

“DAYS OF SCIENCE OF TECHNICAL UNIVERSITY OF SOFIA”



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IEEE Bulgarian Section

**INTERNATIONAL CONFERENCE
AUTOMATICS, ROBOTICS & ARTIFICIAL INTELLIGENCE
ICARAI 2025**

PROGRAMME

June 13 – 15, 2025, Sozopol, Bulgaria

Organized by:



TECHNICAL UNIVERSITY OF SOFIA



FACULTY OF AUTOMATICS



IEEE Bulgarian Section

IEEE BULGARIAN SECTION

WITH THE SUPPORT OF

RESEARCH AND DEVELOPMENT SECTOR OF THE TECHNICAL UNIVERSITY OF SOFIA

13 June 2025 Friday		
13:30 ÷ 15:00	REGISTRATION	HOTEL LOBBY
15:00 ÷ 15:30	OPENING CEREMONY	HALL 1
15:30 ÷ 16:15	PLENARY SESSION	HALL 1
16:15	WELCOME PARTY	COFFEE - BAR
14 June 2025 Saturday		
9:00 ÷ 9:30	PLENARY SESSION	HALL 1
9:45 ÷ 18:30	SESSIONS	HALL 1
9:30 ÷ 12:45	SESSIONS	HALL 2
20:00	COCKTAIL- PARTY	
15 June 2025 Sunday		
9:00 ÷ 10:15	SESSIONS	HALL 1
DEPARTURE		

13 JUNE 2025 (Friday)

15:00 ÷ 15:30 **OPENING CEREMONY**

Prof. Valeri Stoilov – Vice Head of Research and Development sector of the Technical university of Sofia

Assoc. Prof. Tsonyo Slavov – ICARAI PC Chair and Dean of FA

15:30 ÷ 16:15 **PLENARY SESSION**

Chairman: Assoc. Prof. Tsonyo Slavov

Technical support: Assist. Prof. Aleksandar Marinchev

P.P	K. Perv , Rational function approximation of nondifferentiable nonlinearities	in-person
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14 JUNE 2025 (Saturday)

HALL 1

9:00 ÷ 9:30 PLENARY SESSION

Chairman: Assoc. Prof. Tsonyo Slavov

Technical support: Assist. Prof. Aleksandar Marinchev

P.P	P. Georgieva , AI-enabled mechanisms for control of wireless sensor networks	in-person
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9:30 ÷ 10:30

SESSION 1 “APPLICATION OF ARTIFICIAL INTELLIGENCE AND CONTROL SYSTEMS ENGINEERING”

Chairman: Assoc. Prof. Desislava Stoitseva-Delicheva

Technical support: Assist. Prof. Aleksandar Marinchev

S1.1	Angel Marchev , Vasil Marchev and Alexander Efremov, Data expansion by business-logic scaling – an applied approach for data synthesis	in-person
S1.2	Atanas Nachev , Nikolay Gueorguiev, Konstantin Nesterov , Yavor Boychev and Svetlana Yaneva, Approaches to solving the problem of reliability of information systems	on-line
S1.3	Vesela Karlova-Sergieva , Nina Nikolova and Boris Grasiani, Study on the Dynamic Behavior of a Class of Repetitive Controllers in the Control of Systems with Static Dynamics	in-person
S1.4	Desislava Stoitseva-Delicheva and Snejana Yordanova, TSK Modelling of Nonlinear Plants Using Experimental Data for Control Algorithms	in-person

10:30 ÷ 11:00 - COFFEE BREAK

11:00 ÷ 12:45

SESSION 2 “ROBOTICS SYSTEMS § ELECTRICAL DRIVES AND MACHINE AUTOMATION”

Chairman: Assoc. Prof. Vladimir Hristov

Technical support: Assist. Prof. Aleksandar Marinchev

S2.1	Mohamed Gadelrab , Omar Ahmed, Mahmoud Ahmed, Habiba Alakkad, Zeyad Sakr, Bishoy Mikhail, Hady Ayman Khalil and Shady A., Maged Lane Detection using Hybrid Hough Transform for ADAS	on-line
S2.2	Danail Slavov and Pavel Kolev, Machine Vision Mobile Robot for Autonomous Cargo Transportation – Part 1	in-person
S2.3	Nikolay Bratovanov , An Approach to Finding the Orientation of Disk-Shaped Objects With Multiple Marks	in-person
S2.4	Kamen Hristov , An application of Three-Phase PWM AC-DC-AC Rectifier	on-line
S2.5	Danail Slavov and Pavel Kolev, Machine Vision Mobile Robot for Autonomous Cargo Transportation – Part 2	in-person
S2.6	Anastaiya Slavova and Vladimir Hristov, Policy interpretation for Deep Reinforcement Learning	in-person
S2.7	Ted Spasov , Bozhidar Dzhudzhev, Nikolay Stoyanov and Antonia Pandelova, Experimental Studies on the Capabilities of a Mobile Station for Monitoring Environmental Parameters	on-line

S2.8	Ted Spasov , Bozhidar Dzhudzhev, Nikolay Stoyanov and Antonia Pandelova, Mobile Station for Monitoring Environmental Parameters	on-line
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12:45 ÷ 14:00 - LUNCH BREAK

14:00 ÷ 15:45 SESSION 3 “APPLICATION OF ARTIFICIAL INTELLIGENCE – PART 1”

Chairman: Prof. Petya Georgieva

Technical support: Assist. Prof. Aleksandar Marinchev

S3.1	Jon Paolo Estalane , Terrence Ferriol and Glenn Magwili, Eye-Gaze Controlled Wheelchair with Eye-Blinking Selector and LiDAR-based Obstacle Detection System	on-line
S3.2	Jack Pears and Gelayol Golcarenenji An Explainable CNN-based Approach for Classifying Desert Lions from Camera Trap Images	on-line
S3.3	Ali Akbar Forouzeshejad , Farzad Arabikhan, Alexander Gegov and Alexandar Ichtev, Evaluating Project Manager Competencies Using Explainable Artificial Intelligence	on-line
S3.4	Mo Adda and Nancy Scheidt, SpiderNet and Forensics of the IoT	on-line
S3.5	Sumaiya Al Salmi , Alexander Gegov and Alexandar Ichtev, Framework for Fair and Transparent Classroom Analytics Using Explainable AI	on-line
S3.6	Gelayol Golcarenenji and Alaa Mohasseb, An Explainable CNN-based Approach For Maritime Search and Rescue On Edge	on-line
S3.7	Soraya Harding and Mo Adda, Registration with Spidernet based on Multi-Blockchain	on-line

15:45 ÷ 16:00 - COFFEE BREAK

16:00 ÷ 17:30 SESSION 3 “APPLICATION OF ARTIFICIAL INTELLIGENCE – PART 2”

Chairman: Assoc. Prof. Alexander Gegov

Technical support: eng. Martin Minkov

S4.2	Zineb Ibnou Cheikh , Alexander Gegov and Alexandar Ichtev, Fashion Image Classification Using Fuzzy Logic	on-line
S4.3	Eliza Mariz Lopoy , Ric Adrian Palma and Allain Jessel Macas, VISION: Development of Assistive Headwear Device Using Raspberry Pi With Object Recognition and Voice Feedback	on-line
S4.1	Kalindi Vijesh Parekh , Navrati Saxena and Mohammad Adil Ansari, A Comparative Study of Retrieval-Augmented Generation (RAG) Chatbots	on-line
S4.4	Mohith Sai Venkat Ankem , Navrati Saxena and Akshay Ravi, Time Series Modelling of Landslides using Reinforcement Learning for Feature Selection	on-line
S4.5	Farhan Ansari , Navrati Saxena and Aditya Kulkarni, A Comparative Study of Ensemble Learning Methodologies for Multilingual Sentiment Analysis	on-line
S4.6	Koycho Georgiev , Alexander Gegov, Hamidreza Khaleghzadeh, Mo Adda and Alexandar Ichtev, Machine Reasoning Framework for Large Language Models	in-person

17:30 ÷ 17:45 - COFFEE BREAK

17:45 ÷ 18:45**SESSION 4 “CONTROL SYSTEMS ENGINEERING”****Chairman: Assoc. Prof. Asparuh Markovski****Technical support: eng. Martin Minkov**

S5.1	Andrey Yonchev , LMI based H-infinity observer design for continuous-time differential algebraic systems	on-line
S5.2	Edgar David Valverde Ramírez and Luis Antonio Orbegoso Moreno , Neural Operator for Lie Group-Based Kinematic Modeling of Serial Robots	on-line
S5.3	Asparuh Markovski , Tuning of classical regulators for increased load disturbance rejection of magnetic levitation system through an optimization approach	in-person
S5.4	Tsonyo Slavov , Ina Taralova, Rosian Neykov and Luben Mollov, Gain Scheduling Real Time Control of Tank Water Level by PLC	in-person

HALL 2**9:30 ÷ 10:30****SESSION 5 “INFORMATION AND MEASUREMENT TECHNOLOGY”****Chairman: Assoc. Prof. Georgi Milushev****Technical support: Assist. Prof. Nikolay Bratovanov**

S6.1	Martin Minkov and Ivan Evgeniev, Practical aspects of simulation of lithium-ion battery clusters with CPU	in-person
S6.2	Aleksander Dimitrov and Nikolay Stoyanov, Influence of metrological variables on air quality in Sofia, Bulgaria	in-person
S6.3	Neven Kanchev , Nikolay Stoyanov and Georgi Milushev, Prediction of the natural gas calorific value by using artificial neural network	in-person

10:30 ÷ 11:00 - COFFEE BREAK**11:00 ÷ 12:45****SESSION 6 “CONTROL SYSTEMS ENGINEERING AND INFORMATION AND MEASUREMENT TECHNOLOGY”****Chairman: Assoc. Prof. Stanislav Enev****Technical support: Assist. Prof. Nikolay Bratovanov**

S7.1	Bozhidar Rakov and Georgi Ruzhekov, Design of μ controller for a coupled tank system	in-person
S7.2	Bozhidar Rakov and Georgi Ruzhekov, Design of H^∞ controller with IMC structure for coupled tank system	in-person
S7.3	Stela Todorova , Research of rod constructions with 3D-Extended Index Matrix and aggregation operations using Displacement Method	in-person
S7.4	Stoitcho Penkov and Albena Taneva , Face Recognition Algorithm for Control Turnstile System with Camera and Analysis	in-person
S7.5	Tsonyo Slavov , Alexander Mitov and Jordan Krlev, Lyapunov based two degree of freedom model reference adaptive control of axial-piston pump	in-person
S7.6	Devasmito Das , Ina Taralova, Tsonyo Slavov, Jean Jacques Loiseau and Manoj Pandey, An active control scheme implemented via nonlinear feedback linearization for Coupled Fractional-Order Rössler Oscillators: Two and Three Oscillator Configurations	in-person
S7.7	Stanislav Enev , Minimum-Fuel Control Of Arbitrary-Order Self-Regulating Plants With Real Poles	in-person

15 JUNE 2025 (Saturday)

HALL 1

9:00 ÷ 10:15

SESSION 1 “THEORETICAL ELECTRICAL ENGINEERING”

Chairman: Assoc. Prof. Simona Filipova-Petrakieva

Technical support: Eng. Peyu Pasev

S8.1	Peyu Pasev , Design and analysis of a PV plant connected to the energy power system for commercial purposes	in-person
S8.2	Simona Filipova-Petrakieva and Yordan Shopov, AC sweep analysis in 50 and 60 Hz	in-person
S8.3	Stoyan Kirilov , Theodoros Maris and Valeri Mladenov, Application of LTSPICE and Octave in Analysis of Electronic Schemes and Memristor-based Circuits	in-person
S8.4	Stanimir Andonov, Stiliyan Georgiev and Georgi Tsenov , EV and Internal combustion engine driver impact study with biosignal measurements	in-person