INTERMITTENCY ON CATALYSTS

Frank den Hollander
Leiden University and EURANDOM
The Netherlands

In this talk we look at the parabolic Anderson equation

$$\frac{\partial u}{\partial t} = \kappa \Delta u + \xi u, \qquad u|_{t=0} \equiv 1,$$

where $u\colon\ \mathbb{Z}^d \times [0,\infty) \to \mathbb{R}$, κ is the diffusion constant, Δ is the discrete Laplacian, and $\xi\colon\ \mathbb{Z}^d \times [0,\infty) \to \mathbb{R}$ is a space-time random medium. The solution of the equation describes the evolution of a "reactant" u under the influence of a "catalyst" ξ.

We consider three choices for ξ:

(1) independent simple random walks,
(2) symmetric exclusion process,
(3) voter model,

all starting from equilibrium. We study the annealed Lyapunov exponents, i.e., the exponential growth rates of the successive moments of u. We show that these exponents display an interesting dependence on the diffusion constant κ, with qualitatively different behavior in different dimensions.

(Joint work with Jürgen Gärtner and Gregory Maillard.)