Michigan State University  
Department of Statistics and Probability  

**Colloquium**  

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University of Pennsylvania  

Some Statistical Analyses on Polygenic Risk Scores: Applications of Random Matrix Theory in Human Genetics  

Tuesday, November 15, 2022  
10:20 AM - 11:10 AM Eastern Time  
C405 Wells Hall, Simulcast on Zoom  

**Abstract**  
Numerous statistical models have been proposed for genetic prediction using high-dimensional data from genome-wide association studies. The relative performance of these methods varies with the dataset characteristics and underlying genetic architecture of the targeted traits/diseases. Motivated by empirical observations, we present a series of analyses on genetic prediction methods in a high-dimensional sparsity-free setting, where we are allowed to have few to many true signals. In particular, I will present our analyses of two statistical problems. In the first project, we quantify the asymptotic bias when estimating genetic relationships with other traits based on polygenic risk scores (Zhao, Yang, and Zhu, 2022, arXiv). The second project is to understand the impact of reference panels on genetic prediction accuracy (Zhao, Zheng, and Zhu, 2022, arXiv). These analyses are based on recent advances in random matrix theory.  

**Bio**  
Bingxin Zhao is an assistant professor in the Wharton Statistics and Data Science Department at the University of Pennsylvania. He received his Ph.D. in Biostatistics from the University of North Carolina at Chapel Hill in 2020. Prior to joining UPenn, he was an assistant professor in the Department of Statistics at Purdue University from 2020 to 2022. He is interested in statistical methods & applications to big data, high-dimensional statistics, biomedical & biological data science, environmental data science, and social data science. For more information about Bingxin Zhao, please visit: [https://bingxinzhao.com](https://bingxinzhao.com)  

Zoom details can be found at: [https://stt.natsci.msu.edu/stt-colloquium-zoom-info/](https://stt.natsci.msu.edu/stt-colloquium-zoom-info/)  

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