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TMS 2026

155th Annual Meeting & Exhibition

March 15–19, 2026
San Diego Convention Center
and Hilton San Diego Bayfront
San Diego, California, USA
#TMSAnnualMeeting

SUBMIT AN ABSTRACT FOR THE FOLLOWING SYMPOSIUM

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Multiscale and Non-Equilibrium Solidification Fundamentals

Additive manufacturing (AM) is a disruptive technology, offering increased part complexity, short lead times, and opportunities for local microstructure control. AM microstructures often consist of complex features spanning multiple length scales, including dislocations, nucleation, segregation, defects, and grains, and these features directly influence the properties of manufactured parts. Despite the importance of said microstructural features, the application of fundamental solidification theories to AM processing conditions has not been fully explored. As increased demand for customized material properties and localized microstructure control will inevitably require a detailed understanding of AM solidification, this symposium seeks to highlight research in metal AM that applies fundamental solidification theories to understand and solve contemporary materials and processing challenges. This symposium will inform the solidification community about the unique solidification conditions specific to AM and guide the AM community in recognizing the parallels that exist in the solidification literature, e.g., casting, welding, and remelting processes. Both experimental and modeling submissions are encouraged, especially when models or theories are adapted to predict the unique multiscale and non-equilibrium process-microstructure relationships inherent to AM and connected to experimental results or in situ characterization. Also, the use of data analytics and machine learning approaches to building process-structure-property relationships is encouraged.

SPONSORED BY:
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