**Abstract**

My talk will include two parts. In the first part I will first provide the framework of random dynamical systems. Then I will talk about studying qualitatively the asymptotic behavior (more specifically, existence of random attractors) of stochastic lattice differential equations by using a random dynamical system approach. In the second part, I will talk about some quantitative methods for stochastic PDEs including a brief introduction on particle filter and an inverse filtering approach.