A key problem raised by statistical physics is the understanding of the macroscopic properties which are emerging from interacting microscopic particle systems. On the atomistic level, one can model a liquid or a gas as a huge collection of atoms whose individual microscopic behaviours appear to be random and very chaotic. However on a sufficiently large scale, a coherent behaviour takes place and the system can be described by a few macroscopic variables which obey simple laws. Understanding these phenomena from a rigorous probabilistic point of view raises many mathematical challenges. The workshop "Large Scale Stochastic Dynamics" will be focused on three main topics :

(1) Steady state fluctuations and hydrodynamic limit
(2) Approach to equilibrium in reversible systems and interface dynamics
(3) Random walks with long memory due to path-wise self-interaction

These three aspects illustrate the general problematic of emergent structures on large space-time scales. In fact, they share many common features as they are all modeled by high-dimensional Markov processes (sometimes infinite dimensional).