Indiana University Indianapolis
Department of Mathematical Sciences

STATISTICS SEMINAR

12:15pm—1:15pm, Tuesday, March 25, 2025
Zoom Meeting: Meeting ID: 845 0989 4694

Speaker: **Yizhou (Jake) Cai**
Department of Statistics,
University of South Carolina

Title: **Maximum Ideal Likelihood Estimator: A Unified Estimation and Inference Framework for Latent Variable Models**

Abstract:

To model complex dependence and capture the essence of data, latent variable models are widely used in various applications, such as spatial and spatiotemporal models and causal inference. Existing literature focuses on approximating the likelihood or the posterior (of subsets) for inference and prediction to overcome computational challenges due to latency. However, tuning parameters and some technical conditions, such as finite conditional expectations and well-behaved objective functions, are usually involved. In this talk, a unified and flexible framework, Maximum Ideal Likelihood Estimators (MILE), is introduced for general parametric models with latent variables and missing values. Through parameterizing the latent variables, MILE focuses on the joint distribution estimates parameters and latent variables simultaneously based on optimization techniques and algorithms. MILE enjoys theoretical guarantees and remains valid even when traditional methods are not applicable, e.g., the non-finite conditional expectation of the marginal likelihood function. The empirical performance of MILE is illustrated by simulation studies and a real data analysis. Potential applications of MILE will also be discussed.

Bio:
Mr. Yizhou Cai is currently a PhD Candidate of Department of Statistics at the University of South Carolina. He earned a Master in Financial Insurance from University of Toronto, a M.Sc. in Financial Modelling from Western University, and a B.S. in Mathematics and Applied Mathematics from Shanghai Jiaotong University. His research interest is methodology design and framework development under complex dependence. In particular, he works on interdisciplinary statistical application projects of finance, public health, geography, communication and etc.