

# Monday, August 20

## Lecture Hall A

Plenary Session

09:00–09:15 **Opening**

Chairperson **I. Dimov**

09:15–10:00 **Jean-Claude Latché**

*A Class of Staggered Schemes for Euler Equations* (.pdf)

10:00–10:45 **Jun Hu**

*Adaptive and Multilevel Mixed Finite Element Methods* (.pdf)

10:45–11:15 Coffee Break

SS3: Numerical Methods for Fractional Diffusion Problems

Chairperson **R. Lazarov**

11:15–11:50 **Joseph E. Pasciak** (Keynote Lecture)

*Numerical Approximation of Fractional Powers of Elliptic Operators*

11:50–12:15 S. Harizanov, R. Lazarov, **S. Margenov**, P. Marinov, Y. Vutov

*BURA: Robust Solution Methods for Fractional Diffusion Problems*

12:15–12:40 **Zhi Zhou**

*High-Order Time Stepping Schemes for Fractional Evolution Equations*

## Monday, August 20

### Lecture Hall A

#### SS3: Numerical Methods for Fractional Diffusion Problems

Chairperson **Zhi Zhou**

- 14:30–14:55 **Yubin Yan**  
*High Order Fractional Adams Method with Graded Meshes* ([.pdf](#))
- 14:55–15:20 **Abdallah Bradji**  
*A Second Order Time Accurate SUSHI Method for the Time-Fractional Diffusion Equation*
- 15:20–15:45 Francisco J. Gaspar, Xiaozhe Hu, **Carmen Rodrigo**  
*Multigrid with Space-Time Concurrency for Solving the Time-Fractional Heat Equation* ([.pdf](#))
- 15:45–16:10 **Petr N. Vabishchevich**  
*Identification of the Right-Hand Side of an Equation with a Fractional Power of an Elliptic Operator* ([.pdf](#))
- 16:10–16:40 Coffee Break

Chairperson **P. Vabishchevich**

- 16:40–17:05 **Stanislav Harizanov**  
*Positive Approximations of the Inverse of Fractional Powers of SPD  $M$ -matrices*
- 17:05–17:30 Abdallah Bradji, **Tarek Ghoudi**  
*Some Convergence Results of a Multidimensional Finite Volume Scheme for a Semilinear Parabolic Equation with a Time Delay*
- 17:30–17:55 **Vladimir Vasilyev**  
*On Approximate Solution of Pseudo-Differential Equations*
- 17:55–18:20 B. Duan, **R. D. Lazarov**, J. H. Pasciak  
*Numerical Approximation of Fractional Powers of Elliptic Operators* ([.pdf](#))

## Monday, August 20

### Lecture Hall B

#### SS1: Numerical Search and Optimization

Chairperson **S. Fidanova**

- 11:15–11:50 **Kalin Penev** (Keynote Lecture)  
*Factors for Search Methods Scalability*
- 11:50–12:15 **Adis Alihodzic**, Damir Hasic, Elmedin Selmanovic  
*An Effective Guided Fireworks Algorithm for Solving UCAV Path Planning Problem*
- 12:15–12:40 **Paul Bourne**, Neville Palmer, Jan Skrabala  
*Quantifying the Effectiveness of First-hop Redundancy Protocols in IP Networks*  
(.pdf)

Chairperson **K. Penev**

- 14:30–14:55 **Stefka Fidanova**, Olympia Roeva  
*InterCriteria Analysis of Different Variants of ACO Algorithm for Wireless Sensor Network Positioning*
- 14:55–15:20 **Georgi Evtimov**, Stefka Fidanova  
*Subtraction of Two 2D Polygons with Some Matching Vertices*
- 15:20–15:45 Vladimir Myasnichenko, Nikolay Sdobnyakov, Leoneed Kirilov, **Rossen Mikhov**, Stefka Fidanova  
*Monte-Carlo Approach for Optimizing of Metal Nanowires and Nanoalloys Structure* (.pdf)
- 15:45–16:10 **Velislava Stoykova**  
*Statistical Analysis of Conjunctive Adverbs Used in the First Bulgarian School Books in Mathematics (from the First Half of XIX C.)*
- 16:10–16:40 Coffee Break

Chairperson **S. Fidanova**

- 16:40–17:05 **Ján Buša**, Miroslav Dovica, Lukáš Kačmár  
*Identification of a Coordinate System of Three Triangulation Sensors in a Plane*
- 17:05–17:30 **Tatiana F. Filippova**  
*Description of Dynamics of Ellipsoidal Estimates of Reachable Sets of Nonlinear Control Systems with Bilinear Uncertainty* (.pdf)
- 17:30–17:55 Ivan D. Gospodinov, **Stefan M. Filipov**, Atanas V. Atanassov  
*Solving Function Approximation Problems Using the  $L_2$ -Norm of the Log Ratio as a Metric*
- 17:55–18:20 **K. G. Kapanova**, I. T. Dimov  
*Extreme Learning Machines: a Sensitivity Analysis Perspective in the Presence of Random Fluctuations*
- 18:20–19:00 Poster Session

## Monday, August 20

### Lecture Hall B

#### SS2: Problem-driven Numerical Method: Motivation and Application

Chairperson **Jun Hu**

- 09:00–09:35 **Yunfeng Xiong** (Keynote Lecture)  
*Efficient Implementation of the Wigner Branching Random Walk Algorithms*
- 09:35–10:00 **Huazhong Tang**  
*2D Special Relativistic Hydrodynamics* ([.pdf](#))
- 10:00–10:25 **Guoxian Chen**  
*An Well Balanced and Positive Preserving Scheme for Euler Equations with Gravity*
- 10:25–10:50 Philippe Devloo, Rong-Hong Fan, **Chen-Song Zhang**  
*A Multiscale Hybrid Mixed Finite Element Method for Discrete Fracture Networks*  
([.pdf](#))
- 10:45–11:15 Coffee Break

Chairperson **S. Shao**

- 11:15–11:40 **Zhenzhu Chen**, Sihong Shao, Wei Cai  
*An Accurate Four-Dimensional Wigner Simulator with Applications in Double-Slit Interference*
- 11:40–12:05 **Zhaocheng Xuan**  
*The Statistical Property in Finite Element Model of Elastic Contact Problems* ([.pdf](#))
- 12:05–12:30 **Călin-Ioan Gheorghiu**  
*Spectral Collocation Solutions to a Class of Pseudo-Parabolic Equations* ([.pdf](#))
- 12:30–12:55 Johannes Kraus, **Svetoslav Nakov**, Sergey Repin  
*Guaranteed Bounds on the Error in Energy Norm for the Nonlinear Poisson–Boltzmann Equation*

## Monday, August 20

### Lecture Hall B

#### Contributed Talks

Chairperson **G. Dimitriu**

- 14:30–15:05 **Wil Schilders** (Keynote Lecture)  
*Recent Developments in Model Order Reduction* ([.pdf](#))
- 15:05–15:30 **Dimitar Slavchev**, Svetozar Margenov  
*Analysis of Hierarchical Compression Based Solver from STRUMPACK for BEM Problem on Intel Xeon CPUs* ([.pdf](#))
- 15:30–15:55 **Tihomir Ivanov**, Galina Lyutskanova–Zhekova, Zdravka Nedyalkova, Vasil Pashov, Maria Zarcheva  
*Parametric Identification and Post-Processing in Wind Power Forecasting Problems* ([.pdf](#))
- 15:55–16:20 **Galina Lyutskanova–Zhekova**, Krassimir Danov  
*Effect of Ionic Strength on the Electro-Dipping Force* ([.pdf](#))
- 16:10–16:40 Coffee Break

Chairperson **W. Schilders**

- 16:40–17:05 **Gabriel Dimitriu**  
*A Global Sensitivity Analysis for a Chronic Myelogenous Leukemia Model with T Cell Interaction*
- 17:05–17:30 **Milen K. Borisov**, Neli S. Dimitrova, Mikhail I. Krastanov  
*Model-Based Stabilization of a Fermentation Process Using Output Feedback with Discrete Time Delay*
- 17:30–17:55 **Maxim Bashashin**, Elena Zemlyanaya, Mikhail Kiselev  
*Parallel SFF-SANS Study of Structure of Polydispersed Vesicular Systems*
- 17:55–18:20 **Mark Houghton**, Mark Walkley, David Head  
*A Numerical Model For Random Fibre Networks*

**Tuesday, August 21**

**Lecture Hall B**

**SS5: Monte Carlo and Quasi-Monte Carlo Methods**

Chairperson **R. Kruse**

- 09:00–09:35 **Stefan Heinrich** (Keynote Lecture)  
*Complexity Theory for Strong Approximation of Stochastic Problems*
- 09:35–10:00 **Monika Eisenmann**, Raphael Kruse  
*Two Quadrature Rules for Stochastic Itô-Integrals with Fractional Sobolev Regularity*
- 10:00–10:25 **David Cohen**  
*A Fully Discrete Approximation of the One-Dimensional Stochastic Heat Equation*
- 10:25–10:50 Michael Griebel, Aicke Hinrichs, Jens Oettershagen, **Mario Ullrich**  
*Integration of Smooth Functions Using Random Point Sets*
- 10:45–11:15 Coffee Break

Chairperson **S. Heinrich**

- 11:15–11:40 **Stefan Geiss**, Thuan Nguyen  
*Quantitative Discretization of Stochastic Integrals and Fractional Bounded Mean Oscillation*
- 11:40–12:05 **Aicke Hinrichs**, David Krieg  
*How Good Is Random Information? – Approximation in the Hilbert Space Setting*  
(.pdf)

**Tuesday, August 21**

**Lecture Hall B**

*SS5: Monte Carlo and Quasi-Monte Carlo Methods*

Chairperson **S. Heinrich**

- 14:30–14:55 **Christel Geiss**, Céline Labart, Antti Luoto  
*Random Walk Approximation of Forward-Backward SDEs and Their Associated PDEs*
- 14:55–15:20 **Paweł Przybyłowicz**  
*Path-(in)dependent Adaptive Step-Size Control for SDEs with Jumps*
- 15:20–15:45 Andrzej Kałuża, **Paweł M. Morkisz**, Paweł Przybyłowicz  
*Analytic Noise Model for Efficient Approximation of Itô Integrals*
- 15:45–16:10 Murat Sari, **Hande Uslu**  
*Monte Carlo Based Stochastic Approach for Some Nonlinear ODE Systems (.pdf)*
- 16:10–16:40 Coffee Break

**Contributed Talks**

Chairperson **T. Ostromski**

- 16:40–17:05 I. Dimov, J. Kandilarov, **V. Todorov**, L. Vulkov  
*Numerical Analysis of a Pollutant and Environment Interaction Model*
- 17:05–17:30 **Hristo Chervenkov**, Kiril Slavov  
*STARDEX and ETCCDI Climate Indices Based on E-OBS and CARPATCLIM. Part One: General Description (.pdf)*
- 17:30–17:55 Hristo Chervenkov, **Kiril Slavov**, Vladimir Ivanov  
*STARDEX and ETCCDI Climate Indices Based on E-OBS and CARPATCLIM. Part Two: ClimData in Use (.pdf)*
- 17:55–18:20 D. Syrakov, E. Georgieva, M. Prodanova, E. Hristova, K. Slavov, **Blagorodka Veleva**  
*Application of WRF-CMAQ Model System for Analysis of Atmospheric Deposition over Bulgaria (.pdf)*

**Wednesday, August 22**

**Lecture Hall A**

**Plenary Session**

Chairperson **S. Margenov**

09:00–09:45 **Francisco J. Gaspar**

*Stabilized Finite Element Discretizations for Poroelasticity* ([.pdf](#))

09:45–10:30 **Raphael Kruse**

*Error Analysis of Randomized Time-Stepping Methods for Non-autonomous Evolution Equations with Time-Irregular Coefficients* ([.pdf](#))



**Thursday, August 23**

***Lecture Hall A***

**SS1: Numerical Search and Optimization**

Chairperson **S. Fidanova**

- 09:00–09:25 **Lukas Gnam**, Siegfried Selberherr, Josef Weinbub  
*Evaluation of Serial and Parallel Shared-Memory Distance-1 Graph Coloring Algorithms*
- 09:25–09:50 **Zbigniew Kokosinski**, Marcin Pijanowski  
*Application of Parallel and Hybrid Metaheuristics for Graph Partitioning Problem* ([.pdf](#))
- 09:50–10:15 **Sihong Shao**  
*Lovász Extension and Graph Cut*
- 10:15–10:40 **Nina Dobrinkova**, Momchil Panayotov, Peter Boyvalenkov  
*Optimisation Techniques in Wildfire Simulations. Test Case Kresna Fire August 2017*
- 10:45–11:15 Coffee Break

Chairperson **K. Penev**

- 11:15–11:40 **Velichka Traneva**, Stoyan Tranev, Vassia Atanassova  
*An Intuitionistic Fuzzy Approach to the Hungarian Algorithm* ([.pdf](#))
- 11:40–12:05 Velichka Traneva, **Vassia Atanassova**, Stoyan Tranev  
*Index Matrices as a Decision-Making Tool for Job Appointment* ([.pdf](#))
- 12:05–12:30 **Maria Angelova**, Olympia Roeva, Tania Pencheva  
*Cuckoo Search Algorithm for Parameter Identification of Fermentation Process Model*
- 12:30–12:55 Todor Balabanov, Janeta Sevova, **Kolyu Kolev**  
*Optimization of String Rewriting Operations for 3D Fractal Generation with Genetic Algorithms* ([.pdf](#))

**Thursday, August 23**

**Lecture Hall A**

**SS4: Orthogonal Polynomials and Numerical Quadratures**

Chairperson **M. Petkova**

- 14:30–14:55 **Ana Avdzhieva**, Vesselin Gushev, Geno Nikolov  
*Definite Quadrature Formulae of Order Three Based on the Rectangles Quadrature Formula*
- 14:55–15:20 **Rumen Uluchev**, Geno Nikolov  
*Bounds for the Extreme Zeros of the Laguerre Polynomials* (.pdf)
- 15:20–15:45 **Geno Nikolov**  
*New Bounds for the Extreme Zeros of Classical Orthogonal Polynomials* (.pdf)
- 15:45–16:10 Morten A. Nome, **Tor Sørøvik**  
*Discrete Fourier Analysis on Lattice Grids* (.pdf)
- 16:10–16:40 Coffee Break

Chairperson **G. Nikolov**

- 16:40–17:05 Petko D. Proinov, **Milena D. Petkova**  
*A New Local Convergence Theorem for a Family of Multi-Point Weierstrass Type Root-Finding Methods* (.pdf)
- 17:05–17:30 Petko D. Proinov, **Maria T. Vasileva**  
*Local Convergence of a Family of Gargantini–Farmer–Loizou Type Iterative Methods for Simultaneous Approximation of Multiple Polynomial Zeros* (.pdf)
- 17:30–17:55 **Slav I. Cholakov**  
*Wang–Zheng’s Method for Simultaneous Finding Polynomial Zeros* (.pdf)
- 17:55–18:20 E. Ayriyan, **M. D. Malykh**, L. A. Sevastianov, Yu Ying  
*Finite Difference Schemes and Classical Transcendent Functions* (.pdf)

**Thursday, August 23**

**Lecture Hall B**

**Contributed Talks**

Chairperson **T. Chernogorova**

- 09:00–09:25 **V. Vucheva**, N. Kolkovska  
*Symplectic Algorithms for Boussinesq Equation*
- 09:25–09:50 **S. Chandra Sekhara Rao**, Varsha Srivastava  
*Alternate Overlapping Schwarz Method for Singularly Perturbed Semilinear Convection-Diffusion Problems (.pdf)*
- 09:50–10:15 **Juri Kandilarov**, Luben Vulkov  
*Front Fixing Finite Difference Method for Pricing a Corporate Bond with Credit Rating Migration*
- 10:15–10:40 **Miglena N. Koleva**, Lubin G. Vulkov  
*Positivity Preserving Numerical Method for Optimal Portfolio in a Power Utility Two-Dimensional Regime-Switching Model*
- 10:45–11:15 Coffee Break

Chairperson **M. Koleva**

- 11:15–11:40 **Aušra Gadeikytė**, Rimantas Barauskas  
*Computer Simulation of Heat Exchange through 3D Fabric Layer (.pdf)*
- 11:40–12:05 D. V. Divakov, M. D. Malykh, **L. A. Sevastianov**, A. A. Tiutiunnik  
*On the Calculation of Electromagnetic Fields in Closed Waveguides with Inhomogeneous Filling*
- 12:05–12:30 **Daniela Georgieva**, Lubomir Kovachev  
*Mathematical Modeling of Nonlinear Polarization Rotation and THz Generation of Femtosecond Laser Pulses in Isotropic Media*
- 12:30–12:55 B. Batgerel, I. V. Puzynin, T. P. Puzynina, **Z. K. Tukhliev**, I. G. Hristov, R. D. Hristova, Z. A. Sharipov  
*Molecular-Dynamic Modeling of Long-Range Effect in Metals Exposed to Nanoclusters*

**Thursday, August 23**

***Lecture Hall B***

**SS5: Monte Carlo and Quasi-Monte Carlo Methods**

Chairperson **A. Asenov**

- 14:30–14:55 **Stig Larsson**  
*On the Convergence of Numerical Approximations of the Stochastic Cahn–Hilliard Equation*
- 14:55–15:20 **David Krieg**, Daniel Rudolf  
*Recovery Algorithms for High-Dimensional Rank One Tensors (.pdf)*
- 15:20–15:45 **Tzvetan Ostromsky**, Ivan Dimov, Venelin Todorov, Zahari Zlatev  
*Sensitivity Analysis of an Air Pollution Model by Using Quasi-Monte Carlo Algorithms for Multidimensional Numerical Integration*
- 16:10–16:40 Coffee Break

Chairperson **M. Nedjalkov**

- 16:40–17:15 C. Medina-Bailon, T. Sadi, C. Sampedro, J. L. Padilla, L. Donetti, V. Georgiev, F. Gamiz, **A. Asenov** (Keynote Lecture)  
*Impact of the Trap Attributes on the Gate Leakage Mechanisms in a 2D MS-EMC Nanodevice Simulator*
- 17:15–17:40 **Majid Benam**, Mihail Nedjalkov, Siegfried Selberherr  
*A Wigner Potential Decomposition in the Signed-Particle Monte Carlo Approach (.pdf)*
- 17:40–18:05 **Toufik Sadi**, Asen Asenov  
*Microscopic KMC Modelling of Oxide RRAMs*

**Friday, August 24**

**Lecture Hall B**

**Contributed Talks**

Chairperson **L. A. Sevastianov**

- 09:00–09:25 Agnieszka Bielińska, Mikołaj Majkowicz, **Dorota Bielińska-Wąż**, Piotr Wąż  
*Interdisciplinary Aspects of the Classification Studies*
- 09:25–09:50 Agnieszka Bielińska, Mikołaj Majkowicz, **Piotr Wąż**, Dorota Bielińska-Wąż  
*Similarity Studies in Different Areas of Science*
- 09:50–10:15 **Andrius Vytautas Misiukas Misiūnas**, Tadas Meškauskas, Rūta Samaitienė  
*Accuracy of Different Machine Learning Type Methodologies for EEG Classification  
by Diagnosis* ([.pdf](#))
- 10:45–11:00 **Closing**

**Friday, August 24**

**Lecture Hall C**

**Contributed Talks**

Chairperson **M. Malykh**

- 09:00–09:25 P. Kh. Atanasova, **S. A. Panayotova**, Yu. M. Shukrinov, I. R. Rahmonov, E. V. Zemlyanaya  
*Numerical Simulation of the Stiff System of Equations within the Spintronic Model*
- 09:25–09:50 Asuman Zeytinoglu, **Murat Sari**  
*Some Difference Algorithms for Nonlinear Klein–Gordon Equations*
- 09:50–10:15 **Asuman Zeytinoglu**, Murat Sari  
*New Algorithms for the Sine–Gordon Equation*