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TMS 2026

155th Annual Meeting & Exhibition

March 15–19, 2026
San Diego Convention Center
and Hilton San Diego Bayfront
San Diego, California, USA
#TMSAnnualMeeting

SUBMIT AN ABSTRACT FOR THE FOLLOWING SYMPOSIUM

MECHANICS OF MATERIALS

Mechanical Behavior at the Nanoscale VIII

The mechanical behavior of materials emerges from the aggregate operation of competing deformation mechanisms that initiate at the nanoscale. Small-scale mechanics investigations therefore provide critical insights into the fundamentals of deformation phenomena and form a basis for scaling theories. Additionally, the reduction of organizational scale often enables activation of new deformation mechanisms and mechanical behaviors that are not operational in bulk materials. This symposium will focus on the deformation behavior of nanostructured materials. A wide variety of nanostructured materials are considered within this scope, including low-dimensional and 2D materials, multilayers, nanoarchitectured materials and nanolattices, and nanocrystalline aggregates. Studies that examine size effects and scaling laws, new nanoscale deformation phenomena, emerging methods in nanomechanical characterization, and developments in modeling techniques are welcome.

Topics will include:

- Size effects on elastic properties, strength, plasticity, fracture mechanisms, strain-induced phase transformations, adhesion, tribology and fatigue behavior in small-volume and low-dimensional systems, including nanopillars, nanowires, nanoparticles, nanostructured fibers, 2D materials, thin films, interface-rich multilayered materials, and nanolattices
- New nanoscale deformation and failure phenomena in emerging materials and materials systems including concentrated multi-component solutions (e.g. high entropy alloys), complex alloys, sustainable/lean alloys, 2D materials, nanotwinned materials, and nanoarchitectured systems
- Emerging studies in nanomechanics-coupled phenomena including the tailoring of functional properties with size-dependent topologies
- Developments in highly resolved methods (SEM, TEM, synchrotron, neutron, etc.) techniques that push the limits of nanomechanical characterization
- Advancing indentation techniques (high temperatures, low temperatures, humidity controlled, acoustic emission, high strain rates, mapping, machine learning, etc.), in conjunction with “Fracture and deformation across length scales: Celebrating the Legacy of William Gerberich” symposium
- Studies of nanoscale deformation processes using modeling, simulation, and/or AI/big data approaches and coupling of these techniques to meso/microscale methods

SPONSORED BY:
TMS Structural Materials Division; TMS Nanomechanical Materials Behavior Committee

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