Mentor Lecture Series

Organizer(s): Shaowei Lin & Diogo Oliveira e Silva

Monday, 4:10–5:00pm, 60 Evans

Apr. 07 **Fraydoun Rezakhanlou**, UCB

Random Growth Models, Combinatorics and the Hamilton-Jacobi Equation

As a classical problem in combinatorics, consider the longest increasing subsequence of a random permutation of the sequence $1, 2, ..., n$. By a result of Vershik-Kerov and Logan-Shepp, the length of such a random subsequence L_n is approximately $2\sqrt{n}$. Recently Baik, Deift and Johansson settled a long standing open problem by showing that the fluctuations of L_n are of order $n^{1/6}$. In this lecture, I explain how probabilistic arguments can be used to study L_n. After the work of Hammerseley and Aldous-Diaconis, a random growth process known as the Hammersely model is used to get insight into the behavior of L_n as n gets large. This model is one of the most basic examples of growth processes which are described by Hamilton-Jacobi PDEs in macroscopic coordinates.

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.