RUTGERS–NEW BRUNSWICK
School of Arts and Sciences

Department of Statistics

Department of Statistics Seminar Series

Arthur Gretton
Centre for Computational Statistics and Machine Learning
University College London

Causal Effect Estimation using Proxy Variables

Tuesday, October 6th, 2026
12:10-1:30 PM
Hill Center - 552
Light refreshments will be served in Hill Center 452 at 11:40am

Abstract:

Abstract: Estimating the true effect of an action, whether a medical intervention or a business decision, is challenging when unmeasured factors influence both the treatment and the outcome in prior observed data. In this talk, we will explore a framework that addresses this hidden confounding problem using proxy variables: observable information that provides indirect clues about the unmeasured factors. Using machine learning tools such as kernel methods and deep neural networks, we can build mathematical "bridges" between these proxies to obtain the true causal effect. I will describe both the original "outcome bridge" procedure, a more recent "treatment bridge" procedure, and a doubly robust estimator that combines the two. I will further demonstrate how the proxy approach may be used in the setting of domain adaptation, without making the classical assumptions of covariate or label shift.

Bio:

Arthur Gretton is a Professor at UCL's Gatsby Computational Neuroscience Unit, Director of the Centre for Computational Statistics and Machine Learning (CSML) at UCL, and a Research Scientist at Google DeepMind. He received his PhD in collaboration with Microsoft Research and the Signal Processing and Communications Laboratory at the University of Cambridge, and previously worked at the Max Planck Institute for Biological Cybernetics and the Machine Learning Department at Carnegie Mellon University.
Arthur served as Program Chair for AISTATS in 2016, Tutorials Chair for ICML 2018, Workshops Chair for ICML 2019, Program Chair for the DALI Workshop in 2019, and co-organiser of the 2019 Machine Learning Summer School in London. He has also served as an Associate Editor for IEEE Transactions on Pattern Analysis and Machine Intelligence, an Action Editor for the Journal of Machine Learning Research, a member of the Royal Statistical Society Research Section Committee, and an Area Chair or Senior Area Chair for ICML and NeurIPS on several occasions.