Indiana University-Purdue University Indianapolis
Department of Mathematical Sciences

STATISTICS SEMINAR

12:15pm—1:15pm, Tuesday, March 26, 2024
Zoom Meeting: Meeting ID: 845 0989 4694

Speaker: **Daren Wang**
Department of ACMS at the University of Notre Dame

Title: **Nonparametric   Estimation   via   Variance-Reduced Sketching**

Abstract:

Nonparametric models are of great interest in various scientific and engineering disciplines. Classical kernel methods, while numerically robust and statistically sound in low-dimensional settings, become inadequate in higher-dimensional settings due to the curse of dimensionality. In this talk, we will introduce a new framework called Variance-Reduced Sketching (VRS), specifically designed to estimate density functions and nonparametric regression functions in higher dimensions with a reduced curse of dimensionality. Our framework conceptualizes multivariable functions as infinite-size matrices, facilitating a new matrix-based bias-variance tradeoff in various nonparametric models. We will demonstrate the robust numerical performance of VRS through a series of simulated experiments and real-world data applications. Notably, VRS shows remarkable improvement over existing neural network estimators and classical kernel methods in numerous density estimation and nonparametric regression models. Additionally, we will discuss theoretical guarantees for VRS to support its ability to deliver nonparametric estimation with a reduced curse of dimensionality.

Bio:
Dr. Daren Wang is an Assistant Professor of Statistics in the Department of ACMS at the University of Notre Dame. From 2018 to 2021, he was a Postdoc in the Department of Statistics at the University of Chicago. Before that, he completed his Ph.D. in statistics at Carnegie Mellon University in 2018. His research interests lie in high-dimensional nonparametric statistics, change point detection, and time series analysis.