



52nd International Conference

Applications of Mathematics in Engineering and Economics | 06 - 12 June 2026



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SCIENTIFIC PROGRAM

OF THE 52nd INTERNATIONAL CONFERENCE
APPLICATIONS OF MATHEMATICS IN ENGINEERING AND ECONOMICS
SOZOPOL, JUNE 6-12, 2026

June 7, 2026 (Sunday)

Hall 1: Invited talks

Chairperson: Desislava Ivanova

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|-------------|--|
| 10:00-10:15 | Official Opening |
| 10:30-11:00 | Virginia Kiryakova, Generalized Fractional Calculus with Special Functions Originated from Statistical Physics |
| 11:00-11:30 | Stefan Ivanov, Extremals of the Folland-Stein-Sobolev Inequality and the Obata's Type PDE on Quaternionic Contact Setting |
| 11:30-12:00 | Ravshan Ashurov, Uniqueness in the Inverse Problem of Determining the Order and Temporal Factor of the Source Term in Evolution Equations |
| 12:00-12:30 | Mariana Durcheva, Quantum Perspectives on Tropical Cryptography |
| 12:30-13:00 | Murat Gülmez, The Last Competitive Advantage: Human Capital in a Digital World |

Lunch Break

Hall 1: Digitalization and Innovation in Pedagogy

Chairperson: Ivaylo Peev

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|-------------|--|
| 15:00-15:20 | Yoana Pavlova, Innovative Pedagogical Approaches in Education: The Sociological Game "Sociologist in Action" |
| 15:20-15:40 | Ivaylo Peev, Emotional Intelligence as Pedagogical Capital |
| 15:40-16:00 | Todor Todorov, Broken Promises: Education, Inequality and the SDGs |
| 16:00-16:20 | Maria Todorova, Evolving Circular Pedagogy: A Framework for Immersive Transdisciplinary Learning |
| 16:20-16:40 | Radostina Veleva, Neurodiverse Ecosystems and Integrated Skills in Education: A Critical Inquiry into Design and Practice |

Hall 2: Young Researcher Session: Applied Mathematics, Big Data and Artificial Intelligence

Chairperson: Anna Rozeva

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|-------------|--|
| 15:00-15:20 | Ivan Neychev and Anna Rozeva, Nowcasting with Dynamic Confidence Intervals |
| 15:20-15:40 | Marieta Marinova, Mathematical Model for VAT Regime Optimization: SME Scheme vs One-Stop Shop Decision Support for EU Micro-Enterprises |
| 15:40-16:00 | Kaloyan Nenchev, Fiscal Shocks and Currency Board Stability: Evidence from Bulgaria (1997–2025) |
| 16:00-16:20 | Dimitar Toshev, Scenario-Based Fraud and Cyber Risk Assessment in High School |
| 16:20-16:40 | Vasil Ganev, PrepAired: Intelligent Platform for Interview Preparation and Simulation |

Welcome Drinks – 19:30 pm, TU-Sofia Summer House, Sozopol

June 8, 2026 (Monday)

Hall 1: Advances in Quantum Computing, Machine Learning, and Image Processing

Chairperson: Ali Moghiseh

- 10:00-10:20 Ana-Maria Pangeva, Yassine Ferhi, Ali Moghiseh, Alexander Geng, Desislava Ivanova and Andreas Weinmann, **Schmidt Decomposition-Based Methods for Efficient Quantum Image Encoding**
- 10:20-10:40 Ivana Bazhdarova and Desislava Ivanova, **Hybrid Quantum-Safe Banking Architecture with Quantum-Assisted Fraud Detection**
- 10:40-11:00 Kliment Chakarovski and Desislava Ivanova, **Quantum Computational Analysis of BRCA1 Mutations: A Structural and Functional Perspective**
- 11:00-11:20 Kliment Chakarovski and Desislava Ivanova, **Quantum Magnetometry for Biomagnetic Detection in Uncontrolled Environments: Noise Analysis and Sensing Limits**
- Coffee Break**
- 11:40-12:00 Desislava Ivanova, Martin Hristov, Mihaela Stoycheva and Vesela Krumova, **Hybrid Quantum LLM system for Biomedical Big Data Analytics: A Performance Comparison with Quantum Classifiers**
- 12:00-12:20 Maria Marinova and Desislava Ivanova, **A Quantum-Ready Streaming Preprocessing and Adaptive Routing Layer for Hybrid Quantum-Classical Analysis of Big Streaming Data**
- 12:20-12:40 Ivan Ivanov and Zlatko Zahariev, **Domain-Informed Fuzzy Encoding for Quantum Kernel Methods in a NISQ Setting: A Breast Cancer Coimbra Case Study**
- 12:40 - 13:00 A. Weinmann, T. Lenhard, T. Koch, **Machine-learning Based Detection of Drones Detection**

Hall 2: Young Researcher Session: Applied Mathematics, Big Data and Artificial Intelligence

Chairperson: Silvia Baeva

- 10:00-10:20 Stanislav Bachev, Silvia Baeva and Stoyan Popov, **Bank Efficiency under Economic Shocks: A DEA Approach**
- 10:20-10:40 Emanuela Hristova, Silvia Baeva and Stoyan Popov, **Modeling Financial Volatility in Response to Economic Shocks: Application of the GARCH Model**
- 10:40-11:00 Maria Delikotseva, Stoyan Popov and Silvia Baeva, **Comparative Analysis of Text Classification Methods for Mental Health**
- 11:00-11:20 Vasilena Adamova, Silvia Baeva and Stoyan Popov, **Spatio-Temporal Models for Urban Traffic Load Forecasting Using Graph Neural Networks and Temporal Transformers**
- Coffee Break**
- 11:40-12:00 George Popov, Tasho Tashev, Antoaneta Popova and Velislava Radeva, **Optimization of Distribution Logistics Networks through Transportation and Storage Cost Minimization**
- 12:00-12:20 Stoyan Popov and Duygu Duran, **Integration of a Game-theoretic Model for the Distribution of Honeybees across Pastures with Varying Vegetation**
- 12:20-12:40 Stilyan Ivanov, Stoyan Popov and Silvia Baeva, **Sustainable Cooperation and Productivity in Activity-Based Work Environments**

Lunch Break

Hall 1: Modeling and AI-Methods for Imaging and Computer Vision

Chairperson: Andreas Weinmann

- 15:00-15:20 Thomas März and Andreas Weinmann, **Model- and Machine Learning Based Reconstruction for Magnetic Particle Imaging**
- 15:20-15:40 Tim Selig, Thomas März, Martin Storath and Andreas Weinmann, **Sparse-View CT Reconstruction Using Learned Fourier-Domain BP Filtering**
- 15:40-16:00 Alexander Geng, Dominique Decker, Henrike Stephani and Ali Moghiseh, **Robust Fiber Segmentation of Occluded Fibers via Deep Learning with Semi-Synthetic Data Generation**
- 16:00-16:20 Weinmann A., T. Merz, V. Gapyak, **A reconstruction method for real multivariate MPI Data using a Langevin model-based approach**

Coffee Break

Hall 1: Advances in Quantum Computing, Machine Learning, and Image Processing

Chairpersons: Desislava Ivanova

- 16:20-16:40 Smit Golakiya, **Millisecond Coherence in n-Type Diamond: Engineering Spin Defects for Room-Temperature Quantum Sensing**
- 16:40-17:00 Smit Golakiya, **Quantum Control-Enhanced Magnetometry with Nitrogen-Vacancy Centers in Diamond**
- 17:00-17:20 Smit Golakiya, **Radio-Frequency Quantum Sensing with Nitrogen-Vacancy Centers in Silicon Carbide**
- 17:20-17:40 Smit Golakiya, **Probing Nanoscale Spin Ensembles via NV-Center-Based Double Electron-Electron Resonance Spectroscopy**
- 17:40-18:00 Smit Golakiya, **A Laboratory Introduction to Diamond NV Centers as Solid-State Quantum Magnetometers**

Hall 2: E-Learning

Chairperson: Elena Halova

- 15:00-15:20 Georgi Malchev, **Development and Application of a Web-Based Learning Aid for Optics in Physics Education**
- 15:20-15:40 Elena Halova and Khristo Tarnev, **Disciplinary Integration in Stem Teacher Education**
- 15:40-16:00 Miroslava Ivanova and Georgi Malchev, **Problem-Based Learning in Undergraduate Mathematics: An Instructional Scenario with Motion Modelling and Python**
- 16:00-16:20 Ivelina Stefanova and Malinka Ivanova, **Methodology for Using Artificial Intelligence in a Platform for Managing School STEM Education**

Coffee Break

- 16:40-17:00 Rositsa Andreeva and Khristo Tarnev, **Simulation of a Physics Laboratory Exercise for Demonstrating Conservation Laws**
- 17:00-17:20 Neli Sirakova and Nikolay Sirakov, **Mathematical Competencies in Studying the Exponential Function and Exponential Equations and Inequalities for Constructing New Objects of an Interdisciplinary Nature**
- 17:20-17:40 Vanyo Donev and Dena Spyrou, **The Impact of Digital Storytelling on Mathematics Learning Among Bilingual Fifth-Grade Students**
- 17:40-18:00 Dena Spyrou and Monika Simeonova-Ingilizova, **A Pilot Study on the Psychological and Pedagogical Effects of Mathematical Fairy Tales in Fifth-Grade Mathematics Education**

June 9, 2026 (Tuesday)

Hall 1: Mathematical Analysis and Applications & Special Functions & Fractional Calculus

Chairperson: Virginia Kiryakova

- 10:00-10:20 Allaberen Ashyralyev, Betul Hicdurmaz and Fatimanur Gultekin, **On Time-Fractional Semilinear Schrödinger Equations in Multi-Dimensions: An Abstract Approach**
- 10:20-10:40 Oqila Mukhiddinova, **Inverse and Non-Local Problems for Generalized Second-Kind Fluid Flow Models**
- 10:40-11:00 Yulian Tsankov and Emilia Bazhlekova, **Explicit Solution of a BVP for the Time-Fractional Diffusion Equation with Real and Complex Eigenvalues**

Coffee Break

- 11:20-11:40 Bogdan-Cristian Anghelina, **Covers of Fractal Interpolation Surfaces with Finite Families of Octahedrons**
- 11:40-12:00 Radu Miculescu, **On the Range of Fractal Interpolation Functions**
- 12:00-12:20 Krasimira Prodanova and Nonka Yurukova, **Risk Factors for Late Mortality After Liver Transplantation**
- 12:20-12:40 Miroslav Stoenchev, **Symmetric Diophantine Systems Arising from Euclidean Geometry**

Hall 2: E-Learning

Chairperson: Roumiana Peytcheva-Forsyth

- 10:00-10:20 Veronika Racheva, **Artificial Intelligence in School Education: Teachers' and School Leaders' Perspectives on Use, Opportunities, Challenges, and Future Development**
- 10:20-10:40 Vasya Delibaltova and Margarita Bakracheva, **Conceptualization and Practical Implementation of Digital Pedagogical Competencies in the Preparation of Future Teachers - the Example of Sofia University**
- 10:40-11:00 Irena Dimova, Plamen Tsvetkov, Mihal Pavlov and Deyan Petrov, **Developing the Digital Competence of Future Foreign Language Teachers at Sofia University "St. Kliment Ohridski" in Bulgaria**
- 11:00-11:20 Lyubka Aleksieva and Margarita Bakracheva, **Enhancing Future Educators: Analysing University Teachers' Pedagogical Digital Competences and Their Role in Pre-Service Primary Teacher Training**

Coffee Break

- 11:40-12:00 Roumiana Peytcheva-Forsyth and Bistra Mizova, **Mapping the Gaps in the Teachers' Digital Competence: Evidences from a Self-Assessment Instrument**
- 12:00-12:20 Blagovesna Yovkova and Roumiana Peytcheva-Forsyth, **Implemented versus Declared Strategies for Pedagogical Digital Competences Development in Programmes for Future Teachers' Preparation**
- 12:20-12:40 Nikolina Nikolova, Temenuzhka Zafirova-Malcheva, Borislava Kirilova and Pencho Mihnev, **Development of Digital Competences of Bulgarian Secondary Schools Teachers in Mathematical and ICT-Based Disciplines**

Lunch Break

Hall 1: Partial Differential Equations and Applications

Chairperson: Nedyu Popivanov

- 15:00-15:20 Nedyu Popivanov, **Protter-Morawetz BVP for the 3-D Tricomi Equation**
- 15:20-15:40 Makhmud Sadybekov, **Nonlocal Initial-Boundary Value Problems for a Two-Dimensional Hyperbolic Equation in a Circular Cylinder**
- 15:40-16:00 Batirkhan Turmetov, **On an Initial-Boundary Value Problem for a Nonlocal Analogue of a Hyperbolic Equation**

Coffee Break

- 16:20-16:40 Alexander Soldatov and Nedyu Popivanov, **Boundary Properties of Integrals with Homogeneous Difference Kernels**
- 16:40-17:00 Bakytbek Koshanov, **On the Solvability of the Generalized Neumann Problem for a High-Order Elliptic Equation on the Plane**

June 10, 2026 (Wednesday)

Hall 1: Partial Differential Equations and Applications

Chairperson: Nedyu Popivanov

- 10:00-10:20 Tsvetan Hristov, **Ill-posed Multidimensional BVPs for Degenerate Hyperbolic Equations of Keldysh Type**
- 10:20-10:40 Veneta Koleva, **Estimating Time-Varying Parameters in SEIRS-type Models Using Real Data**
- 10:40-11:00 Elena Georgieva and Aleksey Nikolov, **Explicit Solution of a Cauchy-Goursat Problem with Third Type Boundary Condition in a Special Case**
- 11:00-11:20 Todor Popov, **Solutions with Exponential Singularity for Protter Problems for the (3+1)-D Wave Equation**

Hall 2: Mathematical Modeling and Experiment in Physics

Chairperson: Ivan Koprinkov

10:00-10:20 Todor Arabadzhiev and Ivan Uzunov, *Differential and Convolution Raman Models in the Fission of an N-Soliton State*

10:20-10:40 Ivan Koprnikov, *Hilbert Space Geometry Change by a Nonadiabatic Electromagnetic Field*

10:40-11:00 Kristiyan Grozdev, *Design, Fabrication and Characterization of a Multilayer Dielectric Mirror for a Lidar System*

11:00-11:20 Aleksandar Brezhnikov and Khristo Tarnev, *Effects of Coil Shape on the Electromagnetic Field Structure in ICP Discharges*

Coffee Break

11:40-12:00 Radostina Tasheva and Ivan Stefanov, *Using Incomplete QPO Frequency Triplets to Constrain the Mass and Spin of the Neutron Star 4U1728-34*

12:00-12:20 Lyubov Marinkova, *Are There Typical Scales which Shape the High-density Part of the N-PDFs in Star-forming Clouds?*

12:20-12:40 Kaloian Lozanov, *Parametric Resonance and Cosmology*

Lunch Break

Hall 1: Informatics and Software Sciences

Chairperson: Roumiana Ilieva

15:00-15:20 Roumiana Ilieva and Antoni Angelov, *Testing the Neural Network Technology Through a Simple Board Game - Observations and Optimization*

15:20-15:40 Roumiana Ilieva and Yoto Nikolov, *AI-Driven Model for Information Security, Big Data Log Processing, and Event Correlation*

15:40-16:00 Alexander Radoslavov, Yordan Svezhenov, Lubomir Dimitrov and Alexander Nikov, *AI-oriented Framework for User Experience Design of White Cheese Packages*

Coffee Break

16:20-16:40 Ahmed Sarwar Mohammed, *Crisis Lens: A Data-Driven Approach to Identifying Overlooked Humanitarian Crises and Funding Gaps*

16:40-17:00 Saad Rhorab, *A Comparative Analysis of Five Econometric Models for MASI Index Forecasting: The Role of Geopolitical Risk*

17:00-17:20 Viktor Glavev, *Designing a Software Architecture for an AI-Driven Document Management System (AIDMS)*

17:20-17:40 Ivan Ivanov and Dian Nikolov, *From Coarse Categories to Fine-Grained Recognition: An Embedding-Based Approach to Few-Shot Learning*

Hall 2: Topology and Geometry

Chairperson: Aleksey Nikolov

15:00-15:20 Jordan Tabov, Stanislav Stefanov, Dobrinka Milusheva-Boykina, Asen Velchev and Haim Haimov, *Two Pairs Remarkable Points on the Plane of a Convex Quadrilateral*

15:20-15:40 Raja Mohammad Latif, *Pentapartitioned Neutrosophic Pythagorean Generalized Pre-Closed, Open, and Irresolute Mappings in Pentapartitioned Neutrosophic Pythagorean Topological Spaces*

15:40-16:00 Raja Mohammad Latif, *Pentapartitioned Neutrosophic Pythagorean Alpha Compact, Connected, Regular, and Normal Spaces*

Coffee Break

Hall 2: Young Researcher Session: Applied Mathematics, Big Data and Artificial Intelligence

Chairperson: Stoyan Popov

16:20-16:40 Katerina Kostadinova, Silvia Baeva and Stoyan Popov, *Binary Image Classification for Industrial Visual Inspection of Steel Surfaces*

16:40-17:00 Polina Stoyanova, Silvia Baeva and Stoyan Popov, *Adaptive Flicker Suppression for Temporally Consistent Video Restoration*

17:00-17:20 Volen Patsev, Daniela Georgieva and Lyubomir Kovachev, *Mathematical Modeling of Ultrashort Laser Pulse Propagation in a Nonlinear Medium: Self-compression and Filamentation*

17:20-17:40 Nikola Vitanov, Daniela Georgieva and Lyubomir Kovachev, *Mathematical Modeling of Focal Length Corrections in Thin Optical Lenses during Laser Pulse Propagation, Taking into Account the Fresnel Diffraction and Dispersion of the Medium*

OFFICIAL DINNER - June 10, 2026 at 19:30 pm, Porto Elea, Sozopol

[Kraybrezhna 13, Sozopol, Bulgaria, 8130](#)

June 11, 2026 (Thursday)

Hall 1: Numerical Methods and Mathematical Modeling

Chairperson: Jiří Hozman

10:00-10:20 Jiří Hozman and Tomáš Tichý, *Pricing abandonment options under commodity price and salvage value uncertainties*

10:20-10:40 Tsveti Hranov and Silvia Baeva, *Strategic Bug Triage under Limited Developer Attention: A Game-Theoretic and Empirical Study of Assignment, Deferral, and Patch Prioritization*

10:40-11:00 Silvia Baeva, Ivelina Hinova and Mirjana Kocaleva Vitanova, *A Method Selection Framework for Operating-Profile Assessment and Sensitivity Analysis of DC/AC Inverters in Photovoltaic Plants*

Coffee Break

11:20-11:40 Emil Rachev, Vladislav Petrov, Dimitar Pavlov and Gergana Vacheva, *Mathematical Analysis of Electromagnetic Torque Behavior in Vector-Controlled Induction Motors Under Stator Current Excitation*

11:40-12:00 Yonko Stoynov, *Crack Interaction in Magneto-electro-elastic Half-plane*

Lunch Break

Hall 1: Informatics and Software Sciences

Chairperson: Alexander Petkov

15:00-15:20 Lalka Stoeva and Angel Marchev, *Stability-Adjusted Multi-Target Feature Selection for Banking Stress and Volatility Prediction Using Time-Blocked SHAP Analysis*

15:20-15:40 Alexander Petkov, *Introducing Mentorov: An Automated Programming Assignment Evaluation System with AI-Driven Formative Feedback*

15:40-16:00 Preslav Tsenov and Alexander Petkov, *Digitalising Administrative Sanctioning in Bulgaria: Instant Field Issuance of Penalty Notices with Integrated Payment*

Coffee Break

16:20-16:40 Emilija Velinova and Desislava Ivanova, *When RTL Changes, What Breaks? An Empirical Study of Verification Environment Failures in Open-Source Hardware Development*

16:40-17:00 Ivan Pirishanchin, *Conceptual Model for a Generalized Online Registry for Product Tracking: A Case Study for EU-regulated Batteries*

17:00-17:20 Simeon Tsvetanov, *Cooperative Energy Optimization in Agricultural IoT Systems*

17:20-17:40 Katia Chadarova, *Innovative Process Workflow Proposal for AI Benchmarking*

For online participants:

HALL1 - Discord Server: <https://discord.gg/kjwGtjb9MT>

HALL2 - Discord Server: <https://discord.gg/Xsb7EVBu4k>

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