



Probability Seminar

Title: Ranking Time Series Analysis

Speaker: Wagner Barreto-Souza (UCD)

Date: Mon 2nd March 2026 at 3:00PM

Location: E0.32 (beside Pi restaurant)

Abstract: Ranking data are frequently observed nowadays, but there are still scarce methods for treating these data when temporally observed. We introduce a class of time-varying ranking models inspired by the Generalised AutoRegressive Conditional Heteroskedasticity (GARCh) models. More specifically, the temporal dynamics are defined by the conditional distribution of the current ranking given the past rankings, which are assumed to follow a Mallows distribution, which implicitly depends on a distance. Then, autoregressive and feedback components are incorporated into the model through the conditional expectation of the associated distances. Theoretical properties of our ranking GARCh models are established, and the estimation of parameters is performed via maximum likelihood estimation when the data are fully observed. We develop a Monte Carlo Expectation-Maximisation algorithm to deal with cases involving missing data. Monte Carlo simulation studies are presented to study the performance of the proposed estimators under both non-missing and missing data scenarios. A real data application about the weekly ranking of professional tennis players from 2015 to 2019 is presented under our proposed ranking GARCh models. Joint work with Luiza Piancastelli (UCD).