

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-Compatible Devices

Lunch Break

Monday, June 8

Parallel Sessions Lecture Hall A

<u>14:00 - 16:05</u>	<i>Special Session on “Enabling Exascale Computation”</i>
Chairperson	D. Keyes
14:00 - 14:25	A. BARKER, D. Kalchev, P. Vassilevski, Resilient and Scalable Variants of Spectral Element Agglomeration Algebraic Multigrid
14:25 - 14:50	J. MOHRING, O. Iliev, R. Milk, O. Klein, A. Ngo, M. Ohlberger, P. Bastian, Uncertainty Quantification for Porous Media Flow Using Multi Level Monte Carlo
14:50 - 15:15	S. MÜTHING, P. Bastian, Algorithmic and Implementation Advances in the EXA-DUNE Project
15:15 - 15:40	Y. Chen, D. Keyes, K. LAW, H. Ltaief, Massively Parallel Dimension Independent Adaptive Metropolis
15:40 - 16:05	D. STOYANOV, Task-Based Hybrid Parallel Sparse Matrix-Vector Multiplication (SpMVM) with the Communication Library GASPI/GPI2

Coffee Break

<u>16:25 - 17:40</u>	<i>Special Session on “Computational Microelectronics – from Monte Carlo to Deterministic Approaches”</i>
Chairperson	I. Dimov
16:25 - 16:50	J. M. SELLIER, I. Dimov, Is Nature a Monte Carlo Algorithm?
16:50 - 17:15	M. THESBERG, M. Pourfath, N. Neophytou, H. Kosina, Thermoelectric Efficiency Improvements through Grain Shape Optimization: A Non-Equilibrium Green’s Function Study
17:15 - 17:40	K. KAPANOVA, J. M. Sellier, I. Dimov, A Monte Carlo Approach to Neural Networks

20:00 *RECEPTION*

Monday, June 8

Parallel Sessions Lecture Hall B

<u>14:00 - 16:05</u>	<i>Special Session on "Control and Uncertain Systems"</i>
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
15:15 - 15:40	G. CAVAGNARI, A. Marigonda, Time-Optimal Control Problem in the Space of Probability Measures
15:40 - 16:05	A. MARIGONDA, T. Le Thi, Sufficient Conditions for STLA for a Class of Control Systems

Coffee Break

<u>16:25 - 18:05</u>	<i>Special Session on "Control and Uncertain Systems"</i>
Chairperson	N. Ribarska
16:25 - 16:50	S. BERNARD, S. Nuiro, A. Pietrus, Diabetes, Complications and Limit Cycles
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 Aharonov-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

<u>09:00 - 10:15</u>	<i>Special Session on "Numerical Methods for Multiphysics Problems"</i>
Chairperson	R. Lazarov
09:00 - 09:25	J. H. ADLER , T. R. Benson, E. C. Cyr, S. P. MacLachlan, R. S. Tuminaro, Monolithic Multigrid Methods for Two-Dimensional Resistive Magnetohydrodynamics
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

<u>10:35 - 11:50</u>	<i>Special Session on "Numerical Methods for Multiphysics Problems"</i>
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

14:00 - 15:40 *Special Session on “Mathematical Modeling and Analysis of PDEs Describing Physical Problems”*

Chairperson O. Iliev

14:00 - 14:25 P. MATUS, D. Schadinsky, V. Tuyen, Two-Side Estimates of Numerical Solution for Nonlinear Parabolic Equations

14:25 - 14:50 V.I. VASIL’EV, A.M. Kardashevsky, Computational Identification of the Right Side of the Parabolic Equations in Problems of Filtration

14:50 - 15:15 S. Srinivasan, R. Lazarov, P. MINEV, A Multiscale Direction-Splitting Algorithm for Parabolic Equations with Highly Heterogeneous Coefficients

15:15 - 15:40 F. GASPAR, F. Lisbona, C. Rodrigo, Flow in Deformable Porous Media

Coffee Break

16:25 - 18:05 *Special Session on “Mathematical Modeling and Analysis of PDEs Describing Physical Problems”*

Chairperson P. Matus

16:25 - 16:50 P. VABISHCHEVICH, Operator-Difference Schemes with a Factorized Operator

16:50 - 17:15 A. VASILIEV, P. Vabishchevich, A. Avvakumov, Finite Element Method for Neutron Diffusion Equations in Hexagonal Geometry

17:15 - 17:40 T. CHERNOGOROVA, L. Vulkov, A Numerical Approach to Price Path Dependent Asian Options

17:40 - 18:05 O. ILIEV, D. Iliev, R. Kirsch, On Solving of Poroelasticity Problems Related to Simulation of Filtration Processes

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

14:25 - 14:50 S. Bauer, D. Pauly, M. SCHOMBURG, The Maxwell Compactness Property for Mixed Boundary Conditions in Weak-Lipschitz Domains

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 Non-linear 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. Ștefănescu, 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)

11:50 - 12:15 M. ANTONOV, T. Naumenkova, A. Popinako, K. Shaitan, Calculation of the Free Energy Profile of Water Molecule in a Lipid Bilayer Using Umbrella Sampling Method

Lunch Break

Thursday, June 11

Parallel Sessions Lecture Hall B

<u>09:00 - 10:15</u>	<i>Special Session on "Efficient Algorithms for Hybrid HPC Systems"</i>
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

<u>10:35 - 12:15</u>	<i>Special Session on "Efficient Algorithms for Hybrid HPC Systems"</i>
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
11:25 - 11:50	E. Atanasov, T. GUROV, A. Karaivanova, Energy Performance Evaluation of Quasi-Monte Carlo Algorithms (on Hybrid HPC)
11:50 - 12:15	E. Atanassov, M. DURCHOVA, Generating the Modified Halton Sequences Using Xeon Phi Coprocessors

Lunch Break

Thursday, June 11

Parallel Sessions Lecture Hall A

<u>14:00 - 15:40</u>	<i>Special Session on “Multilevel Methods on Graphs”</i>
Chairperson	L. Zikatanov
14:00 - 14:25	D. LaSalle, G. KARYPIS, Multi-Threaded Algorithms for Multilevel Graph Partitioning, Clustering, and Nested Dissection Ordering
14:25 - 14:50	G. Chapuis, H. DJIDJEV, Shortest-Path Queries in Planar Graphs on GPU-Accelerated Architectures
14:50 - 15:15	P. D’AMBRA, P. Vassilevski, Adaptive AMG Solvers Based on Weighted Matching in Graphs
15:15 - 15:40	C. PONCE, A Multigrid Method for Scale-Free Networks: Addressing Degree Explosion

Coffee Break

<u>16:25 - 18:05</u>	<i>Special Session on “Numerical Methods for Multiphysics Problems”</i>
Chairperson	X. Hu
16:25 - 16:50	R. FALGOUT, A Non-Intrusive Parallel Time Integration Method Based on Multigrid Reduction
16:50 - 17:15	C. RODRIGO, Multigrid Solvers for the Biot’s Consolidation Problem
17:15 - 17:40	K. DANOV, Application of the Mehler-Fock Integral Transform to the Solution of Electrostatic Problems
17:40 - 18:05	R. LAZAROV, Numerical Upscaling and Preconditioning of Flows in Highly Heterogeneous Porous Media

19:30 *CONFERENCE DINNER*

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

Friday, June 12

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