



**INTERNATIONAL SYMPOSIUM ON  
NANOMECHANICAL TESTING IN  
MATERIALS RESEARCH AND DEVELOPMENT**

*9 – 14 October, 2011  
Lanzarote, Canary Islands, SPAIN*

**ABOUT ECI:**

Engineering Conferences International (ECI) is a global engineering conferences program, originally established in 1962, that provides opportunities for the exploration of problems and issues of concern to engineers and scientists from many disciplines.

The format of the conference provides morning and late afternoon or evening sessions in which major presentations are made. Poster sessions will be scheduled for discussion as well. Available time is included during the afternoons for ad hoc meetings, informal discussions, and/or recreation. This format is designed to enhance rapport among participants and promote dialogue on the development of the meeting. We believe the conferences have been instrumental in generating ideas and disseminating information to a greater extent than is possible through more conventional forums.

All participants are expected both to attend the entire conference and to contribute actively to the discussions. The recording/photographing of lectures and presentations is forbidden. As ECI conferences take place in an informal atmosphere, casual clothing is the usual attire.

**ECI'S OBJECTIVES**

The objectives of the Engineering Conferences International are to advance engineering science and practice by identifying and developing international interdisciplinary conferences. The specific objectives and purposes of this program shall be to:

- a. Identify and sponsor professional international engineering conferences in specialty or multidisciplinary technology areas that will benefit from a level of discourse not possible in larger forums.
- b. Organize conferences that provide an opportunity for engineering professionals and related physical, biological, and social scientists from academic, industrial, and governmental sectors to gather and discuss areas of technological importance.
- c. Cooperate with professional engineering, scientific, and social science societies to jointly sponsor conferences and to take other joint actions that will foster complementary programming.
- d. Initiate conferences that will have a significant impact on engineering education, research, practice, and/or development, and that will influence national and international technology policy.

**ABOUT THIS CONFERENCE:**

The novel field of miniaturized mechanical testing down to the nanometer length scale has evolved significantly in the last few years. The origin of most methods is based on nanoindentation testing - which is also called instrumented indentation testing - a well established technique in materials research although new developments still improve and extend the application field largely. Novel nano- and micromechanical methods include compression, tension and bending tests, thin film testing methods (e.g. bulge testing, thermal straining), different in situ testing techniques as for example micro-bending experiments combined with X-ray diffraction methods as well as fatigue and fracture experiments performed on a very local scale or on small

specimens to determine mechanical material properties. The samples are prepared by focussed ion beam technique, lithography, etching of thin film and composite structures or growth of micro/nano-objects (whiskers, rods, spheres,...).

Since always very small volumes are tested size effects are very important. Modelling of the mechanical behavior is of special importance to gain an improved understanding of the measurements and underlying deformation mechanisms in the various test methods. For example, discrete dislocation dynamics and molecular dynamics provide meaningful and quantitative insights into the deformation processes around nanoindentations and small scale samples.

Applications of these nano- and micromechanical testing methods become more and more important in all fields of materials research like metals, ceramics, glasses, polymers, coatings, composites, and biomaterials and will improve our understanding of the complex mechanical behaviour. Next to the hardness which is classically measured in an indentation test nanoindentations and other methods allow way more properties to be measured. For example the visco-elastic behaviour or time dependent properties, phase transformations, fracture phenomena and toughness can be quantitatively evaluated. For many applications also the temperature dependence and other environmental influences are of high relevance. These nano- and micromechanical testing techniques will help in the development of design concepts for materials based on their local mechanical properties.

The conference will bring together all people working in the field of nano- and micromechanical testing in materials research. It will provide a forum for discussion of the latest activities in application of nano- and micromechanical testing methods. This conference will be a follow-up meeting to the ECI conference on Instrumented Indentation Testing (Fodele Beach, Crete from October 9 - 14, 2005) and Nanomechanical Testing (Barga - Tuscany, Italy from October 11 - 16, 2009)

## TOPICS

The major topics to be discussed are:

- Fundamental studies in indentation testing (size effects, phase transformations...)
- FIB/lithography based nano- and micromechanical testing
- In situ techniques (synchrotron, electron microscopy...)
- Deformation mechanisms
- Modelling with focus on molecular dynamics, discrete dislocation dynamics and crystal plasticity
- Novel preparation methods for micro- and nanoscale objects
- Testing of nanostructures, thin films and coatings
- Fatigue and fracture testing
- Polymeric and biomaterials
- Testing of metals, ceramics and composites
- Testing at higher temperature and different environments
- Future directions

## COMMITTEES:

### Conference Chair

Prof. Dr. Gerhard Dehm (Department Materials Physics, University of Leoben and Erich Schmid Institute of Materials Science of the Austrian Academy of Sciences, Austria).

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### Organizing Committee

Prof. George M. Pharr (Department of Materials Science and Engineering, University of Tennessee, USA)

Dr. Nigel M. Jennett (National Physical Laboratory, UK)

Dr. Johann Michler (EMPA, Laboratory Mechanics, Materials and Nanostructures, Switzerland)

Dr. Christian Motz (Erich Schmid Institute of Materials Science of the Austrian Academy of Sciences, Austria)

Prof. Sang Ho Oh (Department of Materials Science and Engineering, Pohang University of Science and Technology (POSTECH), Korea)

Prof. Alexander Hartmaier (ICAMS and Ruhr-Universität Bochum, Germany)

