



**Technical University of Sofia
Faculty of Computer Systems and
Technologies**



PROGRAM

2023 11th International Scientific Conference

COMPUTER SCIENCE

18 – 20 September 2023

**organized by
the Faculty of Computer Systems and Technologies
Technical University of Sofia
IEEE Bulgaria Section**



The 2023 11th International Scientific Conference "Computer Science", organized by the Faculty of Computer Systems and Technologies at the Technical University of Sofia, Bulgaria, continues the tradition of a series of ten conferences organized between 2004 and 2022 as a scientific forum to present a discussion of innovative ideas, concepts and technologies in the field of computer science, computer and software engineering, information technology and their application. Participation in the conference of researchers from different countries stimulates the building of a scientific community and encourages interaction and international cooperation. The 2023 11th International Scientific Conference "Computer Science" is part of the "Science Days of TU-Sofia" forum.

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2023 11th International Scientific Conference COMPUTER SCIENCE, 18 – 20 September, Sozopol, Bulgaria

Monday, 18th September 2023

Hall 1, Hotel "Lazur", Sozopol, Bulgaria

Virtual MS Teams meeting

14:00 – 16:00	Registration
16:00 – 16:30	Official Conference Opening
16:30 – 18:30	Plenary Session, Invited talks
19:30	Conference Dinner

Tuesday, 19th September 2023

Hall 1, Hotel "Lazur", Sozopol, Bulgaria

Virtual MS Teams meeting

9:30 – 11:00	Section "Artificial Intelligence, Robotics And Control", Session 1
11:00 – 11:30	Coffee break
11:30 – 13:00	Section "Artificial Intelligence, Robotics And Control", Session 2
13:00 – 14:00	Lunch break
14:00 – 15:30	Sections "Cyber Security And Cyber Protection" & "Smart Cities and Smart Society"
15:30 – 16:00	Coffee break
16:00 – 17:00	Section "High Technology Management"
17:00 – 18:30	Sections "Software Engineering" & "Software Technologies and Applications Systems"
19:30	Conference Dinner

Wednesday, 20th September 2023

Hall 1, Hotel "Lazur", Sozopol, Bulgaria

Virtual MS Teams meeting

9:30 – 11:00	Poster Sessions, Sections "Artificial intelligence, Robotics and Control", "Cyber security and Cyber protection", "Software Engineering", "Education 4.0", "Data structures and Storage, Cloud and Block chain Technologies"
11:00 – 11:30	Coffee break
11:30 – 13:00	Workshop "Universities and Business Collaboration in IT education – Perspectives and Challenges"
13:00 – 14:00	Lunch break
14:00 – 15:30	Workshop "Centres of Excellence and Research Projects in TU-Sofia"
15:30 – 16:00	Coffee break
16:00	Official Conference Closing Ceremony

Link for Virtual MS Teams meeting:

https://teams.microsoft.com/l/meetup-join/19%3a5Mrloi90f8Ei2FCvaN9X37W6hU9yRjdvT-72r8iyB_Ml%40thread.tacv2/1694510066755?context=%7b%22id%22%3a%227feeb5c0-34f4-4a4b-8cc0-e59f06920156%22%2c%22id%22%3a%226a932676-d9f2-42ef-943f-cad9f37b156a%22%7d

Monday, September 18th, 2023

14:00 – 16:00 Registration

Hall 1, Hotel "Lazur", Sozopol, Bulgaria

16:00 – 16:30

Official Conference Opening

Chair: Prof. Dgnyan Nakov

Hall 1, Hotel "Lazur", Sozopol, Bulgaria and virtual MS Teams meeting

16:30 – 18:30

Plenary Session, Invited talks

Chair panel: *Assoc. Prof. Nikolay Hinov, Prof. Milena Lazarova*

Hall 1, Hotel "Lazur", Sozopol, Bulgaria and virtual MS Teams meeting

CHALLENGES AND OPPORTUNITIES IN NEUROINFORMATICS, NEURAL NETWORKS AND NEUROCOMPUTERS

Prof. Nikola Kasabov, Life Fellow IEEE,

Auckland University of Technology, Auckland, New Zealand

Challenges in Control the Granulation Process of Inorganic Fertilizers

by Prof. Darius Andriukaitis

Kaunas University of Technology, Kaunas, Lithuania

19:30 Conference Dinner

Tuesday, September 19th, 2023

Hall 1, Hotel "Lazur", Sozopol and virtual MS Teams meeting

9:30 – 11:00 **SECTION "ARTIFICIAL INTELLIGENCE, ROBOTICS AND CONTROL", Session 1**

Chair: Prof. Milena Lazarova & Assoc. Prof. Valentin Hristov

1. A Software Architecture Selection for Cyber-Physical System
Borislav Ivanov, Alexander Hotmar, Ivan Evg Ivanov, Desislava Georgieva
2. Chat Bots and Their Place in the Modern World. Architecture, Types and Areas of Application
Ivo Gergov, Ognyan Nakov, Nadezhda Angelova, Irina Ivanova
3. Emotional Attention for Trained Convolutional Neural Networks
Stefan Tsakov, Milena Lazarova, Adelina Aleksieva–Petrova
4. CyberAttacks and Robotics
Dayana Mladenova, Grozdan Hristov
5. Biomedical Image Processing Workflow using Segmentation
Stela Vetova, Milena Lazarova
6. Are AI-Assisted Works Copyrightable?
Ralitza Dimitrova
7. Generalization of a Genetic Algorithm for Optimal Coding of the States of a Finite State Machine
Valentin Hristov, Hristo Stefanov

11:00 – 11:30 **Coffee break**

11:30 – 13:00 **SECTION "ARTIFICIAL INTELLIGENCE, ROBOTICS AND CONTROL", Session 2**

Chairs: Prof. Todor Stoilov & Prof. Krasimira Stoilova

1. Reinforcement Learning Using for Planning With Compromises of a Rescue Operation
Dilyana Budakova, Petko Kolev, Lyudmil Dakovski
2. An Optimization Model for Urban Traffic Management with Additional Constraints
Krasimira Stoilova, Todor Stoilov
3. Influence of Interest Rates on Management in Animal Husbandry
Todor Stoilov, Krasimira Stoilova
4. A Novel Method of Obstacle Detection Using Stereo Vision for Unmanned Systems
Fatma Nur Ortatas, Muhammet Emin Sahin, Hasan Ulutas, Ugur Yakut, Yunus Koc
5. Analysis of Sensor Signals with Machine and Deep Learning Algorithms
Ognyan Yotov, Adelina Aleksieva–Petrova
6. Hassenstein–Reichardt Detector Using Controllable Single Pulse Time-Delay Circuit for Neuromorphic Hardware
Ianislav Trendafilov, Veska Gancheva

13:00 – 14:00 **Lunch break**

14:00 – 15:30

SECTION “CYBER SECURITY AND CYBER PROTECTION”

SECTION “SMART CITIES AND SMART SOCIETY”

Chair: Prof. Rumen Trifonov & Assoc. Prof. Galya Pavlova

1. Evaluation of a Loss-Sensitive Autoencoder – A Deep Learning Model for Malicious Network Traffic Detection
Goce Stevanoski, Monika Kachurova, Marko Porjazoski, Aleksandar Risteski, Kire Jakimoski
2. Developing Wind Farm SCADA Physical Testbed System
Evgeni Sabev
3. Action Research on the DevSecOps Pipeline
Lyuben Nikolov, Adelina Aleksieva–Petrova
4. CyberAttacks and Artificial Intelligence: A Systematic Mapping
Grozdan Hristov, Adelina Aleksieva–Petrova, Ivan Stankov
5. On the Choice of Effective Artificial Intelligence Methods for Cyber Defense of Industrial Systems
Roumen Trifonov, Slavcho Manolov, Georgi Tsochev, Galya Pavlova, Kamelia Raynova
6. Cyberattacks Detector with Logistic Regression Module
Aleksandar Hristov, Rumen Trifonov, Valentin Hristov
7. Achieving Energy Efficiency in Smart Home by Using Machine Learning Algorithm for Prediction
Milka Kutseva

15:30 – 16:00

Coffee break

16:00 – 17:00

SECTION “HIGH TECHNOLOGY MANAGEMENT”

Chair: Assoc. Prof. Varbinka Stefanova–Stoyanova & Assoc. Prof. Ivan Stankov

1. Digitalization of Administrative Processes in Primary Schools Using ERP System
Radoslav Kostev, Kristiyan Danachki
2. Challenges and Problems of the MoSCoW Method Application in ERP System Implementation
Radoslav Kostev
3. Software Orthodontics – Myth or Reality? Technological Management of Clinical Practice
Greta Yordanova, Gergana Gurgurova, Iliyan Kostov, Mirela Georgieva
4. Exploring the Synergy between Zero-knowledge Proof and Smart Questioning
Varbinka Stefanova–Stoyanova, Ivan Stankov, Bogdan Danov

17:00 – 18:30

SECTIONS “SOFTWARE ENGINEERING” & “SOFTWARE TECHNOLOGIES AND APPLICATIONS SYSTEMS”

Chair: Assoc. Prof. Varbinka Stefanova–Stoyanova & Assoc. Prof. Ivan Stankov

1. Designating a Leader Browser Tab to Perform Refreshing of Access Token in OAuth 2.0.
Firas Al-Husari
2. Automatic Code Commenting in Integrated Development Environments Based on Indirect Interaction with Chatbots
Samson Damilola Fabiyi, Opeyemi Ajibuwa
3. Evaluation of the Readability of QR Codes on High Reflective Stainless Steel
Georgi Zapryanov, Iva Nikolova
4. Digital Characters and the Concept of Feeling, Perception, and Mind
Vesselin Gueorguiev, Desislava Georgieva
5. Programming Interfaces for Cross-Platform Image Rendering and Deep Learning GPGPU
Georgi Georgiev, Milena Lazarova

19:30

Conference Dinner

Wednesday, September 20th, 2023

Hall 1, Hotel "Lazur", Sozopol and virtual MS Teams meeting

POSTER SESSIONS

9:30 – 11:00

**SECTIONS "ARTIFICIAL INTELLIGENCE, ROBOTICS AND CONTROL",
"CYBER SECURITY AND CYBER PROTECTION", "SOFTWARE ENGINEERING",
"DATA STRUCTURES AND STORAGE, CLOUD AND BLOCK CHAIN
TECHNOLOGIES", "EDUCATION 4.0"**

Chair: Assoc. Prof. Daniela Minkovska

1. Design and Programming of a Cutting Nozzle in an Automated Seeding, Watering and Chemical Treatment System
Reneta Dimitrova, Slav Dimitrov, Stiliyan Nikolov, Anna Maria Lazarova
2. Extended Reality and Control in the Industry
Roumiana Ilieva, Dimitar Ginchev, Nikola Gaydarov, Antoni Angelov
3. Research Firmware Update Over the Air for High Performance Embedded Systems
Neven Nikolov
4. Understanding Student Success Prediction Using SHapley Additive exPlanations
Berat Ujkani, Daniela Minkovska, Ognyan Nakov
5. Input Data Time Range Impact on Forecast Quality Using Automated Procedures
Kiril Koparanov, Elena Antonova, Ognyan Nakov, Daniela Minkovska, Krasin Georgiev, Lyudmila Stoyanova
6. Cryptography and Fermat's Last Theorem
Byulbyul Zyulyamova, Adnan Redzheb, Peter Kopanov
7. Zero-Trust in Instant Messaging
Ivo Gergov, Nikola Obreshkov
8. Penetration Testing of Devices
Zornitsa Terneva, Susa Dimitrova
9. Solving a Mathematical Model for Determining Parking Spaces in the City
Kristina Pavlova, Elisaveta Trichkova-Kashamova
10. Blockchain Based Trusted Distributed Machine Learning for Credit Scoring
Daniel Djolev, Milena Lazarova, Ognyan Nakov

11. Python Based Electrical Engineering Training for Computer Engineers
Nikolay Hinov, Stoyan Popov
12. Open Source Robotics Platform for Educational Purposes
Tsveti Hranov, Nikolay Hinov
13. Investigation of the Production Risk of an Enterprise During a Pandemic
Antoaneta Popova
14. Harmonic Analysis of a Buck-Boost DC-DC Converter
Plamen Stanchev, Gergana Vacheva, Nikolay Hinov
15. A Python-Based Image Processing Method
Plamen Nakov, Stoyan Popov, Nikolay Hinov

11:00 – 11:30 **Coffee break**

11:30 – 13:00 **WORKSHOP “UNIVERSITIES AND BUSINESS COLLABORATION IN IT EDUCATION – PERSPECTIVES AND CHALLENGES”**
Chair panel: Prof. Ognyan Nakov

13:00 – 14:00 **Lunch break**

14:00 – 15:30 **WORKSHOP “CENTRES OF EXCELLENCE AND RESEARCH PROJECTS IN TU-SOFIA”**
Chair panel: Prof. Milena Lazarova, Prof. Nikolay Hinov

15:30 – 16:00 **Coffee break**

16:00

Official Conference Closing Ceremony

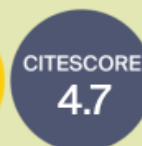
Chair: Assoc. Prof. Nikolay Hinov

Hall 1, Hotel “Lazur”, Sozopol and virtual MS Teams meeting



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Guest Editors

Dr. Nikolay Hinov, Prof. Dr. Ognyan Nakov, Prof. Dr. Milena Lazarova

Deadline

15 December 2023

Special Issue

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Invitation to submit