



## Working Group on Statistical Learning Seminar

**Title:** Scale-closed two-parameter positive exponential families and mis-specification of solvency capital requirements

**Speaker:** Andrew Smith (UCD)

**Date:** Thu 3rd October 2024 at 3:00PM

**Location:** E0.32 (beside Pi restaurant)

**Abstract:** Mis-specification occurs when a set of fitting probability distributions considered by a Statistician does not contain the reference distribution whence Nature generated the data. The consequences of mis-specification are particularly acute in solvency applications, where a fitted distribution is an extrapolation tool, from a small number of data points to a 1-in-200 event. By law, financial firms must hold sufficient capital to survive such events. This talk analyses mis-specification error using a min-max approach. A Statistician and Nature each choose, independently, a scale-closed exponential family of distributions. The Statistician seeks to minimise the worst-case expected mis-specification error in capital requirements. Our conclusion is that the Statistician should choose a fitting family in the centre of Nature's list of permitted reference families. For estimating high quantiles, Pearson's method-of-moments is more effective than maximum likelihood for mitigating mis-specification errors.