# 2018 SIAM Conference on Uncertainty Quantification

Part of [MS62 Recent Advances in Surrogate-based Uncertainty Quantification Methods for Extreme-scale Scientific Computing](#)

**On the Ensemble Propagation for Efficient Uncertainty Quantification of Mechanical Contact Problems**

**Abstract.** A new approach called embedded ensemble propagation has recently been proposed to improve the efficiency of sampling-based uncertainty quantification methods on emerging architectures. It consists of simultaneously evaluating a subset of samples of the model, instead of evaluating them individually. This method improves memory access patterns, enables sharing of information from sample to sample, reduces message passing latency, and improves opportunities for vectorization. However, the impact of these improvements on the efficiency of the code depends on its code divergence, whereby individual samples within an ensemble must follow different code execution paths.

In this presentation we will show the feasibility of propagating an ensemble through mechanical contact problems, discuss some of the code divergence issues arising in mechanical contact problems where each sample within an ensemble can give rise to a different contact configuration, discuss strategies to manage them, and illustrate them with numerical examples. At the end we will extend these notions to more general non-linear problems.

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