Corrector Method in Structural Dynamics*
Mladen Mestrovic, Eva Ocvirk
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- 10:15 *Infrared Image Analysis for Cancer Risk Diagnosis*
Evgeniya Gerasimova, Yuriy Bayandin, Oleg Naimark, Genriatta Freynd
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- 10:15 *Biomechanical Data Repository for Multiscale Modelling of Lower Limbs*
Massimiliano Baleani, Luca Cristofolini, Enrico Schileo, Serge Van Sint Jan, Mateusz Juszczak, Caroline Öhman, Iwona Zwierzak, Philippe Lefèvre, Jan Maria Juszczak, Marco Viceconti
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- 10:15 *Numerical Simulation Based on FEM/MESHLESS Coupling in Axisymmetric Elastoplasticity for 2D Solid Mechanics*
Yosr Ghozzi, Carl Labergere, Pierre Villon
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- 10:15 *Finite Element Modeling of the Humidity-Driven Wetting Mechanism of Wheat Awns*
Gerald A. Zickler, John W.C. Dunlop, Davide Ruffoni, Rivka Elbaum, Richard Weinkamer, Peter Fratzl, Thomas Antretter
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- 10:15 *Damage Accumulation in Metals under Hydrogen Embrittlement*
Vladimir Astafiev
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- 10:15 *Equilibrium of Thin-Walled Tube with Rigid Insert*
Alexei Mikhailovich Kolesnikov
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- 10:15 *Comparison of Analytical Approaches for the Infinite Plate on an Elastic Isotropic Halfspace*
Manuela Hackenberg, Gerhard Müller, Roland Friedl
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- 10:15 *Numerical Computation of the Thin-Walled Structure under the Influence of the Fluctuating Load, Considering the Secondary Plastic Deformation and Damages*
Abdusamat Abdusattarovich Abdusattarov, Muhamadaziz Rasulmuhamedov, Anvar Inomovich Isomidinov
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- 10:15 *Variational Approach to Ductile Fracture: A Simple Model with Damage and Plasticity*
Roberto Alessi, Jean Jacques Marigo, Stefano Vidoli
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- 10:15 *Analysis of the Properties of Resins Used in the Processes - JS and SLA*
Jacek Bernaczek, Grzegorz Budzik
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- 10:15 *Electrical Fail Safe Actuator Design of Shut Down Valves*
Sina Poorgol, **Hadi Homaei**
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- 10:15 *Determination of Effective Elastic Properties of Nanofibrils and Nanofibers by the Method of Differential Replacement with Asymptotic Homogenization*
Edwin Yesid Gomez Pachon, F.J. Sabina, R. Vera-Graziano
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- 10:15 *Incipient Failure Detection and Diagnostics of Self-Aligning Ball Bearing*
Sylvester Aondolumun Aye
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- 10:15 *Analysis of Properties of Models Constructed from Ti6Al4V Alloy Powder*
Jacek Bernaczek, **Grzegorz Budzik**
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- 10:15 *Finite Element Analysis of Shape Memory Polymer Seal Using a Thermomechanical Constitutive Model*
Sujithra Renganathan, Sivakumar Madras Srinivasan, Arockiarajan Arunachalam
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- 10:15 *Optimisation of the Ultra-Supercritical Steam Turbine Rotor Shape and Start-Up Method*
Grzegorz Nowak, Andrzej Rusin
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- 10:15 *Friction Torque Compensation in the Balanced Leg Orthosis for Robotic Rehabilitation*
Vigen Arakelian, **S. Sargsyan**, M. Harutyunyan
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- 10:15 *Relation between Displacement Gradients*
Turat Duishenaliev, R.N. Askarbekov
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Y.S. Rammohan, **H. Murthy**
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- 10:15 *Considerations on Skin Expansion over Adipose Tissue*
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- 10:15 *Evaluation of Glass Fiber/Epoxy Interfacial Failure Criterion by Using a Single Fiber Model Composite Specimen*
Shinji Ogihara, Hayato Nakatani, Jun Koyanagi, Satoshi Kobayashi
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- 10:15 *Chaotic Vibrations of the Duffing System with Fractional Damping*
Grzegorz Litak, Arkadiusz Syta, Stefano Lenci, Michael Scheffler
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- 10:15 *Nonlinear Dynamics Analysis for Geometrically Nonlinear Composite Aircraft Wings*
Ji-Seok Song, Sungsoo Na, Seok-Ju Cha, Zhanming Qin
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- 10:15 *Sequential Limit Analysis of Pressure Vessels with Combined Hardening*
Shyue-Yuh Leu
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- 10:15 *Determination of the Displacements Fields by the Speckle Interferometer with High-Frequency Speckle-Structures of the Reference Beam*
Michael Osipov, Yuriy D. Sheglov
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- 10:15 *Exact Analytical Solutions to Problems on Equilibrium State of Thick-walled Heavy Anisotropic Spheres and their Applications to Initial Strength of Monolithic Concrete Supports for Mine Working*
Anton Alexandrovich Fukalov, Alexey Vyacheslavovich Zaitsev
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- 10:15 *An Equilibrium Problems of a Rectangle in the Micropolar Elasticity*
Yuri Mikhailovich Grigoriev
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- 10:15 *Investigation of Nonstationary Processes of Compression of Thick-Walled Spherical and Cylindrical Shells*
Alexey Borisovich Kiselev
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- 10:15 *Optimal Ratio of Axial Feeding to Branch Height in T-Joints Hydro Forming Process*
 Heidar Ali Hashemi Boroujeni, **Hadi Homaei**
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- 10:15 *A New Design of Automatic Ball Balancer Reducing a Transient-Response*
 Taekil Kim, Ji-Seok Song, **Sungsoo Na**
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- 10:15 *Semi-Analytical Post-Buckling Analysis of Composite Plates Containing Free Edge Embedded Delaminations by Using Higher Order Shear Deformation Theory*
Mohsen Taghizadeh, Hamid Reza Ovesy, Mahsa Kharazi
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- 10:15 *Myringosclerosis and Otosclerosis – Their Effects in the Stapes Footplate*
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