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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

MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

Bridging Scales: Deformation and Damage Mechanisms in Microstructurally and Compositionally Complex Metallic Alloys

This symposium will bring together researchers and practitioners to explore the fundamental mechanisms governing deformation and damage in microstructurally and compositionally complex metallic alloys. Advances in experimental, computational, and theoretical approaches will be highlighted across multiple length scales, from the atomic level to bulk behavior, to address challenges in understanding and predicting the mechanical performance of these advanced materials.

Topics of interest include, but are not limited to:

- Mechanisms of deformation and damage in high-entropy alloys, multiphase alloys, additively manufactured metals, TRIP/TWIP Steels, superalloys, etc.
- Damage initiation and evolution under extreme conditions (e.g., high temperature, cyclic loading, irradiation).
- Coupling experimental and computational approaches to predict mechanical behavior.
- Microstructural design strategies for enhancing mechanical performance and damage tolerance.
- Emerging techniques for multiscale characterization, including in-situ methods and machine learning-driven approaches.
- AI-driven materials discovery and design including the integration of machine learning for microstructure-property predictions and accelerated alloy development.

The symposium will feature invited talks from leading experts in academia, industry, and national laboratories, as well as contributed presentations from researchers working in this field. A panel discussion will explore future research directions, industrial applications, and the role of AI and data-driven approaches in advancing the field, providing a platform for collaboration and knowledge exchange.

SPONSORED BY:
TMS Materials Processing & Manufacturing Division; TMS Phase Transformations Committee; TMS Advanced Characterization, Testing, and Simulation Committee

ORGANIZED BY:

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- **Ashley Bucsek,** University of Michigan
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QUESTIONS?
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