1125-65-2390 **Umberto Villa*** (uvilla@ices.utexas.edu), The University of Texas at Austin, Inst. Computational Engineering and Sciences, 201 E. 24th Street, Stop C0200, Austin, TX 78712, and **Peng Chen** and **Omar Ghattas**. *Bayesian Inverse Problems Governed by Stochastic PDE Models.*

Inverse problems arise when we seek to determine unknown parameters from observational data and mathematical models that relate the parameters to the data. These problems arise across all areas of science, engineering, medicine, and beyond.

Inverse problems are often ill-posed; that is, multiple values of the parameters may be consistent with the data to within the noise. Bayesian inference provides a systematic framework for quantifying the resulting uncertainty in the parameters. However, this formulation presents significant challenges. First, the parameter to be inferred is often a spatially correlated field, resulting in a high dimensional parameter space after discretization. Second, the forward model is often computationally expensive to solve, particularly when it takes the form of PDEs. Finally, for many applications of practical interests, the model is often inadequate, that is it only partially captures the complex dynamics of the physical system leading to a discrepancy between its outputs and reality.

In this talk, we focus on how to model inadequacy by introducing a stochastic term in the governing equations, and how to efficiently solve the resulting Bayesian inverse problem. An application to Bayesian calibration of turbulence closure models is presented. (Received September 20, 2016)