TEXAS STATE UNIVERSITY

The rising STAR *of Texas*

Discrete Mathematics Seminar

Time: Friday, February 21, 2020, 2:15-3:15 PM
Room: 330 Derrick Hall
Title: Rare events in complex networks of noisy dynamical systems
Speaker: Dr. Jason Hindes, U.S. Naval Research Lab

Abstract:

Complex-adaptive networks form the backbone of communication and technological systems ranging from power grids to computer and social networks. Many networks of interest often operate in noisy environments and fluctuate due to random internal effects, both of which can cause sudden transitions from one stable network state to another. These noise-induced events can be associated with desirable outcomes, such as the extinction of an epidemic, or undesirable, such as the loss of network synchrony. In this talk I will discuss a general formalism for predicting rare events in networks with noisy dynamics, the role of topology in facilitating the most extreme events, techniques for optimal network control that leverage uncertainty, and numerical solutions for the aforementioned when explicit formulas are unknown. Along the way, I will consider several examples: from epidemic spreading to opinion formation and power-grid dynamics.

Bio:

Dr. Hindes received his PhD from Cornell University in theoretical physics in 2015. From 2015-2018, he was a National Research Council postdoctoral fellow working under Dr. Ira Schwartz at the U.S. Naval Research Lab within the special section on nonlinear dynamical systems. In 2018, Dr. Hindes was awarded the Navy's prestigious Karles fellowship and was hired as a research physicist at the U.S. Naval Research Lab. His research has focused on the emergent dynamics and stability of networked dynamical systems with applications to: swarm pattern formation in robotics, rare and extreme events, synchronization of coupled oscillators, and epidemic spreading through contact networks.