

*Generating non-stationary Gaussian random fields on  
hypersurfaces using surface finite element methods*

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In the middle of the previous century, Peter Whittle demonstrated that Whittle–Matérn Gaussian random fields on Euclidean domains can be obtained as solutions to fractional elliptic stochastic partial differential equations (SPDEs). The SPDE–random field connection can be leveraged to generate random fields on other domains, such as curves or surfaces, by solving an SPDE on that domain. Selecting a differential operator with variable coefficients, we obtain a flexible class of non-stationary random fields. We consider how the computational technique of surface finite elements can be utilized to generate random fields on surfaces and briefly discuss how strong error bounds are obtained using complex analysis and operator theory. This talk is based on joint work with Annika Lang and Mike Pereira.

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