Speakers: Henry Elsom and Sinyoung Park (University of Bath)

Date: 26/11/2024 at 13:15 in 1 West 3.107

Talk 1: Development of changepoint detection algorithms for extreme values

Abstract:
A large proportion of changepoint detection research has traditionally focused on identifying changes in the mean of a dataset. However, this approach often falls short when applied to financial data, where changes in variance and tail behavior can have significant implications for risk management. For instance, abrupt shifts in volatility or extreme value patterns may signal underlying market shifts, making it crucial to adapt detection algorithms to these features. This talk will examine existing changepoint detection methods when applied to heavy-tailed data, highlighting their performance in detecting shifts in variance and tail behavior. Building on these insights, we will demonstrate how principles from extreme value theory can be integrated into an existing detection algorithm (ED-PELT) to enhance its robustness. Preliminary results will be presented, showcasing the potential of this adapted method to uncover significant changes in financial time series with greater accuracy and reliability.

Talk 2: New directions in community detection for networks

Abstract:
Spectral clustering has been used widely as a popular tool for community detection in data with network structure. However, spectral clustering does not perform well on certain network structures, particularly core-periphery networks. To improve clustering performance in core-periphery structures, Adjacency spectral embedding (ASE) has been introduced. Despite its advantages, ASE has several limitations including its optimal performance only on dense networks and issues with consistency. To address these limitations, we proposed a new approach called Doubled adjacency spectral embedding (DASE). We demonstrate that DASE overcomes these challenges, particularly highlighting the improved clustering performance on both sparse and dense networks, as well as its computational efficiency.