

Eva Löcherbach

Probabilistic models for networks of spiking neurons

We will discuss a class of recently introduced models proposing to describe networks of neurons as stochastic processes with memory of variable length. These are non- Markovian processes in high or infinite dimension in which the past dependence of transition probabilities or intensities has a range that is finite but depends on the particular history. Starting from existence results, we will briefly study related mean-field models in continuous time and their large population limits. We will also discuss the relation with associated Piecewise Deterministic Markov Processes (PDMP's) and state results concerning their longtime behavior. Finally, we will touch an important problem of statistical inference in such models : the estimation of the of the neuronal interaction graph.

My lectures will be based on joint work with Antonio Galves, Aline Duarte and Guilherme Ost.