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**TMS 2023**  
152<sup>nd</sup> Annual Meeting & Exhibition

MARCH 19–23, 2023  
SAN DIEGO CONVENTION CENTER &  
HILTON SAN DIEGO BAYFRONT  
SAN DIEGO, CALIFORNIA, USA  
#TMSANNUALMEETING



**SUBMIT AN ABSTRACT BY JULY 1 FOR THE FOLLOWING TMS2023 SYMPOSIUM:**

**ADDITIVE TECHNOLOGIES**

**Additive Manufacturing Fatigue and Fracture: Effects of Surface Roughness, Residual Stress, and Environment**

The current understanding of fatigue and fracture behavior of additive manufacturing metals is limited and must be expanded before widespread use in fatigue and fracture critical applications can be fully realized. It is the purpose of this symposium to move toward that expanded understanding by providing a forum to present research results from investigations into fatigue and fracture behavior of additive manufacturing of metals. Topics of interest include, but are not limited to:

- Surface Roughness Effects on Fatigue and Fracture
- Residual Stress Effects on Fatigue and Fracture
- Environmental (e.g. Corrosion, High/Low Temperature) Effects on Fatigue and Fracture
- Microstructure-based Fatigue Studies on Additive-Manufactured Materials (Joint Session with Fatigue in Materials Symposium)
- New Fatigue and Fracture Test Methods (e.g. small-scale techniques)
- Prediction of Fatigue Behavior
- Processing-Structure-Property Fatigue and Fracture Investigations (see details below)
  - Processing-structure-property-performance relationships pertinent to this symposium include the following. Processing includes machine settings (e.g. layer thickness), melt parameters (e.g. energy density, scan strategy), post-processing (e.g. heat treatment, surface treatment), and feedstock variables (e.g. flowability, spreadability, particle size distribution) that can directly impact fatigue and fracture performance of parts.
  - Structure includes crystallographic microstructure (e.g. texture, phase content, grain size/morphology), internal defects (e.g. pores, inclusions), external defects (e.g. surface roughness), residual stress, and chemistry.

- Properties include all fatigue and fracture properties (e.g. high-cycle fatigue, low-cycle fatigue, linear elastic fracture toughness (K<sub>IC</sub>), elastic-plastic fracture toughness (J-int), fatigue crack growth rate, and impact toughness (Charpy)).
- Performance includes any end-product testing.

**ORGANIZERS**

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