

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 1 on “Interplay of tensor structured formats with advanced PDE discretizations;
session on Signal processing techniques and directionally adapted discretizations” organized by
Philipp Grohs (U Vienna) and Christoph Schwab (ETH Zurich)

June 11 – 15, 2018

• **Monday, June 11, 2018**

09:00 – 09:30 **Registration**

09:30 – 10:30 **Reinhold Schneider**

Hierarchical Tensor Representation and Variational Monte Carlo

10:30 – 11:00 *Coffee / Tea Break*

11:00 – 12:00 **Holger Rauhut**

Multilevel Compressed Sensing Methods for Parametric PDEs

12:00 – 14:00 *Lunch Break*

14:00 – 15:00 **Helmut Harbrecht**

Second Moment Analysis for Boundary Value Problems with Random Input Parameters

15:00 – 15:30 *Coffee / Tea Break*

15:30 – 16:30 **Jakob Zech**

High Dimensional Sparse Grid Approximation

• **Tuesday, June 12, 2018**

09:00 – 10:00 **Maksim Rakhuba**

Tensor Methods for High Dimensional Eigenvalue Problems

10:00 – 10:30 *Coffee / Tea Break*

10:30 – 11:30 **Markus Bachmayr**

Stability of Low Rank Tensor Representations and Structured Multilevel Preconditioning for Elliptic PDEs (Part I)

11:30 – 12:30 **Vladimir Kazeev**

Stability of Low Rank Tensor Representations and Structured Multilevel Preconditioning for Elliptic PDEs (Part II)

12:30 – 14:15 *Lunch Break*

14:15 – 15:15 **Michael Feischl**
H-Matrices and Multi-Index Monte Carlo

15:15 – 15:45 *Coffee / Tea Break*

15:45 – 16:45 **Sergey Dolgov**
Solving large ODEs with conservation laws by low rank decompositions

• **Wednesday, June 13, 2018**

10:00 – 10:30 *Morning Coffee / Tea*

10:30 – 11:30 **Philipp Petersen**
Neural Networks and Partial Differential Equations: Challenges and Opportunities

11:30 – 12:30 **Dennis Elbrächter**
Approximation of High-Dimensional Tensor Products using deep ReLU networks

12:30 – 14:15 *Lunch Break*

14:15 – 15:15 **Thomas Strohmer**
Uncertainty mitigation and inverse problems

15:15 – 15:45 *Coffee / Tea Break*

15:45 – 16:45 **Wolfgang Dahmen**
Data and Reduced Models

• **Thursday, June 14, 2018**

09:00 – 10:00 **Anthony Nouy**
Adaptive Sampling for Learning Tree Tensor Networks

10:00 – 10:30 *Coffee / Tea Break*

10:30 – 11:30 **Boris Khoromskij**
Tensor numerical methods in computational quantum chemistry

11:30 – 12:30 **Melvin Leok**
Variational discretizations of gauge field theories using group-equivariant interpolation spaces

12:30 – 14:15 *Lunch Break*

14:15 – 15:15 **Lek-Heng Lim**
Tensor Network Ranks

15:15 – 15:45 *Coffee / Tea Break*

15:45 – 16:45 **Steffen Boerm**
Hybrid Compression of Boundary Element Matrices for High-Frequency Helmholtz Problems

• **Friday, June 15, 2018**

09:00 – 10:00 **Guido Kanschat**
Tensor Based Inversion for overlapping Schwarz Smoothers

10:00 – 10:30 *Coffee / Tea Break*

10:30 – 11:30 **Mario Bebendorf**
Degenerate Approximation of Green's Function in the presence of High-Contrast Coefficients

11:30 – 14:15 *Lunch Break*

14:15 – 15:15 **Clemens Hofreither**
Applications of Low-Rank Tensor Methods in Isogeometric Analysis

15:15 – 15:45 *Coffee / Tea Break*

15:45 – 16:45 **Leszek Demkowicz**

Current Research Results on the DPG Method for Wave Propagation Problems

All talks take place at ESI, Boltzmann Lecture Hall!