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Mechanical Characterization of Additive Manufactured Materials and Components

Established testing standards exist for different mechanical properties; however, it has become clear that conventional procedures may not always be applicable to additive manufactured materials due to the nature of the additive fabrication process. Additionally, unique mechanical characteristics and property dependence often exist under different conditions such as geometry, process parameters and post-process procedures.

Therefore, this symposium is designed to cover the following important topics:
- Applicability of existing test methods to additive manufactured materials
- Development of new test methods, such as mini-tensile testing, to represent local material performance
- High throughput testing methods for every build screening
- Properties assessment of tiny engineering structures
- Influence of process and post-process parameters on part performance
- Structure-property-performance relationships
- Build size, orientation and location dependence of mechanical properties
- Characterization of multi-material components

ORGANIZERS
- Joy Gockel, Wright State University, USA
- Jan Dzugan, COMTES, Czech Republic
- Benoit Verquin, Cetim, France

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Session 4
Mechanical Characterization of Additive Manufactured Materials and Components
Session Chairs TBD

8:30 a.m. Invited Talk: Post-processing treatment impact on mechanical properties of AM deposited porous structure for biomedical application
Matej Daniel, Czech Technical University in Prague

9:00 a.m. Invited Talk: Characterization and modeling of fracture of additively manufactured metals
Allison M. Beese, Pennsylvania State University

9:30 a.m. Regular Talk: Inter Laboratory Study of Tensile Properties for Small Size Steel Specimens Deposited by Selective Laser Melting
Jan Dzugan, COMTES FHT Inc.

Thomas Niendorf, University of Kassel

11:00 a.m. Invited Talk: Exploring the structure-property relationships of (Nb,Ta)xCoCrFeMnNi graded high entropy alloy utilizing a high throughput material discovery framework
Jonathan Pegues, Sandia National Labs

11:30 a.m. Regular Talk: Research on the Yield and Fracture Behaviour of Microporous AlSi10Mg Generated by Selective Laser Melting in Multi-Axial Stress States Caused by Different Notches
Martin Henkele, Materials Testing Institute University of Stuttgart

11:50 a.m. Regular Talk: Residual Distortion Prediction through Fast Data Driven Model Approach in Additive Manufactured Components
Anahita Imanian, TDA

12:10 p.m. Regular Talk: Fatigue and Mechanical Properties of Laser Powder Bed Fusion 316L Stainless Steel
Chelsea M. Snyder Naval Nuclear Laboratory

1:30 p.m. Invited Talk: Synergistic effects of stress gradient, surface roughness, and volumetric defects on the fatigue behavior of additive manufactured 316L stainless steel: Axial versus rotating-bending loading
jutima simsiriwong, University of North Florida

2:00 p.m. Regular Talk: On the mechanical property benefits of High Pressure Heat Treatment of additively manufactured CoCr and 17-4SS
Derek Denlinger, Paulo

2:20 p.m. Invited Talk: Synergistic Effects of Defects and Microstructure on Fatigue Behavior of LB-PBF Metallic Materials
Shuai Shao, Auburn University

2:50 p.m. Regular Talk: Demonstration of a laser powder bed fusion combinatorial sample for high-throughput process-microstructure-mechanical property information
Jordan Weaver, NIST

3:30 p.m. Invited Talk: High-Throughput Screening of Additive Lattices using a Deep Neural Network
Brad Boyce, Sandia National Laboratories

4:00 p.m. Regular Talk: Mechanical performance of highly porous sheet-based TPMS scaffolds produced by L-PBF
Cambre Kelly, Restor3D

8:00 OPENING REMARKS | 10:20 BREAK | 12:30 LUNCH | 3:10 BREAK | 4:20 SESSION ENDS