THE WORLD COMES HERE.

TMS2024

153rd Annual Meeting & Exhibition

MARCH 3–7, 2024
HYATT REGENCY ORLANDO
ORLANDO, FLORIDA, USA
#TMSAnnualMeeting

SUBMIT AN ABSTRACT FOR THE FOLLOWING TMS2024 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
- 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 a highly successful 2023 symposium by introducing a new topical area, while continuing to support fatigue topics relevant to academic and industry research.

The proposed TMS2024 symposium will be provisionally organized into seven sessions. One of the sessions, related to microstructure-based fatigue studies on additive-manufactured materials, will be jointly organized with the AM Fatigue & Fracture symposium to prevent overlapping topics at the TMS2024 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 keynote presentations on relevant topics. Researchers who achieved new findings in fundamental and industrial fatigue topics will be given the opportunity to provide an invited talk.

Additionally, a poster session will be held to supplement the oral presentations and to encourage student involvement. Prizes for the best posters will be awarded. A possible edited volume of extended articles on selected topics discussed in this symposium will be evaluated during the meeting.

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 temperature; 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 on additive-manufactured materials (Coordinated joint session with Additive Manufacturing Fatigue and Fracture: Towards Rapid Qualification Symposium)

ORGANIZERS
Orion Kafka, National Institute of Standards And Technology, USA
Jean-Charles Stinville, University of Illinois Urbana-Champaign, USA
Garrett Pataky, Clemson University, USA
Ashley Spear, University of Utah, USA
Brian Wisner, Ohio University, USA

SYMPOSIUM SPONSORS
TMS Materials Processing & Manufacturing Division
TMS Advanced Characterization, Testing, and Simulation Committee
TMS Computational Materials Science and Engineering Committee
TMS Integrated Computational Materials Engineering Committee
TMS Mechanical Behavior of Materials Committee