The Math/Stats Colloquium
Department of Mathematics and Statistics
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Accurate solutions of the Boltzmann equation for nanoscale transport phenomena

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Abstract: Many nanoscale transport phenomena, such as gas flows, heat transfer, and the conduction of charge, may be modeled using the Boltzmann equation. The most popular approach for solving the Boltzmann equation in these cases is to employ a Monte Carlo method. This works well for many cases where the density of particles (e.g., molecules, phonons, or electrons) is low, but becomes computationally infeasible as the density increases. In this talk we discuss the application of a spectral method for solving the Boltzmann equation. When constructed correctly, this approach provides high accuracy solutions and improved computational efficiency in the high density limit.

Background: Multivariable calculus.

About the speaker: Daniel is a research scientist in the Center for Computational Sciences and Engineering at Berkeley Lab. His research interests include nanoscale transport, Brownian dynamics, and fluctuating hydrodynamics.

Colloquium broadcast via Zoom, 3pm Pacific/6pm Eastern
Email `tim.hsu@sjsu.edu` for an invitation

For our full schedule, see: `http://www.timhsu.net/colloq/`