Indiana University-Purdue University Indianapolis

Department of Mathematical Sciences

STATISTICS SEMINAR

12:15pm—1:15pm, Tuesday, March 29, 2022
Zoom Meeting: Meeting ID: 845 0989 4694

Speaker: **Li Chen**
Department of Biostatistics and Health Data Science,
Indiana University School of Medicine

Title: **Deep learning approaches for analyzing noncoding genetic variants by integrating genotype data and multi-omics data**

Abstract:

Genome-Wide Association Studies and Quantitative Trait Locus analysis have successfully identified variants associated with traits or molecular phenotypes. However, most of them are in the noncoding regions. Due to the linkage disequilibrium and limited sample size, the identification and interpretation of causal variants is particularly challenging. Moreover, most of these discoveries are common variants, rare and individual-specific variants in personal genome are underexplored. Understanding these variants will not only explain the missing heritability from GWAS but also improve the precision medicine. To address these challenges, I will first introduce a multi-modal deep learning framework, which leverages the paired whole genome sequencing data and functional assays, to evaluate functional effect of noncoding variants based on allelic alteration of epigenetic and transcriptomic signals in a personal genome. Second, I will introduce another multi-modal deep transfer learning model to evaluate the functional impact of noncoding variants on promoter-promoter and promoter-enhancer interactions by taking the advantage of Capture Hi-C data. Third, I will introduce a novel deep transfer learning for improving the prediction for noncoding causal variants by utilizing few but experimentally validated functional variants.

Bio:
Dr. Li Chen is assistant Professor of Biostatistics and a member in Center for Computational Biology and Bioinformatics at Indiana University School of Medicine. He received a MS in Biostatistics and another MS in Computer Science from the Johns Hopkins University in 2011, and PhD in Computer Science and Informatics from Emory University

in 2017. Dr. Chen's research interests focus on developing statistical and informatics methods for analyzing of multi-omics data, including epigenomics, genetics, metagenomics, single-cell genomics and transcriptomics.