1142-62-241 **Avishek Chakraborty*** (ac032@uark.edu), Department of Mathematical Sciences, SCEN 309, University of Arkansas, Fayetteville, AR 72701. *Bayesian Modeling Ideas for Data Assimilation and Uncertainty Quantification.*

Deterministic computer models (simulators), common in many scientific disciplines to explore the dynamics of physical events, are usually resource and time expensive and they may not adequately capture the real-world system. An emulator, a stochastic surrogate for the computer code, is used within a hierarchical framework to combine realizations from the computer model and field observations for estimation of parameters governing the system and prediction at new input combinations. In this talk, we are going to look at two different choices for emulators based on over-specified set of functions- splines and polynomial chaos expansions. Notably, the number of such functions, and their inclusion probabilities, are treated as unknown quantities. This approach is found to have smaller predictive uncertainty and computational efficiency than the standard Gaussian process approach to emulation and calibration. We will also look at associated inverse problem for retrieval of the unknown experimental input from the observed output. Another aspect of this talk will be to explore options for measurement error modeling in physical experiments when it is known to be non-Gaussian. We will use an example from Astrophysics to illustrate the concepts we discuss. (Received September 04, 2018)