Speaker: Georg Menz, *Stanford University*

Title: A two-scale proof of the Eyring–Kramers formula

Abstract:

We consider a diffusion on a potential landscape which is given by a smooth Hamiltonian in the regime of small noise. We give a new proof of the Eyring–Kramers formula for the spectral gap of the associated generator of the diffusion. The proof is based on a refinement of the two-scale approach introduced by Grunewald, Otto, Villani, and Westdickenberg and of the mean-difference estimate introduced by Chafai and Malrieu. The Eyring–Kramers formula follows as a simple corollary from two main ingredients: the first one shows that the Gibbs measures restricted to a domain of attraction has a “good” Poincaré constant mimicking the fast convergence of the diffusion to metastable states. The second ingredient is the estimation of the mean-difference by a new weighted transportation distance. It contains the main contribution of the spectral gap, resulting from exponential long waiting times of jumps between metastable states of the diffusion. This new approach also allows us to derive sharp estimates on the log-Sobolev constant.

This is joint work with Andre Schlichting.