**Omar Knio** (King Abdullah University of Science and Technology):

**Sampling and Representation of Stiff ODEs in Large Dimension**

**Abstract:**

This work focuses on the construction of functional representations of quantities of interest (QoI) of uncertain ODE systems in high stochastic dimensions. Attention is specifically focused on the ignition delay time of reacting mixtures using detailed chemical mechanisms. We explore two avenues for representing QoIs, namely based on regularized regression and on basis adaptation. Simulations are used to analyze the suitability of the resulting representations and their utility in estimating first-order and total sensitivities. The results are also used to test reduced dimension representations, and to outline potential extensions based on capitalizing on local sensitivity analysis.