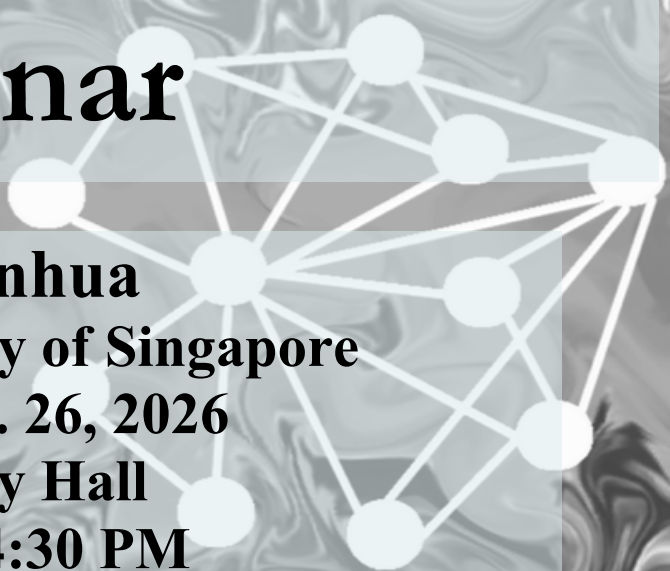


ACMS Statistics Seminar



Lin Zhenhua
National University of Singapore
Monday, Oct. 26, 2026
154 Hurley Hall
3:30 PM – 4:30 PM

Learning-Assisted Inference in High Dimensions: Wasserstein Two-Sample Testing

Two-sample testing is a fundamental problem in statistics, but detecting general distributional differences becomes increasingly challenging in high dimensions, where classical distance-based methods can suffer severely from the curse of dimensionality. In this talk, I will discuss a sequence of approaches that combine optimal transport, dimension reduction, and statistical learning to address this problem. I will first introduce a test based on the max-sliced Wasserstein distance, which searches over low-dimensional projections to identify informative directions along which two distributions differ, while permitting statistically valid calibration and inference. I will then consider a more flexible learning-assisted approach in which both projection directions and nonlinear witness functions are learned from the data using optimization and neural networks, allowing the procedure to adapt to richer forms of distributional discrepancy. By combining flexible representation learning with sample splitting and Gaussian approximation, the resulting tests retain rigorous statistical guarantees while avoiding prohibitively expensive repeated resampling. These developments illustrate a broader theme: modern machine-learning tools can be used to discover informative structure in high-dimensional data, while classical statistical principles provide valid and interpretable inference.

The Department of Applied and Computational
Mathematics and Statistics
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