Indiana University-Purdue University Indianapolis
Department of Mathematical Sciences

Statistics Seminar

10:30am—11:30am, Friday, October 16, 2020
Zoom Meeting: Meeting ID: 751 025 519

Speaker: Ruizhi Zhang
Department of Statistics, University of Nebraska-Lincoln

Title: Adaptive Change-Point Detection of the Ising model and Non-Convex M-estimation

Abstract:

In the first part of my talk, I will talk about change-point detection of the Ising model. The Ising model is usually used for capturing the dependency structure among random variables. It has many interesting real-world applications in the fields of medical imaging, genetics, disease surveillance, etc. Nonetheless, literature on the online change-point detection of the interaction parameter in the model is rather limited. This might be attributed to following two challenges: 1) the exact evaluation of the likelihood function with the given data is computationally infeasible due to the presence of partition function and 2) the post-change parameter usually is unknown. We overcome these two challenges via our proposed adaptive pseudo-CUSUM procedure, which incorporates the notion of pseudo-likelihood function under the CUSUM framework.

In the second part of my talk, I will talk about non-convex M estimation. Specifically, we investigate two important properties of M-estimator, namely, robustness and tractability, in linear regression setting, when the observations are contaminated by some arbitrary outliers. By learning the landscape of the empirical risk, we show that under some sufficient conditions, many M-estimators enjoy nice robustness and tractability properties simultaneously, when the percentage of outliers is small.

Bio:
Ruizhi Zhang is an Assistant Professor in the Department of Statistics at University of Nebraska-Lincoln. He received his B.S. degree in Mathematics from Hua Loo-Keng Talent Program in Mathematics at University of Science and Technology of China (USTC) in 2014, graduated with honors. He received his Ph.D. degree in Statistics in

the School of Industrial and Systems Engineering at Georgia Institute of Technology. His research interests include change-point detection, sequential analysis, robust statistics, high-dimensional statistical inference, functional data analysis, etc.