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SPEAKER/ABSTRACT

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"Competing Complexities in Bayesian Inverse Problems: Models and Distributions"

Abstract:
There are many sources of complexity when considering Bayesian inverse problems for systems in applied mathematics. The primary sources of complexity lie in two broad areas; the mechanistic model of the system that is being analysed, and the structure of the distributions of the parameters that arise. In this talk we will look briefly at two problems which each demonstrate one of these two areas. In the first we will consider an inverse problem for thermodynamical properties of materials from laser flash experiments. In this work we aim to reduce the complexity of the Bayesian inversion by using a stochastic Galerkin approximation of the observation operator in order to make full posterior characterisation via MCMC feasible. In the second we will consider an ensemble importance sampling method which allows for efficient sampling of posterior distributions with complex structure, for example where the posterior density is closely concentrated around a lower dimensional manifold in parameter space.