DISTINGUISHED LECTURE SERIES IN STATISTICAL SCIENCES

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Free Hybrid Event | Registration Required
Virtual & In Person (Toronto, ON)

Dr. Tchetgen Tchetgen is a graduate of Yale University and Harvard University where he received degrees in Applied Mathematics and Biostatistics respectively. After receiving his PhD in 2006, he was a Yerby Postdoctoral Fellow at Harvard University before serving on the faculty from 2008 to 2017. In 2018 Dr. Tchetgen Tchetgen was named the inaugural Luddy Family President's Distinguished Professor in the Department of Statistics at The Wharton School of the University of Pennsylvania. He remains an Adjunct Professor of Biostatistics and Epidemiologic Methods at the Harvard Chan School. Dr. Tchetgen Tchetgen has distinguished himself as one of the leading young biostatisticians and epidemiologic methodologists in the world, having made numerous influential contributions to the development and application of statistical methods for missing data, causal inference, and semiparametric regression in social, genetic and infectious disease epidemiology. In addition to his myriad of research accomplishments, Dr. Tchetgen Tchetgen is a talented and inspiring teacher and mentor who has published well over 200 papers in top statistical, epidemiological and medical journals, produced an impressive record of grant funding, and has generously and tirelessly served the statistical profession, both nationally and internationally. He is a hardworking, creative, and well-respected leader, and through his statistical talent, has dedicated his career to advancing public health. He was awarded the inaugural Rousseeuw Prize for Statistics in 2022 for his contributions to causal inference and its applications in Medicine and Public Health.

May 9 and 10, 2023 | 9th Floor, 700 University Avenue, Toronto, ON

May 9, 3:30-4:30 pm

An (un)Holy Union: Causal Inference, Semiparametric Statistics and Machine Learning in the Age of Data Science

In this talk, I discuss recent advances at the nexus of Causal Inference, Semiparametric Statistics and Machine Learning in the gilded age of modern data science, with emphasis given to sound and responsible decision-making in Public Health and Medicine. I argue with several recent developments, that important scientific progress can be made more likely by fruitful interaction between these three disciplines than without; however, such success will require constant vigilance to ensure that key foundational principles underpinning each discipline are preserved and respected. For illustration, I consider the potential utility and limitations of several recent advances emblematizing this (un) holy union, including conformal predictive causal inference, Double-debiased machine learning, Credence and the so-called Deconfounder.

May 10, 3:30-4:30 pm

Single Proxy Control

Negative control variables are sometimes used in non-experimental studies to detect the presence of confounding by hidden factors. An outcome is said to be a valid negative control outcome (NCO) or more broadly, an outcome that is a proxy for confounding to the extent that it is influenced by unobserved confounders of the exposure effects on the outcome in view, although not causally impacted by the exposure. Tchetgen Tchetgen (2014) introduced the control outcome calibration approach (COCA), as a formal NCO counterfactual method to detect and correct for residual confounding bias. For identification, COCA treats the NCO as an error-prone proxy of the treatment-free counterfactual outcome of interest, and involves regressing the NCO, on the treatment-free counterfactual, together with a rank-preserving structural model which assumes a constant individual-level causal effect. In this work, we establish nonparametric COCA identification for the average causal effect for the treated, without requiring rank-preservation, therefore accommodating unrestricted effect heterogeneity across units. This nonparametric identification result has important practical implications, as it provides single proxy confounding control, in contrast to recently proposed proximal causal inference, which relies for identification on a pair of confounding proxies. For COCA estimation we propose three separate strategies: (i) an extended propensity score approach, (ii) an outcome bridge function approach, and (iii) a doubly robust approach which is unbiased if either (i) or (ii) is unbiased. Finally, we illustrate the proposed methods in an application evaluating the causal impact of a Zika virus outbreak on birth rate in Brazil.

For more information, please visit:
https://canssiontario.utoronto.ca/event/2023-dlss-eric-tchetgen-tchetgen/

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