Department Colloquium

Speaker: Eric Foxall, Arizona State University
Date: Monday January 23rd, 2017
Time: 4:30 p.m.
Place: Jeffery 234
Title: The partner model: critical and non-critical behaviour

Abstract: We consider a stochastic SIS model of infection spread that incorporates non-permanent, monogamous partnerships. Each of N individuals is either healthy or infectious, and infection can only be transmitted between partnered individuals. Normalizing the recovery rate to 1, we identify a threshold value of the transmission rate, as a function of the partnership formation and dissolution rates, below which the infection vanishes within O(log N) time, and above which it survives for at least e^{cN} time for constant c, approaching a unique endemic equilibrium. At the threshold value, the infection survives for order of sqrt{N} time. Away from the threshold value, the dynamics for large N approach solutions to a set of ordinary differential equations describing the proportion of each of the five types of singles and partnered pairs, while at the threshold value, a different rescaling leads to a one-dimensional stochastic differential equation.

Joint work with Rod Edwards, Pauline van den Driessche (non-critical behaviour) and Anirban Basak, Rick Durrett (critical behaviour).