
Christian Ketelsen
**Multilevel Markov Chain Monte Carlo for Uncertainty
Quantification in Subsurface Flow**

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The multilevel Monte Carlo method has been shown to be an effective variance reduction technique for quantifying uncertainty in subsurface flow simulations when the random conductivity field can be represented by a simple prior distribution. In state-of-the-art subsurface simulation the stochastic model of the conductivity field must be conditioned on observed physical data. Sampling from this complicated distribution is carried out by the Markov chain Monte Carlo method. In this talk we extend the multilevel Monte Carlo methodology to the Markov chain Monte Carlo setting. We demonstrate the effectiveness of the method via a model problem of single-phase flow in a random medium discretized with standard finite elements.