ICAM26

ORLANDO, FL
SEPTEMBER 28 -
OCTOBER 2, 2026

International Conference on Advanced Manufacturing

Research to Application through Standardization

Value Chain: Directed Energy Deposition: Process Science, Repair, and Applications

Directed Energy Deposition (DED) is advancing rapidly in response to industry and government demand for reliable, scalable and deployable manufacturing solutions. DED enables component fabrication, feature addition, repair and surface coatings across a broad operating window—from high-throughput deposition to finer, near-net-shape geometries. Scalable machine architectures support **large-format builds beyond the envelopes of other metallic AM processes,** while continued progress in monitoring, control and qualification is accelerating industrial uptake.

DED is now established across aerospace, energy, mining, marine, tooling and defence, driven by high-integrity repairs, and life-extending coatings, and by its potential as an alternative to conventional forging and casting manufacturing routes of full components in selected applications. Alongside continued stories of value generating success in niche use-cases, DED is expanding into higher-volume sectors, including automotive and consumer products.

This session is intended to bring together researchers, technology providers and end-users to discuss recent advancements, persistent challenges and emerging innovations shaping DED's role in modern manufacturing.

1. **Industrial deployment and scale-up**
   - **First-time-right manufacturing:** process chains, optimisation, QA, rocess modelling/prediction
   - **In-situ monitoring, closed-loop control and automation**
   - **Standards, qualification and certification enabling adoption**
   - **Industrialisation and operations:** transition from R&D to robust production; repeatability, reliability, maintainability
   - **Application drivers and case studies:** large-scale, complex and higher-volume use-cases
   - **Deployable DED:** in-/near-field repair, on-demand manufacturing outside "pristine" factory conditions
   - **Sustainability and cost saving leaps:** efficient use of materials and resources

2. **Innovation and emerging approaches**
   - **New system concepts:** architecture, beam shaping, multi-laser, hybrid systems, productivity/quality breakthroughs
   - **AI/ML in DED:** monitoring, defect prediction, parameter optimisation, autonomous process control
   - **Kinetic DED processes (e.g., cold spray):** solid-state deposition for high-throughput manufacturing and low-heat repair/coatings
   - **High-speed / high-productivity DED** (e.g., EHLA / high-speed laser metal deposition, high-deposition-rate approaches, thin-wall/low dilution strategies)
   - **Advanced materials and multi-material DED:** novel alloys, in-situ alloying, graded/FGM structures, dissimilar-material builds

amcoe.org/icam2026

SYMPOSIUM ORGANIZERS

Frank Brückner
Fraunhofer IWS, Germany

Paul Gradl
NASA - Marshall Space Flight Center, USA

Tyson Gregory
Nidec Machine Tool America, USA

Jhonattan Gutjahr
Manufacturing Technology Centre, United Kingdom

Evan Handler
Naval Surface Warfare Center - Carderock Division / America Makes, USA

Vittoria Laghi
University of Bologna, Italy

Misael Pimentel
National Manufacturing Institute Scotland, United Kingdom

Baily Thomas
Boeing, USA

Arkadi Zikin
Oerlikon, Switzerland