

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 **Lek-Heng Lim**

*Tensor Network Ranks*

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**

09:00 – 10:00 **Daniel Kressner**

*T.B.A*

10:00 – 10:30 *Coffee / Tea Break*

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**

*T.B.A.*

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 from 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 **Michael Feischl**

*H-Matrices and Multi-Index Monte Carlo*

15:15 – 15:45 *Coffee / Tea Break*

15:45 – 16:45 **Clemens Hofreither**

*Applications of Low-Rank Tensor Methods in Isogeometric Analysis*

• **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 **Olga Mula**

*A Discontinuous Petrov-Galerkin Method for Radiative Transfer*

11:30 – 12:30 **Mario Bebendorf**

*Degenerate Approximation of Green's Function in the presence of High-Contrast Coefficients*

12:30 – 14:15 *Lunch Break*

14:15 – 15:15 **Steffen Boerm**

*Hybrid Compression of Boundary Element Matrices for High-Frequency Helmholtz Problems*

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!**