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 simplication 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

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- **Friday, June 29, 2018**

  09:00 – 9:45 **Björn Engquist**
  Sampling and low rank compression of multiscale functions and operators

  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!