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The R package stelfi for fitting self-exciting spatiotemporal point process models

Events cluster in time and space: bees swarm, whales click, spores disperse infecting trees. Temporal and spatial proximity are major factors in the chain reaction of events Yet, the nature of how and why these patterns of events propagate is much more complex. In this talk, I will present my R package stelfi, which fits a number of spatiotemporal point process models that include self-exciting mechanisms.

A range of models for spatial, temporal, and spatiotemporal point pattern data are implemented in the package. All models are fitted using automatic differentiation via the R package TMB [1]. This talk will cover the implementation of stelfi models and illustrate their use with real-world examples. To date, the development of spatiotemporal self-exciting point process models has been restricted to the fields of seismology and criminology, where a process is developed for a specific application. This talk will illustrate how such models can be used to model self-exciting mechanisms inherent in many environmental and ecological settings.