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**THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY**

**Department of Mathematics**

# SEMINAR ON STATISTICS

# Graphical regression with covariates in high Dimensions

**By**


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**Abstract**

While covariance matrices have been widely studied in many scientific fields, relatively limited progress has been made on estimating conditional covariances that permits a large covariance matrix to vary with high-dimensional subject-level covariates. In this talk, we present a new sparse covariance regression framework that models the covariance matrix as a function of subject-level covariates. In the context of co-expression quantitative trait locus (QTL) studies, our method can be used to determine if and how gene co-expressions vary with genetic variations. We approach parameter estimation with a coordinate descent algorithm and investigate the $\ell_1$ and $\ell_2$ convergence rate of the estimated parameters. In addition, we propose a computationally efficient debiased inference procedure for uncertainty quantification. The utility of the proposed method is demonstrated through an application to a gene co-expression network study with brain cancer patients.


**Date : 11 December 2025 (Thursday)**

**Time : 11:00a.m.-12:00noon**

**Venue : Room 1409 (near Lift 25/26)**

*All are welcome!*