THE WORLD COMES HERE
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

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling

This symposium features novel methods and new discoveries for understanding all aspects of material fatigue. It brings together scientists and engineers from all over the world to present their latest work on current issues in: characterizing and simulating fatigue damage; identifying microstructural weak links; enhancing fatigue strength and resistance; reporting on quantitative relationships among processing, microstructure, environment, and fatigue properties; fatigue in non-metallic materials; and providing methods to perform life predictions. This symposium further provides a platform for fostering new ideas about fatigue at multiple scales and in multiple environments, numerically, theoretically, and experimentally. The symposium organizers plan to build on the highly successful and well-attended symposia over the last few years by expanding our new topical area of non-metallic fatigue while maintaining support of fatigue topics relevant to academic and industry research across metallic materials systems. The proposed 2026 TMS symposium will be provisionally organized into seven topical areas, roughly one per session. One of the sessions, related to microstructure-based fatigue studies of additively manufactured materials, will be jointly organized with the Additive Manufacturing Fatigue and Fracture symposium to prevent overlapping topics at the TMS 2026 meeting. The proposed sessions will be carried out over three full days. Throughout the seven sessions, there will be an estimated 60 oral presentations, with 3-5 of those being invited/keynote presentations on relevant topics. Researchers who achieved new findings in fundamental and industrial fatigue topics will be given the opportunity to deliver an invited talk. Additionally, a poster session will be held to supplement the oral presentations and to encourage student involvement.

Topics of interest may include (but are not limited to):

- Predictive methods for fatigue properties. For instance, digital twin approaches; data-driven, data-centric and high-throughput methods; multiscale modeling approaches.
- Advanced experimental characterization of microstructurally driven fatigue behavior. For instance, emerging characterization methods; multi-modal, correlative and 3D measurements.
- Fatigue deformation processes. For instance, damage initiation, crack propagation, and plastic localization.
- Fatigue properties in extreme environments. For instance, fatigue properties of novel alloys for extreme environments; fatigue properties at high or cryogenic temperatures; very/ultra-high cycle fatigue.
- Fatigue of non-metallic materials. For example, carbon fiber composites, cementitious and construction materials, ceramics, semiconductor materials up to full chips and packaging, and polymeric materials systems, including resins and other 3D printed polymers.
- Fatigue studies and design under the process-(micro)structure-properties-performance paradigm
- Microstructure-based fatigue studies of additively manufactured materials (Coordinated joint session with Additive Manufacturing Fatigue and Fracture Symposium)

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QUESTIONS?

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