

## Combinatorics and Probability Seminar

*Empirical measures, geodesic lengths, and a variational formula in first-passage percolation*

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**Abstract:** We consider the standard first-passage percolation model on  $\mathbb{Z}^d$ , in which each edge is assigned an i.i.d. nonnegative weight, and the passage time between any two points is the smallest total weight of a nearest-neighbor path between them. This induces a random “disordered” geometry on the lattice. Our primary interest is in the empirical measures of edge-weights observed along geodesics in this geometry, say from 0 to  $[n\xi]$ , where  $\xi$  is a fixed unit vector. For various dense families of edge-weight distributions, we prove that these measures converge weakly to a deterministic limit as  $n$  tends to infinity. The key tool is a new variational formula for the time constant. In this talk, I will derive this formula and discuss its implications for the convergence of both empirical measures and lengths of geodesics.

Monday, November 29 at 2:00 PM in 636 SEO