Randomly fluctuating membranes and particles

Motivated by biological applications, such as cell-biology, partial differential equations (PDEs) on curved (moving) domains have become a flourishing mathematical field. Moreover, including uncertainty into these models is natural due to the
lack of precise initial data or randomness of the processes itself.
We will first discuss the well-posedness results of (parabolic) PDEs on time-dependent random (curved) domains.
These results are based on the general setting for solving PDEs on evolving domains, which we will briefly present.
This is a joint work with C. Elliott and C. Lewis.
One of the basic questions in these models is how to represent a random field on a curved domain? We will construct multilevel series expansion of isotropic Gaussian random fields on a sphere with independent Gaussian coefficients and localized basis functions. This is a joint work with M. Bachmayr.