Data Science Seminar
Hosted by Department of Mathematical Sciences

Interdisciplinary Dean's Speaker Series in Data Science

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- Date: Wednesday, October 9, 2019
- Time: 11:00am – 12:00pm
- Room: AM-189 (Admissions Center)
- Speaker: Joseph Hogan (Professor of Biostatistics, Carole and Lawrence Sirovich Professor of Public Health, Deputy director of the Data Science Initiative at Brown University)
- Title: Using Electronic Health Records Data for Predictive and Causal Inference About the HIV Care Cascade

Abstract

The HIV care cascade is a conceptual model describing essential steps in the continuum of HIV care. The cascade framework has been widely applied to define population-level metrics and milestones for monitoring and assessing strategies designed to identify new HIV cases, link individuals to care, initiate antiviral treatment and ultimately suppress viral load. Comprehensive modeling of the entire cascade is challenging because data on key stages of the cascade are sparse. Many approaches rely on simulations of assumed dynamical systems, frequently using data from disparate sources as inputs. However, growing availability of large-scale longitudinal cohorts of individuals in HIV care affords an opportunity to develop and fit coherent statistical models using single sources of data, and to use these models for both predictive and causal inferences. Using data from 90,000 individuals in HIV care in Kenya, we model progression through the cascade using a multistate transition model fitted using Bayesian Additive Regression Trees (BART), which allows considerable flexibility for the predictive component of the model. We show how to use the fitted model for predictive inference about important milestones and causal inference for comparing treatment policies. Connections to agent-based mathematical modeling are made. This is joint work with Yizhen Xu, Tao Liu, Rami Kantor and Ann Mwangi.

Hogan's research concerns development and application of statistical methods for large-scale observational data with emphasis on applications in HIV/AIDS. He is program director for the Moi-Brown Partnership for Biostatistics Training, which focuses on research capacity building at Moi University in Kenya.

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- Dean's Office of Harpur College of Arts and Sciences
- Department of Biological Sciences
- Department of Mathematical Sciences
- Department of Political Science
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- Data Science Transdisciplinary Area of Excellence
- For questions, contact Changqing Cheng or Xingye Qiao.

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