

**University of California, Irvine
Statistics Seminar**

Role of Statistics in Scientific Computing

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**Thursday, June 7, 2018
4 p.m., 6011 Bren Hall
(Bldg. #314 on campus map)**

Advances in high performance computing have enabled detailed simulations of real-world physical processes, and these simulations produce large datasets. Even as detailed as they are, these simulations are only approximations of imperfect mathematical models, and furthermore, their outputs depend on inputs that are themselves uncertain. The main goal of a validation and uncertainty quantification methodology is to determine the relationship between the true value of a quantity of interest (QOI) and its prediction by the simulation. Variance based sensitivity analysis is often one of the first steps in the analysis of complex simulations. I will describe approaches to doing this in situations where the QOI is a function. I will use case studies from engineering applications at Lawrence Livermore National Laboratory to discuss functional sensitivity analysis. Given inevitable flaws and uncertainties in the results of a computational model, one's confidence in the results must be based on an understanding of the simulation's limitations and uncertainties inherent in its predictions. Therefore, I argue that a collaboration between subject matter experts and statisticians is critically important.

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