

SCYR 2024

24th Scientific Conference of Young Researchers

18 April 2024

by Faculty of Electrical Engineering and Informatics,
Technical University of Košice

Conference Programme

- 9:00 **Conference Opening**
(University Congress Centre, Letná 9, Košice,
room between main building entrance and Aula Maxima entrance)
- 09:15 – 11:15 Parallel Sessions with presentations:
- Session 1: Electrical Engineering and Physical Engineering**
(FEEI Meeting Room, 2nd floor)
- Session 2: Artificial Intelligence and Related Topics**
(University Congress Centre, room 1)
- Session 3: Medical Engineering, Security and Software Engineering**
(University Congress Centre, room 2)
- 11:30 – 12:30 **Raut**
(University Congress Centre, floor no. 0)
- 12:30 **Conference Awards Ceremony** and Closing Ceremony
(University Congress Centre, floor no. 0)



Faculty of Electrical Engineering
and Informatics



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Section 1: Electrical Engineering and Physical Engineering

FEEI Meeting Room, 2nd floor

Chairmen: Prof. Ing. Alena Pietriková, CSc. – head of the committee
 Prof. RNDr. Vladimír Lisý, DrSc.
 Assoc. Prof. Ing. Jaroslav Džmura, PhD.
 Assoc. Prof. Ing. Marek Pástor, PhD.

Time	Name	Paper	Paper ID
9:15	Marek Bobček	Utilizing WAMPAC and Artificial Intelligence for real-time control in power	20
9:21	Ardian Hyseni	Big data research in the electricity distribution network for increasing the reliability and efficiency of electricity distribution	10
9:27	František Margita	Use of WAM systems to determine the ampacity of overhead transmission lines	42
9:33	Tadeáš Kmecik	Artificial Intelligence in the Control of Electromechanical Systems	32
9:39	Daniel Gordan	Phase-shift full-bridge converter, decades ago and now	34
9:45	Tomáš Basarik	Isolated bidirectional power converters for microgrids – A Review	64
9:51	Antónia Jusková	Sparse Wars: A New Compression Paradigm	33
9:57	Lukáš Pancurák	Parameter Mismatch in Finite Control Set Model Predictive Direct Speed Control	23
10:03	Daniel Marcin	Simulations and Comparison of Active Cell Balancing Based on Switched Capacitors	28
10:09	Leoš Ondriš	DMA and XRD study of TPS-based materials	6
10:15	Simona Saparová	Effect of liquid isoprene rubber on molecular mobility of thermoplastic starch/PBAT blends	12
10:21	Dávid Bodnár	Modeling of Bidirectional Buck-Boost DC/DC Converter for Hybrid Energy Storage System	7
10:27	Jozef Kromka	War of the Worlds: Lossless encoding vs. Compressed sensing	3
10:33	Peter Provázek	Polymer Paste Production Based on Modified Ag ₂ O Particles to Form Conductive Ag Layers	8
10:39	Gabriela Hricková	Effect of dopant on Ag ₂ S properties	21
10:45	Simona Kirešová	The Use of Wireless Sensor Network in the Long-Term Measurement and Correlation Analysis of PM and Meteorological Factors	13
10:51	Šimon Gans	Simplified analytical model of a magnetoelastic Pressductor sensor for initial value setting of an optimization process	19
10:57	Kristina Zolochovska	The impact of technological process modulations on structural and colloidal stability of Magnetoferritin	55
11:03	Július Bačkai	Non-metallic Turnbuckle Diamond Anvil Cell for Magnetisation Measurement	52

Section 2: Artificial Intelligence and Related Topics

University Congress Centre, room 1

Chairmen: Assoc. Prof. Ing. Peter Papcun, PhD. – head of the committee
Ing. Tibor Gujdan (FPT Slovakia)
Assoc. Prof. Ing. Emília Pietriková, PhD.
Assoc. Prof. Ing. Matúš Pleva, PhD.
Assoc. Prof. Ing. Ján Papaj, PhD.

Time	Name	Paper	Paper ID
9:15	Maroš Harahus	Training Deep Learning Models for Grammatical Error Correction in Slovak Texts	38
9:21	Samuel Novotný	Logical Modeling of Agent Systems – The Symbolic Approach	36
9:27	Viliam Balara	Multimodal detection of antisocial behaviour in social media	35
9:33	Matúš Dopiriak	Radiance Fields Empowering Vehicular Metaverse	4
9:39	Martin Nguyen	Cosmic Ray Modulation Analysis: Solution Uniqueness and Employing Neural Networks	39
9:45	Matúš Čavojský	Adaptive Edge-Based Computing in Autonomous Vehicle Mobility	51
9:51	Miroslava Matejová	The human aspect of explainable machine learning models	22
9:57	Lenka Kališková	Overview of machine learning methods in astrophysics	61
10:03	Maroš Krupáš	Digital Twin and Human-Machine Collaboration in Industry 5.0	17
10:09	Ľubomír Urbík	Containerization in Edge Intelligence	50
10:15	Nikola Hrabovská	Synergizing Composite AI and Industry 5.0 to Tackle Energy Quadrilemma Challenge	54
10:21	Róbert Rauch	Leveraging Gumbel Softmax to Optimize Split Computing and Early Exiting for Autonomous Driving Applications in Vehicular Edge Computing	46
10:27	Tatiana Kuchčáková	Lease Contract Named Entity Recognition	62
10:33	Zuzana Sokolová	Detection of toxic Slovak comments on social media based on sentiment analysis	60
10:39	Jakub Ivan Vanko	Developing knowledge graphs	40
10:45	Alexander Brecko	Federated Learning for Edge Computing in Transport	11
10:51	Dominik Vranay	Advancing Capsule Neural Networks: Evolution, Challenges, and Future Directions in Interpretable AI Systems	30
10:57	Tomáš Tkáčik	Contribution to Experimental Identification of Nonlinear Dynamical Systems	31
11:03	Maroš Hliboký	Benchmark of convolutional neural models for lung ultrasound sign classification	57

Section 3: Medical Engineering, Security and Software Engineering

University Congress Centre, room 2

Chairmen: Assoc. Prof. Ing. František Babič, PhD. – head of the committee
 Ing. Juraj Bujňák, PhD. (SIEMENS Healthineers)
 Assoc. Prof. Ing. Eva Chovancová, PhD.
 Assoc. Prof. Ing. Stanislav Ondáš, PhD.
 Assoc. Prof. Ing. Peter Feciľak, PhD.

Time	Name	Paper	Paper ID
9:15	Tomáš Buček	Automated Knowledge Evaluation in Software Engineering Disciplines	15
9:21	Tomáš Kormaník	Ambient Software Solutions	47
9:27	Marek Horváth	Stylistic patterns in source code as behavioral biometric markers for programmer identification	49
9:33	Miroslav Murin	Cybersecurity threats from phishing to AI-generated deepfakes	25
9:39	Patrik Jurík	Optimizing Clock Generators for Ultra-Wideband Sensor Systems: VCOs, PLLs, and DROs	65
9:45	Eva Kupcová	Biometric-Enhanced Authentication using OPAQUE Protocol: Keystroke Dynamics and EMG Signals	41
9:51	Peter Pekarčík	Crossover of Encryption Algorithms	2
9:57	Miriama Mattová	XR Diversity and Unified Environment	14
10:03	Emira Mustafa Moamer Alzeyani	Integrated Analysis of LSTM Predictive Model in Project Management	29
10:09	Samuel Andrejčík	Comparison of different steganographic techniques for writing QR codes into images	58
10:15	Dušan Herich	Drone Swarm Simulation: A Real-Time Control and Dynamic Interaction	44
10:21	Natalia Kurkina	Improvement of routing techniques using KNN and fitness function in Cloud MANET	45
10:27	Tomáš Adam	Identifying Illicit Activities in Blockchain Transaction Graph Networks	59
10:33	Dávid Vaľko	Enhancing Heart Arrhythmia Classification Through Ensemble Learning: A Comparative Study	43
10:39	Dávid Jozef Hreško	Enhancing venous leg ulcer images via style mixing generation	16
10:45	Oliver Lohaj	Usability of a ML-based application for medical experts	9
10:51	Stanislav Husár	Intelligent classification of Parkinson's Disease using wearable sensor data	26
10:57	Kristián Mičko	Computer Vision in Smart Transportation System	37
11:03	Filip Gurbát	Bridging the Understanding Gap between Tester's Domain and Programmer's Domain	67