

Stanford University

Department of Statistics

DEPARTMENTAL SEMINAR

4:30pm, Tuesday, October 15, 2019
McCullough Building (04-490) Room 115

Refreshments served at 4pm in Sequoia Lounge.

Speaker: Mark Huber, *Claremont McKenna College*

Title: Robust estimators for Monte Carlo data

Abstract:

Data coming from Monte Carlo experiments is often analyzed in the same way as data from more traditional sources. The unique nature of Monte Carlo data, where it is easy to take a random number of samples, allows for estimators where the user can control the relative error of the estimate much more precisely than with classical approaches. In this talk I will discuss three such estimators useful in different problems. The first is a user-specified-relative-error (USRE) estimate for the mean of a Bernoulli random variable. This allows us to obtain exact error results while using slightly fewer samples than the CLT approximation. The second is more general, applying to any random variable where a bound on the relative error is known. For this problem we give exact error bounds using a number of samples that is the same (to first order) as the CLT approximation requires. In other words, the new algorithm is the equivalent of always actually having normal data. Finally, we look at the problem of data with unknown variance and develop an algorithm that runs very close to the minimum number of samples established by results of Wald.

This is joint work with Bo Jones, Jinglin Feng, and Soda Ruan.

About this Speaker: Huber received his PhD in Operations Research and Industrial Engineering from Cornell. He then completed an NSF postdoc at Stanford before moving to a position at Duke University, jointly appointed with the Department of Mathematics and the Department of Statistical Science. In 2009 he moved to the Department of Mathematical Sciences at Claremont McKenna College, where he is currently the Fletcher Jones Foundation Professor of Mathematics and Statistics and George R. Roberts Fellow. Huber is the author of two books: *Perfect Simulation* and *Probability: Lectures and Labs*.