

Stanford University
Departments of Mathematics and Statistics

PROBABILITY SEMINAR

4pm, Monday, January 13, 2020
Sequoia Hall Room 200

Refreshments served at 3:30pm in the Lounge.

Speaker: Amol Aggarwal, *Harvard University*

Title: **Universality for Lozenge Tiling Local Statistics**

Abstract:

The statistical behavior of random tilings of large domains has been an intense topic of mathematical research for decades, partly since they highlight a central phenomenon in physics: local behaviors of highly correlated systems can be very sensitive to boundary conditions. Indeed, a salient feature of random tiling models is that the local densities of tiles can differ considerably in different regions of the domain, depending on the boundary conditions. Thus, a question of interest, originally mentioned by Kasteleyn in 1961, is how the shape of the domain affects the local behavior of a random tiling. In this talk, we outline recent work that provides an answer (originally predicted by Cohn–Kenyon–Propp) to this question for random lozenge tilings of essentially arbitrary domains. The proof will proceed by locally coupling a uniformly random lozenge tiling with a model of Bernoulli random walks conditioned to never intersect. Central to implementing this procedure is to establish a local law for the random tiling, which states that the associated height function is approximately linear on any mesoscopic scale.