



SUBMIT AN ABSTRACT FOR THE FOLLOWING SYMPOSIUM

ADDITIVE MANUFACTURING

Additive Manufacturing: Materials Design and Alloy Development VII – Design With Multi-Modal and Field Data by Integrating Uncertainty

Additive manufacturing (AM) provides new opportunities to produce metallic components. We can now print complex shape components with micron size resolution. Tailoring the microstructure and compositions are also potentially feasible at voxel size resolution. If the properties of these components are meeting and exceeding requirements and accelerate the certification pace and reduce time and cost of certification, we can reliably use AM in the wide range of critical applications in aerospace, aviation, defense and energy sectors. Beyond this, if rapid solidification and the possibility of gradient design are exploited, unprecedented performance may emerge. However, designing alloys especially structural alloys usually involve integrating multi-modal, multi-field data and also the uncertainty and variability of these design parameters to decide efficiently on next design iteration and finally robust performances. In this symposium, we aim to focus on experimental and numerical or coupled solutions to address these integrations into the design.

The following topics are included in this symposium:

- Uncertainty quantification and data generation approaches for design parameters in AM
- Strategies for rapid gathering multi-field, multi-modal data for unique opportunities in AM including metastable phase, refined microstructure features, and gradient design to achieve unprecedented performances
- Integrating uncertainty quantification in the design for processing and microstructure of alloys
- Using machine learning algorithms, from conventional to advanced LLMs to integrate different modalities and fields of data
- Foundation LLM models for the design of alloys in AM
- Sustainable design of AM alloys

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