THE UNIVERSITY OF CHICAGO

COMPUTATIONAL AND APPLIED MATHEMATICS COLLOQUIUM

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Monte Carlo Methods for High-dimensional Estimation

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Via ZOOM

In high-dimensional estimation problems, Monte Carlo methods are needed for reducing dimensionality and calculating rare probabilities. Despite their popularity in the past decade for such applications, standard Monte Carlo approaches are often inaccurate or slow to converge. What limits the efficiency of the currently available Monte Carlo methods, and what is needed to build more efficient methods for the future? Through numerical analysis, we begin to answer these questions. We present the first-ever convergence proof and error bounds for the variational approach to conformational dynamics (VAC), a popular method for dimensionality reduction used in biochemistry. Additionally, we establish that the weighted ensemble method can reduce error bars on Markov chain Monte Carlo (MCMC) estimates by multiple orders of magnitude.

Organizer:
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CAM Colloquium URL: https://cam.uchicago.edu/events/cam-colloquium/

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