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ASTM INTERNATIONAL CONFERENCE ON ADVANCED MANUFACTURING

Research to Application through Standardization

October 30 – November 3, 2023 | Washington D.C.

Submit an Abstract at www.amcoe.org/icam2023

Modeling, Simulation, and **Digital Twins for Qualification** and Certification

This symposium focuses on recent advances in modeling and simulation that support qualification and certification of higher criticality parts built by an additive manufacturing (AM) process, e.g., powder-bed fusion, direct energy deposition, etc. Here, we will focus on state-of-the-art models and simulations that are firmly in the middle of the technical readiness level (TRL) scale and, upon further maturation, that will enable industry and government to continue expanding their use for practical applications, including qualification and certification, of AM components. To build credibility for their models and simulations, researchers should invoke best practices, including verification, validation, uncertainty quantification, uncertainty reduction, sensitivity studies, and demonstration problems. Symposium topics include probabilistic methods, integrated computational materials engineering (ICME), digital twins, process modeling, machine learning (ML)/artificial intelligence (AI), surrogate modeling, and insights gained from physics-based and data-driven simulations.

Topics of interest include but are not limited to:

- Development of validated uncertainty-quantified processstructure-property (UQ/PSP) relationships or elements thereof
- Microstructure characterization directly linked to material property estimates
- Methodologies that unlock insights in large statistical models, ML, and Al
- Performance modeling to quantify performance and risk in highercriticality parts and assemblies
- Rapid gualification/re-gualification procedures to reduce testing efforts and to maintain process stability
- Approaches, frameworks, standards, and interfaces to guide data transfer in digital twins
- Examples of using modeling, simulation, and digital twins in the context of the Q&C environment
- Knowledge generated from physicsbased process, properties, and/or performance simulations



Symposium Organizers

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- Edward Glaessgen, NASA-LaRC, USA
- Michael Gorelik, FAA, USA
- Nicholas Mulé, Boeing, USA
- Shuai Shao, Auburn University, USA
- James Sobotka, Southwest Research Institute (SwRI), USA

