

*Lyapunov functions, convergence to equilibrium and applications to sampling and optimization*

Abstract: Lyapunov functions play a central role in examining the stability of (stochastic) dynamical systems. In this talk we will study the properties of Lyapunov functions connected to some (stochastic) differential equations which are central to construction of optimization and sampling algorithms. In particular, using a control theoretical formulation of these equations, we will utilise a set of linear matrix inequalities (applicable in the case of strongly convex potentials) which allow us to deduce their long-time properties as well as deducing the behaviour of a number of popular optimization and sampling algorithms.