Indiana University-Purdue University Indianapolis

Department of Mathematical Sciences

STATISTICS SEMINAR

12:15pm—1:15pm, Tuesday, February 15, 2022
Zoom Meeting: Meeting ID: 845 0989 4694

Speaker: **Jie Ren**
Department of Biostatistics and Health Data Science,
Indiana University School of Medicine

Title: **Bayesian Variable Selection for Gene-Environment Interactions**

Abstract:

Gene-environment (GxE) interactions have important implications to elucidate the etiology of complex diseases beyond the main genetic and environmental effects. In the joint analysis of a large number of main and interaction effects, identification of important effects that are associated with the disease phenotype amounts to a variable selection problem. In this talk, we will introduce two powerful variable selection methods for GxE interaction studies within the Bayesian framework. In the first part, we propose a novel semi-parametric Bayesian variable selection model for investigating linear and nonlinear GxE interactions simultaneously. In the second part, we present a robust Bayesian variable selection method that can effectively accommodate heavy-tailed errors and outliers in the response variable while conducting variable selection by accounting for structural sparsity. Extensive simulation studies demonstrate the superior performance of the proposed methods over multiple competing alternatives. In the case studies, the proposed Bayesian methods lead to the identification of effects with important implications in high-throughput profiling studies.

Bio:
Dr. Jie Ren is an Assistant Professor in the Department of Biostatistics and Health Data Science at Indiana University School of Medicine. She received her PhD in Statistics from Kansas State University in 2020. Dr. Rens research interests include high-dimensional data analysis, Bayesian sparse learning, robust variable selection, integrative analysis of omics data, statistical genetics and bioinformatics.