

Programme on
“Numerical Analysis of Complex PDE Models in the Sciences”

June 11 – August 17, 2018

organized by

Annalisa Buffa (EPFL Lausanne), Thomas Y. Hou (Caltech), J.Markus Melenk (TU Vienna),
Ilaria Perugia (U Vienna), Christoph Schwab (ETH Zurich)

Workshop 2 on “Interplay of multiscale data assimilation and data science with advanced PDE
discretizations” organized by Thomas Hou (Caltech) and Jens Markus Melenk (TU Wien)

June 25 – 29, 2018

• Monday, June 25, 2018

09:00 – 09:30 **Registration**

09:30 – 10:15 **Andrew Stuart**

Large graph limits of learning algorithms

10:15 – 10:45 *Coffee / Tea Break*

10:45 – 11:30 **Barbara Verfürth**

Numerical multiscale methods for Maxwell’s equations in complex media

11:30 – 12:15 **Gilles Vilmart**

Uniformly accurate numerical schemes for highly oscillatory evolution problems

12:15 – 14:00 *Lunch Break*

14:00 – 14:45 **Peter Monk**

Optimal design of thin film solar cells

14:45 – 15:15 *Coffee / Tea Break*

15:15 – 16:00 **Andrea Moiola**

Scattering by fractal screens: functional analysis and computation

16:00 – 16:45 **Joachim Schöberl**

Hybrid mixed methods for the Helmholtz equation

• Tuesday, June 26, 2018

09:00 – 9:45 **Mario Ohlberger**

Localized model reduction for PDE-constrained parameter optimization

9:45 – 10:15 *Coffee / Tea Break*

10:15 – 11:00 **Gianluigi Rozza**

Reduced order methods: state of the art and perspectives with a special focus on computational fluid dynamics

11:00 – 11:45 **Assyr Abdulle**

Bayesian multiscale inverse problems and probabilistic numerical methods

11:45 – 14:00 *Lunch Break*

14:00 – 14:45 **Yalchin Efendiev**
Data integration in multiscale simulations

14:45 – 15:15 *Coffee / Tea Break*

15:15 – 16:00 **Thomas Hou**
Sparse operator compression for higher order elliptic PDEs and graph Laplacians with rough coefficients

16:00 – 16:45 **Benjamin Stamm**
An embedded corrector problem for stochastic homogenization

• **Wednesday, June 27, 2018**

09:00 – 9:45 **Sebastian Reich**
Data assimilation: coupling of probability measures

9:45 – 10:15 *Coffee / Tea Break*

10:15 – 11:00 **Michal Branicki**
Accuracy of a class of nonlinear filters for dissipative PDEs in the presence of model errors

11:00 – 11:45 **Jonathan Weare**
Stratification for Markov chain Monte Carlo simulation

11:45 – 14:00 *Lunch Break*

14:00 – 14:45 **Claudia Schillings**
Well-posedness and convergence analysis of the ensemble Kalman inversion

14:45 – 15:15 *Coffee / Tea Break*

15:15 – 16:00 **Dimitri Giannakis**
Data-driven approaches for spectral decomposition of ergodic dynamical systems

16:00 – 16:45 **Zuoqiang Shi**
PDE-based models in learning manifold

• **Thursday, June 28, 2018**

09:00 – 9:45 **Daniel Peterseim**
Quasi-local numerical stochastic homogenization

9:45 – 10:15 *Coffee / Tea Break*

10:15 – 11:00 **Barbara Kaltenbacher**
Adaptive discretization of inverse problems based on functional error estimators

11:00 – 11:45 **Stefan Sauter**
Estimating the effect of data simplification for elliptic PDEs

11:45 – 14:00 *Lunch Break*

14:00 – 14:45 **Lise-Marie Imbert-Gérard**
Wave propagation in inhomogeneous media: beyond the Helmholtz equation

14:45 – 15:15 *Coffee / Tea Break*

15:15 – 16:00 **Zhiming Chen**
The reverse time migration method for inverse scattering problems

16:00 – 16:45 **Otmar Scherzer**
On a multi-level algorithm for solving the inverse boundary value problem for the Helmholtz equation

- **Friday, June 29, 2018**

09:00 – 9:45 **Björn Engquist**

TBA

9:45 – 10:30 **Viet-Ha Hoang**

Bayesian inverse homogenization

10:30 – 11:00 *Coffee / Tea Break*

11:00 – 11:45 **Sergei Pereverzyev**

Application of graph Laplacian in semi-supervised learning

11:45 – 12:30 **Eric Chung**

Generalized multiscale finite element methods and nonlocal multi-continua upscaling for heterogeneous and fracture media

12:30 – 12:45 *Closing*

All talks take place at ESI, Boltzmann Lecture Hall!