1142-28-64 **Tim M Wildey*** (tmwilde@sandia.gov), P.O. Box 5800, Albuquerque, NM 87185-1318, and **Troy Butler** and **John Jakeman**. *The Consistent Bayesian Approach for Stochastic Inverse Problems.*

Uncertainty quantification is challenging for large-scale multiphysics applications where the number of uncertain parameters may be large, the number of high-fidelity model evaluations may be limited, and the available data may be corrupted by significant noise. The recently developed consistent Bayesian approach solves a specific stochastic inverse problem based on the measure-theoretic principles. This approach produces a pullback density on the parameters that is consistent in the sense that the push-forward of this density matches the given distribution on the observable data. While the consistent Bayesian approach is theoretically sound and conceptually simple, it does require approximating the push-forward of an initial probability density through the computational model. While this is certainly nontrivial, we can leverage advanced approaches for forward propagation of uncertainty to reduce the online computational burden. In this presentation, we give an overview of the consistent Bayesian approach and discuss some of the challenges in applying this methodology in the context of large-scale multiphysics problems. Numerical results will be presented to highlight various aspects of this consistent Bayesian approach and to compare with the standard Bayesian formulation. (Received August 27, 2018)