

Radioelektronika 2022

Technicom, Košice, April 21-22, 2022

Final program

Registration, Thu, Apr 21, 08:00 – 09:00, Lobby

Opening

Session Chair: **Pavol Galajda (Technical University of Košice)**

Thu, Apr 21, 08:45 – 09:00, Room 001

Invited speakers 1

Session Chair: **Ján Šaliga & Matúš Pleva (Technical University of Košice)**

Thu, Apr 21, 08:45 – 09:00, Room 001

- **Machine Learning for Consumer Electronics: Opportunities and Challenges (30m)** - Miloš Cerňák (Logitech Europe)
- **Accuracy of Measurement by Drones (30m)** - Luca De Vito (Università degli Studi del Sannio)

Coffee break, Thu, Apr 21, 10:00 – 10:15, Lobby

Signal processing 1

Session Chair: **Luca De Vito (Università degli Studi del Sannio)**

Thu, Apr 21, 10:15 – 11:15, Room 001

- **Analysis of Quantization Noise in FFT Algorithms for Real-Valued Input Signals (15m)** - Monther Alrwashdeh (Budapest University of Technology and Economics)*; Zsolt Kollár (Budapest University of Technology and Economics)
- **Towards efficiency of a subjective evaluation for music source separation (15m)** - Peter Kasak (University of Zilina)*; Roman Jarina (University of Zilina); Dasa Ticha (University of Zilina)
- **Deep Learning Pipeline for Chromosome Segmentation (15m)** - Kristyna Pijackova (Brno University of Technology)*; Tomas Gotthans (Brno University of Technology); Jakub Gotthans (Brno University of Technology)
- **Acute Lymphoblastic Leukemia Detection by Tuned Convolutional Neural Network (15m)** - Eva Tuba (Singidunum University)*; Ivana Strumberger (Singidunum University); Ira Tuba (Singidunum University); Nebojsa Bacanin (Singidunum University); Milan Tuba (Singidunum University)

Information technologies 1

Session Chair: **Miloš Cerňák (EPFL, Lausanne)**

Thu, Apr 21, 10:15 – 11:15, Room 003

- **Exploiting hierarchy in environmental sound classification (15m)** - Jakub Bajzik (University of Zilina)*; Roman Jarina (University of Zilina)
- **Enhanced Speaker Embeddings with CNN-based Multi-scaling features (15m*)** - Maros Jakubec (University of Zilina); Roman Jarina (University of Zilina); Eva Lieskovska (University of Zilina)*
- **Stress detection using non-semantic speech representation (15m*)** - Jay Kejriwal (Institute of Informatics, Faculty of Informatics and Information Technology, Slovak Technical University Bratislava,)*; Stefan Benus (IISAS, Constantine the Philosopher University, Nitra); Marian Trnka (SAV)
- **Evaluation of Proximal Policy Optimization with Extensions in Virtual Environments of Various Complexity (15m)** - Róbert Rauch (Department of Computers and Informatics, Faculty of Electrical Engineering and Informatics, Technical University of Kosice); Stefan Korecko (Department of Computers and Informatics, Faculty of Electrical Engineering and Informatics, Technical University of Kosice)*; Juraj Gazda (Technical university of Košice)

Poster session

Session Chair: **Ján Staš & Gabriel Bugár** (Technical University of Košice)

Thu, Apr 21, 11:15 – 12:00, Lobby

- **Design of hard switching for FSO/RF hybrid system based on prediction of RSSI parameter and environmental conditions** - Maroš Lapčák (Technical university of Košice)*; Jakub Oravec (Technical University of Košice); Ľuboš Ovseník (Technical University of Košice); Norbert Zdravecký (Technical university of Košice)
- **Reciprocity of the Turbulent Cascade Model** - Alžbeta Kovaľová (Brno University of Technology)*; Lucie Hudcová (Brno University of Technology)
- **On Radio Wave Forward Scattering on Rain Drops**- Maria Kovalchuk (University of Pardubice)*; Ondrej Fiser (University of Pardubice)
- **Measuring Particulate Matter (PM) Using SPS30** - Simona Kirešová (Technical University of Košice)*; Milan Guzan (Technical University of Košice); Pavol Galajda (Technical University of Kosice)
- **Picture Quality of 360° Images Compressed by Emerging Compression Algorithms** - Marek Simka (Brno University of Technology)*; Jan Kufa (Brno University of Technology); Ladislav Polak (Brno University of Technology)
- **Slovak dialogue corpus with backchannel annotation** -Stanislav Ondas (Technical University of Kosice)*; Eva Kiktová (Pavol Jozef Safarik University in Kosice); Matus Pleva (TUKE)
- **Analysis of Fixed-Point Quantization Noise in Multicarrier Transmitter Schemes** - Monther Alrwashdeh (Budapest University of Technology and Economics)*; Zsolt Kollár (Budapest University of Technology and Economics)
- **Morphological annotation of the Slovak language in the Spacy library with the pretraining** - Maroš Harahus (Technical university of Kosice)*; Jozef Juhár (TUKE); Daniel Hladek (TUKE)
- **A Systematic Review of Alzheimer's disease detection based on speech and natural language processing** - Adam Ševčík (Institute of Informatics, Slovak Academy of Science)*; Milan Rusko (SAV)

Lunch break, Thu, Apr 21, 12:00 – 13:00, Lobby

Invited speakers 2 + Industry talks + Student Awards ceremony

Session Chair: **Anton Čižmár & Matúš Pleva** (Technical University of Košice)

Thu, Apr 21, 13:00 – 14:30, Room 001

- **Gotta Catch 'Em All! (30m)** - Patrick Bours (NTNU, Gjøvik, Norway)
- **Emona TutorTIMS Cloud** - communications technology teaching assistant (not only) in pandemic times (20m) - Juraj Mikus (TR instruments)
- **A glimpse into the bright future of ultra-wide band (UWB) (20m*)** Jörg Köpp (Rohde&Schwarz)
- **Best student paper award ceremony (20m)** - Jozef Juhár (Technical university of Košice)

Coffee break 2, Thu, Apr 21, 14:30 – 14:45, Lobby

Microwave and photonic systems 1

Session Chair: **Patrick Bours** (NTNU, Gjøvik, Norway)

Thu, Apr 21, 14:45 – 15:45, Room 001

- **GPU-Accelerated Shooting and Bouncing Ray Method for Inverse Synthetic Aperture Radar Imaging (15m)** - Berk Bural (Hacettepe University); Ozlem Ovgun (Hacettepe University)*; Asim Egemen Yilmaz (Ankara University); Mustafa Kuzuoglu (Middle East Technical University)
- **Effective Constitutive Parameters Retrieval of Artificial 3D Printed Substrates with Conductive**

- **Inclusions (15m*)** - Petr Kadera (Brno University of Technology)*; Jaroslav Lacik (Brno University of Technology)
- **Calculation of Solar Noise in Selected Underwater Depths (15m*)** - Lucie Hudcová (Brno University of Technology)*; Alžbeta Kovařová (Brno University of Technology)
- **Design of Artificial Neural Network for Antenna Synthesis using the Optimization with Variable Number of Dimensions (15m*)** - Petr Kadlec (Brno University of Technology)*

Circuits and systems 1

Session Chair: **Roman Maršálek (Brno University of Technology)**

Thu, Apr 21, 14:45 – 15:45, Room 003

- **Hyperchaotic behavior of oscillator with cross-coupled transistor pair (15m)** - Miroslav Rujzl (Brno University of Technology)*; Jiří Petržela (Brno University of Technology)
- **On the Interference between LoRa and Bluetooth in the 2.4 GHz Unlicensed Band (15m*)** - Ladislav Polak (Brno University of Technology)*; Filip Paul (Brno University of Technology); Marek Simka (Brno University of Technology); Radim Zedka (Brno University of Technology); Jan Kufa (Brno University of Technology); Roman Sotner (Brno University of Technology)
- **Design of a Low Power and Area Efficient Bfloat16 based Generalized Systolic Array for DNN Applications (15m*)** - Ankita Tiwari (IIT Guwahati); Saras Mani Mishra (IIT Guwahati); Prithwijit Guha (IIT Guwahati); Jan Pidanic (University of Pardubice)*; Zdenek Nemeč (UPCE); Gaurav Trivedi (Indian Institute of Technology Guwahati)
- **Space-Time Line Code Based on Quasi-Orthogonal Design (15m*)** - Radim Zedka (Brno University of Technology - Faculty of Electrical Engineering and Communication)*; Marek Bobula (RACOM, s.r.o.); Jiri Blumenstein (Brno University of Technology - Faculty of Electrical Engineering and Communication); Ladislav Polak (Brno University of Technology)

Coffee break 3, Thu, Apr 21, 15:45 – 16:00, Lobby

Signal processing 2

Session Chair: **Eva Tuba (Singidunum University)**

Thu, Apr 21, 16:00 – 17:00, Room 001

- **An Image Encryption Algorithm with an Efficient Quantization Scheme (15m)** - Jakub Oravec (Technical University of Košice)*; Ľuboš Ovseník (Technical University of Košice); Samuel Andrejčík (Technical University of Košice)
- **Commercial UAV Jamming Possibilities (15m*)** - Ondřej Šimon (Brno University of Technology)*; Tomáš Götthans (Brno University of Technology); Miroslav Popela (Brno University of Technology)
- **Tests of Rain Attenuation Prediction Models for Satellite links through Long Term Data (15m)** - Ondrej Fiser (University of Pardubice)*; Aneta Zikesova (FEI University of Pardubice); Maria Kovalchuk (Institute of Atmospheric Physics)
- **Diakoptic Method as a Generalized Form of the Thevenin's Theorem (15m*)** - David Matousek (University of Pardubice)*; Bohumil Brtník (University of Pardubice)

Circuits and systems 2

Session Chairs: **Ozlem Ozgun (Hacettepe University) & Mustafa Kuzuoglu (Middle East Technical University)**

Thu, Apr 21, 16:00 – 17:00, Room 003

- **Determination of the fundamental resonance mode of a birdcage resonator (15m)** - Karel Juřík (Brno University of Technology)*; Petr Drexler (Brno University of Technology)
- **An Energy Efficient and Resource Optimal VLSI Architecture for ECG Feature Extraction for Wearable Healthcare Applications (15m*)** - Jan Pidanic (University of Pardubice)*; Meenali Janveja (IIT Guwahati); Rushik Parmar (IIT Guwahati); Gaurav Trivedi (IIT Guwahati); Zdenek Nemeč (UPCE)

- **Universal Measuring Device for Antenna Parameter Testing and Radio Traffic Analysis (15m*)** - Miroslav Popela (Brno University of Technology)*; Ondřej Šimon (Brno University of Technology); Stanislav Vaněk (Brno University of Technology)
- **An Area and Power Efficient VLSI Architecture to Detect Obstructive Sleep Apnea for Wearable Devices (15m*)** - Jan Pidanic (University of Pardubice)*; Rushik Parmar (Indian Institute of Technology Guwahati); Meenali Janveja (IIT Guwahati); Gaurav Trivedi (Indian Institute of Technology Guwahati); Zdenek Nemeč (UPCE)

Fri, Apr 22

Online - Signal processing 3

Session Chair: **Jana Fortes (Technical university of Košice)**

Fri, Apr 22, 08:30 – 10:00, Room 003

- **Personalized Taiwanese Speech Synthesis using Cascaded ASR and TTS Framework (15m*)** - Yuan-Fu Liao (National Taipei University of Technology)*; Wen-Han Hsu (National Taipei University of Technology); Wern-Jun Wang (Chunghwa Telecom Laboratories); Chen-Ming Pan (Chunghwa Telecom Laboratories); Matus Pleva (Technical University of Kosice); Daniel Hladek (Technical University of Kosice)
- **Multiwavelet toolbox for MATLAB (15m*)** - Jozef Kromka (Technical University of Košice)*; Ondrej Kováč (Department of Technologies in Electronics, Faculty of Electrical Engineering and Informatics, Technical University of Kosice); Ján Šaliga (Technical university of Kosice)
- **A Scalable and Adaptive Convolutional Neural Network Accelerator (15m*)** - Jan Pidanic (University of Pardubice)*; Arpan Vyas (Indian Institute of Technology Guwahati); Karki Rishav (Indian Institute of Technology Guwahati); Vij Prateek (Indian Institute of Technology Guwahati); Gaurav Trivedi (Indian Institute of Technology Guwahati); Zdenek Nemeč (UPCE)
- **Intelligent Monitoring System for Universal Data Collection and Analysis (15m*)** - Ondrej Kachman (R-DAS, s.r.o.)*; Jakub Findura (R-DAS, s.r.o.); Marcel Balaz (R-DAS, s.r.o.); Gabor Gyepes (R-DAS, s.r.o.); Libor Majer (R-DAS, s.r.o.); Marian Vojs (Faculty of Electrical Engineering and Information Technology, Slovak University of Technology)
- **Evaluation of Traffic Crossings Situations using Machine Learning (15m*)** - Jakub Hlaváček (Brno University of Technology)*; Jakub Götthans (Brno University of Technology)
- **Micro-Doppler Effect and Determination of Rotor Blades by Deep Neural Networks (15m*)** - Stanislav Vaněk (Brno University of Technology)*; Jakub Götthans (Brno University of Technology); Tomáš Götthans (Brno University of Technology)

Online - Circuits and systems 3

Session Chair: **Ján Šaliga (Technical University of Košice)**

Fri, Apr 22, 08:45 – 10:00, Room 001

- **Low-Power Rail-to-Rail Comparator in 130 nm CMOS Technology (15m*)** - Lukas Nagy (Slovak University of Technology)*; Daniel Arbet (Slovak University of Technology); Martin Kovac (Slovak University of Technology); Miroslav Potocny (Slovak University of Technology); Michal Sovcik (Slovak University of Technology); Viera Stopjakova (Slovak University of Technology)
- **Broadband Ka-band SPDT switch with 15 GHz bandwidth and 15.4 dBm IP1dB (15m*)** - Vijay Kumar (Indian Institute of Science (IISc), Bangalore)*; G. Sai Saravanan (Gallium Arsenide Enabling Technology Centre, Hyderabad); Shankar Kumar Selvaraja (Indian Institute of Science (IISc), Bangalore)
- **Design of Energy Efficient Static Level Restorer Based Half Subtractor using CNFETs (15m*)** - Avireni Bhargav (La Trobe University)*; Phat Huynh (La Trobe University)
- **Practical Aspects of Impedance Measurement using Operational Amplifier and Oscilloscope (15m*)** - Marek Svoboda (Brno University of Technology); Roman Sotner (Brno University of Technology); Ladislav Polak (Brno University of Technology)*
- **Autoaligning System for Short-Range Free Space Optics Links (15m*)** - Petr Skryja (Brno University of Technology)

Technology)*; Peter Barcik (Brno University of Technology); Zdenek Kolka (Brno University of Technology); Otakar Wilfert (Brno University of Technology)

Coffee break 4, Fri, Apr 22, 10:00 – 10:15, Lobby

Information technologies 2

Session Chair: **Daniel Hládek (Technical university of Košice)**

Fri, Apr 22, 10:15 – 12:00, Room 003

- **RNN with Improved Temporal Modeling for Speech Emotion Recognition (15m*)** - Eva Lieskovska (University of Zilina)*; Maros Jakubec (University of Zilina); Roman Jarina (University of Zilina)
- **Bi-directional Erbium Doped Fiber Amplifier in XPM Limited High-capacity DWDM System in C Band (15m)** - Norbert Zdravecký (Technical university of Košice)*; Ľuboš Ovseník (Technical University of Košice); Jakub Oravec (Technical University of Košice); Maroš Lapčák (Technical university of Košice)
- **Design and Implementation of a Low Power Area Efficient Bfloat16 based CORDIC Processor (15m*)** - Jan Pidanic (University of Pardubice)*; Saras Mani Mishra (IIT Guwahati); Hanumant Singh Shekhawat (Indian Institute of Technology Guwahati); Gaurav Trivedi (Indian Institute of Technology Guwahati); Zdenek Nemeč (UPCE)
- **Comparison of Floating-point Representations for the Efficient Implementation of Machine Learning Algorithms (15m*)** - Jan Pidanic (University of Pardubice)*; Saras Mani Mishra (IIT Guwahati); Ankita Tiwari (IIT Guwahati); Hanumant Singh Shekhawat (Indian Institute of Technology Guwahati); Prithwijit Guha (IIT Guwahati); Zdenek Nemeč (UPCE); Gaurav Trivedi (Indian Institute of Technology Guwahati)
- **Comparative study of machine learning technics for mobile ad hoc networks (15m)** - Natalia Kurkina (Technical University of Košice)*; Ján Papaj (Technical University of Košice), Anton Čižmár (Technical University of Košice)
- **Robust Data Transmission in 5G Networks Without Infrastructure based on blockchain technology (15m)** - Maros Baumgartner (Technical University of Kosice)*; Ján Papaj (Technical University of Košice)

Circuits and systems 4 - Workshop on wireless sensing and person activity monitoring

Session Chair: **Roman Maršálek (Brno University of Technology) & Pavol Galajda (Technical University of Košice)**

Fri, Apr 22, 10:15 – 12:00, Room 001

- **Workshop keynote: Geometric tracking based on angular and Doppler information for crowd motion detection (30m*)** - Erich Zöchmann (Brno University of Technology)
- **Moving person localization by cluster analysis using UWB sensor system (15m)** - Miriam Balintová (Technical university of Košice); Mária Švecová (Technical university of Košice); Jana Fortes (Technical university of Košice)*
- **Impact of Hardware Imperfections and Imperfect Channel Knowledge on SVD-precoded MIMO (15m)** - Miroslav Waldecker (Brno University of Technology)*; Roman Marsalek (Brno University of Technology)
- **Human activity classification via Doppler shift estimation from 60 GHz OFDM transmission (15m)** - Radek Závorka (Brno University of Technology)*; Roman Marsalek (Brno University of Technology); Josef Vychodil (Brno University of Technology); Erich Zöchmann (Brno University of Technology); Golsa Ghiaasi (Silicon Austria Lab); Jiří Blumenstein (Brno University of Technology)
- **High-Frequency Dielectric Resonator Oscillator for 21.68 GHz Ultra-Wideband Applications. (15m)** - Patrik Jurik (Technical University of Kosice)*; Pavol Galajda (Technical University of Kosice); Miroslav Sokol (Technical University of Košice)
- **A High-Speed Differential Frequency Divider-by-7 With a 50 % Output Duty Cycle (15m)** - Miroslav Sokol (Technical University of Košice)*; Patrik Jurik (Technical University of Kosice); Pavol Galajda (Technical University of Kosice)

Farewell lunch, Fri, Apr 22, 12:00 – 13:00, Lobby