



THE UNIVERSITY OF CHICAGO

Department of Statistics

DISSERTATION PROPOSAL PRESENTATION

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Data Science Theory and Applications in Climate Science,
Epidemics, and Public Health

THURSDAY, February 18, 2021, at 3:00 PM
ZOOM Meeting

ABSTRACT

New statistical and machine learning methods have led to important advances in image and natural language processing, genetics, digital advertising, and other fields where there is an abundance of high quality digital data and strong market incentives for automating tasks. This talk focuses on areas such as climate science and public health which have suffered in this space without the same scale of training data and private investment.

Part 1 of this talk will focus on applications in climate science, specifically prediction of precipitation at seasonal timescales, which is notoriously difficult due to complex dependence structures, nonstationarities, and lack of a reliable observational record. Part 2 of this talk will describe the development of city to multi-county scale synthetic populations for application to an agent-based model (CityCOVID) that simulates the endogenous transmission of Covid-19 and measures the impact of public health interventions. We then extend this work to empirically investigate the impacts of social determinants of health (SDOH) on Covid-19 transmission and mortality in order to better target interventions and counter social inequities in healthcare. Part 3 of this talk will focus on interpretability in machine learning through efficient computational methods of estimating variable importances.