



The rising STAR of Texas

Discrete Mathematics Seminar

Time: Friday, October 26, 2018, 2:15-3:15 PM
Room: 330 Derrick Hall
Title: The Threshold Density Theorem
Speaker: Dr. David Perkinson, Department of Mathematics, Reed College/MIT

Abstract:

Imagine a system in which particles of energy are randomly added to sites in a finite network. When the number of particles at a site reaches a certain threshold, the site becomes unstable and fires, sending one particle to each of its immediate neighbors in the network. These neighbors, in turn, might then exceed their thresholds---so adding a single particle can set off a cascade of firings. We wait until all firing activity has subsided before randomly adding the next particle. Since the network is finite, we will eventually reach a point at which a particle is added and the system is no longer stabilizable. What total amount of energy do you expect to be in the system then? This talk will be an introduction to chip-firing and the abelian sandpile model through Lionel Levine's threshold density theorem, which provides an answer to the above question.

Bio:

David Perkinson received his PhD from the University of Chicago in 1990 working on jet bundles on curves in Grassmannians under the direction of William Fulton. Since that time, he has been at Reed College in Portland, Oregon, with shorter stays at the University of Genoa, the University of Oslo, MIT, and the African Institute for Mathematics Sciences (AIMS) in South Africa, Ghana, and Cameroon. Somewhere along the way, he was seduced by combinatorics, and his main research field now is the divisor theory of graphs and the abelian sandpile model. He strives to involve undergraduates in his research and has advised approximately fifty undergraduate thesis projects. His main hobby outside of mathematics is music of all sorts.