



Department of Mathematical Sciences welcomes

Lily Wang Iowa State University

Statistical Modeling and Inference for Next-Generation Functional Data Analysis

ABSTRACT:

With the rapid growth of modern technology, many large-scale imaging studies have been or are being conducted to collect massive datasets with large volumes of imaging data, thus boosting the investigation of “next-generation functional data.” These enormous collections of imaging data contain interesting information and valuable knowledge, which has raised the demand for further advancement in functional data analysis. In this talk, we mainly focus on modeling and inference of the next-generation functional data. We propose to use flexible multivariate splines over triangulation or tetrahedral partitions to handle irregular domain of the images that is common in brain imaging studies and in other biomedical imaging applications. The proposed spline estimators are shown to be consistent and asymptotically normal under some regularity conditions. We also provide a computationally efficient estimator of the covariance function and derive its uniform consistency. Finally, we discuss the inferential capabilities of the proposed method. To be more specific, we develop simultaneous confidence corridors for the mean of the next-generation functional data. The procedure is also extended to the two-sample case in which we focus on comparing the mean functions of random samples drawn from two population. The proposed method is applied to analyze brain Positron Emission Tomography (PET) data of Alzheimer’s disease.

ABOUT THE SPEAKER:

Lily Wang is tenured Associate Professor at Iowa State University since 2014, and was tenure-track Assistant/tenured Associate Professor at the University of Georgia 2007-13/13-14, after receiving her PhD in Statistics from Michigan State University in 2007. She is an Elected Member of the International Statistical Institute, and was recipient of Senior Research Fellowship from American Statistical Association/National Science Foundation/Bureau of Labor Statistics in 2010. Dr. Wang’s primary areas of research include flexible non/semi-parametric methods, statistical learning of large datasets with complex features, high dimensional data analysis, methodologies for functional data, spatial data analysis and survey sampling. Her work has been published in several major statistical journals such as Journal of the American Statistical Association, the Annals of Statistics, the Annals of Applied Statistics and Biometrics.

October 18, 2019

Hosted by:
Prof. Honglang Wang

Tea begins at 3:00
in LD 259

Research Topic
begins at 3:30
in LD 229

