

Workshop 1 on  
“Multilevel and multifidelity sampling methods in UQ for PDEs”

May 2 - 6, 2022

organized by

Kody Law (U of Manchester), Fabio Nobile (EPF Lausanne),  
Robert Scheichl (U Heidelberg), Karen Willcox (U of Texas, Austin)

of the Thematic Programme on  
“Computational Uncertainty Quantification: Mathematical Foundations, Methodology &  
Data”(May 2 - June 24, 2022)

• Monday, May 2nd, 2022

08:45 – 09:15 **Registration & Welcome**

09:15 – 10:00 **Abdul-Lateef Haji-Ali (Heriot-Watt U, Edinburgh)**

*Multilevel Path Branching for Digital Options*

10:00 – 10:45 **Michael Feischl (TU Vienna)**

*Multilevel methods for computational micromagnetism*

10:45 – 11:15 **Coffee Break**

11:15 – 12:00 **Tiangang Cui (Monash U, Melbourne)**

*Multi-Level Optimization based Monte-Carlo Samplers for Large-Scale Inverse Problems (- online)*

12:00 – 12:45 **Neil Chada (KAUST, Thuwal)**

*Improved efficiency of multilevel Monte Carlo for stochastic PDE through strong pairwise coupling (- online)*

12:45 – 14:15 **Lunch Break**

14:15 – 15:00 **Lorenzo Tamellini (CNR-IMATI, Pavia)**

*Comparing Multi-Index Stochastic Collocation and Multi-Fidelity Stochastic Radial Basis Functions for Forward Uncertainty Quantification of Ship Resistance (- online)*

15:00 – 15:30 **Coffee Break**

15:30 – 15:45 **Robert Scheichl (U Heidelberg)**

*Introduction to discussion & summary of results from 2020 ESI workshop*

15:45 – 16:30 **Discuss Talks & Create Ideas**

16:30 – 16:55 **Robert Scheichl (U Heidelberg)**

*Collect Ideas in Plenum*

- **Tuesday, May 3rd, 2022**

09:00 – 09:30 **Andreas Stein (ETH Zürich)**

*Multilevel Monte Carlo FEM for Elliptic PDEs with Besov Random Tree Priors*

09:30 – 10:00 **Niklas Baumgarten (KIT, Karlsruhe)**

*A Non-Intrusive Multilevel Uncertainty Quantification (UQ) Framework for Wave Equations with Random Input Data*

10:00 – 10:30 **Linus Seelinger (U Heidelberg)**

*UM-Bridge: Bridging the Gap Between UQ and Model Software*

10:30 – 11:00 **Coffee Break**

11:00 – 11:45 **Andrea Barth (U of Stuttgart)**

*Uncertainty quantification and subordinated fields - online*

11:45 – 12:30 **Tim Dodwell (U of Exeter)**

*Multilevel Delayed Acceptance MCMC - online*

12:30 – 14:00 **Lunch Break**

14:00 – 14:45 **Alex Gorodetsky (U of Michigan, Ann Arbor)**

*MFNETS: Multifidelity surrogate modeling of ensembles of information sources through directed acyclic graphs - online*

14:45 – 15:15 **Coffee Break**

15:15 – 16:15 **Discuss Talks & Create Ideas**

16:15 – 16:45 **Fabio Nobile (EPFL Lausanne)**

*Collect Ideas in Plenum*

- **Wednesday, May 4th, 2022**

09:00 – 09:30 **Robert Scheichl (U Heidelberg)**

*Cluster Ideas & Form Groups*

09:30 – 10:30 **Work in Groups**

10:30 – 11:00 **Coffee Break**

11:00 – 12:30 **Work in Groups**

12:30 – 14:00 **Lunch Break**

14:00 – 14:30 **Juan Pablo Madrigal Cianci (EPFL Lausanne)**

*Multi-level Markov Chain Monte Carlo Methods for Bayesian Inverse Problems*

14:30 – 15:00 **Paul Rohrbach (U Cambridge)**

*Multilevel simulation of hard sphere mixtures*

15:00 – 15:30 **Coffee Break**

15:30 – 16:00 **Parisa Khodabakhshi (U of Texas, Austin)**

*Multifidelity Uncertainty Quantification for Nonlocal Models - online*

16:00 – 16:30 **Ionut-Gabriel Farcas (U of Texas, Austin)**

*Learning hierarchies of reduced-dimension and context-aware low-fidelity models for multi-fidelity Monte Carlo sampling (- online)*

18:30 – 22:00 **Workshop Dinner at Heuriger Weingut Wolff**

- **Thursday, May 5th, 2022**

09:00 – 10:30 **Work in Groups**

10:30 – 11:00 **Coffee Break**

11:00 – 12:30 **Work in Groups**

12:30 – 14:00 **Lunch Break**

14:00 – 14:45 **Benjamin Peherstorfer (CIMS, New York)**

*Multilevel Stein variational gradient descent with applications to Bayesian inverse problems*

14:45 – 15:15 **Coffee Break**

15:15 – 15:45 **Shangda Yang (U of Manchester)**

*Multi-index Sequential Monte Carlo Ratio estimators for Bayesian Inverse problems (- online)*

15:45 – 16:15 **Mikkel Lykkegaard (U of Exeter)**

*Derivative-Free Thinning (DaFT) with Stochastic Kernel Embeddings (- online)*

16:15 – 16:45 **Pieterjan Robbe (Sandia National Laboratories)**

*Uncertainty Quantification in Computational Modeling of Plasma-Surface Interactions (- online)*

- **Friday, May 6th, 2022**

09:00 – 10:30 **Group Presentations**

*TBA*

10:30 – 11:00 **Coffee Break**

11:00 – 11:45 **Group Presentations**

*TBA*

11:45 – 12:30 **Hermann Matthies (TU Braunschweig)**

*What is a Sample?*

12:30 – 14:00 **Lunch Break**

14:00 – 14:45 **Elisabeth Ullmann (TU Munich)**

*Rare event estimation with PDE-based models*

14:45 – 15:00 **Robert Scheichl (U Heidelberg) & Fabio Nobile (EPFL Lausanne)**

*Final Discussions & Concluding Remarks*

**The event takes place at the Erwin Schrödinger Institute - Boltzmann lecture hall! Online participation is possible via zoom. Zoom coordinates are available on request ([secr@esi.ac.at](mailto:secr@esi.ac.at)) and after registration until April 29, 2022.**