



### Normal Approximation for $U$ -Statistics with Cross-Sectional Dependence

by

Mr. Weiguang LIU  
University of Cambridge

**Date** : Thursday, 16 February 2023  
**Time** : 10:30 am - 11:45 am  
**Venue** : ISOM Conference Room, LSK 4047



#### Abstract:

We apply Stein's method to study the normal approximation for  $U$ -statistics of crosssectionally dependent underlying processes in the Wasserstein metric. We show that Central Limit Theorems hold for non-degenerate and degenerate  $U$ -statistics with rates dependent upon the mixing rates and sparsity of the cross-sectional dependence, and moments of the kernel functions. Simulation results with several models of cross-sectional dependence verify our theory. The theory of degenerate  $U$ -statistics is then used to extend the classical Fama-Macbeth regression test for asset pricing models to the nonparametric settings.

#### Bio:

Weiguang Liu is a PhD candidate at the University of Cambridge, UK, supervised by Prof Oliver Linton. His research focuses on econometric theory and empirical finance, in particular, the development of theories for financial data that display complex dependence structure and high dimensionality. He obtained a MPhil degree with distinction from the University of Cambridge and bachelor degree in economics with distinction and a minor in math from Peking University."