

Talk Abstract

Speaker: Laura Swiler, Sandia National Laboratories

Talk Title: Epistemic Uncertainty: Computation and Usage

Talk prepared for the Virtual Conference on Epistemic Uncertainty in Engineering, University of Liverpool, Institute for Risk and Uncertainty.

<https://sites.google.com/site/riskthinkover/home/epistemic>

Talk Date: March 17, 2021

Abstract:

This talk will present three approaches used in propagation of epistemic uncertainty: interval analysis, Dempster-Shafer evidence theory, and probability theory. The talk will present both sampling methods and optimization methods that can be used in these calculations as well as surrogate models.

Additionally, the discussion of “mixed” epistemic-aleatory uncertainty will be presented with an emphasis on efficient methods beyond nested sampling. Results will be presented for various test problems. The last section of the talk will cover some history, including the treatment of epistemic uncertainty in large uncertainty analyses supporting risk assessment for nuclear power plants and waste repositories.

Bio:

Dr. Laura P. Swiler is a computational scientist whose research focuses on quantifying the uncertainty associated with predictions from computational models. Her research addresses the question “how much can we infer from as few model runs as possible” given the high cost of running advanced science and engineering models. Particular research areas include experimental design, adaptive sampling algorithms, Bayesian inference, model calibration, and Gaussian process surrogate models. Dr. Swiler has been a staff member at Sandia National Laboratories for 26 years.