Ecological applications of spatial point process theory – examples of spatial complexity

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To gain an understanding of the anthropogenic impact on ecosystem functioning associated with threats to biodiversity, ecologists are becoming increasingly interested in understanding community dynamics and species coexistence. Since most ecological processes take place in a spatial context and individuals interact primarily with their spatial neighbours, recent ecological theory frequently discusses spatial population dynamics from the individuals' perspective.

Spatial point process processes model the spatial patterns formed by the spatial locations of individuals along with their properties. They may be used to provide answers to concrete ecological questions related to the increasing numbers of spatially explicit data sets of ecological communities that have recently become available. However, spatial point process methods, in particular spatial point process models, have only rarely been used for this purpose,since the relevant point pattern data sets are highly complex.

This talk discusses several applications of spatial point processes to complex ecological data sets. This includes Bayesian approaches to the fitting of models with temporarily varying effects and to model selection as well as measures of spatial biodiversity based on graph theory.

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