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**Cluster reconstruction and parameter estimation for Neyman-Scott point processes**

*Joint work with Yongtao Guan*

We consider the class of Neyman-Scott point processes. Such a process can be constructed in two steps: first, a Poisson point process of *parent points* is specified, and second, each parent point produces a random number of *daughter points* scattered independently around it. Only the daughter points are then observed.

If we condition on the number and positions of the parent points as well as the total number of the daughter points, the positions of the daughter points follow a finite mixture model. Hence, one can use the traditional methods such as the Expectation-Maximization algorithm to identify the clusters and estimate the mixture model parameters.

This approach has some rather interesting benefits, e.g. it does not rely on a stationarity or second-order intensity reweighted stationarity assumption and it can be used for Neyman-Scott process models with inhomogeneous parent population. However, the approach has also some important limitations such as cluster overlapping causing negative bias of the estimates of the cluster scale.

In this contribution we will discuss further details and provide examples in which situations this approach can find its use and in which situations it should be avoided.