ICAM26

ASTM INTERNATIONAL

International Conference on Advanced Manufacturing

Research to Application through Standardization

Value Chain: Extreme Environments, Corrosion, and Performance Durability

Environmental and corrosion behavior of additively manufactured alloys remains an underexplored but critically important area for ensuring reliable service performance. While AM research has traditionally emphasized microstructure and mechanical properties, environmentally driven deterioration, including corrosion, hydrogen embrittlement, stress-corrosion cracking, and corrosion-fatigue, often governs the service life of a component. AM materials can exhibit distinct microstructures and degradation mechanisms when compared with conventionally processed alloys. (casting, forging, etc.). The application of post-processing methods, such as heat treatment, surface finishing, and coatings may influence material properties, and therefore enhance component performance. Another issue to be considered is that most characterization efforts rely on legacy corrosion-testing standards, which may not fully account for the unique microstructures and new materials produced by AM. While often applicable, these standards may require additional considerations or adaptation to ensure accurate evaluation of AM alloys.

This symposium invites research that advances the understanding of AM-specific environmental degradation modes and investigations into countering them.

Topics of interest include but are not limited to:
– Quantification and characterization of AM alloy corrosion and environmental cracking behavior (e.g., HE, SCC, corrosion-fatigue, etc.)
– Identification of AM-specific environmental degradation modes by linking microstructural features to damage mechanisms.
– Build and post-processing parameter impact on environmental degradation.
– Methods to prolong the life of AM parts against environmental effects (e.g., coatings, etc.)
– AM specific standardization issues and challenges
– Physics based simulations of environmental effects on AM parts
– Incorporation of machine learning/artificial intelligence approaches

amcoe.org/icam2026

SYMPOSIUM ORGANIZERS

Tony Fry
National Physical Laboratory, United Kingdom

Zachary Harris
University of Pittsburgh, USA

Robert Kelly
University of Virginia, USA

Matt Sanders
Stress Engineering Services, USA

Nicole Tailleart
U.S. Naval Research Laboratory, USA

Gary Whelan
QuesTek Innovations, USA