Report Out

June 10, 2016

Breakout Out Group:

Process Modeling

NIST

Desired AM Capabilities/Technologies

Categories: Process Structure Property, Variability and Uncertainty, Multi-Component Materials, Physics

- Ability to have fully user defined processing parameters
- Predict properties that a designer can actually use (e.g., strength, ductility)
- Models that are consistent with non-equilibrium thermodynamics
- Predict and understand build variability (which will be process dependent), or be able to characterize variability by process
- Fully understand process-structure-property links so as to enable design for performance
- Nonlinear material models for failure mechanism (temperature, constrained properties)

Top-Voted Challenges/Priority Topics

- Lack of non-equilibrium materials and process measurements and models (9)
- Interfacial science (between layers, phases, or multi-materials) (9)
- Agreed model systems for development/validation (e.g., benchmarks (8)
- Test protocols for testing AM parts (mechanical) (7)
- (Non-technical) Better Structures for multi-disciplinary collaboration (7)