

UCLA

# BIOSTATISTICS SEMINAR

SPRING 2012

## **Multiplicative Algorithms: Why Do They Converge and How to Make Them Faster**

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3:30pm - 4:30pm, CHS 33-105A

Refreshments served at 3:00 PM in room 51-254 CHS

**ABSTRACT:** Multiplicative algorithms are simple optimization schemes that iteratively adjust an input probability vector by multiplicative factors so as to increase a suitable objective function. Examples include the EM algorithm for maximum likelihood estimation of mixture proportions, EM for the nonparametric MLE with interval censored data, multiplicative algorithms for computing optimal designs (e.g., in pharmacokinetics or dose-response studies), and the Arimoto-Blahut algorithm for calculating channel capacities in Shannon theory. By exploiting the connections among these seemingly separate problems we derive general conditions that ensure monotonic convergence for multiplicative algorithms in optimal designs, and construct hybrid algorithms that converge faster but maintain the simplicity and stability.