Monday, June 8

Plenary Talks
Plenary Hall

10:00 - 10:15  Opening
Chairperson  S. Margenov
10:15 - 11:00  T. COUPEZ, H. Digonnet, L. Silva, Implicit Boundary in Multiphase Flows and Anisotropic Adaptive Meshing
11:00 - 11:45  V. Sverdlov, S. SELBERHERR, Spin-Based CMOS-Compatibile Devices

Lunch Break
<table>
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<tr>
<th>Time</th>
<th>Session</th>
<th>Chairperson(s)</th>
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<tr>
<td><strong>14:00 - 16:05</strong></td>
<td>Special Session on “Enabling Exascale Computation”</td>
<td>D. Keyes</td>
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<td>14:00 - 14:25</td>
<td>A. Barker, D. Kalchev, P. Vassilevski, Resilient and Scalable Variants of Spectral Element Agglomeration Algebraic Multigrid</td>
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<td>14:50 - 15:15</td>
<td>S. Müthing, P. Bastian, Algorithmic and Implementation Advances in the EXA-DUNE Project</td>
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<td>15:40 - 16:05</td>
<td>D. Stoyanov, Task-Based Hybrid Parallel Sparse Matrix-Vector Multiplication (SpMVM) with the Communication Library GASPI/GPI2</td>
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<td><strong>16:25 - 17:40</strong></td>
<td>Special Session on “Computational Microelectronics – from Monte Carlo to Deterministic Approaches”</td>
<td>I. Dimov</td>
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<td>16:25 - 16:50</td>
<td>J. M. Sellier, I. Dimov, Is Nature a Monte Carlo Algorithm?</td>
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<td>16:50 - 17:15</td>
<td>M. Thesberg, M. Pourfath, N. Neophytou, H. Kosina, Thermo-electric Efficiency Improvements through Grain Shape Optimization: A Non-Equilibrium Green’s Function Study</td>
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<td>17:15 - 17:40</td>
<td>K. Kapanova, J. M. Sellier, I. Dimov, A Monte Carlo Approach to Neural Networks</td>
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Monday, June 8
Parallel Sessions
Lecture Hall B

14:00 - 16:05  Special Session on “Control and Uncertain Systems”
Chairperson  G. Tragler
14:00 - 14:25  A. Dontchev, Dennis-Moré Theorem Revisited
14:25 - 14:50  M. Bivas, N. Ribarska, On the Projection Processes with Definable Right-Hand Side
14:50 - 15:15  M. Krastanov, N. Ribarska, Viability and an Olech Type Result
15:40 - 16:05  A. Marigonda, T. Le Thi, Sufficient Conditions for STLA for a Class of Control Systems

Coffee Break

16:25 - 18:05  Special Session on “Control and Uncertain Systems”
Chairperson  N. Ribarska
16:50 - 17:15  B. Riesner, G. Tragler, Financing of Reducing Emissions from Deforestation: A Differential Game Approach
17:15 - 17:40  M. Borisov, N. Dimitrova, M. Krastanov, Functional Differential Model of an Anaerobic Biodegradation Process
17:40 - 18:05  V. Veliov, On the Relaxation of Discretized Differential Inclusions

20:00  RECEPTION
Tuesday, June 9

Parallel Sessions
Lecture Hall A

09:00 - 10:15  Special Session on “Computational Microelectronics – from Monte Carlo to Deterministic Approaches”

Chairperson  M. Nedjalkov
09:00 - 09:25  D. Osintsev, J. Ghosh, V. SVERDLOV, J. Weinbub, S. Selberherr, Spin Lifetime in MOSFETs: A High Performance Computing Approach
09:25 - 09:50  J. WEINBUB, P. Ellinghaus, S. Selberherr, Parallelization of the Two-Dimensional Wigner Monte Carlo Method
09:50 - 10:15  F. RUDOLF, J. Weinbub, K. Rupp, P. Resutik, S. Selberherr, Mesh Healing for TCAD Simulations

Coffee Break

10:35 - 11:50  Special Session on “Computational Microelectronics – from Monte Carlo to Deterministic Approaches”

Chairperson  J. Weinbub
10:35 - 11:00  M. NEDJALKOV, P. Ellinghaus, S. Selberherr, The Aharanov-Bohm Effect from a Phase Space Perspective
11:00 - 11:25  P. ELLINGHAUS, M. Nedjalkov, S. Selberherr, The Influence of Electrostatic Lenses on Wave Packet Dynamics
11:25 - 11:50  J. CERVENKA, P. Ellinghaus, Preconditioned Deterministic Solver for the Wigner Equation

Lunch Break
Tuesday, June 9
Parallel Sessions
Lecture Hall B

09:00 - 10:15  Special Session on “Numerical Methods for Multiphysics Problems”
Chairperson  R. Lazarov
09:25 - 09:50  X. Hu, Convergence Analysis of Finite Element Discretizations for Biot’s Equations
09:50 - 10:15  J. Brannick, Multigrid Preconditioning of the Overlap and Domain Wall Operators in Lattice Quantum Chromodynamics

Coffee Break

10:35 - 11:50  Special Session on “Numerical Methods for Multiphysics Problems”
Chairperson  J. Adler
10:35 - 11:00  U. Langer, H. Yang, Robust Monolithic FSI Solvers
11:00 - 11:25  X. Ye, Recent Development of Weak Galerkin Methods
11:25 - 11:50  L. Mu, Numerical Applications of Weak Galerkin Finite Element Methods

Lunch Break
Tuesday, June 9
Parallel Sessions
Lecture Hall C

09:00 - 10:15 Contributed Talks
Chairperson S. Harizanov
09:00 - 09:25 A. Dorostkar, M. Neytcheva, S. Serra-Capizzano, Generalized Locally Toeplitz Matrix Sequences for Analysing Finite Element Block Matrices
09:25 - 09:50 A. Manapova, An Iterative Process for the Solution of Semi-Linear Elliptic Equations with Discontinuous Coefficients and Solution
09:50 - 10:15 K. Vlachkova, Extremal Interpolation of Convex Scattered Data in $\mathbb{R}^3$ Using Tensor Product Bézier Surfaces

Coffee Break

10:35 - 12:15 Special Session on “Large-Scale Models: Numerical Methods, Parallel Computations and Applications”
Chairperson K. Georgiev
10:35 - 11:00 P. Arbenz, P. Derlet, S. Schaffner, A Jacobi–Davidson Algorithm for Large Scale Eigenvalue Problems in Heterogeneous Materials
11:00 - 11:25 I. Dimov, K. Georgiev, Z. Zlatev, Selecting Explicit Runge-Kutta Methods with Improved Stability Properties
11:25 - 11:50 C. Hofreither, S. Takacs, W. Zulehner, A New Multigrid Smoother for Isogeometric Analysis
11:50 - 12:15 N. Kosturski, S. Margenov, P. Popov, N. Simeonov, Y. Vutov, Performance Analysis of Block AMG Preconditioning of Poroelasticity Equation

Lunch Break
### Tuesday, June 9

#### Parallel Sessions
Lecture Hall A

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<td>V.I. Vasil’ev, A.M. Kardashevsky, Computational Identification of the Right Side of the Parabolic Equations in Problems of Filtration</td>
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<td>S. Srinivasan, R. Lazarov, P. Minev, A Multiscale Direction-Splitting Algorithm for Parabolic Equations with Highly Heterogeneous Coefficients</td>
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<td>F. Gaspar, F. Lisbona, C. Rodrigo, Flow in Deformable Porous Media</td>
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<td>16:25 - 18:05</td>
<td>Special Session on “Mathematical Modeling and Analysis of PDEs Describing Physical Problems”</td>
<td>P. Matus</td>
<td>P. Vabishchevich, Operator-Difference Schemes with a Factorized Operator</td>
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<td>A. Vasiliev, P. Vabishchevich, A. Avvakumov, Finite Element Method for Neutron Diffusion Equations in Hexagonal Geometry</td>
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<td>T. Chernogorova, L. Vulkov, A Numerical Approach to Price Path Dependent Asian Options</td>
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<td>O. Iliev, D. Iliev, R. Kirsch, On Solving of Poroelasticity Problems Related to Simulation of Filtration Processes</td>
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Tuesday, June 9

Parallel Sessions
Lecture Hall B

14:00 - 16:05  *Special Session on “A Posteriori Error Control and Iterative Methods for Maxwell Type Problems”*

**Chairperson** J. Kraus

- **14:00 - 14:25** I. ANJAM, D. Pauly, Functional A Posteriori Error Equality for the Eddy-Current Problem
- **14:50 - 15:15** S. BAUER, Maxwell Equations in the Limit of Small Velocities
- **15:15 - 15:40** S. MATCULEVICH, S. Repin, Computable Bounds of Constants in Poincaré Type Inequalities for Functions with Zero Mean on the Boundary and Their Applications for Time-Dependent Reaction-Diffusion Problem
- **15:40 - 16:05** D. PAULY, Functional A Posteriori Error Estimates for First Order Systems

Coffee Break

16:25 - 18:30  *Special Session on “A Posteriori Error Control and Iterative Methods for Maxwell Type Problems”*

**Chairperson** D. Pauly

- **16:25 - 16:50** J. Kraus, M. LYMBERY, D. Pauly, S. Repin, Numerically Computed Estimates of the LBB Constant
- **16:50 - 17:15** Q. HONG, J. Kraus, Uniformly Stable Discontinuous Galerkin Discretization and Robust Iterative Solution Methods for the Brinkman Problem
- **17:15 - 17:40** M. WOLFMAYR, Functional A Posteriori Estimates for Time-Periodic Eddy Current Problems
- **17:40 - 18:05** O. MALI, S. Repin, Application of Functional A Posteriori Error Estimates for Problems with Incompletely Known Data
- **18:05 - 18:30** S. BARTELS, Projection-Free Approximation of Geometric Evolution Problems
Tuesday, June 9
Parallel Sessions
Lecture Hall C

14:00 - 16:05  
Special Session on “Large-Scale Models: Numerical Methods, Parallel Computations and Applications”

Chairperson  
Z. Zlatev

14:00 - 14:25  
I. GEORGIEV, Numerical Characterization of Elastic Properties of Metal Porous Materials

14:25 - 14:50  
I. Georgiev, S. HARIZANOV, Y. Vutov, Supervised 2-Phase Segmentation of Porous Media with Known Porosity

14:50 - 15:15  
N. Kosturski, I. Lirkov, S. Margenov, Y. VUTOV, Thermoelectrical Tick Removal Process Modeling

15:15 - 15:40  
S. STOYKOV, S. Margenov, Scalability of Shooting Method for Nonlinear Dynamical Systems

15:40 - 16:05  
Z. Zlatev, K. GEORGIEV, I. Dimov, Tz. Ostromsky, Running the Danish Eulerian Model on Different Vector and Parallel Computers: History and Comparison Results

Coffee Break

16:25 - 18:05  
Special Session on “Large-Scale Models: Numerical Methods, Parallel Computations and Applications”

Chairperson  
I. Georgiev

16:25 - 16:50  
G. DIMITRIU, R. Ştefănescu, I. Navon, Comparative Numerical Analysis Using Reduced-Order Modeling Strategies for Large-Scale Systems

16:50 - 17:15  
M. KOLEVA, L. Vulkov, Fully Implicit Time-Stepping Schemes for a Parabolic-ODE system of European Options with Liquidity Shocks

17:15 - 17:40  
T. Chernogorova, I. Dimov, L. VULKOV, Splitting Numerical Method for Primary and Secondary Pollutants Models

17:40 - 18:05  
TZ. OSTROMSKY, I. Dimov, V. Alexandrov, Z. Zlatev, High Performance Tools for Sensitivity Analysis with Application in the Air Pollution Modelling
Wednesday, June 10

Plenary Talks
Plenary Hall

Chairperson  P. Vassilevski
09:00 - 09:45  D. Keyes, Algorithmic Adaptations to Extreme Scale
09:45 - 10:30  L. Zikatanov, Subspace Correction Methods: Theory, Practice, and Robustness
10:30 - 11:15  J. Kraus, Combined Strategies in Algebraic Multilevel Preconditioning

Lunch Break

13:00 - 19:00  EXCURSION
Thursday, June 11

Parallel Sessions
Lecture Hall A

09:00 - 10:15  
Special Session on “Large-Scale Models: Numerical Methods, Parallel Computations and Applications”

Chairperson C. Hofreither

09:00 - 09:25  A. LAKSÅ, B. Bang, Surface Constructions on Irregular Grids
09:25 - 09:50  B. BANG, J. Bratlie, R. Dalmo, Image Rescaling Using Spline Techniques
09:50 - 10:15  A. PEDERSEN, J. Bratlie, R. Dalmo, Spline Representation of Connected Surfaces with Custom-Shaped Holes

Coffee Break

10:35 - 12:15  
Special Session on “Large-Scale Models: Numerical Methods, Parallel Computations and Applications”

Chairperson Tz. Ostromsky

10:35 - 11:00  A. KOKOULIN, I. May, A. Kokoulina, Analysis of Component Composition and Distribution of Dust Emissions for Environmental Quality Management
11:00 - 11:25  H. CHERVENKOV, T. Todorov, K. Slavov, Snow Cover Assessment with Regional Climatological Model – Problems and Results
11:25 - 11:50  N. DOBRINKOVA, G. Dobrinkov, Input Data Preparation for Fire Behavior Fuel Modeling of Bulgarian Test Cases (Main Focus on Zlatograd Test Case)

Lunch Break
Thursday, June 11

Parallel Sessions
Lecture Hall B

09:00 - 10:15  Special Session on “Efficient Algorithms for Hybrid HPC Systems”
Chairperson  A. Karaivanova
09:00 - 09:25  G. Haase, D. Martin, G. Offner, Interpolation with Radial Basis Functions with MPI and Hardware Accelerators
09:25 - 09:50  V. Alexandrov, S. Ivanovska, A. Karaivanova, On the Preconditioned Quasi-Monte Carlo Algorithm for a Matrix Computations
09:50 - 10:15  B. Philippe, GPREMS: A Parallel GMRES Linear Solver Preconditioned by a Block Multiplicative Schwarz Scheme

Coffee Break

10:35 - 12:15  Special Session on “Efficient Algorithms for Hybrid HPC Systems”
Chairperson  A. Karaivanova
10:35 - 11:00  M. Mascagni, Y. Li, H. Ji, A Monte Carlo Linear Solver with Soft-Error Resilience
11:00 - 11:25  N. Manev, On the Relation Between Matrices and Greatest Common Divisor of Polynomials
11:50 - 12:15  E. Atanassov, M. Durchova, Generating the Modified Halton Sequences Using Xeon Phi Coprocessors

Lunch Break
### Thursday, June 11

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<td>Chairperson</td>
<td>L. Zikatanov</td>
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<td>14:00 - 14:25</td>
<td>D. LaSalle, G. <strong>KARYPIS</strong>, Multi-Threaded Algorithms for Multilevel</td>
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<td>Graph Partitioning, Clustering, and Nested Dissection Ordering</td>
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<td>14:25 - 14:50</td>
<td>G. Chapuis, H. <strong>DJIDJEV</strong>, Shortest-Path Queries in Planar Graphs</td>
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<td>14:50 - 15:15</td>
<td>P. D’<strong>AMBRA</strong>, P. Vassilevski, Adaptive AMG Solvers Based on</td>
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<td>Weighted Matching in Graphs</td>
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<td>16:25 - 18:05</td>
<td><strong>Special Session on “Numerical Methods for Multiphysics Problems”</strong></td>
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<td>Chairperson</td>
<td>X. Hu</td>
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<td>16:25 - 16:50</td>
<td>R. <strong>FALGOUT</strong>, A Non-Intrusive Parallel Time Integration Method</td>
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<td>16:50 - 17:15</td>
<td>C. <strong>RODRIGO</strong>, Multigrid Solvers for the Biot’s Consolidation Problem</td>
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<td>17:15 - 17:40</td>
<td>K. <strong>DANOV</strong>, Application of the Mehler-Fock Integral Transform to</td>
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Thursday, June 11
Parallel Sessions
Lecture Hall B

14:00 - 16:05  Special Session on “Applications of Metaheuristics to Large-Scale Problems”
Chairperson  K. Penev
14:00 - 14:25  R. Nogueras, C. Cotta, Sensitivity Analysis of Checkpointing Strategies for Multimemetic Algorithms on Unstable Complex Networks
14:25 - 14:50  S. Fidanova, Z. Ilcheva, Application of Ants Ideas on Image Edge Detection
14:50 - 15:15  A. Mucherino, Optimal Discretization Orders for Distance Geometry: a Theoretical Standpoint
15:15 - 15:40  K. Penev, Free Search in Multidimensional Space III
15:40 - 16:05  B. Zaválnij, Speeding up Parallel Combinatorial Optimization Algorithms with Las Vegas Method

19:30  CONFERENCE DINNER
## Parallel Sessions
### Lecture Hall A

**10:00 - 11:15**  
**Special Session on “Applications of Metaheuristics to Large-Scale Problems”**

**Chairperson**: S. Fidanova

10:00 - 10:25  
P. Koprinkova-Hristova, K. Alexiev, ACD with ESN for Tuning of MEMS Kalman Filter

10:25 - 10:50  
T. Balabanov, I. Zankinski, M. Barova, Distributed Evolutionary Computing Migration Strategy by Incident Node Participation

10:50 - 11:15  
T. Balabanov, I. Zankinski, B. Shumanov, Slot Machine RTP Optimization and Symbols Wins Equalization with Discrete Differential Evolution

### Lecture Hall B

**10:00 - 11:15**  
**Contributed Talks**

**Chairperson**: R. Blaheta

10:00 - 10:25  
O. Axelsson, M. Hasal, R. Blaheta, A Comparison of Three Preconditioners for the Solution of Saddle Point Problems

10:25 - 10:50  
S. Farouq, M. Neytcheva, Comparisons of the Performance of Preconditioned Iterative Solution Methods for Discrete PDE-Constrained Optimization Problems

10:50 - 11:15  
O. Axelsson, R. Blaheta, M. Hasal, T. Luber, Preconditioners for Mixed FEM Solution of Stationary and Nonstationary Problems

Lunch Break

**13:00**  
**DEPARTURE**