

**A Match made in Heaven –
periodic random variables and kernels anchored at lattice points**

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This talk describes joint work with Vesa Kaarnioja and Frances Kuo (UNSW), and with Yoshihito Kazashi and Fabio Nobile (EPFL, Lausanne).

In this talk we replace the affine model of a random field, often used in uncertainty quantification, with a model using periodic random variables, taking care to match the mean and the covariance of the affine random field. With this tweak any output quantity of interest becomes a periodic function of the stochastic variables. The motivation is that the linear systems needed for constructing an approximate solution of an elliptic PDE with high-dimensional input random field can now be solved very quickly, and the approximation can achieve a relatively high order of convergence, if the approximation is by periodic kernels anchored at appropriate lattice points. The takeaway message is that periodic random variables and periodic kernels anchored at lattice points are a “Match made in Heaven”.