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
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!