1143-60-476 **Jeffrey Schenker*** (schenke6@msu.edu), **Zak Tilocco**, **Alejandro Becerra** and **Tait Weicht**.
How big is a lattice point?

A lattice random walk may be approximated over long time scales by Brownian motion. Suppose we wish to compute the probability for a random walk to hit a particular point over a given time. It is natural to approximate this hitting probability by the probability for Brownian motion to hit a ball over the same time. But how big of a ball should we use? In $d = 1$ this problem is trivial and in $d \geq 3$ it is not difficult. However, in two dimensions the problem is subtle because the probability for Brownian motion to eventually hit any disk is one, regardless of the radius.

Borrowing ideas from spectral theory and the physics of renormalization, we show how to use the singular part of lattice Green's functions to compute an "effective Brownian radius" for a lattice point, which can be used to obtain the best approximation of random walk hitting probabilities. We apply this technique to a variety of 2D lattices, as well as to various directed random walks, obtaining for each an "effective Brownian radius" for a point. I will close the talk with some conjectures about the numerical error in this approximation. (Joint work with A. Becerra, Z. Tilocco, and T. Weicht.) (Received August 20, 2018)