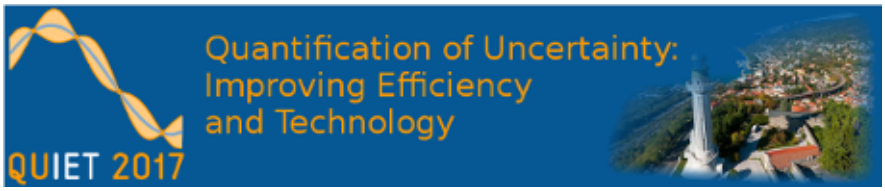


# Sparse Grid Methods in Uncertainty Quantification

M. Griebel[1]

[1]Universität Bonn, Germany

In this presentation, we give an overview on generalized sparse grid methods for stochastic and parametric partial differential equations as they arise in various forms in uncertainty quantification. We focus on the efficient approximation and treatment of the stochastic/parametric variables and discuss both, the case of finite and infinite/parametric stochastic dimension. Moreover, we deal with optimal numerical schemes based on sparse grids where also the product between the spatial and temporal variables and the stochastic/parametric variables is collectively taken into account. Overall, we obtain approximation schemes which involve cost complexities that resemble just the cost of the numerical solution of a constant number of plain partial differential equations in space (and time), i.e. without any stochastic/parametric variable. Here, this constant number depends only on the covariance decay of the stochastic fields of the input data of the overall problem. We give examples from incompressible non-Newtonian fluid simulations.