# *Preliminary Program*

***June 26, 2026***

# *Nanomechanical Testing in Materials Research and Development X*

**October 4 - 9, 2026**

**Rhodes, Greece**

**Conference Chair**

**Verena Maier-Kiener**
**Montan Universität Leoben, Austria**

Engineering Conferences International

**Engineering Conferences International**
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**Sunday, October 4, 2026**

09:30 – 10:00 Check-in for Optional Tutorial Session

10:00 – 13:00 **Tutorial Session**
**Accelerated Materials Discovery: Introduction to Thin Film Libraries and High-throughput Nanomechanics**
Andrea M. Hodge, University of Southern California, USA

**Dynamic in situ Micromechanics – Fundamentals and Beyond** Markus Alfreider, Montanuniversität Leoben, Austria

13:00 - 14:30 Lunch on your own

14:30 – 15:45 Conference Check-In

15:45 – 16:00 Conference Welcome Remarks

**Session 1A: Machine Learning and Mechanical Mapping**
Moderator: TBA

16:00 – 16:30 **Highlight talk 1**
**Using Data Science and AI to enhance Experimental Micromechanics**
Christoph Eberl, Fraunhofer IMW, Freiburg, Germany

16:30 – 16:50 **High-throughput analysis of material libraries: Analysis of chemical composition, microstructure, mechanical, optical and electrical properties in a single benchtop instrument**
Johann Michler, EMPA Thun, Switzerland

16:50 – 17:10 **Correlative mechanical microscopy of deformation**
Jeffrey Wheeler, EMPA Dübendorf, Switzerland

17:10 – 17:40 **Highlight Talk 2**
**From 3d to 4d nanoindentation mapping: machine learning for high-dimensional mechanical data analysis and correlative interpretation**
Edoardo Rossi, Department of Civil, Computer Science and Aeronautical Technologies Engineering, Rome Tre University, Italy

17:40 – 18:00 **I High throughput 4d nanoindentation mapping: the new paradigm in small-scale mechanical testing**
Sudharshan Phani Pardhasaradhi, University of Hyderabad, India

18:00 – 18:20 **Probing phase complexity in combinatorial thin film libraries via high-throughput characterization**
Marco Sebastiani, Department of Civil, Computer Science and Aeronautical Technologies Engineering, Rome Tre University, Italy

18:20 – 18:40 **Expanding the Ashby Chart for Nanoengineered Complex Concentrated Alloy Thin Films: Overcoming Strength–Plasticity Trade-Off**
Mattheo Ghidelli, LSPM-CNRS, Paris, France

19:00 – 21:30 Opening reception and dinner

**Monday, October 5, 2026**

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| 07:30 – 08:30 | Breakfast buffet |
| | **Session 2A: Activating Plasticity: The Role of Beams, Fields, and Light**<br>Moderator: TBA |
| 09:00 – 09:30 | **Highlight Talk 3**<br>**From Artifact to Opportunity: Electron-Beam-Induced Activation of Viscous Flow in Oxide Glasses**<br>Sebastian Bruns, Technical University Darmstadt, Germany |
| 09:30 – 09:50 | **Electro-Plasticity and Photo-Plasticity of Ionic Crystals and Semiconductors at the Micrometre Scale**<br>Yu Zou, University of Toronto, Canada |
| 09:50 – 10:10 | **Electron-Beam–Assisted Mechanical Deformation in Oxide Ceramics**<br>In-Suk Choi, Seoul National University, South Korea |
| 10:10 – 10:30 | **Stress relaxation of amorphous silicates under electron irradiation – mechanism and dynamics of plastic flow in the glassy state**<br>Etienne Barthel, SIMM/ESPCI, France |
| 10:30 – 10:50 | **Ion irradiation induced hardening and toughening of amorphous alumina protective coating**<br>Sergio Sao Jao, CNRS Laboratoire Georges Friedel, MINES Saint-Etienne, France |
| 10:50 – 11:20 | Coffee break |
| | **Session 2B: From Stress Fields to Structural Transformations**<br>Moderator: TBA |
| 11:20 – 11:50 | **Highlight Talk 4**<br>**Metastable group-iv allotropes via nanoindentation: converging theory and experiments**<br>Emilio Scalise, University Milano-Biccoca, Italy |
| 11:50 – 12:10 | **A new approach to study the deformation behavior of bulk metallic glass from the atomic to the micrometer scale using micropillar compression**<br>Udo Schwarz, Yale University, USA |
| 12:10 – 12:30 | **Thermally activated plasticity of silicon up to 900 °C - from twinning to perfect dislocation slip**<br>Gerald Schaffar, KAI-Infineon, Austria |
| 12:30 – 12:50 | **Fracture of Brittle Materials and interfaces at the Nanoscale**<br>Oriol Gavalda Diaz, Imperial College, UK |
| 12:50 – 13:10 | **80nm-resolved in situ x-ray diffraction reveals multiaxial stress transfer at the indenter-sample interface**<br>Michael Meindlhumer, Montanuniversität Leoben, Austria |
| 13:10 – 13:30 | **From brittle to metal-like plasticity in transition metal nitrides probed by in-situ micropillar compression**<br>Rainer Hahn, TU Wien, Austria |

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| 13:30 – 14:30 | Lunch buffet |
| 14:30 – 15:30 | Networking time |
| | **Session 3A: Beyond the Scratch: New Frontiers in Small-Scale Tribology**<br>Moderator: TBA |
| 15:30 – 16:15 | **Keynote Talk**<br>**Scratching across grains & boundaries: a hunt for design guidelines**<br>Cem Tasan, MIT, USA |
| 16:15 – 16:35 | **Beyond just scratching the surface: dislocation engineering regulated tribological responses in oxides**<br>Oliver Preuss, Institute for Applied Materials (IAM), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany |
| 16:35 – 16:55 | **In-situ nanoscratch synchrotron x-ray diffraction: probing asperity-scale sliding deformation in austenitic stainless steel and hardfacing alloys**<br>Anna Karrer, Oxford University, UK |
| 16:55 – 17:15 | **Tribological behavior of graphene-reinforced ceramic composites - nanofriction experiments under water vapor in environmental transmission electron microscopy**<br>Karine Masenelli-Varlot, INSA Lyon, Universite Claude Bernard Lyon 1, CNRS, France |
| 17:15 – 17:45 | Coffee Break |
| 17:45 – 18:15 | **Highlight Talk 5**<br>**A Predictive Framework Linking Surface Topography to Friction in Nano to Meso Contacts**<br>Christian Greiner, Institute for Applied Materials (IAM), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany |
| 18:15 – 19:15 | **Poster Preview Session (odd-numbered posters)**<br>Moderators: TBA and Prof. Benoit Merle<br>(One minute each speaker) |
| 19:15 – 21:00 | Buffet dinner |
| 21:00 – 23:00 | Poster session with social time |

**Tuesday, October 6, 2026**

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| 07:30 – 09:00 | Breakfast buffet |
| | **Session 4A: Designing Energy Materials through Nanomechanics** |
| | Moderator: TBA |
| 09:00 – 09:30 | **Highlight Talk 6**<br>**Mechanics of Materials for Rechargeable Batteries**<br>Matt Pharr, Texas A&M, USA |
| 09:30 – 09:50 | **Nanomechanics of functional nanostructures: from Kirkendall-based thermal insulators to reactive multilayers**<br>Ralph Spolenak, ETH Zurich, Switzerland |
| 09:50 – 10:10 | **Effect of oxygen on the deformation mechanism of inorganic fullerenes studied by TM in situ approaches**<br>Lucile Joly-Pottuz, University of Lyon, France |
| 10:10 – 10:40 | **Highlight Talk 7**<br>**Nanomechanical testing as the rate-limiting step in solid-state battery development**<br>Ruth Schwaiger, Forschungszentrum Jülich, Germany |
| 10:40 – 11:00 | **Elastic strain engineering applied to enhance the electrocatalytic activity of intermetallic compounds for the hydrogen evolution reaction**<br>Jon Molina, IMDEA-Materials Institute, Spain |
| 11:00 – 11:30 | Coffee break |
| | **Session 4B: Beyond Failure: Understanding and Controlling Degradation Pathways**<br>Moderator: TBA |
| 11:30 – 12:00 | **Highlight Talk 8**<br>**Measuring adhesion energies of critical interfaces in aerospace**<br>Megan Cordill, Austrian Academy of Sciences, Erich-Schmid-Insitute Leoben, Austria |
| 12:00 – 12:20 | **Plastic flow and fracture of chromium-coating deposited on a Zr-based nuclear fuel cladding**<br>Guillaume Kermouche, Mines Saint-Etienne, Laboratoire Georges Friedel, CNRS UMR 5307, France |
| 12:20 – 12:50 | **Highlight Talk 9**<br>**Tritium-based Micromechanics (TRITIME) for a Mechanistic Understanding of Hydrogen Embrittlement**<br>Christoph Kirchlechner, Institute for Applied Materials (IAM), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany |

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| 12:50 – 13:10 | **Advancing hydrogen resistance using innovative ECO/polymer composite coatings**<br>Maria Jazmin Duarte Correa, Max Planck for Sustainable Materials, Düsseldorf, Germany |
| 13:10 – 13:30 | **Circularity by design: nanomechanical pathways to understand and control residual effects in martensitic steels**<br>Eloho Okotete, Institute for Applied Materials (IAM), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany |
| 13:30 – 14:30 | Lunch buffet () |
| 14:45 – 15:00 | Board buses for excursion |
| 15:00 – 22:30 | Excursion to Rhodes City (dinner on your own) |

**Wednesday, October 7, 2024**

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| 07:30 – 09:00 | Breakfast buffet |
| | **Session 5A: Blueprints of Nature: Mechanics Across Biological and Geological Scales**<br>Moderator: TBA |
| 09:00 – 09:30 | **Highlight Talk 10**<br>**Investigating structure-property relationships of bone and the effects of metabolic diseases using experimental micromechanics**<br>Jakob Schwiedrzik, EMPA Dübendorf, Switzerland |
| 09:30 – 09:50 | **Nature's Blueprints: Nanomechanical Insights From Bone, Teeth and Shells**<br>Michael Wurmshuber, FAU Erlangen, Germany |
| 09:50 – 10:10 | **Deformation mechanisms of talc: insights from nanomechanical testing and numerical modelling**<br>Patrick Cordier, Université de Lille, France |
| 10:10 – 10:40 | **Highlight Talk 11**<br>**Bridging planetary science and materials physics: micromechanics of meteorites**<br>Szilvia Kalacska, CNRS LGF, Mines St. Etienne, France |
| 10:40 – 11:00 | **Investigation of sapphire strength across the scales**<br>Sylvain Meille, INSA Lyon, France |
| 11:00 – 11:30 | Coffee break |
| | **Session 5B: Capturing Plasticity in the Fast Lane**<br>Moderator: TBA |
| 11:30 – 12:00 | **Highlight Talk 12**<br>**Microparticle impact as a window on dislocation-drag plasticity**<br>Luciano Borasi, Northwestern University, USA |
| 12:00 – 12:20 | **Acoustic Signatures of High-Strain-Rate Microcompression in Zn Single Crystals**<br>Peter Ispanovity, ELTE Eötvös Loránd University, Hungary |
| 12:20 – 12:40 | **Constant Strain Rate Nanoindentation at High Strain Rates: Force versus Displacement Control**<br>Benoit Merle, University of Kassel, Germany |
| 12:40 – 13:00 | **Do strain rate sensitivity exponents and deformation mechanisms change in constant strain rate nanoindentation between $10^3$ and $10^4$ $s^{-1}$?**<br>Gaurav Mohanty, Tampere University, Finland |
| 13:00 – 13:20 | **Nanoindentation Under Cryogenic Conditions at Extreme Strain Rates**<br>Hendrik Holz, Max Planck for Sustainable Materials, Düsseldorf, Germany |

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| 13:20 – 14:30 | Lunch buffet |
| 14:30 – 15:30 | Networking time |
| | **Session 6A: Seeing Deformation: Correlative Electron Microscopy in Nanomechanics**<br>Moderator: TBA |
| 15:30 – 16:00 | **Highlight Talk 13**<br>**Revealing deformation mechanisms in nanocrystalline thin films using 4D STEM**<br>Christoph Gammer, Austrian Academy of Sciences, Erich-Schmid-Insitute Leoben, Austria |
| 16:00 – 16:20 | **Expanding the capabilities of the scanning electron microscope: Diffraction, imaging, and in-situ**<br>Dan Gianola, University of California, Santa Barbara |
| 16:20 – 16:40 | **Cryogenic and hot nano-tensile testing with in situ TKD and transmission electron imaging in the SEM**<br>Thomas Edwards, NIST, Japan |
| 16:40 – 17:00 | **Correlative analysis of the elementary deformation mechanisms in metallic thin films by lab-on-chip, nano-dic and acom-tem**<br>Hosni Idrissi, Université catholique de Louvain, Belgium |
| 17:00 – 17:30 | Coffee Break |
| 17:30 – 17:50 | **From Dislocation Structure to Local Strength: A Correlative ECCI–Micropillar Study in Ferritic Steel**<br>Subin Lee, Institute for Applied Materials (IAM), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany |
| 17:50 – 18:10 | **Microscale tension–torsion coupled testing of additively manufactured metallic microarchitectures**<br>Rajaprakash Ramachandramoorthy, Max Planck for Sustainable Materials, Düsseldorf, Germany |
| 18:10 – 18:30 | **3D Printed Metal Micro- and Nanomechanical Testing Platforms**<br>Lalith Kumar Bhaskar, Max Planck for Sustainable Materials, Düsseldorf, Germany |
| 18:30 – 19:30 | **Poster Preview Session (even-numbered posters)**<br>Moderators: XX and Prof. Benoit Merle<br>(one minute each speaker) |
| 19:30 – 21:00 | Buffet dinner |
| 21:00 – 23:00 | Poster session with social time |

**Thursday, October 8, 2026**

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| 07:30 – 09:00 | Breakfast buffet |
| | **Session 7A: From Complexions to Plasticity: Grain Boundary-Mediated Deformation**<br>Moderator: TBA |
| 09:00 – 09:30 | **Highlight Talk 14**<br>**Micromechanical Testing to Probe Plasticity and Failure of Grain Boundary and Dislocation Complexions**<br>Timothy Rupert, Johns Hopkins University, USA |
| 09:30 – 09:50 | **Tailoring grain boundary states in severely deformed Ti-Nb based nanocrystalline systems**<br>Markus Alfreider, Montanuniversity Leoben, Austria |
| 09:50 – 10:10 | **Grain Boundary hardening vs. softening in nanocrystalline Cu-X Solid Solutions: A multi-method nanomechanical investigation from RT to 300°C**<br>Karsten Durst, Technical University of Darmstadt, Germany |
| 10:10 – 10:30 | **Enhancing strength and deformability in nanocomposites via thick 3-D bimetallic interfaces**<br>Nathan Mara, University of Minnesota, USA |
| 10:30 – 11:00 | **Invited Talk 15**<br>**Nanoindentation pop-ins revisited: recrystallization and twinning in molybdenum at room temperature**<br>Eugen Rabkin, Technion Haifa, Israel |
| 11:00 – 11:30 | Coffee break |
| | **Session 7B: Decoding Complex Materials through Micromechanics and Modeling**<br>Moderator: TBA |
| 11:30 – 12:00 | **Highlight Talk 16**<br>**Determination of material parameters using inverse analysis of indentation results**<br>Alexander Hartmaier, ICAMS, RUB, Germany |
| 12:00 – 12:20 | **Transformation-induced misfit strains and their impact on micromechanical response in ti-al-nb lamellar colonies**<br>Henri Ovri, Hereon, Hamburg, Germany |
| 12:20 – 12:40 | **Nanomechanics of coupled defects in Laves intermetallics**<br>Sandra Korte-Kerzel, Institut für Metallkunde und Materialphysik, RWTH Aachen University, Germany |
| 12:40 – 13:00 | **From the nucleation of prismatic dislocation loops to basal: various aspects of small scale plasticity in Cr2AlC MAX phase revealed by micromechanichal testing**<br>Christoph Tromas, Pprime Institute, University of Poitiers, France |
| 13:00 – 13:20 | **Nanoindentation Mapping of cemented carbides as complex biphasic materials: From Surface Statistics to Volumetric Mechanical Correlation by FEM simulation and tomography**<br>Emilio Jimenez Pique, Spain |

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| 13:20 – 14:30 | Lunch buffet |
| 14:30 – 15:30 | Networking Time |
| | **Session 8A: Tracking Failure: From Crack Initiation to Final Fracture**<br>Moderator: TBA |
| 15:30 – 16:00 | **Highlight Talk 17**<br>**Fracture behavior of multilayered thin films and coatings: insights from beam bending techniques**<br>Nagamani Jaya Balila, IIT Bombay, India |
| 16:00 – 16:20 | **Assessing local cyclic failure of materials: From threshold to final fracture**<br>Daniel Kiener, Department Materials Science, Chair of Materials Physics, Montanuniversität Leoben, Austria |
| 16:20 – 16:40 | **Small-scale fatigue crack growth: a versatile tool - from characterizing material properties to elucidating deformation mechanisms and beyond**<br>Jutta Luksch, Saarland University, Saarbrücken, Germany |
| 16:40 – 17:00 | **Cantilever bending coupled to DIC to obtain constitutive laws for deformation under constant strain rate and stress: experiments and instrument development**<br>Vikram Jayaram, Indian Institute of Science, India |
| 17:00 – 17:20 | **Understanding the grain boundary sliding mechanism via in situ high temperature pillar compression**<br>Divya Sri Badla, Institute for Applied Materials (IAM), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany |
| 17:20 – 17:50 | Coffee Break |
| | **Session 8B: Twinning and Size Effects in Thin Films and Crystalline Materials**<br>Moderator: TBA |
| 17:50 – 18:20 | **Highlight Talk 18**<br>**Understanding the deformation of single-crystalline gold thin films with nanotwins: contribution of atomic-scale simulations**<br>Sandrine Brochard, Pprime Institute, University of Poitiers |
| 18:20 – 18:40 | **The fracture toughness and thickness dependence of thin films**<br>Mathias Göken, FAU Erlangen, Germany |
| 18:40 – 19:00 | **Influence of sample size, strain rate and temperature on deformation of an Fe-2.4 wt.% Si bi-crystal and its paired single crystals**<br>Chunhua Tian, Institut für Metallkunde und Materialphysik, RWTH Aachen University, Germany |
| 19:00 – 19:20 | **In situ TKD coupled with DIC for investigating twinning mechanisms in HCP metals**<br>Xavier Maeder, EMPA Thun, Switzerland |
| 20:00 – 22:30 | Conference Banquet |

**Friday, October 09, 2024**

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| 07:30 – 09:00 | Breakfast and departures |