

## **DETAILED SCHEDULE**

# **Nanobrücken-Dresden**

## **A Nanomechanical Testing Workshop & Hysitron User Meeting**

*In cooperation with Dresden Fraunhofer Cluster Nanoanalysis (DFCNA) and  
Dresden Center for Nanoanalysis (DCN) of TU Dresden*

March 20-22, 2013

TU Dresden (March 20) and Fraunhofer IZFP Dresden (March 21, 22)  
Dresden, Germany

### **Program Committee**

Eduard Arzt, *INM Saarbrücken*

Ude Hangen, *Hysitron, Inc.*

Małgorzata Lewandowska, *Warsaw University of Technology*

Jose San Juan, *University of the Basque Country*

Oden Warren, *Hysitron, Inc.*

Ehrenfried Zschech, *Fraunhofer IZFP Dresden*

### **Keynote Speaker**

Reinhold Dauskardt, *Stanford University*

### **Invited Speakers**

Karsten Durst, *University of Erlangen-Nuremberg*

Christian Kübel, *Karlsruhe Institute of Technology*

Jon Molina-Aldareguía, *IMDEA Materials Institute*

Roman Nowak, *Aalto University*

Michelle Oyen, *Cambridge University*

## DAY 1: WEDNESDAY, MARCH 20 at TU DRESDEN

Technische Universität Dresden  
Barkhausen Building  
Helmholtzstraße 18  
Room: 205  
01069 Dresden

### Welcome

- 13:30-13:45    Opening Remarks
- 13:45-14:15    \*Invited Talk: "Nanoindentation of hydrogels"  
**Michelle Oyen**, *Cambridge University*

### Student Talks I

*All Student Talks are eligible for the top Student Talk prize. Student Talks have been ordered randomly.*

- 14:15-14:30    "Investigation of the time-dependent behavior of CNT-filled epoxy using nanoindentation technique"  
**Karim Elabshihy**, *BAM Federal Institute for Materials Research and Testing*
- 14:30-14:45    "Mechanical characterization of pulp fibers by atomic force microscopy based methods"  
**Christian Ganser**, *Montanuniversitaet Leoben and Graz University of Technology*
- 14:45-15:00    "Determining the effect of substitutional and interstitial solute atoms on the mechanical properties of Fe<sub>3</sub>Al intermetallics"  
**Mohammad Zamanzade**, *Saarland University*

### Posters I

*All Posters are eligible for the top Poster prize.*

- 15:00-16:00    **Poster Session** (all posters) / Coffee Break  
*See Poster List.*

### Student Talks II

*All Student Talks are eligible for the top Student Talk prize. Student Talks have been ordered randomly.*

- 16:00-16:15    "Influence of test temperature on the size effect of bcc metal pillars"  
**Oscar Torrents Abad**, *INM-Leibniz Institute for New Materials and Saarland University*
- 16:15-16:30    "Static and dynamic behavior of freestanding Cu micron lines observed by *in situ* EBSD"  
**Alexander Wimmer**, *Kompetenzzentrum Automobil- und Industrie-Elektronik GmbH and Eric Schmid Institute of Materials Science, Austrian Academy of Sciences*

- 16:30-16:45 “Nanomechanical characterization techniques for FEA-relevant material properties of 3D IC structures”  
**Christoph Sander**, *Fraunhofer Institute for Nondestructive Testing (IZFP-D)*
- 16:45-17:00 “Tribological behavior of individual micron-sized silica particles assessed by means of a nanoindentation based approach– experiment and model”  
**Regina Fuchs**, *University of Siegen*

## Posters II

*All Posters are eligible for the top Poster prize.*

- 17:00-19:00 **Poster Session** (all posters) / **Workshop BBQ**  
*See Poster List.*

## Keynote Address

- 19:00-19:45 “Adhesion and mechanical behavior of films in nanoscience and bioscience”  
**Reinhold Dauskardt**, *Stanford University*

## Student Talks III

*All Student Talks are eligible for the top Student Talk prize. Student Talks have been ordered randomly.*

- 19:45-20:00 “On hardness and its benefit to the characterization and optimization of coatings”  
**Marcus Fuchs**, *Chemnitz University of Technology*
- 20:00-20:15 “Mechanical characterization of yeast cells: effects of growth conditions”  
**Achim Overbeck**, *Technische Universität Braunschweig*
- 20:15-20:30 “Micro shear experiments on fcc metals in-situ in the scanning electron microscope”  
**Jenna-Kathrin Heyer**, *Ruhr-Universität Bochum*

## DAY 2: THURSDAY, MARCH 21 at FRAUNHOFER IZFP DRESDEN

Fraunhofer IZFP-D  
Maria-Reiche-Straße 2  
01109 Dresden

### Hysitron User Meeting

- 9:00-10:00 Product Updates by the **Hysitron Europe Team**
- 10:00-11:00 Educational Talks by the Program Committee:
- 10:00-10:15 **Ehrenfried Zschech**, *Fraunhofer IZFP Dresden*
  - 10:15-10:30 **Ude Hangen**, *Hysitron, Inc.*
  - 10:30-10:45 **Jose San Juan**, *University of the Basque Country*
  - 10:45-11:00 **Oden Warren**, *Hysitron, Inc.*
- 11:00-11:50 Coffee Break (50 min)

### More Information from Nanoindentation

- 11:50-12:20 \*Invited Talk: "Influence of stacking fault energy and solid solution strengthening on the local mechanical properties of SX and nanocrystalline binary CuAl solutions"  
**Karsten Durst**, *University of Erlangen-Nuremberg*
- 12:20-12:40 "Elastic nanoindentation experiments with mixed load (normal and lateral) for the parallel determination of Young's modulus and Poisson's ratio"  
**André Clausner**, *Chemnitz University of Technology*
- 12:40-13:00 "Penetration resistance for the energetics in pyramidal/conical and spherical loading curves, including long-range and phase transition energies"  
**Gerd Kaupp**, *University of Oldenburg*
- 13:00-14:30 Lunch (provided)

### Direct-Observation Experiments

- 14:30-14:50 "Small-scaled fracture experiments using different tungsten materials"  
**Stefan Wurster**, *Erich Schmid Institute of Materials Science of the Austrian Academy of Sciences*

14:50-15:10     “Mini-samples mechanical tests with digital image correlation measurements”  
**Tomasz Brynk**, *Warsaw University of Technology*

### **Testing Device Materials**

15:10-15:30     “Nanoindentation of contact lens materials and lenses: determination of a universal thickness correction factor”  
**Brian Derby**, *University of Manchester*

15:30-15:50     “Investigation and coatings method production of diamond-like coatings on optical materials”  
**Denis Tokarev**, *NEW PLASMA TECHNOLOGIES LLC*

15:50-16:20     Coffee Break (30 min)

### **Testing Semiconductor Device Materials**

16:20-16:50     \*Invited Talk: “Mechanics meets electronics in nanoscale: the mystery of current spike and nanoscale-confinement”  
**Roman Nowak**, *Aalto University*

16:50-17:10     “Assessment of mechanical properties in nanotechnology: porous low-k dielectrics, TSVs and  $\mu$ bumps”  
**Ingrid De Wolf**, *imec and KU Leuven*

17:10-17:30     “Mechanical properties investigation of copper depends on production process using nanoindentation technique”  
**Saskia Huber**, *Fraunhofer IZM*

17:30-17:50     “The effect of pore topology on the elastic modulus of organosilicate glasses”  
**Kong Boon Yeap**, *GLOBALFOUNDRIES*

19:30-            **Workshop Dinner:** *Presentation of top Poster prize and top Student Talk prize.*

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### DAY 3: FRIDAY, MARCH 22 at FRAUNHOFER IZFP DRESDEN

Fraunhofer IZFP-D  
Maria-Reiche-Straße 2  
01109 Dresden

#### ***In Situ TEM***

- 9:00-9:30      \*Invited Talk: “Characterization of deformation processes in nanocrystalline metals by in-situ straining in combination with ACOM-STEM”  
**Christian Kübel**, *Karlsruhe Institute of Technology (KIT)*
- 9:30-9:50      “Dynamic nanoscale reciprocating wear of surfaces”  
**Beverley Inkson**, *University of Sheffield*
- 9:50-10:10     “In-situ electron-beam-assisted modification and mechanical testing of amorphous silica nanospheres in a TEM”  
**Mirza Mačković**, *Center for Nanoanalysis and Electron Microscopy (CENEM)*
- 10:10-10:30    “Study of small-scale plasticity and fracture mechanisms in ultrafine-grained Al wires using in-situ BF-TEM and in-situ ACOM-TEM nanomechanical testing”  
**Hosni Idrissi**, *Electron microscopy for materials science (EMAT) and Institute of Mechanics, Materials and Civil Engineering (IMMC)*
- 10:30-11:00    Coffee Break (30 min)

#### **Layers and Zones**

- 11:00-11:30    \*Invited Talk: “High temperature mechanical behaviour of nanoscale multilayers”  
**Jon Molina-Aldareguía**, *IMDEA Materials Institute*
- 11:30-11:50    “Densification and incipient cracking under nano indentations and nano scratch in oxide glasses”  
**Jean-Pierre Guin**, *University of Rennes*
- 11:50-12:10    “Nanoindentation tests of the nanostructured Cr/CrN multilayer coatings on Ti<sub>6</sub>Al<sub>4</sub>V titanium alloy”  
**Piotr Wieceński**, *Warsaw University of Technology*
- 12:10-12:30    “Radiation effects in nanostructured FeCrAl oxide dispersion strengthened steel by simultaneous dual beam ion implantation”  
**Asta Richter**, *Technical University of Applied Sciences Wildau*
- 12:30-13:30    Lunch (provided)

### **AFM Methods**

- 13:30-13:50     “Determination of adhesion forces between smooth and structured solids”  
**Hartmut Fischer**, *TNO, Technical Sciences Materials Performance Centre*
- 13:50-14:10     “Nanoscale characterization of porous thin films by use of atomic force acoustic microscopy and nanoindentation methods”  
**Malgorzata Kopycinska-Müller**, *Technical University Dresden and Fraunhofer Institute for Nondestructive Testing, Branch Dresden*

### **Closing Activities**

- 14:10-            Closing Remarks followed by Lab Tour and Equipment Demonstrations

## Poster List

*Ordered by last name of presenting author.*

- 1) "Mapping the nanomechanical properties and structure of human hair using an atomic force microscopy"  
**Adrian Chlanda**, *Warsaw University of Technology*
- 2) "Nanoindentation of skin"  
**Marek Drab**, *Institute of Immunology and Experimental Therapy, Polish Academy of Sciences*
- 3) "Origin of anomalously high nanoindentation elastic modulus values of industrial scale cathodic arc evaporated coatings"  
**Hanna Fager**, *Linköping University*
- 4) "Determination of the mechanical properties of nanopillars"  
**Sai Gao**, *Physikalisch-Technische Bundesanstalt*
- 5) "Mechanical characterization of the microalga *Chlorella vulgaris*"  
**Steffi Günther**, *Technische Universität Braunschweig*
- 6) "Free and forced vibrations of helical nanoshells with piezoelectric properties"  
**Ardeshtir Guran**, *Institute of Structronics*
- 7) "Microstructural changes in  $\text{Co}_{38}\text{Ni}_{33}\text{Al}_{29}$  F-SMA during transformation"  
**Jaromír Kopeček**, *Institute of Physics of the AS CR*
- 8) "Room temperature nanoindentation creep testing of selected materials"  
**Petr Král**, *Institute of Physics of Materials, Academy of Sciences of the Czech Republic*
- 9) "Nanoindentation of a circular sheet of monolayer  $\text{MoS}_2$ "  
**Tommy Lorenz**, *Technische Universität Dresden*
- 10) "Mechanical property measurements of doubly clamped elastic beam using atomic force microscopy"  
**Magdalena Moczala**, *Wrocław University of Technology*
- 11) "Synthesis, characterization and mechanical properties of metallic nanoglasses"  
**Ramanathan Perumal**, *Karlsruhe Institute of Technology (KIT)*
- 12) "Nanomechanical properties of plasma-treated polylactic acid for packaging applications"  
**Marian Valentin**, *Polymer Institute, Slovak Academy of Sciences*