Department Colloquium

Speaker: Scott Greenhalgh, Queen's University
Date: Friday, February 12
Time: 2:30 p.m.
Place: Jeffery 234
Title: First principles and epidemiological applications of nonlinear recovery rate

Abstract: Differential equation models of infectious disease have undergone many theoretical extensions that have proved invaluable for the evaluation of disease spread. For instance, while one traditionally uses a bilinear term to describe the incidence rate of infection, physically more realistic nonlinear generalizations exist. However, such theoretical extensions of nonlinear recovery rates have yet to be developed. This is despite the fact that a constant recovery rate does not perfectly describe the dynamics of recovery, and that the recovery rate is arguably as important as any incidence rate in governing the dynamics of a system.

In this talk, I will provide a first principle derivation of nonlinear recovery rates in differential equation models of infectious disease. To accomplish this, I will rely on an intimate connection between integral equations, stochastic processes, and differential equations. Finally, I will apply a novel nonlinear recovery rate, where infected individuals can only contribute to disease spread for a finite amount of time, to model the elimination of measles in Iceland.