

STATISTICS COLLOQUIUM

MONDAY, DECEMBER 1, 2008

Talk: 4:00 PM — *Science Center 309*

Reception: 5:15 PM — *Science Center, 7th Floor*

“Adaptive One Factor at a Time Experiments: Theory and Practice”

Daniel D. Frey

Massachusetts Institute of Technology
Mechanical Engineering and Engineering Systems

ABSTRACT

This talk will review a few research results related to adaptive One-Factor-at-a-Time (aOFAT) experimentation. Our research group has demonstrated that the aOFAT approach provides high expected values of improvements and high probabilities of exploiting two-factor interactions, especially when these interactions are large. We recently extended the aOFAT approach by incorporating concepts from “ensemble methods.” In the proposed method, the experimenter plans and executes multiple adaptive experiments on the same system with differences in starting points. Decisions are made by aggregating the outcomes of the aOFAT experiments by weighted voting. This approach is compared to alternative methods using both a case study to illustrate the approach and a hierarchical probability model. More recently, we have investigated the properties of adaptive experimentation from a Bayesian perspective. This enables one to determine the degree to which aOFAT represents an efficient response to step-by-step accrual of sample information.