TEMPLE UNIVERSITY
Department of Mathematics

Applied Mathematics and Scientific Computing Seminar

Room 617 Wachman Hall

Wednesday, 23 October 2013, 4:00 p.m.

Modeling Point Processes on Social Networks

by Martin Short
Georgia Tech

Abstract.

The study of social networks, and the dynamics of activity taking place on those networks, is currently of great interest, thanks in part to the availability of datasets from sources such as Facebook and Twitter. In this talk, I will discuss the dynamics of events occurring within two seemingly very different contexts: a network of gang rivalries from Los Angeles and a network of e-mail activity among a small group of college students. I will describe how both of these datasets can be understood through a common mathematical framework, the self-exciting point process. This modeling framework allows us to study interesting and difficult questions regarding the data, such as: which gangs were involved in a given violent altercation; how might police intervention within the gang network alter levels of violence; and which students within the e-mail network are the "leaders" of the group. The mathematical techniques used to answer these questions range from solving of inverse problems through a variational approach to the analysis of high-dimensional systems of nonlinear ODEs.