ICAM 2023

ASTM INTERNATIONAL CONFERENCE ON ADVANCED MANUFACTURING

Research to Application through Standardization

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Industry 4.0: Artificial Intelligence and Machine Learning in AM

The rapid advancement and increased adoption of additive manufacturing (AM) technologies in industry have coincided with, and in many instances been enabled by, the application of artificial intelligence (AI) and machine learning (ML). The various steps of the AM process generate massive quantities of diverse, multimodal data. Further, the operational performance of a component during its service life generates valuable data, if recorded. Besides generated data, the AM processes can be controlled by changing and optimizing many parameters using AI and ML. Hence, both data and parameters make AM a great candidate for AI and ML applications to further understand and improve AM process and product quality, if the data can be structured and registered and the parameters made clear, consistent, and comparable.

Topics of interest include but are not limited to:

- Landscape surveys and analyses: AI & ML applied to AM
- Applications of AI & ML in:
  - Design optimization
  - Process planning and optimization
  - Material development
  - In-situ process monitoring
  - Material-process-microstructure-property relationships
  - Predictive maintenance
  - Process qualification
  - Non-destructive part evaluation
- AM data requirements for enabling AI & ML (e.g. data registration and featurization)
- Infrastructure design and software development for AI & ML in AM
- Data and software integration for findability, accessibility, interoperability, and reusability
- Big data analytics in AM; definition and case studies
- Rapid defect detection
- Standardization needs for AI & ML in AM
- Platform design for data sharing and collaboration in AI & ML in AM

Symposium Organizers

- Kareem Aggour, GE Research, USA
- Gareth Conduit, Intellegens, UK
- Shaw Feng, NIST, USA
- Jia (Peter) Liu, Auburn University, USA

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