Makiko Sasada (Keio University, Japan)

Title: On the spectral gap of binary interacting processes having product reversible measures

Abstract: We give a general strategy to obtain a lower bound on the spectral gap for a class of binary interacting processes having product reversible measures. In 2008, Caputo showed that, for a class of binary collision processes given by simple averages (we call the class "Averaging model") on the complete graph, the analysis of the spectral gap of an N-component system can be reduced to that of the same system for $N = 3$. In this talk, we give a comparison technique to reduce the analysis of the spectral gap on d-dimensional lattice to that on the complete graph for Averaging models. Also, we show another type of comparison theorem which allows us to reduce the spectral gap estimate for a very general class of binary interacting processes to that for Averaging models. The method applies to a number of binary interacting processes on the complete graph and also on d-dimensional lattice, including stochastic energy exchange models which was recently introduced by Grigo et al. and many types of interacting particle systems.

Daisuke Shiraishi (Kyoto University, Japan)

Title: Non-intersecting random walks in low dimensions

Abstract: We consider two random walks conditioned "never to intersect" in $\mathbb{Z}^2$. We show that each of them has infinitely many global cut times with probability one. In fact, we prove that the number of *global* cut times up to n grows like $n^{3/8}$. Next we consider the union of their trajectories to be a random subgraph of $\mathbb{Z}^2$ and show the subdiffusivity of the simple random walk on this graph.

Gordon Slade (University of British Columbia, Canada)

Title: Growth constants of lattice trees and lattice animals in high dimensions

Abstract: We study the growth constants of nearest-neighbour lattice trees and (bond) lattice animals in high dimensions. We prove that to leading order, as the dimension goes to infinity, these growth constants are asymptotic to $2de$. In addition, we compute the next two terms in a $1/d$ expansion, with rigorous error estimates. The proof uses the lace expansion together with a new inclusion-exclusion expansion for the generating function (one-point function) of lattice trees or animals containing the origin. This is joint work with Yuri Mejia Miranda.

Daniel Stein (New York University, US)

Title: Predictability in nonequilibrium discrete spin dynamics

Abstract: Understanding the dynamical behavior of many-particle systems both in and out of equilibrium is a central issue in statistical mechanics. One question involves the relative importance of "nature vs. nurture": that is, given a system with a random initial state evolving through a well-defined stochastic dynamics, how much of the information contained in the state at future times depends on the initial condition ("nature") and how much on the dynamical realization ("nurture")? I will discuss this question and present both old and new results for low-dimensional discrete spin systems.

Rongfeng Sun (National University of Singapore, Singapore)

Title: Independent random walks on $\mathbb{Z}$ with self-blocking immigration at the origin

Abstract: We study a collection of independent random walks on $\mathbb{Z}$ such that at rate 1, a new independent random walk is inserted at the origin (immigration) if the origin is not occupied, otherwise the insertion is blocked. We show that starting with an empty configuration, the number of random walks added to the system grows almost surely as $\sqrt{2/\pi}\sqrt{t}\log t$. The proof is based on coupling techniques. Joint work with Matthias Birkner.