

# Call for Papers

## 2024 Summer Topical Meeting

# Advancing Precision in Additive Manufacturing

Colorado School of Mines | Golden, Colorado, USA  
July 15-19, 2024

## Topics

- **Dimensional accuracy and surface finish in AM**
  - State of the art: What level of dimensional precision and accuracy is achievable?
  - Functional specifications for form and finish
  - Prediction and modeling of dimensional errors and surface topography
  - Applications ranging from large-scale to micro-nano
- **Metrology**
  - Challenges in form, texture, and internal feature metrology of rough as-built AM components
  - Computed tomography for defect detection, dimensional metrology, internal geometries
  - Multi-sensor approaches, data fusion, and machine learning
  - Measurement, registration, and fitting of point clouds for freeform surfaces
  - Development of instruments, artifacts, and data processing tools to establish traceability across ex- and in-situ metrology systems (e.g., dimensional, thermal, etc.)
- **Design for manufacturing and precision applications**
  - Design rules and tolerancing for AM
  - Topology optimization in the context of AM and achieving precision
  - Novel designs for flexures and kinematic couplings
  - Metallurgy and fatigue issues in high-cycle precision applications
  - Design, tolerancing, manufacture, and metrology of lattice structures
- **AM machines and process control**
  - Holistic views of the control system, process feedback, and correction
  - Novel AM machine designs and control strategies
  - In-process monitoring: melt pool, powder bed, workpiece shape and topography
  - Artifacts to assess machine performance and errors; round-robin testing
  - Fundamental machine metrology to assess machine performance and errors
- **Integrating AM into a holistic manufacturing process**
  - Cost-benefit trade-offs of using AM within a complex process chain
  - Engineered partnerships between AM and secondary finishing
  - Fixturing, machining, and metrology of near-net shape parts
  - Deterministic methods for qualification of AM processes, feedstocks, and parts
  - Functional correlations for the development of standards that support industry
  - Achieving precision with a focus on sustainability
- **Process physics, simulation, and optimization**
  - Prediction and modeling of distortion and topography
  - Parameter optimization and defect avoidance
  - Model validation: experimental requirements and datasets
  - Machine learning to conquer the complex AM parameter space

*Tutorials July 15 | Technical sessions July 16, 17, 18 | Tours July 19*

**Short abstracts due April 15, 2024**

[www.aspe.net](http://www.aspe.net)

## Co-chairs

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National Institute of Standards and Technology  
**Jaime Berez**  
University of North Carolina at Charlotte  
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University of Huddersfield, UK

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