

VALIDATED MATERIALS MODELING WITH QUANTIFIED UNCERTAINTIES ACROSS SCALES AND PHYSICS

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ABSTRACT

Accelerating the discovery of new engineering materials and finding optimal processing techniques requires synergistic advances in predictive modeling, simulation and experimentation tightly coupled within an uncertainty quantification framework for decision-making. In this symposium we seek to bring together scientists and engineers working in this area with emphasis on establishing relationships between processing, structure and properties with quantified uncertainties and accounting for stochastic variability and uncertainties. Topics and applications of interest to be covered in this symposium include:

- 1) Multiscale simulations of devices and materials with focus on the hierarchy of simulations and coupling techniques from first principles to continuum models.
- 2) Uncertainty quantification and inference for materials and systems design and certification.
- 3) Multiphysics simulations with uncertainty propagation and quantification of margins of uncertainty for decision-making.
- 4) Experimental efforts in support of rigorous model calibration and validation of multiscale models as well as error estimation and model improvement.
- 5) Nanostructured and composite materials including metals, alloys and polymers and their processing-structure-response relationship.