

**The Hong Kong Polytechnic University
Department of Applied Mathematics**

Seminar Series on Young Scholars in Optimization and Data Science

Learning One-Dimensional Geometry in Random Graphs

By

**Dr. Cheng MAO
Georgia Institute of Technology**

Abstract

Geometric structures appear frequently in real-world networks, and many random graph models have been developed to incorporate latent geometries. In this talk, I will mainly discuss a random graph with a planted dense cycle of a small bandwidth, which is a variant of the Watts-Strogatz small-world model. For this random graph model with one-dimensional geometry, we characterize the information-theoretic and computational thresholds for the detection and recovery problems. In particular, a statistical-to-computational gap exists between the thresholds achieved by exponential-time algorithms and efficient algorithms based on small subgraph counts. Moreover, a detection-to-recovery gap exists between the threshold for testing the existence of the planted cycle and that for estimating the location of the cycle.

Biography

Dr. Cheng Mao is an Assistant Professor in the School of Mathematics at Georgia Tech. His research interests include mathematical statistics, machine learning theory, and applied probability. Recently, he has been working on statistical inference of combinatorial structures in data. Before joining Georgia Tech, he was a postdoctoral researcher at Yale University from 2018 to 2019. He obtained his Ph.D. degree in Mathematics and Statistics from MIT in 2018, and B.S. and M.A. degrees in Mathematics from UCLA in 2013.

Date: 10 November 2023 (Friday)

Time: 10:00-11:00 (Hong Kong Standard Time GMT +8)

Venue: Online Talk via Zoom (Meeting ID: 920 9066 3066; Passcode: 1110)

Speaker: Dr. Cheng Mao, Georgia Institute of Technology

Host: Dr. Ruijian Han, The Hong Kong Polytechnic University

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