Speaker: Euan McGonigle (University of Bristol)

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Title: Nonparametric Change Point Detection for Multivariate Time Series

Abstract:
In time series analysis, many data sets of practical interest contain abrupt changes in structure, such as the mean level or serial dependence. Nonparametric change point detection is a flexible approach which aims to find general distributional changes in the data. In this talk, we propose a method for nonparametric detection of multiple change points in serially dependent multivariate time series. We define a notion of distributional change using joint characteristic functions of the time series and its lagged values. This is used in combination with a moving sum-type procedure to identify multiple change points by finding local maximisers of a test statistic calculated in a rolling fashion over the data. This enables the detection of changes in both the marginal and pairwise joint distributions of the time series. We examine the theoretical properties of the procedure and illustrate the flexibility of the method by applying it to a data example from neuroscience.