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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: Advanced Characterization With Synchrotron, Neutron, and In Situ Laboratory-scale Techniques IV

Additive manufacturing (AM) is rapidly advancing with new technologies, materials, and processes emerging. To accelerate process and product qualification, these developments demand innovative characterization tools to monitor processes, understand and elucidate the microstructure/defect evolution, and validate theories and process models. Facility-based X-ray and neutron techniques, along with advanced laboratory-scale characterization methods, are crucial in addressing these scientific challenges. This biennial symposium, now in its 4th edition, brings together experts from scattering, imaging, and other characterization techniques from the AM community to discuss latest developments, industrial applications, and collaborative opportunities in advanced characterization to drive innovation and address industrial needs.

Theme 1: Facility-Based Techniques in AM This theme highlights cutting-edge X-ray and neutron methods for investigating AM processes at various time and length scales. Topics include:

- Real-time imaging and diffraction of AM processes.
- Microstructure evolution during fabrication and post-processing.
- Residual stress measurements and model integration.
- Chemical analysis using X-ray and neutron spectroscopy.
- High-resolution spatially resolved techniques, e.g. microdiffraction, nano-tomography, etc.
- In situ studies of material behavior under different in-service conditions.
- Machine learning for predictive analysis using synchrotron and neutron data.

Theme 2: Laboratory-Scale Techniques for AM Diagnostics This theme focuses on laboratory-based tools for process monitoring and diagnostics. Topics include:

- Innovations in process monitoring techniques for anomaly/defect detection, understanding microstructure evolution, and enabling parameter optimization.
- Characterization of high deposition rate processes such as directed energy deposition, friction stir, and cold spray AM.
- Bridging research insights with industrial implementation through data-driven approaches.

We also welcome abstracts on emerging opportunities, including real-time data integration with computational models, hybrid characterization methods, and machine learning for AM applications.

SPONSORED BY:
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QUESTIONS?
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