

## *Program*

# **Nanomechanical Testing in Materials Research and Development VI**

**October 1 - 6, 2017**

**Dubrovnik, Croatia**

### **Conference Chair**

**Karsten Durst**

Technical University Darmstadt  
Germany



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**Previous conferences in this series**

***Instrumented Indentation Testing in  
Materials Research & Development***

**October 9 – 15, 2005**

**Crete, Greece**

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Carl McHargue, University of Tennessee, USA

***Nanomechanical Testing in Materials Research & Development II***

**October 11 - 16, 2009**

**Barga, Italy**

*Conference Chair:*

Mathias Göken, University Erlangen-Nurnberg, Germany

***Nanomechanical Testing in Materials Research & Development III***

**October 9 – 14, 2011**

**Lanzarote, Canary Islands, Spain**

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***Nanomechanical Testing in Materials Research & Development IV***

**October 6 - 11, 2013**

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***Nanomechanical Testing in Materials Research & Development V***

**October 4-9, 2015**

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## **NOTES**

- *Technical Sessions and the Tutorial Session will be in Soderini 3 (Level R). Poster sessions will be in Giardino (Level 0).*
- *Dinners will be in Giardino. Lunches on Monday and Wednesday will be in the Origano Restaurant. Lunch on Thursday will be in Giardino.*
- *Audio, still photo and video recording by any device (e.g., cameras, cell phones, laptops, PDAs, watches) is strictly prohibited during the technical sessions, unless prior permission has been granted by the author and ECI.*
- *Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).*
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- *Please write your name on your program so that it can be returned to you if lost or misplaced.*
- *After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.*

## Sunday, October 1, 2017

08:30 - 09:00 Check-in for Optional Tutorial Session

09:00 - 13:00 Tutorial Session

### **Advances in high temperature nanoindentation**

Jeff Wheeler, ETH Zurich, Switzerland

### **Analysis of thermally activated processes during indentation**

Verena Maier-Kiener, Montanuniversität Leoben, Austria

### **Industrial application of small scale mechanical testing**

Johann Michler, EMPA, Switzerland

13:00 - 14:00 Lunch (on your own)

14:00 - 15:45 Conference check-in (Pre-function area)

### **Welcome and Conference Overview**

Conference Chair: Karsten Durst

ECI Technical Liaison: Larry Kabacoff

16:00 - 17:00 **Keynote: Integrated experimental and simulation analysis of stress and strain partitioning in dual phase steel**

Dierk Raabe

Max-Planck-Institut für Eisenforschung GmbH, Düsseldorf, Germany

17:00 - 19:00 **Session I: Introducing nanomechanical testing in research and development**

17:00 - 17:30 *Highlight:* **Quantifying the commonalities in structure and plastic deformation in disordered materials**

Daniel S. Gianola, University of California, Santa Barbara, USA

17:30 - 17:50 **Plastic deformation of sub-micron Al and Be wires: A TEM and in situ TEM study**

Marc Legros, CEMES-CNRS, Toulouse, France

17:50 - 18:10 **The brittle-ductile transition of tungsten single crystals at the micro-scale**

Johannes Ast, EMPA Swiss Federal Laboratories for Materials Science and Technology, Switzerland

19:00 - 20:00 Welcome Reception

20:00 - 21:30 Dinner (Giardino)



**Monday, October 2, 2017**

- 07:30 - 09:00 Breakfast Buffet
- 09:00 - 13:00 **Session II: Small scale fracture mechanics**
- 09:00 - 09:40 *Invited*  
**Fracture mechanics of microsamples**  
Reinhard Pippan, Erich Schmid Institute of Materials Science of the Austrian Academy of Sciences, Austria
- 09:40 - 10:00 **In situ HR-EBSD during micro-mechanical testing for microstructure, stress and plastic deformation characterizations in material**  
Xavier Maeder, EMPA - Swiss Federal Laboratories for Materials Science and Technology, Switzerland
- 10:00 - 10:20 **Micromechanics of fully lamellar TiAl alloys**  
Jon Molina-Aldareguia, IMDEA Materials Institute, Spain
- 10:20 - 10:40 **In situ stable fracture of ceramic interfaces**  
Finn Giuliani, Imperial College London, UK
- 10:40 - 11:10 Coffee break
- 11:00 - 11:30 **Miniaturized fracture experiments on pearlitic steel: Challenges and solutions**  
Gerhard Dehm, Max-Planck-Institut für Eisenforschung GmbH, Düsseldorf, Germany
- 11:30 - 11:50 **Understanding the performance of nano-structured ferritic alloys through micro-mechanical testing**  
David Armstrong, University of Oxford, UK
- 11:50 - 12:10 **Using simulations to investigate the apparent fracture toughness of microcantilevers**  
Steffen Brinckmann, Max-Planck-Institut für Eisenforschung, Düsseldorf, Germany
- 12:10 - 12:30 **Fracture of silicon at low length scales**  
Jeffrey M. Wheeler, ETH Zurich, Switzerland
- 12:30 - 12:50 **Elastic-plastic fracture toughness of electrodeposited Ni-W thick films using in-situ microcantilever bend tests**  
Denise Yin, Lehigh University, USA
- 13:00 - 14:30 Lunch
- 14:30 - 16:30 Networking / Time for *ad hoc* discussions

**Monday, October 2, 2017 (continued)**

- 16:30 - 19:00            **Session III: Coatings and small-scale fracture mechanics**
- 16:30 - 16:50            **Multiple cracking events in metal bi-layers on polymer substrates**  
Megan J. Cordill, Erich Schmid Institute of Materials Science, Leoben, Austria
- 16:50 - 17:10            **Mechanical properties and failure of Ag nanowire transparent electrodes studied by means of in situ tensile testing**  
Nadine Schrenker, University Erlangen-Nürnberg (FAU), Germany
- 17:10 - 17:30            **Fracture behavior of metallic thin films as evaluated by bulge-tests and in situ TEM deformation experiments**  
Mathias Göken, FAU Erlangen-Nürnberg, Germany
- 17:30 - 17:50            **Micro-mechanical testing of transition metal (oxy)nitride coatings**  
James S.K-L. Gibson, RWTH Aachen University, Germany
- 18:20 - 19:00            *Invited*  
**Filamentary growth of metals: Microstructure and properties of (nano-) whiskers**  
Gunther Richter, Max-Planck-Institute for Intelligent Systems, Stuttgart, Germany
- 19:00 - 20:00            Poster Preview I
- 20:00 - 21:30            Dinner
- 21:30 - 23:00            **Poster Session I with Social Hour**

**Tuesday, October 3, 2017**

- 07:30 - 09:00 Breakfast Buffet
- 09:00 - 13:00 **Session IV: In-situ Experiments II**
- 09:00 - 09:40 *Invited*  
**Combined in situ mechanical testing and scale-bridging 3D analysis of nanoporous gold**  
Erdmann Spiecker, University Erlangen-Nürnberg, Germany
- 09:40 - 10:00 **Plastic deformation and anisotropy of long-period-stacking-ordered structures in Mg-Zn-Y alloys**  
Stefanie Sandlöbes, RWTH Aachen University, Germany
- 10:00 - 10:20 **Mechanical hysteresis of the MAX phase Ti<sub>2</sub>AlN: A nano-mechanical testing study**  
Christophe Tromas, Institut Pprime - Université de Poitiers, France
- 10:20 - 10:40 **Plasticity of an atomically layered crystal: A combined nanomechanical and ab initio study on Mo<sub>2</sub>BC**  
Sandra Korte-Kerzel, RWTH Aachen University, Germany
- 10:40 - 11:10 Coffee break
- 11:10 - 11:30 **The impact of grain boundary character on the size dependence of Bi-crystals**  
Christoph Kirchlechner, Max-Planck-Institut für Eisenforschung, Düsseldorf, Germany
- 11:30 - 11:50 **Mechanical testing of nanotwinned alloys**  
Andrea M. Hodge, University of Southern California, USA
- 11:50 - 12:10 **Mechanical testing of copper and copper alloy micropillars containing a single twin boundary**  
Benoit Merle, University Erlangen-Nürnberg (FAU), Germany
- 13:00 - 19:00 Boxed lunch and optional excursion
- 19:00 - 20:15 Dinner
- 20:15 - 21:00 Poster Preview II
- 21:00 - 23:00 Poster Session II with Social Hour

**Wednesday, October 4, 2017**

- 07:30 - 09:00 Breakfast Buffet
- 09:00 - 13:00 **Session V: New Instrumentation, Methods and Development**
- 09:00 - 09:30 *Highlight*  
**Interface strength and toughness measurements in multi-layered systems**  
Daniel Kiener, Erich Schmid Institute, Montanuniversität Leoben, Austria
- 09:30 - 09:50 **Room temperature plasticity in sub-micrometer thermally grown oxide scales**  
Magnus Hörnqvist Colliander, Chalmers University of Technology, Sweden
- 09:50 - 10:10 **Femtosecond laser and FIB: A revolutionary approach in rapid micro-mechanical sample preparation**  
Manuel J. Pfeifenberger, Montanuniversität Leoben, Austria
- 10:10 - 10:30 **Microscale additive manufacturing of metal – mechanical properties**  
Alain S. Reiser, ETH Zurich, Switzerland
- 10:30 - 11:00 Coffee Break
- 11:00 - 11:30 *Highlight*  
**Spatially resolved depth profiling of residual stress by micro-ring-core method**  
Marco Sebastiani, Roma TRE University, Italy
- 11:30 - 11:50 **Novel in situ nanomechanical tests: a new insight into the hydrogen embrittlement**  
Afrooz Barnoush, Norwegian University of Science and Technology, Norway
- 11:50 - 12:10 **Development and application of an in situ-SEM nanoindenter coupled with electrical measurements**  
Fabien Volpi, Univ. Grenoble Alpes, CNRS, SIMaP Lab., Grenoble, France
- 12:10 - 12:30 **Interfacial adhesion of compositional gradient ternary FCC alloy films**  
Rachel L. Schoeppner, EMPA Swiss Federal Laboratories for Materials Science and Technology, Switzerland
- 12:30 - 12:50 **Strain rate influence on the thermo-mechanical deformation behavior of Aluminum thin films**  
Johannes Zechner, KAI GmbH, Villach, Austria
- 13:00 - 14:30 Lunch
- 14:30 - 16:30 Networking Time / Time for *ad hoc* discussions

**Wednesday, October 4, 2017 (continued)**

- 16:30 - 19:00            **Session VI: Small scale testing of advanced materials**
- 16:30 - 16:50            **Nanoscale compressive deformation mechanisms and yield properties of hydrated bone extracellular matrix**  
Jakob Schwiedrzik, EMPA - Swiss Federal Laboratories for Materials Science and Technology, Switzerland
- 16:50 - 17:10            **Cyclic indentation test to characterize viscoelastic behavior of polymers**  
Olga Smerdova, Institut Pprime - Université de Poitiers, France
- 17:10 - 17:30            **Probing crystalline phases in cubic boron nitride as a function of boron content by massive nanoindentation and microsample testing**  
Joan Josep Roa Rovira, Universidad Politecnica de Cataluña, Barcelona, Spain
- 17:30 - 17:50            **Anisotropic deformation of ZrB<sub>2</sub> ceramic grains during in-situ micropillar compression up to 500°C**  
Tamás Csanádi, IMR-SAS, Slovakia
- 17:50 - 18:10            **Room temperature and high temperature micromechanical testing of SiC-SiC fiber composites for nuclear fuel cladding applications**  
Yevhen Zayachuk, Department of Materials, University of Oxford, UK
- 18:10 - 18:30            **Nanoindentation of Au nanoparticles – A combined experimental/computational multiscale study**  
Dan Mordehai, Technion - Israel institute of Technology, Israel
- 18:30 - 18:50            **A new type of superelastic and shape memory materials: ThC<sub>r2</sub>Si<sub>2</sub>-structured novel intermetallic compounds at small length scales**  
Seok-Woo Lee, University of Connecticut, USA
- 20:00 - 22:00            Conference Dinner

**Thursday, October 5, 2017**

- 07:30 - 09:00 Breakfast Buffet
- 09:00 - 13:00 **Session VII: New developments in indentation testing**
- 09:00 - 09:30 *Highlight*  
**Wide dynamic range 2-D nanoindentation: Friction and partial slip at contacts**  
John B. Pethica, Trinity College Dublin, Ireland
- 09:30 - 09:50 **Investigation of contact-induced near-surface materials transformations using nanomechanical testing.**  
Guillaume Kermouche, Ecole des Mines de Saint-Etienne, France
- 09:50 - 10:10 **New methods for nanoindentation mapping to account for size dependence**  
Andy Bushby, Queen Mary University of London, UK
- 10:10 - 10:30 **Scratching the surface of Lateral Size Effects (LSE): A critical comparison between indentation and scratch hardness size effects**  
Nigel Jennett, Coventry University, UK
- 10:30 - 11:00 Coffee Break
- 11:00 - 11:20 **The formation and evolution of cracks during nanoindentation of fused quartz**  
Brittnee A. Mound, University of Tennessee, USA
- 11:20 - 11:40 **Constitutive modeling of indentation cracking in fused silica**  
Sebastian Bruns, TU Darmstadt, Germany
- 11:40 - 12:00 **Constant contact stiffness indentation relaxation test**  
Jean-Luc Loubet, CEMES-CNRS, Ecully, France
- 12:00 - 12:20 **Spherical nanoindentation – advancements and prospects towards its application as a multifunctional testing technique**  
Alexander Leitner, Montanuniversität Leoben, Austria
- 12:20 - 12:40 **Identification of macroscopic hardening law through spherical indentation: definition of an average representative strain and a confidence domain.**  
Charbel Moussa, MINES ParisTech, France
- 12:40 - 13:00 **Size effect observed in spherical indentation test of single crystal copper**  
Stanislaw Kucharski, Institute of Fundamental Technological Research, Polish Academy of Science, Poland
- 13:00 - 14:30 Lunch
- 14:30 - 16:30 **Session VIII: New instrumentation and Developments**  
*Sponsored by Micro Materials Limited*
- 14:30 - 14:50 **Temperature dependence of indentation size effects, pile-up and strain rate sensitivity in polycrystalline tungsten from 25-950 C**  
Ben D. Beake, Micro Materials Ltd, UK

**Thursday, October 5, 2017 (continued)**

- 14:50 - 15:10            **Nanoindentation at elevated temperatures**  
Warren C. Oliver, Nanomechanics, Inc., Oak Ridge, USA
- 15:10 - 15:30            **Microcompression high cycle fatigue tests up to 10 million cycles**  
Gaurav Mohanty, Alemnis, Thun, Switzerland
- 15:30 – 15:50            **The effect of thermally induced stresses on indentation experiments**  
Ude D. Hangen, Bruker BNS, USA
- 16:30 - 19:00            **Session IX: Deformation mechanisms**
- 16:30 - 16:50            **Nanoindentation study of the temperature dependence of plastic instability in Al alloys.**  
Henry Ovri, Helmholtz Zentrum Geesthacht, Germany
- 16:50 - 17:10            **Determination of mechanical properties of different sized silicon and silica nanowires tested in SEM**  
Nicole Wollschläger, Bundesanstalt für Materialforschung und –prüfung, Germany
- 17:10 - 17:30            **Initiation of fatigue damage in ultra-fine grained thin films: Schmid, Taylor or Hall-Petch?**  
Oleksandr Glushko, Montanuniversität Leoben, Austria
- 19:00 - 21:00            Dinner followed by Social Hour

**Friday, October 6, 2017**

- 07:00 – 09:00            Breakfast and Departures

## Poster Presentations

- 1. Bulk metallic glass composites: microstructural influences on mechanical properties**  
Lisa Kraemer, Erich Schmid-Institute of Materials Sciences, Austrian Academy of Sciences; OEAW, Austria
- 2. Locally resolved fracture mechanisms by using in-situ microscopic testing**  
Markus Alfreider, Erich Schmid Institute for Materials Science, Austrian Academy of Science, Austria
- 3. High-resolution structural-mechanical characterization and simulation of novel barrier coatings**  
André Clausner, Fraunhofer IKTS, Germany
- 4. Evolution of thickness dependent buckle geometries**  
Alice Lassnig, Erich Schmid Institute of Materials Science, Austrian Academy of Sciences; Department Materials Physics, Montanuniversität Leoben, Austria
- 5. Changes in amorphous silica mechanical properties induced by femtosecond laser irradiation**  
Guillaume Kermouche, Ecole des Mines de Saint-Etienne, France
- 6. Residual stress characterization in DLC coating by focused ion beam milling and finite element modeling**  
Sergio Sao Joao, Ecole des Mines de Saint-Etienne, LGF UMR5307 CNRS, France
- 7. Combining high strength and moderate ductility in wear resistant coatings: a MO<sub>2</sub>BC study**  
Rafael Soler, Max-Planck-Institut für Eisenforschung, Germany
- 8. Nanoindentation and optical properties of transparent metal oxide multilayers**  
Chelsea D. Appleget, University of Southern California, USA
- 9. Mechanical behavior and size effects of polymer/amorphous NiB composites with 3D micro-architectures**  
Johann Michler, EMPA, Switzerland
- 10. Effects of indenter geometry on micro-scale fracture toughness measurement by Pillar splitting**  
Marco Sebastiani, Roma TRE University, Italy
- 11. High-speed nanoindentation for fast mechanical property mapping and surface patterning,**  
Riccardo Moscatelli, University of Rome "Roma TRE", Italy
- 12. Mechanical testing of twinned copper and copper alloy micropillars**  
Sebastian Krauß, FAU Erlangen-Nürnberg, Germany
- 13. Small-scale insights into superplasticity using micromechanical testing methods**  
Patrick Feldner, Materials Science & Engineering, Institute I, Friedrich-Alexander-University Erlangen-Nuremberg (FAU), Germany



- 14. Ductile-brittle-transition of flash annealed Fe-based metallic glass ribbons**  
Christian Minnert, TU Darmstadt, Germany
- 15. Indentation size effect and 3D dislocation structure evolution in (001) oriented SrTiO<sub>3</sub>: HR-EBSD and etch-pit analysis**  
Farhan Javaid, Physical Metallurgy Division, Institute of Materials Science, Technische Universität Darmstadt, Germany
- 16. In-situ Bragg coherent X-ray diffraction during tensile testing of an individual Au nanowire**  
Jungho Shin, University of Pennsylvania, USA
- 17. A model for size-effects in flat punch nanoindentation**  
Christopher James Campbell, University of Leicester, United Kingdom
- 18. WITHDRAWN**
- 19. Portevin-Le Chatelier effect in AlMg<sub>3</sub>% studied using elevated temperature nanoindentation**  
Gaurav Mohanty, EMPA, ALEMNIS AG, Switzerland
- 20. An in-situ indentation system for high dynamic nanomechanical measurements**  
Damian Frey, ALEMNIS, Switzerland
- 21. Superelasticity and micaceous plasticity of the novel intermetallic compound CaFe<sub>2</sub>As<sub>2</sub> at small length scales**  
John T. Sypek, University of Connecticut, USA
- 22. Ultra-high elastic strain energy storage in hybrid metal-oxide infiltrated polymer nanocomposites**  
Keith Dusoe, University of Connecticut, USA
- 23. Micro-fracture experiments on nanocomposite hard coatings**  
Matthias Bartosik, TU Wien, Austria
- 24. Deformation behavior of gold/copper multilayer systems**  
Hauke L. Honig, TU Ilmenau, Germany
- 25. Determination of stress-strain relation using instrumented ball indentation at micron scale**  
Alexey Useinov, TISNCM, Russia
- 26. New Tools to solve known problems at critical nanoindentation measurements**  
Wolfgang Alfred Stein, SURFACE Nanometrology, Germany
- 27. Nanoindentation tests using flat punch indenter - Contact formation and tilt correction**  
Dennis Bedorf, SURFACE, Germany
- 28. Microcompression experiments on glasses - strain rate sensitive cracking behavior**  
Christoffer Zehnder, RWTH Aachen University, Germany

- 29. Room temperature deformation mechanisms of the C14 Laves Phase in the Mg-Al-Ca system**  
Christoffer Zehnder, RWTH Aachen University, Germany
- 30. Using impact-nanoindentation to test glasses at high strain rates and room temperature**  
Christoffer Zehnder, RWTH Aachen University, Germany
- 31. Observing the size effect in copper-chromium-zirconium using spherical indentation**  
Alexandra Joanna Cackett, Queen Mary University of London, UK Atomic Energy Authority, United Kingdom
- 32. WITHDRAWN**
- 33. Determination of Mechanisms of Abrasion in WC/Co hard metals by In situ micro-tribology experiments**  
Mark Gee, National Physical Laboratory, United Kingdom
- 34. WITHDRAWN**
- 35. Analyzing the onset of plasticity in Fe-3wt.%Si**  
Nousha Kheradmand, NTNU, Norway
- 36. Hydrogen enhanced cracking studies by in-situ electrochemical micro cantilever bending test**  
Tarlán Hajilou, NTNU, Norway
- 37. Real-time in situ micro-mechanical testing of hard metals using FIB-SEM**  
Helen Jones, National Physical Laboratory, United Kingdom
- 38. WITHDRAWN**
- 39. Hydrogen-microstructure interactions in bcc FeCr alloys by in-situ nanoindentation**  
Maria Jazmin Duarte Correa, Max-Planck-Institut für Eisenforschung GmbH, Germany
- 40. Micropillar compression of hexagonal and cubic NbCo<sub>2</sub> Laves phases**  
Wei Luo, Max-Planck-Institut für Eisenforschung GmbH, Germany
- 41. WITHDRAWN**
- 42. Indentation behavior of single-crystalline tungsten**  
Jin Wang, Karlsruhe Institute of Technology (KIT), Institute of Applied Materials (IAM) , Germany
- 43. Nanoindentation of ferritic-martensitic steels – a comparative study of static and dynamic measurements**  
Ana Ruiz Moreno, Joint Research Centre. European Commission, Netherlands
- 44. Monitoring the breath through mechanical movements of the chest using continuous wave bioradar system**  
Giovanni Cerasuolo, Italian Aerospace Research Centre, Italy

- 45. Heat flux gauge calibration using the blackbody**  
Giovanni Cerauolo, Italian Aerospace Research Centre, Italy
- 46. Micromechanical testing of Mo-B-C layers prepared by magnetron sputtering**  
Jiří Buršík, Institute of Physics of Materials, Czech Academy of Sciences, Czech Republic
- 47. Indentation modulus and Young's modulus of Cu-Cr-Zr alloy at macro-scale level**  
Alessandro Schiavi, INRIM - National Institute of Metrological Research, Italy
- 48. Effect of pre-existing dislocations on the strength of gold at very small scales**  
Paula O. Guglielmi, Helmholtz-Zentrum Geesthacht, Experimental Materials Mechanics, Institute of Materials Research, Germany
- 49. WITHDRAWN**
- 50. From Reactive multilayer nanofoils to self-healing metallic systems**  
Stefano Danzi, ETH Zurich, Laboratory for NanoMetallurgy, Switzerland
- 51. Portevin-Le Chatelier effect studied at small scale**  
Yuan Xiao, Laboratory for Nanometallurgy, ETH Zurich, Switzerland
- 52. Plasticity and size effects in germanium: From cryogenic to elevated temperatures**  
Ming Chen, Laboratory for Nanometallurgy (LNM), Department of Materials, ETH Zurich, Switzerland
- 53. An almost unifying theory for grain boundary-based plasticity**  
Marc Legros, CEMES-CNRS, France
- 54. Thermo oxidative aging of polymers and polymer-matrix composites studied with cyclic indentation**  
Olga Smerdova, ENSMA, France
- 55. Fracture toughness of thermal barrier coatings determined by micro cantilever bending tests**  
Sven Giese, University Erlangen-Nuremberg, Germany
- 56. WITHDRAWN**
- 57. Experimental design for uniaxial tensile measurements at the microscale**  
Daniele Casari, EMPA, Swiss Federal Laboratories for Materials Science and Technology, Switzerland
- 58. Nanomechanical test specimen preparation techniques by microfabrication and two-photon lithography to avoid FIB induced Ga implantation damage**  
Laszlo Pethö, EMPA, Switzerland
- 59. Indentation relaxation test: Opportunities and limitations**  
Paul Baral, Ecole Centrale de Lyon, France

**60. A new push-pull sample design for microscale mode 1 fracture toughness measurements under uniaxial tension**

Johann Jakob Schwiedrzik, EMPA Swiss Federal Laboratories for Materials Science and Technology, Switzerland

**61. In situ micromechanical testing inside the scanning electron microscope at subambient temperatures**

Johann Jakob Schwiedrzik, EMPA Swiss Federal Laboratories for Materials Science and Technology, Switzerland

**62. Small-Scale Mechanical Testing of Nuclear Structural Materials**

Vineet Bhakhri, Canadian Nuclear Laboratories, Chalk River, Canada

**63. Size effects in electrodeposited Ni – coatings**

Michael Griepentrog, Bundesanstalt für Materialforschung und -prüfung BAM, Germany

**64. High temperature nanoindentation up to 800°C for characterizing high temperature properties of materials**

Nicholas Randall, Anton Paar TriTec, Switzerland

**65. Nanomechanical testing of Ti/Ni multilayer thin films**

Vilma Bursikova, Masaryk University, Czech Republic

**66. Methods of actual indenter shape determination**

Jaroslav Čech, Czech Technical University in Prague, Czech Republic

**67. Influence of the Interface and the microstructural length scale on the grid indentation**

Petr Hausild, Czech Technical University in Prague, Czech Republic

**68. Limitation of Hall-Petch relationship for interpreting scratch on polycrystalline copper using spherical indenter**

Xiaodong Hou, Coventry University, United Kingdom

**69. WITHDRAWN**

**70. Annealing effect on the Fracture Toughness of CrN/TiN Superlattice Systems**

Rainer Hahn, Christian Doppler Laboratory for Application Oriented Coating Development at the Institute of Materials Science and Technology, TU Wien, Austria

**71. (Nano-)Mechanical properties and deformation mechanisms of the topologically closed packed Fe-Mo<sub>55</sub> μ-Phase at room temperature**

Sebastian Schröders, RWTH Aachen University, Germany

**72. XFEM modelling of ball indentation cracking in a-C:H Coatings**

Sebastian Bruns, TU Darmstadt, Germany

**73. Investigating the local fatigue properties of materials by dynamic micropillar Compression**

Benoit Merle, University Erlangen-Nürnberg (FAU), Germany

**74. Influence of modulus-to-hardness ratio and harmonic parameters on continuous stiffness measurement during nanoindentation**

Benoit Merle, University Erlangen-Nürnberg (FAU), Germany