Title: Identifying Boundaries in Spatial Modelling

Abstract:
Disease mapping is the field of spatial epidemiology interested in characterising how disease risk varies across different geographical regions. A key aim is to identify regions which exhibit significantly elevated disease risk levels, thus allowing public health interventions to be focused on these areas. Bayesian models utilising a Conditional Auto-Regressive (CAR) structure are typically used in these settings. These models usually assume a spatially smooth risk surface across the entire region, but this is not necessarily realistic in practice. Using a case study of respiratory hospital admissions in Glasgow, Scotland, a city with many localised inequalities, I will present two alternative approaches which use clustering techniques to allow for discontinuities in the spatial structure. One of these approaches utilised Integrated Nested Laplace Approximation (INLA), and I will touch on its use as a computationally efficient tool for approximate Bayesian inference.