MM 1: HV Lilleodden

Time: Monday 9:30–10:00 Location: H16

Invited Talk MM 1.1 Mon 9:30 H16

Size Effects in Metal Plasticity — •Erica Lilleodden — GKSS Forschungszentrum, Institut für Werkstoffforschung, Max-Planck-Straße 1, D-21502 Geesthacht

Size effects in plasticity have received much attention in recent years, due to increased resolution in experimental capabilities, and the development of materials at small geometric and microstructural length scales. Nanoindentation, wafer curvature and, more recently, microcompression tests have all shown such size effects. To date, a multitude of theories for the observed behaviors exist based on the evolution of dislocation distributions, and are often conflicting. This talk will provide an overview of recent experimental studies of size effects in materials, particularly those which combine nanoindentation-based techniques with microstructural characterizations (e.g., transmission electron microscopy, orientation imaging microscopy and x-ray microdiffraction). The overwhelming observation of "smaller is stronger" will be discussed in terms of the volume of deformation, the presence of strain gradients, and the evolution of dislocation structure.