



University
of Manitoba

STATISTICS SEMINAR

Thursday, February 6th, 2020
111 Armes Bldg
3:45 p.m.

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“Emulation Based Inference for Spatial Dynamics of Infectious Diseases”

Mechanistic models of infectious disease spread are key to inferring spatio-temporal infectious disease transmission dynamics. Ideally, covariate data and the infection status of individuals over time would be used to parameterize such models but in reality, complete data are rarely available. For example, infection times are almost never observed. Bayesian data augmented Markov chain Monte Carlo (MCMC) methods are commonly used to allow us to infer such missing data. However, for large disease systems, the method can be highly computationally expensive. Here, we propose a method of inference based on so-called emulation techniques.

Once again, the method is set in a Bayesian MCMC context, but avoids calculation of the computationally expensive likelihood function by replacing it with a Gaussian process approximation of the likelihood function built from simulated data. We show that such a method can be used to infer the model parameters and underlying characteristics of spatial disease systems, and that this can be done in much more computationally efficient manner compared to the full Bayesian MCMC methods.

Light refreshments will be served between 3:15-3:45 p.m. in 318D Machray Hall