

# 13<sup>th</sup> Annual Meeting of the Bulgarian Section of SIAM

## BGSIAM'18

### SCIENTIFIC PROGRAM

Tuesday, December 18

08:30 – 09:00 **Registration**

09:00 – 09:20 **Opening**

Chairperson: Svetozar Margenov

09:20 – 10:00 Blagovest Sendov and Hristo Sendov, *Algorithmic problems in the geometry of polynomials*

10:00 – 10:30 **Coffee break**

Chairperson: Maya Neytcheva

10:30 – 11:10 Mauro Ballicchia, Josef Weinbub, Ivan Dimov, and Mihail Nedjalkov, *Recent Advances of the Wigner Signed-Particle Approach*

11:10 – 11:50 Vesselin Iossifov, *Programming Techniques for Energy-efficient Software*

11:50 – 12:20 **BGSIAM business meeting** (SIAM members only)

12:10 – 13:30 **Lunch time**

Chairperson: Mihail Nedjalkov

13:30 – 13:50 Majid Benam, Maciej Wołoszyn, Siegfried Selberherr, *Self-consistent Monte Carlo Solution of Wigner and Poisson Equations Using an Efficient Multigrid Approach*

13:50 – 14:10 Owe Axelsson, Maya Neytcheva, Anders Ström, Johanna Brodin, Ivo Dravins, André Falgin, *On the numerical solution of state- and control-constrained optimal control problems*

14:10 – 14:30 Stanislav Harizanov, Raytcho Lazarov, Svetozar Margenov, Nedyu Popivanov, *Spectral Fractional Laplacian with Inhomogeneous Dirichlet Data: Questions, Problems, Solutions*

14:30 – 14:50 Tatiana Gateva-Ivanova, *The braided group of a square-free solution of the Yang-Baxter equation*

14:50 – 15:10 Tsonka Baicheva, Violeta Dutcheva, Nikolay Nikolov, *Simulation model for investigation of the efficiency of an artificial immune algorithm for generation of S-boxes with good cryptographic properties*

15:10 – 15:30 **Coffee break**

Chairperson: Gergana Bencheva

15:30 – 15:50 Tzvetan Ostromsky, *Critical Points in the Optimization of a Parallel Code for Air Pollution Modelling*

15:50 – 16:10 Hristo Chervenkov, Valery Spiridonov, Kiril Slavov, *Modelled versus Satellite Retrieval Estimation of the Direct Normal Irradiance and the Sunshine Duration over Bulgaria*

16:10 – 16:30 Nina Dobrinkova, Adrián Cardil, *The use of Wildfire Analyst in Bulgaria - a fire simulator to analyze fire progression in real-time. The Kresna case study (2017)*

16:30 – 17:00 Poster Slam

**17:00 – 18:00 Poster session**

**18:00 – 19:00 Welcome drink**

### **Wednesday, December 19**

Chairperson: Nikolaj Kutev

09:00 – 09:40 Owe Axelsson, *An inner-product free iteration method for an equation of motion and for a bound-constrained optimal control PDE problem*

09:40 – 10:20 Bangti Jin, Raytcho Lazarov, Joseph Pasciak, and Zhi Zhou, *Recent advances in numerical methods for fractional differential equations with non-smooth data: a concise overview*

10:20 – 10:40 **Coffee break**

Chairperson: Hristo Kostadinov

10:40 – 11:00 Nikolay Vitanov, Kaloyan Vitanov, Zlatinka Dimitrova, *Study of a flow of reacting substances in a channel of network*

11:00 – 11:20 Kristina Kapanova, Velislava Stoykova, *Comparative Study of Social Network Interactions in Unexpected Event: the Cases of Journalists Jan Kuciak and Viktoria Marinova*

11:20 – 11:40 Nikolay Nikolov, Eugenia Stoimenova, *Rank data clustering based on Lee distance*

11:40 – 12:00 Violeta Ivanova-Rohling, *Theoretical Properties of Exploration and Exploitation of the Neighborhood-based Widening Approaches*

12:00 – 12:20 Snezhana Hristova, Radoslava Terzieva, *Lipschitz stability of neural networks with non-instantaneous impulses*

12:20 – 13:30 **Lunch time**

Chairperson: Raytcho Lazarov

13:30 – 13:50 Alina Streche-Pauna, A. Florian, Vladimir Gerdjikov, *On the spectral properties of Lax operators and soliton equations*

13:50 – 14:10 Natalia Kolkovska, Milena Dimova, Nikolaj Kutev, *Finite time blow up of the solutions to nonlinear double dispersive equation with supercritical energy*

14:10 – 14:30 Veselina Vucheva, Natalia Kolkovska, *A Symplectic Numerical Method for Sixth Order Boussinesq Equations*

14:30 – 14:50 Miglena Koleva, Lubin Vulkov, *Iterative Implicit Schemes for Compaction-Driven Darcy Flow Viscoelastic Rock Magma*

14:50 – 15:10 Slavi Georgiev, Lubin Vulkov, *Numerical Determination of Time-Dependent Implied Volatility by Point and Integral Observations*

15:10 – 15:30 Konstantinos Liolios, Krassimir Georgiev, Ivan Georgiev, *A Monte Carlo based stochastic numerical approach for contaminant removal in constructed wetlands*

15:30 – 16:00 **Coffee break**

Chairperson: Petia Koprinkova-Hristova

16:00 – 16:20 Stefka Fidanova, Krassimir Atanassov, *Generalized Net Model for Flying Ant Colony Optimization*

16:20 – 16:40 Ivan Georgiev, Andrey Gizdov, Stanislav Harizanov, Silviya Nikolova, Diana Toneva, *Digital Cranial Suture Analysis with Application in Age Estimation*

16:40 – 17:00 Nikolay Ikononov, Pencho Marinov, Peter Vassilev, Olympia Roeva, Dafina Zoteva, Vassia Atanassova, Krassimir Atanassov, *MkBGFire -- Game Modelling of Forest Fires in Bulgaria*

17:00 – 17:20 Dessislava Jereva, Tania Pencheva, Ivanka Tsakovska, Petko Alov, Ilza Pajeva, *Exploring Applicability of InterCriteria Analysis on the Performance of MOE and GOLD Scoring Functions*

17:20 – 17:40 Vladimir Myasnichenko, Stefka Fidanova, Rossen Mikhov, Leoneed Kirilov, Nikolay Sdobnyakov, *Influence of the temperature on Simulated Annealing Method for Metal Nanoparticle Structures Optimization*

17:40 – 18:00 Alexander Alexandrov, Vladimir Monov, *Design of a multi-objective optimization model for wireless sensor networks*

**18:30 Dinner**

**Thursday, December 20**

**Chairperson:** Vesselin Iossifov

09:00 – 09:20 Stefan Stefanov, *Desktop application for operational teams support activities suggested in eOUTLAND project*

09:20 – 09:40 Toddor Velez, Nina Dobrinkova, *The logical model of unify, innovative Platform for Automation and Management of Standards (PAMS)*

09:40 – 10:00 Biser Tsvetkov, Hristo Kostadinov, *Using DLT in Software Lifecycle Management*

10:00 – 10:20 Zlatogor Minchev, *Multicriteria Assessment Approach for Future Digital Security Trends Dynamics*

10:20 – 10:40 **Coffee break**

**Chairperson:** Zlatogor Minchev

10:40 – 11:00 Stanislav Harizanov, Yavor Vutov, *High-Resolution Digital Image Processing*

11:00 – 11:20 Leoneed Kirilov, Petar Georgiev, *Multicriteria Approach for Solving Engineering Robust Design Problems*

11:20 – 11:40 Georgi Evtimov, *Increase Speed of algorithm for Subtract of two 2D polygons. Comparing with commercial product and Genetic algorithm*

11:40 – 12:00 Lubomir Markov, *Several results concerning the Barnes G-function, a cosecant integral, and some other special functions*

12:00 – 12:20 Stoyan Apostolov, Miroslav Stoenchev, Venelin Todorov, *One parameter family of elliptic curves and the equation  $x^4+y^4+kx^2y^2=z^2$*

12:20 – 13:30 **Lunch time**

**Chairperson:** Ivan Georgiev

13:30 – 13:50 Svilen Popov, Vassil Vassilev, *Symmetries and Conservation Laws of the Timoshenko Beam Equations for Double-Wall Carbon Nanotubes*

13:50 – 14:10 Svetoslav Nikolov, Vasil Vasilev and Daniela Zaharieva, *Analysis of Swing Oscillatory Motion*

14:10 – 14:30 Nikola Nikolov, Sonia Tabakova, Stefan Radev, *Blood flow instabilities related to the elasticity and asymmetry of an abdominal aorta aneurysm*

14:30 – 14:50 Petia Koprinkova-Hristova, Nadejda Bocheva, *Spike Timing Neural Model of Eye Movement Motor Response with Reinforcement Learning*

14:50 – 15:10 Vladimir Ivanov and Hristo Chervenkov, *Modelling Human Biometeorological Conditions Using Meteorological Data from Reanalysis and Objective Analysis -Preliminary Results*

15:10 – 15:20 **Closing**

### **List of posters:**

1. Slav Angelov, Eugenia Stoimenova, *Cross-validated sequentially constructed multiple regression with centered right side*
2. Vera Angelova, *Non-local non-linear perturbation analysis for a nonlinear matrix equation arising in Tree-Like stochastic processes*
3. Todor Balabanov, Iliyan Zankinski, Kolyu Kolev, *Multilayer Perceptron Training Randomized by Second Instance of Multilayer Perceptron*
4. Milen Borisov, Neli Dimitrova, Mikhail Krastanov, *Maximizing the Biogas Production of a Fermentation Process Using Output Feedback with Discrete Time Delay*
5. St. Bushev, *Solidification process in 3D printing*
6. Miroslav Dimitrov, *Blind Partial Key Exposure Attack on RSA Using 2-Dimensional Lattices*
7. Ivan Dimov, Juri Kandilarov, Lubin Vulkov, *Numerical Identification of the Time Dependent Vertical Diffusion Coefficient in a Model of Air Pollution*
8. Jordan Genoff, *On Some Sources of Inaccuracy in Classical Molecular Dynamics Simulations*
9. Atanaska Georgieva, Albena Pavlova, Lozanka Trenkova, *Homotopy analysis method to solve two-dimensional nonlinear Volterra-Fredholm fuzzy integral equations*
10. Nevena Ilieva, Elena Lilkova, Peicho Petkov, Leandar Litov, *Tracing point-mutation implications in human interferon-gamma variants*
11. Vladyslav Kyrychok, Roumen Iankov, Maria Datcheva, Petr Yukhymets, *Mathematical modeling and numerical simulation of nanoindentation accounting for material heterogeneity*
12. Lingyun Li, Maria Datcheva, *Coupled hydro-mechanical finite element simulation of loess slope under atmospheric boundary conditions*
13. Elena Lilkova, Nevena Ilieva, Peicho Petkov, Elena Krachmarova, Gevoveva Nacheva, Leandar Litov, *Molecular dynamics simulations of His<sub>6</sub>-FLAG-hIFN $\gamma$  fusion glycoproteins*
14. Maya Mikrenska, Jean-Baptiste Renard, *Monte Carlo simulation of light scattering by hexagonal prisms with rough surface*
15. Iva Naydenova, *Numerical solution of nonlinear Fredholm fuzzy integral equation by fuzzy neural network*
16. Elena Nikolova, Denislav Serbezov, Ivan Jordanov, Nikolay Vitanov, *Non-linear waves of interacting populations with density--dependent diffusion*
17. Ludmila Parashkevova, Ludmil Drenchev, Pedro Egizabal, *Mechanical properties assessments for cellular materials and light alloys with predominant embedded phases*
18. Evgenija Popova, Isaac Elishakoff, *Novel Application of Interval Analysis in Strength of Materials*
19. Dimitar Slavchev, Svetozar Margenov, *Performance analysis of hierarchical semi-separable compression solver for fractional diffusion problems*
20. Velichka Traneva, Stoyan Tranev, *InterCriteria Analysis of the Human Factor Assessment in a Mobile Company*
21. Krassimira Vlachkova, *Convergence of the minimum  $L_p$ -norm networks as  $p \rightarrow \infty$*

### **Project presentation:**

*Center of Excellence in Informatics and Information and Communication Technologies*

**The event will take place at the Institute of Mechanics, Bulgarian Academy of Sciences**

**Acad. Geogri Bonchev Str., Bl. 4, Room 510**

