

The Stein geometry in machine learning: gradient flows, large deviations and convergence properties

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Sampling or approximating high-dimensional probability distributions is a key challenge in computational statistics and machine learning. This talk will present connections to gradient flow PDEs and interacting particle systems, focusing on the recently introduced Stein variational gradient descent methodology. The construction induces a novel geometrical structure on the set of probability distributions related to a positive definite kernel function. We discuss the corresponding geodesic equations as well as large deviation functionals and leverage those to shed some light on the convergence properties of the algorithm. This is joint work with A. Duncan (Imperial College London), L. Szpruch (University of Edinburgh) and M. Renger (Weierstrass Institute Berlin).