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**MM 1: Invited Talk (Hauptvortrag) Kiener**

Time: Monday 9:30–10:00

Location: BAR 205

**Invited Talk** MM 1.1 Mon 9:30 BAR 205  
**Progress in understanding nanoscale plasticity using quantitative in situ TEM** — •DANIEL KIENER — Montanuniversität Leoben, Austria

It is established that deformation mechanisms are subject to change once microstructural features approach the micron and sub-micron range [1]. Moreover, miniaturized sample dimensions themselves can lead to pronounced size effects on material strength [2], even if only simple dislocation plasticity governs the plastic deformation.

Quantitative testing in the scanning or transmission electron microscope offers a versatile way to aid to a better understanding of the basic

governing deformation processes, since a direct correlation between the material microstructure or individual crystal defects with the sample deformation behavior and the mechanical properties is achieved by direct observation of the plastic deformation.

In this presentation, different case studies will be presented to highlight recent developments in the field of quantitative nanomechanical in situ testing in the electron microscope, focusing on advanced testing techniques providing novel insights on nanoscale plasticity.

References: [1] T. Zhu, and J. Li: Ultra-strength materials. *Prog. Mater. Sci.* 55, 710 (2010) [2] M. D. Uchic, D. M. Dimiduk, J. N. Florando, and W. D. Nix: Sample Dimensions Influence Strength and Crystal Plasticity. *Science* 305, 986 (2004)