

COST Action MecaNano General Meeting 2025

19-21 May 2025, AGH University of Krakow, Poland

Academic Centre for Materials and Nanotechnology, Kawory 30, 30-055 Krakow, Poland

Local organizers: Wiktor Bednarczyk (bednarczyk@agh.edu.pl), Grzegorz Cios, Piotr Bała, Anna Smyk

Monday, May 19 th	
13:00	Welcome reception
14:00	Opening talk
Chairman: Marie-Stéphane Colla	
14:10	Keynote Talk - Urszula Stachewicz, <i>AGH University of Krakow, Poland</i> Structure-properties relationship in electrospun polymer and composite fibers
14:50	Aleksija Djuric, <i>University of East Sarajevo, Bosnia and Herzegovina</i> Influence of Adhesive Type on the Tensile-Shear Strength of CFRP-DP500 Steel Joints
15:10	Sophie Vanpee, <i>UCLouvain, Belgium</i> Nanoindentation Analysis of individual phases in model Carbon Fiber-Reinforced PEEK composite
15:30	Johanna Byloff, <i>EMPA - Swiss Federal Laboratories for Materials Science and Technology</i> Thin Film Interface Engineering using Atomic Layer Deposition: Improved Electromechanical Properties and Adhesion
15:50	Coffee break
Chairman: Julien Guénolé	
16:20	Francesco Maresca, <i>University of Groningen, Netherlands</i> Multi-scale modelling of fracture from atomistics to micromechanics
16:50	Laurent Pizzagalli, <i>Institut Pprime, l'Université de Poitiers, France</i> Molecular dynamics calculations of the mechanical properties of nanopillars made of pyrocarbons
17:10	Konrad Perzynski, <i>AGH University of Krakow, Poland</i> Prediction of crack evolution in thin films and coatings based on the digital material representation concept
17:30	Ashish Chauniyal, <i>Ruhr University Bochum, Germany</i> Using data-based methods for microstructure characterization
17:50	Bal Burak, <i>Abdullah Gül University, Turkey</i> Molecular dynamics based mobility laws
18:10	Social networking

Tuesday, May 20 th	
Chairman: Benoît Merle	
9:00	Marc Legros, CEMES-CNRS, Toulouse, France
	In situ TEM straining: old tricks and new artefacts. An intrinsically small-scale testing method
9:30	Vivek Devulapalli, EMPA - Swiss Federal Laboratories for Materials Science and Technology
	Fracture behaviour in Cu-Al multilayer thin films with amorphous AlO interlayers: Insights from in-situ TEM tensile testing
9:50	Pierre Godard, Institut Pprime, Université de Poitiers, France
	[110] tensile testing of single crystalline gold thin films with nanotwins: in situ TEM and XRD studies
10:10	Luke Hewitt, United Kingdom Atomic Energy Authority, United Kingdom
	In-situ strain measurement of micro-mechanical specimens using DIC
10:30	Tijmen Vermeij, EMPA - Swiss Federal Laboratories for Materials Science and Technology
	In situ Transmission Kikuchi Diffraction (TKD) Tensile Testing
10:50	Coffee Break
Chairman: Maria Wątroba	
11:20	Martina Freund, RWTH Aachen, Germany
	Plasticity of Ca-Mg-Al C14 and C15 Laves Phases and its Temperature and Chemistry Dependency
11:50	Sang-Hyeok Lee, RWTH Aachen, Germany
	Dislocations in Laves phases: Atomistic Mechanisms of Motion and Reaction
12:10	Kamila Hamulka, EMPA - Swiss Federal Laboratories for Materials Science and Technology
	Strain rate dependence of slip vs. twinning in c-axis compression of α -titanium
12:30	Hannah Howard, University of California, Santa Barbara, USA
	Dislocation-localized phase evolution in FCC alloys and the resulting dislocation mechanics evaluated by spherical nanoindentation
12:50	Stefan Zeiler, Montanuniversität Leoben, Austria
	A versatile electrochemical charging cell for studying hydrogen-related effects in materials
13:10	Lunch break (organized locally)
Chairman: Xavier Maeder	
14:40	Edoardo Rossi, Università degli Studi Roma Tre, Italy
	Decoding Microstructures: Machine Learning for High-Speed Nanoindentation Mapping
15:10	Pedro Camanho, University of Porto, Portugal
	Physically recurrent neural networks for micromechanical analyses of composite materials undergoing plasticity and distributed damage
15:30	Laia Ortiz-Membrado, Universitat Politècnica de Catalunya, Spain
	Deep Learning Mechanical Properties Classification of Metal-Ceramic Composites Using Nanoindentation Curves
15:50	Ruomeng Chen, Forschungszentrum Jülich, Germany
	Understanding microstructure-property correlation of pearlitic steel by nanoindentation and machine learning-based modeling
16:10	Hanna Szebesczyk, Wrocław University of Science and Technology, Poland
	Application of high-throughput materials science methods for rapid screening and optimization of ultra-strong light-weight alloys for automotive
16:30	Coffee break
16:50	Poster session
19:00	Official Dinner (Paid separately) - Klub Studio, Witolda Budryka 4, 30-072 Kraków, Polska


Anton Paar

SURFACE
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SYNTON-MDP
 MICRO DIAMOND POINTS

Competence in diamond

Wednesday, May 21 st	
Chairman: Marc Legros	
9:00	Bo-Shiuan Li, National Sun Yat-sen University, Taiwan Small-Scale Mechanical Testing of Semiconductor Materials
9:30	Roозbeh Neshani, UCLouvain, Belgium Lab-on-a-chip nanomechanical study of annealing and stress-induced grain growth effects on plasticity and time-dependent deformation in sputtered Pt thin films.
9:50	Muhammad Muzammil, Koç University, Istanbul, Turkey MEMS Platforms for Automated and High-Throughput Micromechanical Testing of Silicon Nanowires
10:10	Gaurav Mohanty, Tampere University, Finland High strain rate nanoindentation up to 10,000/s and associated deformation mechanisms
10:30	Hannah Lichtenegger, Montanuniversität Leoben, Austria Hardness values as a function of the degree of deformation for tungsten and doped tungsten fine wire
10:50	Coffee Break
Chairman: Grzegorz Cios	
11:20	Fatima-Zahra Moul-El-Ksour, École Centrale de Lyon, CNRS, France High Temperature Scanning Indentation: Latest Results On Amorphous Selenium
11:40	Francesc Barbera Flichí, Universitat Politècnica de Catalunya, Spain Small scale deformation of cemented carbides at high temperature
12:00	James Gibson, United Kingdom Atomic Energy Authority, United Kingdom Irradiation Hardening in Advanced Reduced Activation Ferritic-Martensitic Steels for Future Fusion Applications
12:20	Chunli Wu, Technion - Israel Institute of Technology, Israel The Effect of Oxidation on the Compressive Strength of Ni Nanoparticles: a Nano-Mechanics Perspective
12:40	Anastasiia Walrave, Aix Marseille Université, CNRS, Marseille, France Small-Scale Plasticity in ZnO: Combined Experimental and Computational Insights
13:00	Lunch - The end of the Meeting

Poster list		
Poster session: Tuesday 16:50		
1	Mohammed Tahir Abba	Toward High Strain Rate Spherical Nanoindentation Testing
2	Fabien Amiot	Second strain-gradient elasticity for centro-symmetric cubic materials
3	Muhammet Anıl Kaya	Mechanical Characterization of Hazelnut Shell Powder-Reinforced Epoxy Composites for Sustainable Applications
4	Tizian Arold	Nitrogen-Doped PVD MoS ₂ Coatings: Enhanced Wear Resistance and Tribological Performance in Rolling-Sliding Contact
5	Burak Bal	Molecular dynamics based mobility laws
6	Saulius Baskutis	Investigation of the Potential of PTFE Coatings for Journal Bearings
7	Samuel Bojarski	High-strength and non-brittle crystalline-amorphous PVD-ALD nanolaminates of amorphous alumina and AlCoCrFeNi high-entropy alloy
8	Jaroslav Cech	Nanoindentation study of NiTi shape memory alloys
9	Grzegorz Cios	Orienting grains for nanomechanical testing without EBSD
10	Özgen Ümit Çolak Çakır	Machine Learning in Thermoset Polymer Creep Modeling
11	Diego Cruaños	Understanding nanoindentation statistical dispersion in ceramic - metal cemented carbides by numerical simulation and FIB tomography
12	Arjun Bharath Curam	Defect-driven microstructural evolution and mechanical characterization of CoCrNi, Fe _x (CoCrNi) _{100-x} and CoCrNi/Fe nanolaminate complex compositional alloy thin films
13	Miljan Dašić	Selecting Protein Crystal Structure for Optimal Scoring of Protein-Ligand Interactions
14	Emine Özlem Dengiz	Investigation of the Mechanical Behavior of Graphene-Reinforced Magnesium via Experimental and Finite Element Method
15	Cengiz Görkem Dengiz	Investigation of the Mechanical Behavior of Graphene-Reinforced Magnesium via Experimental and Finite Element Method
16	Oğuzhan Der	Quantitative Analysis of Nanoscale Mechanical Behavior in Hybrid Materials Through Nanoindentation and FEM Simulations
17	Francisco Javier Dominguez-Gutierrez	Nanoindentation and Defect Dynamics in Irradiated Fcc NiFe Alloys: Insights from Experiments and Atomistic Modeling
18	Marco Ezequiel	Suppressing shear band instability for strong and ductile crystal/glass nanolaminates
19	Lala Gahramanli	Analysis of the physical properties of Cd _x Zn _{1-x} S-based nanocomposites synthesized through sonochemical and SILAR methods
20	Julien Guénolé	Interfaces as dislocation density fields for bridging length scales in nanomechanics
21	Amine Haj Taieb	Review of Auxetic properties of textile structures
22	Evghenii Harea	Comparative Analysis of the Gao-Nix Model and Multifractal Scaling Law Model for Indentation Size Effect
23	Petr Hausild	Temperature and strain rate dependent indentation size effect at shallow indentation depths
24	Benedykt Jany	Integrating Machine Learning and Data Mining Techniques with Surface Texture Analysis to Explore Wetting and Optical Properties of CuAg Alloys

25	Piotr Jenczyk	Modification of the matrix-reinforcement interface in Ni-SiC composites
26	Cihan Kaboglu	Investigation of Mechanical and Physical Properties of Polyphenylene sulfide (PPS) Matrix Composite Reinforced with GNP and MWCNT
27	Tomas Kacinskas	Investigation of the Potential of PTFE Coatings for Journal Bearings
28	Hesam Khaksar	A comparative study on the nanotribological properties of amorphous and polycrystalline forms of MoS ₂ using Nano-Indenter and AFM.
29	Rana Khankishiyeva	Effect of Chitosan Particle Size on the Mechanical Performance and UV Degradation of Low-Density Polyethylene-Chitosan Composites
30	Philipp Kroecker	In-Situ TKD Tensile Testing Reveals Complex Nanoscale Deformation Twinning in Rhenium
31	Valeria Lemkova	Scale-Bridging Nanoindentation to Probe Structural Heterogeneity in Amorphous Metals
32	Feitao Li	Room-temperature recrystallization of Mo induced by nanoindentation
34	Xavier Maeder	Metal-Ceramic Nanolaminate Design for Enhanced Thermal and Mechanical Properties
35	Lukasz Maj	Micro-mechanical evaluation of coatings produced by micro-arc oxidation of titanium
36	Bakhtiyar Mammadli	Prediction of Mechanical Properties using DIC analysis and Machine Learning
37	Sevinj Mammadyarova	Effect of Ag-doping concentration on the structural and optical properties of NiO nanoparticles
38	David Mercier	Unsupervised Machine Learning for Nanoindentation Mapping Analysis and Microstructural Correlation
39	Yannis Missirlis	Regulation of relevant gene expressions in cells and bacteria by dynamic mechanical conditioning
40	Tuğba Mutuk	Hybrid Composite production for Defense Industry
41	Paolo Nicolini	Nanowear in molybdenum disulfide studied by molecular dynamics simulations
42	Olivier Noel	Contact mechanics and tribological properties on polymers: An experimental approach.
43	Krzysztof Pajor	Comparative analysis of plastic deformation in Zr-Cu-Ag metallic glasses: insights from micropillar and bulk sample compression tests
44	Mirosława Pawlyta	Structure of Ta/TaN nanolayered systems investigated by Transmission Electron Microscopy
45	Tatiana Petrova	Optimal safety loads and design of polymer nanocomposites under static loading
46	Barbara Putz	Improved thermal stability of Cu nanoparticle thin films via atomic layer deposition
47	Chaofeng Qin	Phase Stability and Mechanical Properties of Cobalt Nanoparticles
48	Eugen Rabkin	Drastic softening of Pd nanoparticles induced by hydrogen cycling
49	Monika Rejek	Advanced characterization of metal-oxide-metal interfaces produced by combined ALD/PVD deposition
50	Nicolae Serban	Influence of temperature and impact energy on microstructural evolution and deformability of Inconel 925 nickel-based superalloy
51	Raul Simões	HDPE reinforced with CDs with enhanced processing lifespan and improved recyclability traceability

52	Igor Stankovic	Analytical Modeling of Wear Mechanisms in Nanocontacts: Influence of Applied Load and Material Composition
53	Wolfgang Stein	Advanced tools for G200 nanoindenter: motorized tilt correction stage to optimize flat punch measurement - motorized 8" wafer vacuum chuck allows full size wafer measurement
54	Pavlos Stephanou	Use of non-equilibrium thermodynamics to derive a variable entanglement density constitutive model for entangled polymer melts
55	Mona Stoll	Abusing the Sink-In Coefficient to Quantify Pile-Up in Nanoindentation
56	Aleksandra Szczupak	Colorimetry and Tribology of Ultrapure Copper Micromodification
57	Claus Trost	Unlocking Micromechanical Insights: Explainable Machine Learning and Feature Engineering applied to Nanoindentation Data
58	Ahmed Uluca	2D spherical nanoindentation reveals nanoscale roughness of microscopic contacts
59	Deniz Uzunsoy	Characterisation of Titanium Matrix Composites with Hybrid Reinforcements of Al ₂ O ₃ and Functionalised Graphene Nanoplatelets
60	Maria Watroba	Microstructure-Property Relationships in Template-Assisted Electrodeposited Zinc Micropillars: A Comparative Study with FIB-Milled Specimens
61	Krzysztof Wiczerzak	Systematic exploration of refractory high entropy alloys using high-throughput techniques and machine learning
62	Zhuocheng Xie	Grain Boundary Segregation Landscape in Mg Alloys: From Solute Decoration to Clustering and Structural Transitions
63	Stanislav Zak	Road to Failure: AFM Indentation of Polymers
64	Sina Zarepakzad	Machine Learning-Driven High-Throughput Analysis of Damping Effects in Silicon-Based Cantilever Resonators with Metallic Coating
65	Wen Zhao	Materials Informatics in Academia: Challenges and Opportunities