

**Stanford University**  
**Departments of Mathematics and Statistics**

PROBABILITY SEMINAR

4pm, Monday, September 30, 2019  
Sequoia Hall Room 200

Refreshments served at 3:30pm in the Lounge.

**Speaker:** Reza Gheissari, *UC Berkeley*

**Title:** Maximum height of low-temperature 3D Ising interfaces

**Abstract:**

Consider the random surface given by the interface separating the plus and minus phases in a low-temperature Ising model in dimensions  $d \geq 3$ . Dobrushin (1972) famously showed that in cubes of side-length  $n$  the horizontal interface is rigid, typically exhibiting order-one height fluctuations. We study the large deviations of this interface and obtain a shape theorem for its pillar, conditionally on it reaching an atypically large height. We use this to analyze the law of the maximum height of the interface,  $M_n$ : we prove that for every  $\beta$  large,  $M_n / \log n \rightarrow c_\beta$  in probability, and  $(M_n - \mathbb{E}[M_n])_n$  forms a tight sequence. Moreover, even though the centered sequence does not converge, all its subsequential limits satisfy uniform Gumbel tail bounds.

This is joint work with Eyal Lubetzky.