

**TMS 2018**  
147<sup>th</sup> Annual Meeting & Exhibition



**MARCH 11 – 15, 2018**  
**PHOENIX, ARIZONA**

**SUBMIT AN ABSTRACT TO:**

## **MECHANICS AND STRUCTURAL RELIABILITY**

# **COUPLING EXPERIMENTS AND MODELING TO UNDERSTAND PLASTICITY AND FAILURE**

This symposium celebrates new discoveries and advances in the exploration of the mechanical behavior of polycrystalline metals and alloys, while emphasizing a strong coupling between experiments and modeling approaches to address these problems. The deformation of solids—even under nominally “uniform” loading conditions—often involves gradients, due to various heterogeneities in the microstructure and anisotropic single-crystal properties that govern mechanical behavior. Over the past decade, the application of advanced tools for the interrogation of materials at the mesoscale (aggregate of individual crystals) is revolutionizing mechanics. Concurrently, simulations have benefited from increased computational power, which enables the role of the microstructure in the mechanical behavior of solids to be captured and predicted with high accuracy and fidelity.

The central theme of this symposium is a strong coupling between modeling and experiments. To accentuate this theme, we target research with the following objectives:

- Simultaneous modeling/experimental approaches
- Experiments that elucidate the need for specific models
- Modeling approaches to down-select the need for experimental testing
- Modeling raw characterization data to reconstruct mechanical behavior

The research addressed in this symposium has direct implications in accelerating advanced materials discovery and deployment, in concurrence with the Materials Genome Initiative and Integrated Computational Materials Science and Engineering. The main topics of the symposium are as follows:

- Individual and collective behavior of dislocations in dislocation mediated plasticity
- Grain interactions, leading to evolution of intra- and inter-granular stress and orientation heterogeneities
- Mesoscale performance response, including yield, strain hardening, fatigue, fracture, and creep

The symposium will offer three to four half-day sessions, and each session will have a strong integration between experimentalists and modelers. An effort will be made to schedule adjacent talks for collaborators working on the same project, to show synergy amongst techniques. To supplement these efforts and to enhance student involvement, this symposium will also offer a poster session following this theme, integration of poster presentations within the main sessions, and a prize for best student poster.

## **ORGANIZERS**

**Michael Sangid**, Purdue University, USA

**Philip Eisenlohr**, Michigan State University, USA

**Matthew Miller**, Cornell University, USA

**Paul Shade**, Air Force Research Laboratory, USA

## **SPONSORS**

TMS Materials Processing & Manufacturing Division; TMS Structural Materials Division

TMS Advanced Characterization, Testing, and Simulation Committee; TMS Integrated Computational Materials Engineering Committee; TMS Mechanical Behavior of Materials Committee

**ABSTRACT DEADLINE IS JULY 1, 2017. SUBMIT ONLINE AT [www.programmaster.org/TMS2018](http://www.programmaster.org/TMS2018).**

**QUESTIONS? CONTACT [programming@tms.org](mailto:programming@tms.org)**