Center for Environmental
& Applied Fluid Mechanics

Uncertainty Quantification in Chemical Systems

Presented by

Dr. Habib Najm
Sandia National Laboratories

This talk will demonstrate the use of multiwavelet spectral polynomial chaos (PC) techniques for uncertainty quantification in ignition of a methane-air system at atmospheric pressure. Bayesian inference is employed for identifying the probabilistic representation of the uncertain parameters based on data. These random/uncertain parameters are represented using multiwavelet PC, and the uncertainty is propagated through the ignition process using both intrusive Galerkin projection and non-intrusive monte-carlo sampling methods. I analyze the time evolution of moments and probability density functions of the solution, and examine the role and significance of dependence among the uncertain parameters. I finish with a discussion of the role of nonlinearity and the performance of the algorithm.

Friday, September 19, 2008
11:00 a.m., 110 Maryland Hall