

# High Dimensional Dynamic Covariance Matrices with Homogeneous Structure

Date: 13 October 2021 (Wednesday)

Time: 10:00am - 11:00am

Seminar link: <https://cityu.zoom.us/j/97173120340>



## ABSTRACT

High dimensional covariance matrices appear in many disciplines. Much literature has devoted to the research in high dimensional covariance matrices. However, most research is about constant covariance matrices, and constant covariance matrices are not sufficient in application, e.g. in portfolio allocation, dynamic covariance matrices would be more appropriate.

There are two difficulties with the introduction of dynamic structures into covariance matrices: (1) simply assuming each entry of a covariance matrix is a function of time to introduce the dynamic needed would not work; (2) there is a risk of having too many unknowns to estimate due to the high dimensionality.

In this talk, we propose a dynamic structure embedded with a homogeneous structure. We will demonstrate the proposed dynamic structure makes more sense in application and avoids, in the meantime, too many unknown parameters/functions to estimate, due to the embedded homogeneous structure.

An estimation procedure is also proposed to estimate the proposed high dimensional dynamic covariance matrices, and asymptotic properties are established to justify the proposed estimation procedure. Intensive simulation studies show the proposed estimation procedure works very well when the sample size is finite. Finally, we apply the proposed high dimensional dynamic covariance matrices to portfolio allocation. It is interesting to see the resulting portfolio allocation yields much better returns than some commonly used ones.



## Prof Wenyang ZHANG GUEST SPEAKER'S PROFILE

Prof Wenyang Zhang is a Chair in Statistics, at University of York, UK. He is an expert in high dimensional/Big data analysis, financial data analysis, nonparametric modelling, nonlinear time series, survival analysis, functional data analysis, spatial data analysis, multi-level modelling, structural equation models. He was a member of Research Section Committee of the Royal Statistical Society, UK. He served for Journal of the American Statistical Association as an associate editor from 2008 to 2017. He is now an associate editor of Journal of Business & Economic Statistics.

Prof Zhang has published many high quality papers in top statistics journals with quite a few papers being highly cited. One of his papers has been cited more than 2850 times, with another one cited more than 780 times.