

Indiana University Indianapolis

Department of Mathematical Sciences

STATISTICS SEMINAR

12:15pm—1:15pm, Tuesday, December 10, 2024
Zoom Meeting: Meeting ID: 845 0989 4694

Speaker: Changbo Zhu

*Department of Applied and Computational Mathematics and Statistics,
University of Notre Dame*

Title: Distance-based Tests for Sparse Functional Data

Abstract:

With the advance of science and technology, more and more data are collected in the form of functions. A fundamental question for a pair of random functions is to test whether they are independent. This problem becomes quite challenging when the random trajectories are sampled irregularly and sparsely for each subject. In other words, each random function is only sampled at a few time-points, and these time-points vary with subjects. Furthermore, the observed data may contain noise. To the best of our knowledge, there exists no consistent test in the literature to test the independence of sparsely observed functional data. We show in this work that testing pointwise independence simultaneously is feasible. The test statistics are constructed by integrating pointwise distance covariances (Székely et al., 2007) and are shown to converge, at a certain rate, to their corresponding population counterparts, which characterize the simultaneous pointwise independence of two random functions. The performance of the proposed methods is further verified by Monte Carlo simulations and analysis of real data.

Bio:

Dr. Changbo Zhu joined the Department of Applied and Computational Mathematics and Statistics as an assistant professor in 2022. Previously, he spent two years working as a postdoctoral scholar at University of California, Davis. Dr. Zhu earned his Ph.D. from University of Illinois at Urbana-Champaign, and completed his master's and bachelor's degrees both from National University of Singapore. He is interested in solving complex data science problems when data are dependent and naturally lying in some nonlinear spaces. Applications of his research include brain imaging analysis, longitudinal studies and econometrics.