**The Hong Kong Polytechnic University**
**Department of Applied Mathematics**

**Seminar**

# Causal inference on distribution functions

**By**

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**National University of Singapore**

**Abstract**

Understanding causal relationships is one of the most important goals of modern science. So far, the causal inference literature has focused almost exclusively on outcomes coming from the Euclidean space R^p. However, it is increasingly common that complex datasets are best summarized as data points in nonlinear spaces. In this paper, we present a novel framework of causal effects for outcomes from the Wasserstein space of cumulative distribution functions, which in contrast to the Euclidean space, is nonlinear. We develop doubly robust estimators and associated asymptotic theory for these causal effects. As an illustration, we use our framework to quantify the causal effect of marriage on physical activity patterns using wearable device data collected through the National Health and Nutrition Examination Survey.

**Biography**

Zhenhua Lin is currently Presidential Young Professor in the Department of Statistics and Data Science, National University of Singapore. Prior to this he was a postdoctoral fellow in UC Davis and received his Ph.D. degree in statistics from University of Toronto. His research primarily focuses on non-Euclidean/high-dimensional/functional data analysis and statistics under non-statistical constraints, with papers published in various statistical journals including Journal of the Royal Statistical Society: Series B, The Annals of Statistics, Journal of the American Statistical Association, Biometrika, Biometrics and Journal of Computational and Graphical Statistics. He serves as an associate editor in the editorial board of Bernoulli Journal.

**Date: 23 August 2023 (Wednesday)**
**Time: 15:00-16:00 (Hong Kong Standard Time GMT +8)**
**Venue: FJ304 (Hybrid mode)**
**Meeting ID: 939 3973 6668 (Passcode: 0823)**
**Speaker: Prof. Zhenhua Lin, National University of Singapore**
**Host: Dr. Ruijian Han, The Hong Kong Polytechnic University**
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