

All sessions of October 4th and 5th and plenary sessions of October 6th will be transmitted in Zoom:

<https://rtucloud1.zoom.us/j/915231864%2052?pwd=WG1GT2ZTVWozT3JMWTRhZTR%20GSkeE0UT09>

Meeting ID: 915 2318 6452 Passcode: 686442

Online MTTW'2023 sessions of October 6th will be transmitted in Zoom separately (see links in program).

Program for parallel sessions of ITMS'2023 conference is published on <https://itms.rtu.lv/> and <https://ictfest.org/>

IEEE ICTfest & MTTW'2023 Program

Riga Technical University, Scientific Library

Address: Paula Valdena street 5, 2.12 room, Riga LV1048.

04.10.2023

8:30 – 9:00 Registration

9:00 – 9:30 ICTfest opening ceremony, prof. Anna Litvinenko, prof. Jānis Grabis, prof. Andrejs Romanovs, prof. Anastasija Zirovecka

<https://events.vtools.ieee.org/m/372987>

9:30 – 11:00 Discussion with Industry representatives on "Skills and perspectives of Post-COVID Young Professionals in the field of Information and Communication

Technology" (<https://events.vtools.ieee.org/m/373028>)

A discussion of the industry representatives on the skills of the next generation of young professionals in information and communication technology (ICT) field will encourage all interested to participate in whole festival program. Leading industry experts from companies and universities will present, sharing perspectives and challenges in ICT education and professional development. Together we will solve how to prepare young specialists in this rapidly changing digital environment. Representatives of Accenture, Mikrotik, AirBaltic, Sadales tīkls, Lightspace Technologies companies, and the vice-rector of RTU studies will participate in the discussion. The discussion is led by RTU students Darja Cirjulina and Valters Nelke .

11:00 – 11:30 Coffee break

11:30 - 12:30 IEEE Joint Baltic Life Member Affinity Group Discussion on "IEEE's Contribution to Professional Development"

<https://events.vtools.ieee.org/m/375527>

In the continuation of the IEEE day, the participants of the IEEE Joint Baltic Life Member Affinity Group will share their experience and discuss the IEEE association's contribution to professional development of young technical specialists. Experienced professionals such as Dr. Ulo Jaaksoo, Dr. Raimund Ubar, Prof. Mart Min, Prof. Jaan Jarvik from Estonia, Dr. Guntis Berzins, Dr. Imants Freibergs, Dr. Ernests Petersons from Latvia and Dr. Borisas Levitas, Dr. Irina Naidionova from Lithuania will participate in the discussion. The discussion is led by RTU prof. Anastasija Zirovecka and prof. Nadezda Kunicina.

12:30 –13:30 Lunch Break

13:30 – 18:00 IEEE Lithuania and Latvia Sections Workshop on Microwave Devices and Systems (<https://events.vtools.ieee.org/m/373030>)

The IEEE Lithuania and Latvia Sections Workshop on Microwave Devices and Systems gathers Baltic experts from academia and industry to present and discuss the latest innovative solutions and research results in the development of measuring equipment and devices. The workshop is led by RTU asoc.prof. Anna Litvinenko

13: 30 – 14:15" *Magnetic Field Measurement in Magnetic Pulse Forming and Welding Systems*",
Voitech Stankevič^{1,2}, Pavel Piatrou¹, Nerija Žurauskienė^{1,2}, Skirmantas Keršulis¹ -

¹Department of Functional Materials and Electronics, Center for Physical Sciences and Technology, Sauletekio ave. 3, LT-10257 Vilnius, Lithuania,

²Faculty of Electronics, Vilnius Gediminas Technical University, Naugarduko 41, LT-03227 Vilnius, Lithuania

Magnetic pulse welding (MPW) is a collision welding process, which uses a high velocity impact to join the two metals. This method allows for the joining of similar and dissimilar metals without the input of external heat and without any critical formation of their intermetallic phases. Sheets, profiles, and tubes can be processed. During the MPW process the parts being welded are positioned inside a tool coil. During the fast discharge of the capacitor banks via the coil, a magnetic field is generated around the coil, which leads to eddy currents in the electrically conductive flyer part positioned in close vicinity to the coil. The eddy currents induced in the flyer create an opposite magnetic field and a repulsive Lorentz force. This force causes the flyer to quickly accelerate plastically and to impact with the inner parent at an extremely high velocity resulting in a metallic bond. One of the simplest ways of obtaining information about the electromagnetic processes which take place during MPW is to measure the waveform of the magnetic field in the gap between the coil or field shaper and the flyer. In this work, it was investigated how fast, small size CMR-B-scalar sensors could be used for the measurements of the magnetic field magnitudes in the gap between the flyer and the field shaper during MPW and how they can provide quick, non-destructive evaluations of the weld quality.

and "*Magnetic Field Dynamics During Magnetic Pulse Forming*"

Pavel Piatrou¹, Jorūnas Dobilas, Voitech Stankevič^{1,2}

¹Department of Functional Materials and Electronics, Center for Physical Sciences and Technology, Vilnius, Lithuania,

²Faculty of Electronics, Vilnius Gediminas Technical University, Vilnius, Lithuania

Magnetic Pulse Forming (MPF) is an innovative and environmentally friendly method of forming metal workpieces by the controlled application of magnetic forces. To ensure the quality and accuracy of the MPF process, it is important to monitor the dynamics of the applied magnetic field magnitude in real time. Analysis of the magnetic field dynamics can provide information about the material forming process. This paper discusses the possibility of using manganite oxide-based sensors as an effective control method in the MPF process. Sensors based on manganite oxides (e.g., La_{1-x}Sr_xMnO₃) have

a colossal magnetoresistance, their compact size allows to be placed in the gap between the workpiece and the coil, and they are ideal candidates for monitoring the dynamics of magnetic fields with a magnitude of more than 1 Tesla and a duration of tens of microseconds. Numerical modeling of the workpiece deformation process and the dynamics of the magnetic field in the gap between the workpiece and the coil are discussed.

14:15 – 14:50 "Field heterogeneity estimation for sixth-order symmetrical current loop systems",

Romans Kusnis, Janis Semenako, Anna Litvinenko, Raivis, Deksnis - Institute of Microwave Engineering and Electronics Riga Technical University Riga, Latvia

The magnetic field of symmetrical three-coil DC current loop systems is investigated. All coils are arranged in parallel with their centers aligned along the same axis. The obtained results are applicable to very low-frequency current fields. Assuming negligible cross-sections for the coils, we derive a universal solution for the magnetic field expressed in terms of elliptic integrals, with the coil radii and distances between them serving as system parameters. The commonly used design technique for coil systems that aims to provide maximally homogeneous fields relies on expanding the field generated by the coil system into a Taylor series centered at the origin. In our investigation, the coil system is oriented so that the axis connecting the coil centers corresponds to the z-axis, with the coordinate $z=0$ representing the center of symmetry. This orientation ensures homogeneity along the z-axis, which, in turn, guarantees a sufficient level of field uniformity in other directions around the origin.

Analytical calculations reveal that the axial component of the magnetic field along the z-axis is an odd function of z. Consequently, the Taylor series exclusively contains even-order terms. To enhance field homogeneity, several lower-order even derivatives within the series can be set to zero. For a tri-coil system, physically realizable solutions are obtained by setting the 2nd and 4th-order derivatives equal to zero, resulting in a sixth-order tri-coil system. Importantly, there exist infinitely many such solutions achieved by varying the radius of the middle coil and the distance of the outer coils from the center. Notably, coil systems where the radius of the middle coil falls within 0.5 to 1.5 times the radius of the outer coils are particularly interesting for practical applications.

The primary focus of this research is to determine which of these coil systems offers the best field uniformity (heterogeneity). To address this, we investigate how to evaluate and compare the heterogeneity of such coil systems, despite their differing geometric dimensions and occupied volumes. Furthermore, we explore the extent to which the non-zero terms in the Taylor series impact field homogeneity. The research findings highlight the absence of universal solutions and emphasize the need for additional criteria tailored to specific applications, such as constraints on maximum radial system size or dimensions in the longitudinal direction.

14:50 - 15:25 "Overview of in-vehicle microwave sensors" , Dr. Eldar Sabanovic

Senior Research Fellow at Transport and Logistics Competence Centre, Faculty of Transport Engineering, Associate Professor at Department of Electronic Systems, Faculty of Electronics Vilnius Gediminas Technical University (VILNIUS TECH)

In the rapidly evolving landscape of automotive technology, the integration of microwave sensors has emerged as a pivotal advancement, enhancing vehicle safety, performance, and user experience. This presentation provides a comprehensive overview of in-vehicle microwave sensors, elucidating their fundamental principles, diverse applications, and the transformative impact they have on modern transportation.

Microwave sensors, operating in the electromagnetic spectrum, offer unique advantages over traditional sensors, including their ability to function in adverse weather conditions, penetrate non-metallic materials, and provide high-resolution data. These attributes make them particularly suitable for automotive applications.

The overview covers these topics: Fundamentals of Microwave Sensing, Adaptive Cruise Control and Collision Avoidance, Blind Spot Detection and Lane Change Assistance, Parking Assistance and Autonomous Parking, In-Cabin Monitoring, Challenges, and Future Prospects.

In conclusion, as vehicles become increasingly autonomous and connected, the role of microwave sensors will be paramount. This overview aims to shed light on the current state of this technology and its potential to redefine the future of transportation.

15:25– 15:45 Coffee break

15:45 – 16:20 "Advanced techniques for Wireless power transfer", Janis Eidaks¹, Romans Kusnins¹, Ruslans Babajans¹, Darja Cirjulina^{1,2}, Anna Litvinenko^{1,2}

¹ Institute of Microwave Engineering and Electronics, Riga Technical University, Riga, Latvia,

² SpacESPro Lab, Riga Technical University Riga, Latvia

The growing number of low-power wireless devices and sensors led to the integration of the Internet of Things (IoT) and Wireless Sensor Networks (WSNs) in various branches of industry, agriculture, medicine, etc. With such wide application, the powering of the autonomous sensor nodes (SNs) poses a challenge since batteries are the most common power source of the SNs. The growing interest in overcoming this challenge was directed toward developing far field wireless power transfer (WPT). While the given powering technique is feasible, WPT performance enhancement is the main challenge. The device-level improvements focus on enhancing the performance of the WPT nodes. This includes improving the performance of the RF-DC converters, energy storage solutions, and the design of power-carrying signal waveforms. The network-level improvements are focused on incorporating and combining new technologies, such as multi-hop transfer and beamforming, to increase the performance of WPT on a network scale. The current project aims to investigate and experimentally study several innovative techniques of wireless power transfer: multi-hop energy transfer, passive beamforming using intelligent reflecting surfaces (IRSs), and application of RF powering signals adapted to the transmission channel. The research also studies the combinations of the techniques for more efficient WPT.

16:20 - 16:55 "Open structures in electromagnetics: scientific heritage of Victor P. Shestopalov", Yury Shestopalov - Faculty of Engineering and Sustainable Development, University of Gävle, Sweden.

We briefly summarize the milestones describing comprehensive scientific activities and results achieved by Victor P. Shestopalov and his disciples in the fields specifically connected with applications of the nonselfadjoint operator spectral theory in electromagnetics of open structures. We emphasize that his achievements paved the way to creating the modern level of the mathematical theory of wave propagation and diffraction and resulted in constructing efficient solution techniques and discovery of various phenomena and effects.

16:55 – 17:30 "Mobile FMCW Radar Technology in cm Range" Dr. Borisas Levitas, Michael Drozdov, Matvej Khazarov – Geozondas LTD, Lithuania.

An overview of frequency domain Software Defined Radars (SDR) was completed. The Frequency Modulated Continuous Wave (FMCW) radar with multiple receiving antennas after the initial processing (some form of Fourier transforms) creates a Range-Azimuth-Doppler 3D data array on each frame. The schemes and signal processing algorithms of SDR through wall radar developing in frame of project FRED were described. A printed Aperture Stacked Patch Antenna were calculated and simulated. 4 antenna transmitting array and 8 antenna receiving array form a 32 elements virtual array. A decade convolutional neural networks (CNN) is used to improve probability and accuracy of though wall live being target detection and localization with a minimum number of false alarms. Our goal with the CNN was to improve the performance of the proprietary FMCW radar, find a data representation that allows to conveniently store the radar data but also have an efficient data pipeline during the training phase and find a set of data augmentation strategies to avoid overfitting to the training set.

17:30 – 18:00 "Event timer-based PPM transceiver design and implementation", Arturs Aboltins¹, Tatjana Solovjova¹, Viktors Kurtenoks²

¹ Institute of Microwave Engineering and Electronics Riga Technical University Riga, Latvia

² Eventech Ltd, Riga, Latvia

The employment of event timers for the demodulation of pulse position modulation (PPM) signals allows the building of data communication systems with unprecedented energy efficiency and competitive transmission speeds. PPM modulation techniques can be employed for space communications, sensor networks, high-accuracy integrated sensing and communications.

This presentation is devoted to the PPM transceiver design capable of transmitting data with a data transfer speed of up

to 160 Mbit/s and energy efficiency of less than 5 pJ/bit. The transceiver employs Eventech ESTT-01 event-timer to demodulate the signal, whereas the modulation uses high-speed digital delay lines. In the first part, design decisions, main challenges and prospects of high-speed communication using PPM. are addressed. The second part analyzes the impact of optical and microwave links on the transmitted waveform, and electro-optical solutions for transmitter/receiver front-ends are proposed. It will be shown how a pulse expander could be implemented either in the optical or in the electrical domain of the PPM communication link to satisfy the requirements of the event timer for input signal duration.

18:00 – 20:00 Social program – a guided tour In Old Riga town

(<https://events.vtools.ieee.org/m/373039>)

RTU and IEEE organized MTTW'2023
International Conference - Workshop on Microwave Theory and Technology in
Wireless Communications 2023

05.10.2023

8:30 – 9:00 Registration

9:00 – 10:30 Keynote speeches

9:00 – 9:45 Prof. Oscar Quevedo-Teruel (Sweden) – A fast ray-tracing code for the simulation of lens antennas (<https://events.vtools.ieee.org/m/373033>)

In this talk, Prof. Quevedo-Teruel will explain the operation of a ray-tracing code that can be used to calculate in a few seconds, and extremely accurately, the radiation pattern, efficiency and gain of lens antennas. Lenses are an excellent candidate for new applications in the millimeter frequency regime, especially for antennas with low-scan losses. For example, they are being considered for antenna solutions in 5G/6G, satellite communications in Low-Earth Orbit constellations and automotive radars. However, their simulation and optimization are time-consuming due to their large dimensions in terms of wavelength. In this presentation, Prof. Quevedo-Teruel will explain the theory of ray-tracing, its features, and he will demonstrate its operation with some practical examples.

9:45 – 10:30 Prof. Mike Hinchey (UK) – Is There Anything That Isn't Software?

(<https://events.vtools.ieee.org/m/373035>)

In this rapidly changing world, evolving technologies such as Artificial Intelligence, Robotics, Machine Learning, Cloud Computing, Big Data, the Internet of Things, and Mobile Computing are combining to disrupt traditional models and radically change how we live, work, and interact. More importantly, these technologies change the way we live and do business: the world's largest bookstore is a Cloud Computing provider, and the largest fleet of cars in the world is operated by an app provider. Areas such as healthcare have been transformed dramatically, with better analysis, imaging, detection, diagnosis, treatment, robot-assisted surgery, and even significant advances in sharing health records. We eagerly await the day when cars, buses, trucks, and railways are self-driven, and Industry 4.0 is already upon us, and of course we claim the use of AI in just about everything. All of these advances are entirely dependent on software. We ask the question: is there anything that isn't software?

10:30 – 11:00 Coffee break

11:00 – 12:30 MTTW Workshop sessions (Session A1-I Wireless communications in-person) (<https://events.vtools.ieee.org/m/373040>) / ITMS conference sessions (online)

Session A1-I Wireless communications in person – chairs Deniss Kolosovs, Darius Plonis

11:00 - 11:15 Challenges for Designing an FPGA-Based Data Link Layer Processor Dedicated to Sub-THz Communication

Yiyun Jian (IHP - Leibniz Institute for High Performance Microelectronics, Germany); Lukasz Lopacinski and Klaus Tittelbach-Helmrich (IHP, Germany); Matthias Scheide (IHP - Leibniz Institut für Innovative Mikroelektronik, Germany); Karthik Krishnegowda (IHP GmbH, Innovations for High Performance Microelectronics, Germany); Eckhard Grass (IHP & Humboldt-University Berlin, Germany)

11:15 - 11:30 Q-Learning Inspired Method for Antenna Azimuth Selection in Cellular Networks

Darius Chmieliauskas (Vilnius Tech, Lithuania); Aamir Mahmood (Mid Sweden University, Sweden); Sarunas Paulikas (Vilnius Gediminas Technical University, Lithuania); Kyi Thar and Mikael Gidlund (Mid Sweden University, Sweden)

11:30 - 11:45 Congestion Probabilities in a Mobile Hotspot Supporting Quasi-Random Traffic

Marinos Vlasakis and Ioannis Moscholios (University of Peloponnese, Greece); Panagiotis Sarigiannidis (University of Western Macedonia, Greece); Michael D. Logothetis (University of Patras, Greece)

11:45 - 12:00 Fundamental Frequency Impact on Colpitts Chaos Oscillator Dynamics

Darja Čirjuļina, Ruslans Babajans, Deniss Kolosovs and Anna Litvinenko (Riga Technical University, Latvia)

12:00 - 12:15 Experimental Study on Analog and Discrete Chaos Oscillators Synchronization

Ruslans Babajans, Darja Čirjuļina, Deniss Kolosovs and Anna Litvinenko (Riga Technical University, Latvia)

12:15 - 12:30 Performance Evaluation of Frequency Modulated Antipodal Chaos Shift Keying Digital Communication System

Filips Capligns, Anna Litvinenko and Deniss Kolosovs (Riga Technical University, Latvia)

12:30 – 13.30 Lunch Break

13:30 – 15.30 MTTW Workshop sessions (Session A2 Microwave Technology in-person) (<https://events.vtools.ieee.org/m/373041>) / ITMS conference sessions (online)

Session A2 Microwave Technology in person – chairs Tatjana Solovjova, Oscar Quevedo-Teruel

13:30 – 13:45 Wide-Scan/High-Gain Phased Array Antenna for 5G/6G Cellular Networks

Haleh Jahanbakhsh Basherlou (Edinburgh Napier University, United Kingdom (Great Britain)); Naser Ojaroudi Parchin (Edinburgh Napier University, United Kingdom, United Kingdom (Great Britain)); Mohammad Alibakhshikenari (Universidad Carlos III de Madrid, Spain); Chan Hwang See (Edinburgh Napier University, United Kingdom (Great Britain))

13:45 – 14:00 Tri-Band Endfire Antenna Array with Wide Angles of Beam-Scanning Capability for 5G mmWave Mobile Communications

Ali Zidour (University of M'hamed Bougara, Algeria); Mouloud Ayad (University of Bouira, Algeria); Mohammad Alibakhshikenari (Universidad Carlos III de Madrid, Spain); Haleh Jahanbakhsh Basherlou (Edinburgh Napier University, United Kingdom (Great Britain)); Naser Ojaroudi Parchin (Edinburgh Napier University, United Kingdom, United Kingdom (Great Britain)); Chan Hwang See (Edinburgh Napier University, United Kingdom (Great Britain))

14:00 – 14:15 Axial Cylindrical Three-Coil Systems for Producing a Uniform Magnetic Field

Janis Semenako, Romans Kuskins, Anna Litvinenko and Raivis Deksnis (Riga Technical University, Latvia)

Study on a Metal Closet Based Wireless Power Transfer System for Smart Suit Charging

Romans Kuskins, Dmitrijs Pikulins, Sergejs Tjukovs and Janis Eidaks (Riga Technical University, Latvia); Arturs Aboltins (RTU, Latvia)

14:15 – 14:30 Study on a Metal Closet Based Wireless Power Transfer System for Smart Suit Charging

Romans Kuskins (Riga Technical University, Latvia); Dmitrijs Pikulins (Riga Technical University, Latvia); Sergejs Tjukovs (Riga Technical University, Latvia); Janis Eidaks (Riga Technical University, Latvia); Arturs Aboltins (RTU, Latvia)

14:30 – 14:45 Wireless Induction Charging Station for Industrial Applications

Didzis Lapsa (Institute of Electronics and Computer Science, Latvia)

14:45– 15:00 Ray-Tracing Model for Planar Mikaelian Lens Antennas

Mingzheng Chen (KTH Royal Institute of Technology, Sweden); Francisco Mesa (University of Seville, Spain); Oscar Quevedo-Teruel (KTH Royal Institute of Technology, Sweden)

15:00 – 15:15 Analyzing Glide-Symmetric Structures with Method-Of-Moments

Martin Petek (Politecnico di Torino, Italy & KTH Royal Institute of Technology, Sweden); Javier Rivero and Jorge A. Tobon Vasquez (Politecnico di Torino, Italy); Guido Valerio (Sorbonne Université, France); Oscar Quevedo-Teruel (KTH Royal Institute of Technology, Sweden); Francesca Vipiana (Politecnico di Torino, Italy)

15:15 – 15:30 Evolutionary Algorithm-Based Superdirective Broadband Wire-Bundle Antenna

Dmytro Vovchuk, Gilad Uziel and Andrey Machnev (Tel Aviv University, Israel); Mykola Khobzei and Vladyslav Tkach (Yuriy Fedkovych Chernivtsi National University, Ukraine); Vjaceslavs Bobrovs (Riga Technical University, Latvia); Pavel Ginzburg (Tel Aviv University, Israel)

15:30 – 16:00 Coffee break

16:00 – 17:30 MTTW Workshop sessions (A1-II Wireless communications in-person)

(<https://events.vtools.ieee.org/m/3730410>) / ITMS conference sessions (online)

A1-II Wireless communications in person – chairs Anna Litvinenko , Dmytro Vovchuk

16:00 – 16:15 Making Ping Feint to Avoid Service State Desynchronization

Dmitrijs Rjazanovs (Riga Technical University, Latvia)

16:15 – 16:30 Nonlinearity Calibration Method for the Picosecond Precision Time Interval Meter

Viktorija Smetskaja, Anna Litvinenko and Viktors Kurtenoks (Riga Technical University, Latvia)

16:30 – 16:45 Deep Learning-Based Radio Frequency Identification of False Base Stations

Jan Bolcek, Jan Kufa, Michal Harvanek, Ladislav Polak, Jan Kral and Roman Marsalek (Brno University of Technology, Czech Republic)

16:45 – 17:00 Method of Choosing Chaotic Spreading Sequences for Communication Systems

Serhii Haliuk and Andrii Yanchak (Yuriy Fedkovych Chernivtsi National University, Ukraine); Oleh Krulikovskiy (Yuriy Fedkovych Chernivtsi National University, Ukraine & Ștefan Cel Mare University of Suceava, Romania); Dmytro Vovchuk (Tel Aviv University, Israel)

17:00 – 18.30 Guided tour to RTU campus

(<https://events.vtools.ieee.org/m/375538>)

18:30 – 20.30 Gala Dinner in RTU (<https://events.vtools.ieee.org/m/373042>)

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06.10.2023

8:30 – 9:00 Registration

9:00 – 10:30 Keynote speeches

9:00 - 9:45 Prof. Izzet Kale (UK) – *Balanced Model Truncation and its Practical Real-World Applications* (<https://events.vtools.ieee.org/m/373037>)

This talk will look into the theoretical foundations of Balanced Model Truncation (BMT) which has its origins in the Control Engineering literature, and cover the practical implementation steps, with a view to deploying it in real-world DSP applications. The speaker will provide a number of examples from the use of the BMT technique, in actual product design and development, from project undertaken for various sectors of industry, where the BMT technique has made a very substantial difference in system order reduction as well as complexity reduction, which resulted in substantial footprint and power reduction in the actual circuit level implementations.

9:45 – 10:30 Assoc. Prof. Alex Norta (Estonia) – *Global Development Trends of Blockchain Technology* (<https://events.vtools.ieee.org/m/373038>)

Blockchain technology has evolved rapidly over the past decade, from the launch of Bitcoin in 2009 to the emergence of programmable blockchains like Ethereum. This keynote speech will provide an overview of the global development trends in blockchain technology. It will cover the evolution from Blockchain 1.0 focused on cryptocurrencies to Blockchain 2.0 enabling smart contracts and decentralized applications. Architectures like directed acyclic graphs (DAGs) have also emerged to address scalability and other limitations.

The speech will highlight major public blockchain infrastructure projects and applications like decentralized finance (DeFi), non-fungible tokens (NFTs), decentralized metaverses, and blockchain games. It will also discuss enterprise blockchain adoption with use cases, Blockchain-as-a-Service offerings, and alliances like the Enterprise Ethereum Alliance. Government initiatives around blockchain will be covered, including the European Blockchain Services Infrastructure (EBSI) and central bank digital currency (CBDC) projects.

The talk provides a comprehensive overview of global blockchain trends relevant to IT professionals, researchers, and developers working in this rapidly evolving space.

10:30 – 11:00 Coffee break & Special PhD poster session

(<https://events.vtools.ieee.org/m/373043>)

11:00 – 12:30 MTTW Workshop sessions (Session B1 Wireless communications remotely) (<https://events.vtools.ieee.org/m/373044>) / ITMS conference sessions (in person)

Session B1 Wireless communications remotely – chairs Arturs Aboltins, Dmitrijs Pikulins ZOOM link <https://rtucloud1.zoom.us/j/97763922833> Meeting ID: 977 6392 2833

11:00 – 11:15 Bit Error Rate Performance of Real-Valued Spreading Sequences in DSSS-CSK Based Wireless Communications

Lukasz Lopacinski (IHP, Germany); Nebojsa Maletic (IHP - Leibniz-Institut für Innovative Mikroelektronik, Germany); Alireza Hasani (IHP GmbH, Germany); Muhammad Nauman (IHP Leibniz-Institut Für Innovative Mikroelektronik, Germany); Jesús Gutiérrez (IHP - Leibniz-Institut für Innovative Mikroelektronik, Germany); Eckhard Grass (IHP & Humboldt-University Berlin, Germany)

11:15 – 11:30 6G and Beyond: Hardware-In-The-Loop Experiments with OTFS Modulation Using SDR

Muhammad Nauman (IHP Leibniz-Institut Für Innovative Mikroelektronik, Germany); Lukasz Lopacinski (IHP, Germany); Nebojsa Maletic (IHP - Leibniz-Institut für Innovative Mikroelektronik, Germany); Matthias Scheide (IHP - Leibniz Institut für Innovative Mikroelektronik, Germany); Milos Krstic (IHP, Germany); Eckhard Grass (IHP & Humboldt-University Berlin, Germany)

11:30 – 11:45 Improvement of Direct Communication to Satellite Using LoRa-FHSS Compared to LoRa-CSS (DEWASAT-1 Case of Study)

Balaji Ramachandran (Research and Development Centre & Dubai Electricity and Water Authority, United Arab Emirates); Sidi Ahmed Bendoukha and Jayakumar Vandavasi Karunamurthy (Dubai Electricity and Water Authority, United Arab Emirates)

11:45 – 12:00 Experimental Study of Non-Contact Detection of Vital Signs Using IR-UWB

Mahdi Esmaeilshahir and Ali Shakfa (Bahçeşehir University, Turkey); Saeid Karamzadeh (Silicon Austria Labs, Austria)

12:00 – 12:15 Instantaneous Velocity Estimation of Multiple Targets Using Coordinated OFDM RADAR Nodes

Yanhua Zhao (IHP, Germany and HU, Berlin, Germany); Vladica Sark (IHP - Leibniz-Institut für Innovative Mikroelektronik, Germany); Milos Krstic (IHP, Germany); Eckhard Grass (IHP & Humboldt-University Berlin, Germany)

12:15 – 12:30 Development of an Array of Patch Antennas for Straightforward Beamforming Application

Rama Rahardi (Institut Teknologi Bandung, Indonesia); Agus D. Prasetyo (Telkom University, Indonesia & Institut Teknologi Bandung, Indonesia); Rezki Benedikto Renwarin and Achmad Munir (Institut Teknologi Bandung, Indonesia)

12:30 – 12:45 Features of Time-Scale System VLBI Radio Telescope RT-32 Zolochiv

Viktor A. Gaidamanchuk (Wircom Company, Kyiv, Ukraine)

12:30 – 13:30 Lunch Break

13:30 – 15:45 MTTW Workshop sessions (Session B2 Microwave Technology

remotely) (<https://events.vtools.ieee.org/m/373044>) / ITMS conference sessions

(in person)

Session B2 Microwave Technology remotely – chairs Romans Kusnins, Andrius Katkevicius

ZOOM link: <https://rtucloud1.zoom.us/j/96464255850> Meeting ID: 964 6425 5850

13:30 – 13:45 Dualband and Tunable Beam Tilting Wideband High Gain Compact Endfire Antennas Based on Spoof Surface Plasmon Polaritons

Goksel Turan (Eskisehir Osmangazi University, Turkey)

13:45 – 14:00 On Regularized T-Matrix Method and Its FMM Acceleration Incorporating Oblique Plane mmWave Scattering by Dielectric Cylinders for Anti-Isorefractive DNG Materials

Murat Enes Hatipoglu and Fatih Dikmen (Gebze Technical University, Turkey)

14:00 – 14:15 Simulation of Electromagnetically Induced Transparency and Autler-Townes Splitting in Microwave Frequency Range

Gleb Leonidovich Avdeyenko (National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" & Research and Educational Institute of Telecommunication Systems, Ukraine); Oleg V'yunov (V. I. Vernadsky Institute of General and Inorganic Chemistry of the NAS of Ukraine, Ukraine); Olexandr Fedorchuk (V. I. Vernadsky Institute of General and Inorganic Chemistry of Ukrainian NAS, Ukraine); Roman Kamarali (Igor Sikorsky Kyiv Polytechnic Institute, Ukraine); Olexander Zhivkov (Igor Sykorsky Kyiv Polytechnic Institute, Ukraine); Volodymyr Stepanenko (Igor Sikorsky Kyiv Polytechnic Institute, Ukraine)

14:15 – 14:30 A Dual-Band Flexible Antenna with an Adaptable Design Technique

Abdullah M. Alamri, Mohammed Almutlag and Muhmmad Shah Alam (Imam Mohammad Ibn Saud Islamic University (IMSIU), Saudi Arabia); Asif Alam (Delta International School, Saudi Arabia); Khalid AlMuhanna (Al Imam Mohammad Ibn Saud Islamic University, Saudi Arabia)

14:30 – 14:45 Design and Validation of 2 Port CP MIMO Monopole Antenna for n79 5G Domain

Manjunath M n (Nagarjuna College of Engineering and Technology, Bengaluru, India); Vivek Singh (Nagarjuna College of Engineering and Technology, Bengaluru, Karnataka, INDIA, India); Ajay Kumar Dwivedi (Nagarjuna College of Engineering and Technology, Bengaluru, India)

14:45 – 15:00 Characterization of A 3D-Printed PLA-Based Slotted SIW Antenna

Achmad Munir and Muhammad Farhan Maulana (Institut Teknologi Bandung, Indonesia); Budi Syihabuddin (Telkom University, Indonesia); Rivaldi Aulia Muhammad (UIN Sunan Gunung Djati Bandung, Indonesia)

15:00 – 15:15 Design and Realization of a Wideband Quadratic Wire-Shaped Discone Antenna

Rheyuniarto Sahendar Asthan (Institut Teknologi Sumatera, Indonesia & Institut Teknologi Bandung, Indonesia); Achmad Munir (Institut Teknologi Bandung, Indonesia)

15:15 – 15:30 Controllable Microwave Phase Shifter Using Varactor Diodes Loaded Microstrip Line

Zulfi Zulfi (Telkom University, Indonesia); Achmad Munir (Institut Teknologi Bandung, Indonesia)

15:30 – 15:45 Additive Manufacturing for Developing Present and Future Microwave Components

José Rico-Fernández (University of Oviedo, Spain & KTH Royal Institute of Technology, Sweden); Oscar Quevedo-Teruel (KTH Royal Institute of Technology, Sweden)

15:45 – 16:00 Utilization of 3D Printing Technique for Manufacturing Planar Marchand Balun Fed UHF Vivaldi Antenna

Muhammad Farhan Maulana (Institut Teknologi Bandung, Indonesia); Zulfi Zulfi (Telkom University, Indonesia); Yamato Tan (University of Pakuan, Indonesia); Achmad Munir (Institut Teknologi Bandung, Indonesia)

16:00 – 16:15 Reconfigurable UWB Hexagonal Antenna with U-Stub Form for Cognitive Radio Applications

Boualem Hammache (Université des Frères Mentouri, Constantine, Algeria); Abderraouf Messai (University of Constantine 1, Algeria); Idris Messaoudene (University of Bordj Bou Arréridj, Algeria); Massinissa Belazzoug (Université de Bordj Bou Arréridj, Algeria); Khier Benderradji (Laboratoire Electronique, Algeria); Tayeb Denidni (INRS, Canada)

16:15 – 16:30 Circularly Polarized Square Loop Shaped Passive RFID Transponder for Thin UHF Applications in Random Mobility Use

Boualem Mekimah (University Kasdi Merbah Ouargla, Algeria); Tarek Djerafi (Institut National de la Recherche Scientifique, Canada); Abderraouf Messai (University Freres Mentouri Constantine 1, Algeria); Abdelkrim Belhedri (University of Constantine1, Algeria); Mohammed Boulesbaa (University Kasdi Merbah Ouargla, Algeria); Amira Hamidi (University Kasdi Merbah Ouargla, Algeria)

17:30 – 18.00 Closing and Awarding Ceremony

(<https://events.vtools.ieee.org/m/373045>)