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**MARCH 14-18, 2021 • ORLANDO WORLD CENTER MARRIOTT  
ORLANDO, FLORIDA, USA**  
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## **ADDITIVE TECHNOLOGIES**

# **ADDITIVE MANUFACTURING FATIGUE AND FRACTURE V: PROCESSING-STRUCTURE-PROPERTY INVESTIGATIONS AND APPLICATION TO QUALIFICATION**

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.

The symposium will be organized into seven sessions:

1. Microstructure-based Fatigue Studies on Additive-Manufactured Materials (Jointly organized with Fatigue in Materials Symposium)
2. Small-Scale Fatigue and Fracture Test Methods
3. Corrosion and other Environmental Effects on Fatigue and Fracture
4. Residual Stress Effects on Fatigue and Fracture
5. Toward Fatigue Lifting Techniques
6. Surface Roughness Effects on Fatigue and Fracture
7. Role of Non-Destructive Evaluation (NDE) Techniques in Fatigue and Fracture

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), 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), 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>1c</sub>), elastic-plastic fracture toughness (J-int), fatigue crack growth rate, and impact toughness (Charpy)). Performance includes any end-product testing.

## **ORGANIZERS**

**Nik Hrabe**, National Institute of Standards and Technology, USA

**John Lewandowski**, Case Western Reserve University, USA

**Nima Shamsaei**, Auburn University, USA

**Mohsen Seifi**, ASTM International/Case Western Reserve University, USA

## **SYMPOSIUM SPONSORS**

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TMS Additive Manufacturing Committee

TMS Mechanical Behavior of Materials Committee

**Abstract Deadline is July 1, 2020. Submit online at**  
[www.programmaster.org/TMS2021](http://www.programmaster.org/TMS2021).

**Questions?**  
Contact [programming@tms.org](mailto:programming@tms.org)