Title: Modelling and simulation of elliptic diffusion problems on random domains

Abstract:
There are basically two methods to deal with elliptic diffusion problems on random domains. On the one hand, the perturbation method is based on a prescribed perturbation field of the boundary and uses a shape Taylor expansion with respect to this perturbation field to approximately represent the random solution. This yields a simple approach which, however, induces a model error. On the other hand, in the domain mapping approach, the random domain is mapped on a nominal, fixed domain. This requires that the perturbation field is also known in the interior of the domain but the resulting partial differential equation with random diffusion matrix and random load can be solved without systematic errors. In this talk, we present theoretical and practical results for both methods. In particular, we discuss their advantages and disadvantages.