

Union of Electronics, Electrical Engineering and Telecommunications (CEEC)
Federation of the Scientific-Technical Unions in Bulgaria (FNTS)
Ministry of Transport and Communications
Communications Regulation Commission
Union of Scientists in Bulgaria
Technical University of Sofia - Faculty of Telecommunications
New Bulgarian University – Department of Telecommunications
South-West University "Neofit Rilski" - Technical Faculty
IEEE Bulgarian Section

**32nd NATIONAL CONFERENCE
WITH INTERNATIONAL PARTICIPATION**

TELECOM 2024

THE WAYS TO CONNECT THE FUTURE



P R O G R A M M E

21 - 22 November 2024
*National Science and Technical Centre,
108 Rakovsky St. – Sofia & Virtual room*

TELECOM 2024

is technically co-sponsored by IEEE:

**2024 32nd National Conference with
International Participation - #63374**

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Telecom 2024 Sessions Timetable

| <i>Date</i> | <i>Time</i> | <i>Sessions</i> |
|---------------------------------|----------------------|--|
| Wednesday 20.11.2024 | 15.00-16.00 | <p>Registration of participants & test the system (Virtual Room 1) Meeting ID: 870 9552 5921, Passcode: 232653 Zoom Platform (Phone: +359 2 987 97 67, Mail: ceec@mail.bg)</p> |
| Thursday 21.11.2024 | 10.00 – 12.00 | <p>Conference Opening, Greetings Plenary Session 1, Hall 1 & Virtual Room 2 Meeting ID: 836 4436 7937, Passcode: WZJF1P Chairmen: Assoc. Prof. Plamen Vachkov, PhD Prof. Seferin Mirtchev, DSc Presentations: 1. CRC, 2. MTC, 3. A1, 4. Kamen Rangelov, 5. Ivan Ganchev - invited paper</p> |
| | 12.30 - 14.00 | <p>Section Session 1, Hall 1 & Virtual Room 2 Meeting ID: 836 4436 7937, Passcode: WZJF1P INTERNET OF THINGS (IoT). MACHINE LEARNING. Chairman: Assoc. Prof. Rositsa Goleva, PhD Presentations: Papers 1.1, 1.2, 1.3,.1.4, 1.5, 1.6, 1.7, 1.8</p> |
| | 14.15 – 15.45 | <p>Section Session 2, Hall 1 & Virtual Room 2 Meeting ID: 836 4436 7937, Passcode: WZJF1P TELECOMMUNICATIONS THEORY. SIGNALS AND SYSTEMS. IMAGE PROCESSING AND CODING. Chairman: Eng. Stefan Patchedjiev, PhD Presentations: Papers 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8</p> |
| | 16.00 – 17.30 | <p>Section Session 3, Hall 1 & Virtual Room 2 Meeting ID: 836 4436 7937, Passcode: WZJF1P ARTIFICIAL INTELLIGENCE IN ICT. EDUCATION METHODOLOGIES IN ICT. Chairman: Prof. Seferin Mirtchev, DSc Presentations: Papers 3.1, 3.2, 3.3,.3.4, 3.5, 3.6, 3.7, 3.8</p> |
| | 17.35 – 17.50 | <p>Plenary Session 2, Hall 1 & Virtual Room 2 Meeting ID: 836 4436 7937, Passcode: WZJF1P Chairmen: Prof. Seferin Mirtchev, DSc Presentations: 1. Alliance of the Technology Industry (ATI)</p> |
| | 18.00 – 20.00 | <p>Informal meeting forum - Cocktail – Hall 3</p> |

| <i>Date</i> | <i>Time</i> | <i>Sessions</i> |
|--------------------------|----------------------|--|
| Friday 22.11.2024 | 08.30 – 10.00 | <p>Section Session 4, Hall 1 & Virtual Room 3 Meeting ID: 811 5752 6503, Passcode: 018159</p> <p>TELECOMMUNICATIONS NETWORKS. SOFTWARE DEFINED NETWORKS. SMART HOME AND CITIES.</p> <p>Chairman: Eng. Stefan Patchedjiev, PhD</p> <p>Presentations: Papers 4.1, 4.2, 4.3,.4.4, 4.5, 4.6, 4.7, 4.8</p> |
| | 10.15 – 11.45 | <p>Section Session 5, Hall 1 & Virtual Room 3 Meeting ID: 811 5752 6503, Passcode: 018159</p> <p>TELECOMMUNICATIONS THEORY. SIGNALS AND SYSTEMS. IMAGE PROCESSING AND CODING.</p> <p>Chairman: Prof. Seferin Mirtchev, DSc</p> <p>Presentations: Papers 5.1, 5.2, 5.3,.5.4, 5.5, 5.6, 5.7, 5.8</p> |
| | 12.00 – 13.00 | <p>Section Session 6, Hall 1 & Virtual Room 3 Meeting ID: 811 5752 6503, Passcode: 018159</p> <p>WIRELESS SYSTEMS. MOBILE COMMUNICATIONS.</p> <p>Chairman: Assoc. Prof. Kamelia Nikolova, PhD</p> <p>Presentations: Papers 6.1, 6.2, 6.3,.6.4, 6.5</p> |
| | 13.30 – 15.00 | <p>Section Session 7 Hall 1 & Virtual Room 3 Meeting ID: 811 5752 6503, Passcode: 018159</p> <p>COMMUNICATION TECHNOLOGY IN INTELLIGENT TRANSPORT SYSTEMS. CLOUD COMMUNICATIONS.</p> <p>Chairman: Assoc. Prof. Georgy Petrov, PhD</p> <p>Presentations: Papers 7.1, 7.2, 7.3,.7.4, 7.5, 7.6, 7.7, 7.8</p> |
| | 15.15 – 17.00 | <p>Section Session 8, Hall 1 & Virtual Room 3 Meeting ID: 811 5752 6503, Passcode: 018159</p> <p>TELETRAFFIC ENGINEERING. RESEARCH/EDUCATION METHODOLOGIES IN ICT.</p> <p>Chairman: Assoc. Prof. Ivan Nedyalkov, PhD</p> <p>Presentations: Papers 8.1, 8.2, 8.3,.8.4, 8.5, 8.6, 8.7, 8.8, 8.9</p> |
| | 17.05 | <p>Closing of the Conference, Hall 1 & Virtual Room 3 Meeting ID: 811 5752 6503, Passcode: 018159</p> <p>Prof. Seferin Mirtchev, DSc</p> |

CONFERENCE PROGRAMME

Wednesday,
15.00 – 16.00
20.11.2024 г.

Registration of participants & test the system, Zoom Platform
([Virtual Room 1](#)) Meeting ID: 870 9552 5921, Passcode: 232653

Thursday,
21.11.2024 г.

NATIONAL SCIENCE AND TECHNICAL CENTRE
Hall 1 & [Virtual Room 2](#) Meeting ID: 836 4436 7937, Passcode: WZJF1P

Conference Opening, Greetings

10.00 – 12.00
21.11.2024 г.

Plenary Session 1, Hall 1 & [Virtual Room 2](#)
Meeting ID: 836 4436 7937, Passcode: WZJF1P

Conference Opening, Greetings
Chairmen: Assoc. Prof. Plamen Vachkov, PhD
Prof. Seferin Mirtchev, DSc

1. „Digital Services Act - Objectives and Implementation”

Mila Malinova, State Expert in the Department of Regulation of Electronic Communications, Directorate of Regulation.
Communications Regulation Commission

2. „European Commission Study on the Future Development of the Postal Sector”

Ilyana Karafizieva - Director of Communications Directorate,
Ministry of Transport and Communications

3. „5G Stand Alone – Why and When”

Alexandar Puntchev
AI Bulgaria EAD

4. “Notes on Telecommunications – 2024”

Kamen Rangelov – CEEC

5. ”Service Provider Initiated Hot Change of Access Network Facilitated by Trusted Third Party” - invited paper

Ivan Ganchev - University of Plovdiv “Paisii Hilendarski”, Plovdiv; Institute of Mathematics and Informatics – Bulgarian Academy of Sciences, Sofia; Telecommunications Research Centre (TRC), University of Limerick, Limerick

12.30 – 14.00
21.11.2024 г.

Section Session 1, Hall 1 & [Virtual Room 2](#)
Meeting ID: 836 4436 7937, Passcode: WZJF1P

INTERNET OF THINGS (IoT). MACHINE LEARNING.
Chairman: Assoc. Prof. Rositsa Goleva, PhD

1.1. 4\$ LuatOS-based 4G IoT Gateway

Zhanlin Ji, Ivan Ganchev

1.2. A Novel Decentralised Identity Platform using Blockchain

Sulakshna Puttoo, Roopesh Kevin Sungkur

1.3. Comparison of IoT Low-Power Wide-Area Networks for Smart City Organisation

Yurii Karaush, Mykola Patlaienko

1.4. Safeguarding Mobility: YOLOv8n-Enabled Road Surface Detection and Classification

Vivek Kumar, Hitesh Singh, Kumud Saxena, Boncho Bonev, Shruti Karn, Garima Tiwari

1.5. Predictive Modeling of Gamma Radiation Levels during Solar Eclipses: A Machine Learning Approach

Hitesh Singh, Vivek Kumar, Tausif Quadri, Boncho Bonev

1.6. Method for Monitoring the Quality and Quantity of Consumed Electrical Energy in Real Time

Todor Todorov, Emil Iontchev

1.7. Universal Interpersonal Communication Application (UICA) – File Transfer

Lazar Pendov

1.8. Blockchain-Enabled Dynamic Spectrum Usage Rights: A Framework for 5G/6G Spectrum Allocation and Pricing

Deyan Paroushev, Petko Ruskov

14.15 – 15.45
21.11.2024 r.
Section Session 2, Hall 1 & [Virtual Room 2](#)
Meeting ID: 836 4436 7937, Passcode: WZJF1P
TELECOMMUNICATIONS THEORY. SIGNALS AND SYSTEMS.
IMAGE PROCESSING AND CODING.
Chairman: Eng. Stefan Patchedjiev, PhD

2.1. Matrix Spectral Factorization for Alpert Multiwavelet Filter Bank

Vasil Kolev, Todor Cooklev

2.2. Advanced Methods for Development of Microwave Antennas for Integration in Space-based Radar Systems

Yoana Ivanova, Rosen Pasarelski, Georgi Petrov

2.3. Colour Fluctuations in HDR Images

Olena Osharovska, Mikola Patlaeynko, Valentina Solodka, Ivan Tomashevkyi, Okeksandr Hohniak, Andriy Doroshuk

2.4. AtmoCell: Advanced Home Air-Quality Monitoring Using Low-Power Embedded Systems

Yassen Gorbounov

2.5. Decentralized Identity and Verifiable Credentials – Trends and Advancement

Anastasios Liveretos, Prof. Milena Lazarova

2.6. Development of a System for Monitoring Hardware Metrics

Aleksandar Hristov

2.7. Application of Analysis of Variance in Evaluating Skin Temperature Changes in the Throwing Hand of Female Handball Players During Training Using Thermal Imaging

Kalin Dimitrov, Emil Avramov, Milena Avramova, Dimitar Asenov

2.8. Intelligibility Measurements in Wireless Voice Communication Relative to Distance, Indirect Visibility and Obstacles

Ivan Bojilov, Aleksandar Bekyarski, Shezhana Pleshkova

16.00 – 17.30
21.11.2024 г.

Section Session 3, Hall 1 & [Virtual Room 2](#)

Meeting ID: 836 4436 7937, Passcode: WZJF1P

**ARTIFICIAL INTELLIGENCE IN ICT. EDUCATION
METHODOLOGIES IN ICT.**

Chairmen: Prof. Seferin Mirtchev, DSc

3.1. Forework: A Real-Time, Distributed Digital Forensic Analysis Framework

Sahil Varma Penmetsa

**3.2. Predictive Optimization of Energy Consumption in Smart Building through AI_Gen
Scenarios**

Ekanand Mungra, Roopesh Kevin Sungkur

3.3. Penetration Tests on Linux Server

Ivan Ivanov, Mariyana Dimitrova, Martin Voynov

**3.4. Trying to Develop and Assess Computational Thinking in Computer Science Unplugged
Activities with Gamification**

Serafeim A. Triantafyllou, Theodosios Sapounidis, Andreas Oikonomou

3.5. Educational Remote Platform for Programming and Control of CNC 3D Printers

Ventsislav Nachev, Daniela Gotseva

3.6. Educational Remote Platform for Programming and Control of Unmanned Aerial Vehicles

Ventsislav Nachev

3.7. An Interactive Application for the Analysis of Continuous Systems

Hristina Andreeva, Radoslava Gabrova, Luchezar Mihov

**3.8. Design and Implementation of a Prototype Web Platform to Enhance Student Motivation
through Specific Functionalities**

Nikolay Nikolov

17.35 – 17.50
21.11.2024 г.

Plenary Session 2, Hall 1 & [Virtual Room 2](#)

Meeting ID: 836 4436 7937, Passcode: WZJF1P

Conference Opening, Greetings

Chairmen: Prof. Seferin Mirtchev, DSc

2. „The Future of Digital Connectivity in Europe”

Andreana Atanasova - Chairperson of the Managing Board

Alliance of the Technology Industry (ATI)

Friday,
22.11.2024 г.

NATIONAL SCIENCE AND TECHNICAL CENTRE

Hall 1 & [Virtual Room 3](#) Meeting ID: , Passcode:

08.30 – 10.00
22.11.2024 г.

Section Session 4, Hall 1 & [Virtual Room 3](#)

Meeting ID: 811 5752 6503, Passcode: 018159

**TELECOMMUNICATIONS NETWORKS. SOFTWARE DEFINED
NETWORKS. SMART HOME AND CITIES.**

Chairman: Eng. Stefan Patchedjiev, PhD

4.1. Design Considerations for Transition from MPLS to SD-WAN Solution

Stefan Sarafoff, Kamelia Nikolova, Georgi Iliev

4.2. Performance Analysis of Docker Swarm on Raspberry Pi Clusters

Milen Hrabarov Todorov

4.3. Design Consideration for Assembling of PV System for Small Enterprises

Gergana Vacheva, Plamen Stanchev, Nikolay Hinov

4.4. Study of the Influence of the Output Capacitor on the Operating Modes of a Buck DC-DC Converter

Gergana Vacheva, Plamen Stanchev, Nikolay Hinov

4.5. Application of Digital Twins for Design and Operation of Power Electronic Devices

Nikolay Hinov, Gergana Vacheva, Plamen Stanchev

4.6. Web-Based Management System for Network of Autonomous Smart Hydrogen Refueling Stations

Petko Danov

4.7. Methodology in Intelligent Control in Expert System and Neural Networks

Petar Raykov, Ivo Dochev

4.8. Matching Text from Start to Finish Against Multiple Regular Expressions

Ivan Stankov, Alex Tsvetanov

Section Session 5, Hall 1 & [Virtual Room 3](#)

10.15 – 11.45

22.11.2024 г.

Meeting ID: 811 5752 6503, Passcode: 018159

**TELECOMMUNICATIONS THEORY. SIGNALS AND SYSTEMS.
IMAGE PROCESSING AND CODING.**

Chairman: Prof. Seferin Mirtchev, DSc

5.1. Directional 2D FIR Filters Synthesis Using Sigmoidal Function

Peter Apostolov, Dimitar Shopov

5.2. Improving Human-Computer Interaction with Generative Adversarial Networks by Covering ISO 9241 Standards in Interaction Design

Varbinka Stefanova-Stoyanova, Petko Danov, Kamelia Raynova

5.3. Development of Graphical User Interface for Creating Audio Effects in Music Production with Artificial Intelligence

Snezhana G. Pleshkova, Konstantin Kostov

5.4. YOLO Performance Comparison on Stock Images of Grocery Products

Aykut Ismailov, Vladimir Hristov

5.5. AI Algorithms Enhancing Threat Detection and Reinforcement Data Protection

Elina Tlachenska, Kiril Ivanov, Maria Nenova

5.6. Increasing of the Vegetable Oils Purification Efficiency in an Electromagnetic Field

Petr Osadchuk, Yurii Enakiev, Dmitry Domuschi, Ivan Morteve, Valentyna N. Bandura

5.7. Investigation of Data Extraction Process with Anonymizations using Different Data Types

Grigor Sotirov, Maria Nenova, Valeria Nenova, Ivelina Teneva

5.8. Reinforcement Learning for Key Management in Distributed Systems

Lyubomir Nenov

12.00 – 13.00
22.11.2024 г.

Section Session 6, Hall 1 & [Virtual Room 3](#)

Meeting ID: 811 5752 6503, Passcode: 018159

WIRELESS SYSTEMS. MOBILE COMMUNICATIONS.

Chairmen: Assoc. Prof. Kamelia Nikolova, PhD

- 6.1. Comparing Azure Sentinel and ML-extended Solutions Applied to a Zero Trust Architecture**
Ivan Stankov, Evgeni Dulgerov
- 6.2. Computer Vision Model for Semantic Segmentation of Electronic Components in 2D Space**
Danail Slavov, Veselin Krachunov
- 6.3. Frequency Domain Measurements of Radio Channels in a Typical Agriculture Environment**
Nikolay Atanasov, Blagovest Atanasov
- 6.4. Specific Absorption Rate Induced in a Plant Leaf from a Wearable Antenna for Smart Agriculture**
Blagovest Atanasov, Nikolay Atanasov
- 6.5. Wearable Antennas: General Requirements for SAR Numerical Assessment**
Nikolay Hristov, Gabriela Atanasova

13.30 – 15.00
22.11.2024 г.

Section Session 7, Hall 1 & [Virtual Room 3](#)

Meeting ID: 811 5752 6503, Passcode: 018159

COMMUNICATION TECHNOLOGY IN INTELLIGENT TRANSPORT SYSTEMS. CLOUD COMMUNICATIONS.

Chairmen: Assoc. Prof. Georgi Petrov, PhD

- 7.1. A Nonlinear Control for the Path Tracking Problem of Autonomous Bi-Steerable Vehicles**
Plamen Petrov, Ivan Kralov
- 7.2. Integration of Generative AI for Intelligent Diagnostic of Vehicles**
Vladimir Ranchev, Rumen Jordanov, Rosen Miletiev
- 7.3. Automation Deployment in Azure Cloud with a Modular Terraform Approach**
Vladislav Manolov, Prof. Ph.D Daniela Gotseva, Neven Nikolov
- 7.4. Cloud Practical analysis of Google Cloud Platform and Microsoft Azure**
Vladislav Manolov, Daniela Gotseva, Danko Valkov
- 7.5. Application of Reinforcement Learning in Autonomous Mobile Robots**
Anastasiya Slavova, Vladimir Hristov
- 7.6. Investigating the Influence of the Environment on the Detection and Monitoring of Cattle with an Unmanned Aerial Vehicle using Infrared Radiometry**
Hristo Hristov, Kalin Dimitrov
- 7.7. Thermal Infrared Imaging of Near-Freezing Objects with Unmanned Aerial Vehicles and the Influence of Observation Height in Real Conditions**
Kalin Dimitrov, Iliyan Damyanov
- 7.8. Infrared Thermography Analysis of Temperature Changes and Performance in Active and Inactive Sportsmen across Multiple Laps**
Tsvetan Valkovski, Kalin Dimitrov

15.15 – 16.45
22.11.2024 r.

Section Session 8, Hall 1 & [Virtual Room 3](#)

Meeting ID: 811 5752 6503, Passcode: 018159

**TELETRAFFIC ENGINEERING. RESEARCH/EDUCATION
METHODOLOGIES IN ICT.**

Chairmen: Prof. Ivan Nedyalkov, PhD

8.1. Behavior of VoIP Traffic QoS Metrics in Loaded Networks

Vladimir Vichev, Todorka Georgieva

8.2. Exact Queuing Model of Heterogeneous Local Communication Network

Elchin Gezalov

8.3. Windows or Linux – the Most Suitable Platform to Run the GNS3

Ivan Nedyalkov, Georgi Georgiev, Anton Gogushev, Vencislav Duev

8.4. Mathematical Approach to Social Network Modelling

Petar Marinov

8.5. University Parallel Computing Micro-Cluster Build with Second-Hand Computer Systems

Rosen Pasarelski, Georgi Petrov, Krasen Angelov

8.6. Wireless Measurement Station using Arduino

Marin Dochev, Ivo Dochev, Lilyana Docheva, Stoycho Manev

8.7. Microprocessor System for Studying the Operating Characteristics of the Photovoltaic Panels

Angel Chekichev, Anatoly Parushev, Rumen Popov, Nikolai Paunkov, Milena Bundevea

8.8. Using ESP32 and Air Quality Sensor in Engineering Student Education

Ivan Maradzhiev

8.9. In-Depth ECG Signal Processing with Hardware Modules and Python Programming for Enhanced Engineering Education

Lyubomir Laskov, Kalin Dimitrov

16.55
22.11.2024 r.

CLOSING OF THE CONFERENCE, Hall 1 & [Virtual Room 3](#)

Meeting ID: 811 5752 6503, Passcode: 018159

Prof. Seferin Mirtchev, DSc

Information for the participants and guests of Telecom 2024

Until 20 November 2024 detailed information on issues of the Conference can be obtained at the National House of Science and Technology in Sofia, 108 Rakovski St., V Floor, Room 506 or by phone: 02 987-97-67.

Email of the conference: telecom.ceec@gmail.com

Website of the conference: <http://e-university.tu-sofia.bg/e-conf/?konf=37>

Registration fee: Participants with/without a paper - Euro 200, Students - Euro 100, IEEE and CEEC Members Discount - 15 %. The fee should be preferably paid before November 18, 2024 through a bank transfer on the account of:

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CEEC, TELECOM 2024, participant's name

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The Registration Fee can be paid in cash at the Office of CEEC: 108, Rakovsky Str., Sofia 1000.

By way of exception, the Registration Fee may be paid upon arrival at the Conference site in cash (Euro 220).

The Registration Fee includes admission to all Conference events, a set of Conference materials (program, abstracts etc.).

The Organizing Committee will award a young author (up to 35 years old) for the best individually presented paper with substantial scientific research contribution.

