

**PLASTICITY AND DAMAGE AT THE MICROSCALE:
MODELING, SIMULATION, AND EXPERIMENTAL SYNERGY**

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ABSTRACT

This session aims to explore the critical role of microstructure in either promoting or preventing plastic deformation, damage, and fracture in metals and alloys across different length scales. It intends to strengthen connections between theory, simulation, and experimental developments, emphasizing synergies at the microstructural level. We invite contributions that investigate synergies between microstructural numerical models, such as crystal plasticity, phase field modeling, and dislocation dynamics, and experimental approaches like microscopy, diffraction, tomography, and micromechanical testing. Contributions can range from fundamental research that deepens our understanding of material behavior to practical applications addressing industrial challenges. This session will provide a platform for researchers working at the intersection of microstructure, plasticity, damage mechanics, and multi-physics modeling to present their work and foster collaborations across experimental and computational disciplines.