

Title: Interacting Particle System Strategies to Sampling from Unnormalised Probability Distributions

Abstract: Bayesian inference problems require sampling or approximating high-dimensional probability distributions. The focus of this talk is on the recently introduced Stein variational gradient descent methodology, a class of algorithms that rely on iterated steepest descent steps with respect to a reproducing kernel Hilbert space norm. This construction leads to interacting particle systems, the mean-field limit of which is a gradient flow on the space of probability distributions equipped with a certain geometrical structure. This viewpoint is leveraged to shed some light on the convergence properties of the algorithm, in particular addressing the problem of choosing a suitable kernel function. In the last part of the talk, I will discuss some new work where similar analysis is applied to a wider class of ensemble particle-based methods to analyse their performance and robustness under noisy likelihoods. Related work can be found here:

<https://arxiv.org/abs/1912.00894>

<https://arxiv.org/abs/2104.03384>