# Multiscale modeling and uncertainty quantification of heterogeneous materials

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Over the last few years, integration of stochastic methods into a multiscale framework or development of multiscale modeling in a stochastic setting for uncertainty quantification and reliability analysis of heterogeneous materials is becoming an emerging research frontier. Translation of deterministic multiscale methods into corresponding stochastic versions requires not only development of highly efficient stochastic algorithms to deal with the "curse of dimension" problem, but also knowledge of multiscale probabilistic characteristics of complex material systems. Specifically, it is the emergence of new advanced heterogeneous materials that makes imperative the need of accurate stochastic modeling across multiple length scales. Equally important is to ensure the link between stochastic models and physical realities by establishing a connection of probabilistic methods to fundamental materials science and experimental mechanics.

The scope of this Minisymposium is to bring together researchers in the areas of multiscale and stochastic mechanics seeking interactions among stochastic material models, multiscale methods and uncertainty quantification in order to improve the safety and reliability of engineering material systems. In this respect, topics of interest include but are not limited to:

- Multiscale methods involving uncertainties
- Random field modeling of multiscale material systems
- Microstructure/morphology characterization
- Stochastic fracture and damage
- Wave propagation in multiscale random media
- Validation of stochastic multiscale modeling techniques