



Statistical Sciences
UNIVERSITY OF TORONTO

SEMINAR

January 23, 2017 at 2:00 pm

Refreshments will be provided at 1:30pm

Sidney Smith Hall, Room 2127

Speaker: Daniel Simpson, University of Bath

Host: Patrick Brown

Towards a global, high-resolution model of air pollution

Ambient air pollution poses a significant threat to global health and has been associated with a range of adverse health effects, including cardiovascular and respiratory diseases in addition to some cancers. Fine particulate matter (PM_{2.5}) in particular has been established as a key driver of global health with an estimated 3 million deaths being attributable to PM_{2.5} annually (WHO, 2016). The first step towards measuring the global public health impact of air pollution is accurately monitor the ambient air pollution on a region, country, state, and city scale. This task is greatly complicated by the paucity of ground monitoring stations in many regions. Ground monitoring data therefore needs to be supplemented with information from other sources, such as satellite retrievals of aerosol optical depth, land-use information and chemical transport models. These sources of data have better coverage but will be measured at different geo-temporal locations and different resolutions. More pressingly, they will have different biases and error structures, and sophisticated modelling is required to make the most of this additional information. It is imperative that any methodology for combining information from multiple sources is able to handle data at it's native resolution with aggregation to the required resolution, for example to match to population estimates or health data, being performed within a coherent statistical framework rather than forcing data to be aggregated in order to input to the model, a trait which will often result in incorrect estimation of uncertainties. This talk will outline the methods and techniques that are required to build a realistic, flexible, and computationally feasible Bayesian model for this problem