Name: Dr. Luiza Piancastelli (UCD)
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Title: Recent Advances in Statistical Models for Rankings
Abstract:

This talk introduces distance-based probabilistic models for rankings and goes over two recent advancements in this area. Ranking data refers to information that has been arranged in a specific order and is increasingly abundant. Market research, elections, sports and recommendation systems are some examples. However, rankings require special attention due to their specific multivariate and relative nature.

In the first part of the talk, we deal with a problem called ranking aggregation. In this scenario, preferences from multiple evaluators are observed and the goal is to summarise their opinions. The Mallows model (Mallows, 1957) is one of the most famous approaches for this, summarising the preferences in terms of a modal permutation. But what if the judge body is not decisive about all ranking positions? For example, there might be strong evidence of which are the best and worst options, but less so on the middle ranks. The Clustered Mallows Model (CMM, Piancastelli and Friel 2025) is an extension that accommodates indifferences in the consensus by clustering options. This is done via tied rankings, effectively replacing a modal permutation by ordered groups.

In the second part of the talk, our focus is on rankings that change in time. Motivated by the weekly rankings of tennis players we ask: how can we model ranking dynamics and carry out predictions? To this aim, we propose the R-GARCH model (Piancastelli and Barreto-Souza, ArXiv) that combines the Mallows distribution with a autoregressive-moving average type structure. Model strengths include an elegant mathematical formulation, clear conditions for stationarity and ergodicity, easy parameter interpretation, and a solid strategy for handling incomplete data.