

## A Bayesian nonparametric framework for batch-mark models with losses on capture and cases of intractable likelihood functions.

Batch-marking is an efficient way for monitoring wildlife populations when individual marking is not feasible. Typically, in batch-mark experiments, all individuals caught for the first time on a sampling occasion are given the same mark, so that the data include information on how many individuals from each “batch” are recaptured on each subsequent sampling occasion but not on how many times each individual has been recaptured. There has been an increased interest in recent years in batch-mark experiments because of new technologies that enable marking of different species.

In this talk, I will describe the formulation of batch-mark models within a Bayesian non-parametric framework, and in particular one that employs the Polya Tree (PT) prior. We show that our PT framework provides an efficient way of inference in batch-mark experiments and we demonstrate the ease with which we can incorporate additional information, such as losses on capture, in the model within our framework.

Finally, we consider an ABC-based approach with our PT framework for more complicated cases, which lead to intractable likelihood functions, such as when not all caught individuals are marked before being released into the population or when all “batches” are given the same mark. We demonstrate our new framework using real and simulated data.