

The Hong Kong University of Science and Technology

Seminar on Business Data Science

Department of ISOM

**Estimating the Wasserstein barycenter of
one-dimensional distributions under sparse sampling**

by

**Professor Linbo WANG
University of Toronto**

Date: 24 July 2026 (Friday)

Time: 3:00pm – 4:00pm

Venue: Room 4047 (LSK Business Building)

Abstract

Distributional data arise when each observational unit is represented by a probability distribution rather than a scalar or vector. For one-dimensional distributions, a natural notion of central tendency is the Wasserstein barycenter, whose quantile function is the pointwise average of the unit-level quantile functions. In many applications, however, each unit-level distribution is observed only through a small sample, and the empirical Wasserstein barycenter can be severely biased under such sparse sampling. In this talk, I will discuss a marginal-constructed barycenter estimator that avoids directly estimating either the full unit-level distributions or the population law of distributions. The method uses binomial mixture ideas to estimate the distribution of latent unit-level quantiles, and then averages this estimated distribution to recover the barycenter quantile function. I will describe its theoretical properties and illustrate the approach using HIV-1 sequence data from the HVTN 502/503 vaccine efficacy trials.

Bio

Linbo Wang is Canada Research Chair in Causal Machine Learning and an associate professor in the Department of Statistical Sciences and the Department of Computer and Mathematical Sciences at the University of Toronto. He is also a faculty affiliate at the Vector Institute and holds affiliate positions in the Department of Statistics at the University of Washington and the Department of Computer Science at the University of Toronto. His research focuses on causality and its interaction with statistics and machine learning.

All interested are welcome!

For details, please contact ISOM Department.