STATISTICS DEPARTMENT SEMINAR

TITLE: **DESIGN AND ANALYSIS OF HIGH-ACCURACY EXPERIMENT AND LOW-ACCURACY EXPERIMENT**

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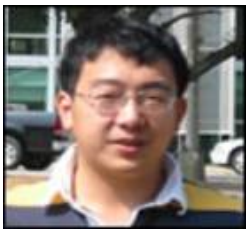

TIME: 4:00 P.M.

DATE: Wednesday, February 8, 2006

ROOM: 140 BARDEEN

ABSTRACT:

Experiments to study complex real world systems in engineering and sciences can be conducted at different levels of accuracy and sophistication. A physical experiment offers rich information, but is sometimes infeasible or difficult to conduct owing to time and budget constraints. A simulated experiment implemented in large computer codes is used as an alternative. Furthermore, a large computer program can be run at different levels of sophistication with vastly varying computational times. It is evident that the degree of accuracy and sophistication is inversely related to the cost and time involved in experimentation. Therefore, creating and analyzing an optimum mix of two or more types of experiments is a challenging and fascinating problem. In this talk, I consider a generic situation where two such experiments, called high-accuracy experiment (HE) and low-accuracy experiment (LE) need to be designed and analyzed simultaneously. The pair can be physical experiment vs. computer modeling or detailed vs. approximate computer models. A new method is proposed for constructing nested Orthogonal-array based Latin hypercube designs for LE and HE with guaranteed space-filling properties. To analyze data from such experiments, we propose a new integrated analysis based on some Bayesian hierarchical Gaussian process models to incorporate the systematic differences among various experiments. The proposed method is illustrated with two real examples.

Coffee and Cookies at 3:30 p.m. in Room 1210 MSC