

# Mentor Lecture Series

Organizer: Daniel Erman and Bianca Viray

Monday, 4:10–5:00pm, 60 Evans

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Oct. 16 **Fraydoun Rezakhanlou**, UCB

*Macroscopic descriptions of large stochastic and deterministic systems*

An important task of Statistical Mechanics is to explain the macroscopic behavior of a gas or a fluid using its microscopic details. For example a gas may be modeled by a system of particles which are interacting via a two-body potential.

Microscopically the dynamics is governed by a large system of ordinary differential equations which are formulated with the aid of Newton's second law. An important open problem in this context is the derivation of Euler and Navier-Stokes equations from the microscopic description.

Some of the variants of this problem have been treated recently for some stochastic particle systems.

These systems are microscopically described by stochastic rules and macroscopically are governed by Euler or Navier-Stokes type equations. The primary goal of this lecture is to discuss the connection between the microscopic structure and macroscopic behavior of some of these models.

*The Mentor Lecture Series is designed for first and second year graduate students. The series aims to acquaint beginning graduate students with potential dissertation supervisors whom they might not otherwise closely encounter, and to impart a taste of research activity in the mathematics department in order to help beginning students choose fields of specialization.*