

**University of California, Irvine
Statistics Seminar**

***Statistical Challenges and Opportunities
in Stochastic Epidemic Modeling***

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**Thursday, April 11, 2019
4 p.m., 6011 Bren Hall
(Bldg. #314 on campus map)**

Stochastic epidemic models describe how infectious diseases spread through populations. These models are constructed by first assigning individuals to compartments (e.g., susceptible, infectious, and removed) and then defining a stochastic process that governs the evolution of sizes of these compartments through time. Stochastic epidemic models and their deterministic counterparts are useful for evaluating strategies for controlling the infectious disease spread and for predicting the future course of a given epidemic. However, fitting these models to data turns out to be a challenging task, because even the most vigilant infectious disease surveillance programs offer only noisy snapshots of the number of infected individuals in the population. Such indirect observations of the infectious disease spread result in high dimensional missing data (e.g., number and times of infections) that needs to be accounted for during statistical inference. I will demonstrate that combining stochastic process approximation techniques with high dimensional Markov chain Monte Carlo algorithms makes Bayesian data augmentation for stochastic epidemic models computationally tractable. I will present examples of fitting stochastic epidemic models to incidence time series data collected during outbreaks of Influenza and Ebola viruses.