

BalkanCom 2026

Ninth International Balkan Conference on
Communications and Networking

Ulcinj/Ulqin, Montenegro, June 16-19, 2026



Networks Meet Intelligence: The Future is Now

PROGRAM



Technical Co-Sponsors

Organizations Sponsor

Silver Sponsors





Dear Participants of BalkanCom 2026,

It is our great honor and pleasure to welcome you to BalkanCom 2026, the 9 th International Balkan Conference on Communications and Networking, held in the vibrant city of Ulcinj/Ulqin, Montenegro.

Over the years, BalkanCom has become a unique forum that brings together researchers, industry professionals and students from the Balkan region and around the world. Beyond presenting cutting-edge research, the conference serves as a platform for building lasting collaborations and strengthening the scientific community that connects the region with the global communications and networking ecosystem.

The theme of BalkanCom 2026 “Networks Meet Intelligence: The Future is Now” reflects one of the currently most significant transformations. Artificial intelligence is rapidly becoming an integral part of communication networks, enabling new levels of automation, adaptability and efficiency. At the same time, advances in networking technologies continue to provide the foundation for intelligent systems to operate at unprecedented scale. This year’s BalkanCom program showcases convergence between these two domains with high-quality contributions covering a broad range of topics, including wireless communications, network architectures, artificial intelligence and machine learning for communications, edge intelligence, Internet of Things and emerging 6G technologies. We are confident that the presentations, discussions and interactions throughout the conference will inspire new ideas and foster future collaborations.

We thank all participants for being part of the Conference and hope that their time in Montenegro will be professionally rewarding, intellectually stimulating and personally enjoyable.

Wishing you a successful and memorable BalkanCom 2026.

BalkanCom 2026 General Chairs



**Milica Pejanović
Đurišić**



Ilir Çapuni



Dear Participants of the Ninth BalkanCom Conference,

It is our great pleasure to warmly welcome you to the beautiful Adriatic coast of Montenegro and the historic city of Ulcinj/Ulqin for the Ninth International Balkan Conference on Communications and Networking (BalkanCom 2026), the premier telecommunications and networking conference in the Balkan region.

We would like to express our sincere gratitude to the Steering Committee, Conference Chairs, Keynote Speakers, Technical Program Committee members, reviewers, and all volunteers whose dedication, expertise, and hard work have made BalkanCom 2026 possible. We are delighted to present a high-quality technical program that brings together state-of-the-art research and emerging trends across the broad field of communications and networking. We look forward to stimulating discussions, fruitful collaborations, and the exchange of ideas among researchers, practitioners, and industry professionals from the Balkans and around the world.

The theme of this year's conference, "Network Meets Intelligence: The Future is Now," reflects the profound transformation currently taking place across communications and networking through the integration of Artificial Intelligence and machine learning technologies. From intelligent network management and AI-native architectures to autonomous systems and data-driven optimization, this new wave of innovation is reshaping the way future networks are designed, operated, and utilized. The conference program and keynote talks strongly reflect these exciting developments.

We are grateful to our hosts in Montenegro, all members of the organizing and technical committees, and especially to the authors who responded to our call for papers and contributed their latest research results. BalkanCom 2026 attracted submissions from researchers across the world. The final technical program includes eight regular technical sessions, including two dedicated student sessions, featuring a total of 36 papers. In addition, the conference hosts three special sessions comprising 14 papers and presentations, as well as a poster session featuring four papers. Together, these contributions span a wide range of topics, including artificial intelligence and machine learning for communications and networking, wireless systems, network security, emerging communication paradigms, and experimental platforms and applications.

The conference is further enriched by four distinguished keynote presentations addressing timely topics such as AI-driven spectrum management, physical-layer security in optical networks, emerging concepts in networked communications and cybersecurity, and the evolution of future IPv6-based Internet architectures.

We are proud to continue the successful BalkanCom tradition, which has grown over the past decade into a recognized and important forum for researchers, innovators, and industry leaders throughout the Balkan region and beyond.

We wish you a productive, inspiring, and enjoyable conference, and we look forward to welcoming you to Ulcinj/Ulqin, Montenegro.

BalkanCom 2026 Technical Program Chairs



Özgür Gürbüz



**Dejan
Vukobratović**



	TUE June 16	WED June 17	THU June 18	FRI June 19		
09:00	Tutorial 1 Advanced Signal Processing for Visible Light Communications: Channel Estimation in Practical Scenarios and Machine Learning Approaches <i>Maysa Yaseen, Ayşe Elif Canbilen, Salama S. Ikki</i>	<i>Opening & Welcome Ceremony</i>	Session 5 AI for Network Management and Data Analytics	Special Session 3 Towards AI-Enabled Internet of Medical Things	09:00	
09:15		Session 1 AI-Native Wireless Networks and Edge Intelligence - Part 1			Special Session 3	09:15
09:30						09:30
09:45						09:45
10:00						10:00
10:15		10:15				
10:30		<i>Coffee Break</i>	<i>Coffee Break & Poster Session</i>	<i>Coffee Break</i>	10:30	
10:45		Keynote 1 Prof. Edward Knightly	Keynote 3 Prof. Danijela Cabric	Panel 2 Establishing a Regional Partnership in AI-driven Healthcare Research	10:45	
11:00					11:00	
11:15					11:15	
11:30	11:30					
11:45	Session 2 AI-Native Wireless Networks and Edge Intelligence - Part 2	Session 6 IoT, Non-Terrestrial and Sustainable Networks	Keynote 4 Prof. Marija Furdek	11:45		
12:00				12:00		
12:15				<i>Lunch Break</i>	12:15	
12:30					12:30	
12:45	12:45					
13:00	<i>Lunch Break</i>	<i>Lunch Break</i>	<i>Lunch Break</i>	13:00		
13:15				13:15		
13:30				13:30		
13:45				13:45		
14:00	Tutorial 2 Massive MIMO Under Fronthaul Constraints: Signal Processing for Limited-Resolution Architectures <i>Özlem Tuğfe Demir</i>		Keynote 2 Prof. Latif Ladid	Session 7 Security, Privacy and Trust in Future Networks	14:00	
14:15		Panel 1 AI for Communications in Challenging Dynamic Wireless Environments			14:15	
14:30					14:30	
14:45					14:45	
15:00	Session 3 Wireless Systems, Antennas and Emerging Communications	<i>Coffee Break</i>	15:00			
15:15		Special Session 1 Novel Techniques for Low-latency, Spectral and Energy Efficient Communications	<i>Coffee Break</i>	15:15		
15:30			15:30			
15:45			Session 8 Student Session 2	15:45		
16:00	<i>End of day 1</i>			16:00		
16:15	<i>Coffee Break</i>	16:15				
16:30		<i>Closing Session</i>	16:30			
16:45			16:45			
17:00			17:00			
17:15	Session 4 Student Session 1	Special Session 2 Intelligent Governance for Sustainable Communication Networks	17:15			
17:30			17:30			
17:45			17:45			
18:00			<i>End of day 2</i>	<i>End of day 3</i>	18:00	

18:15
Welcome Reception

19:00
Old City Tour
Gala Dinner

SESSIONS

AI-Native Wireless Networks and Edge Intelligence - Part 1

Visual Signatures of Suboptimal Sampling in Constellation-Based AMC with CNNs	Alexander D Gros (<i>University of Mons, Belgium</i>), Véronique Moeyaert, Patrice Mégret (<i>University of Mons & Faculté Polytechnique, Belgium</i>)
Joint Channel Prediction and Power Allocation Under Feedback Delay Using Deep Learning for High-Speed Railway OFDM Systems	Aphitchaya Siriwanitpong, Kosuke Sanada, Hiroyuki Hatano, Kazuo Mori (<i>Mie University, Japan</i>), Pisit Boonsrimuang (<i>King Mounkut's Institute of Technology Ladkrabang, Thailand</i>)
Pilot Allocation for Multi-Hop Over-the-Air Neural Inference under Imperfect CSI	Tolga Girici (<i>TOBB University of Economics and Technology, Turkey</i>), Meng Hua, Deniz Gündüz (<i>Imperial College London, United Kingdom (Great Britain)</i>)

Session 1

Wednesday, June 17
09:30 - 10:30

Chair:

Tolga Girici

*TOBB University of
Economics and Technology,
Türkiye*

AI-Native Wireless Networks and Edge Intelligence - Part 2

Hybrid Deep Learning for 5G Positioning: Integrating Map-Derived Environmental Features with GAT-GRU-Attention	Cemre S. Akdağ, Berkay Bayramoğlu, Efekan Çelik, Enes Daşçı, Mert Fiçici, Rukiye S. Kızıltepe and Murat Karakus (<i>Ankara University, Türkiye</i>), Fatih Cogen, Gokhan Kalem (<i>Turkcell Technology, Türkiye</i>)
CSI-Assisted Edge SLAM Testbed Platform for 5G Connected Unmanned Autonomous Vehicles	Boris Radovanovic, Sasa Talosi, Srdjan Sobot, Dejan Vukobratović (<i>University of Novi Sad, Serbia</i>)
Intent-Driven Optimization of MANET Routing Using a Large Language Model	Yusuf Emre Baysal (<i>İstanbul Technical University, Türkiye</i>), Ibrahim Hokelek (<i>TÜBİTAK BİLGEM, Türkiye</i>), Hakan A. Çırpan (<i>İstanbul Technical University, Türkiye</i>)

Session 2

Wednesday, June 17
11:45 - 12:45

Chair:

Tolga Girici

*TOBB University of
Economics and Technology,
Türkiye*

Wireless Systems, Antennas and Emerging Communications

A Simple Analytical Ergodic Capacity Approximation for Sub-Terahertz Band Drone-to-Ground Communication	Mikail Erdem (<i>Hamad Bin Khalifa University (HBKU), Qatar</i>), Mazen Omar Hasna (<i>Qatar University, Qatar</i>), Khalid A. Qaraqe (<i>Hamad Bin Khalifa University & College of Science and Engineering, Qatar</i>)
Implications of Incumbent Radar Operations on 5G-NR Link Integrity: An Experimental Analysis in the Citizens Broadband Radio Service Band	Sharzeel Saleem, Miguel López-Benítez (<i>University of Liverpool, United Kingdom (Great Britain)</i>)
Coexistence of Wi-Fi 6E and 5G NR-U: Experimental Performance Analysis and Novel Interference Detection Model	Sharzeel Saleem, Miguel López-Benítez (<i>University of Liverpool, United Kingdom (Great Britain)</i>)
Energy-Aware Design of UAV-mounted Active RIS for Maritime Communications	Kyriakos Ioannou (<i>Aristotle University of Thessaloniki, Greece</i>), Dimitrios Tyrovolas (<i>Aristotle University of Thessaloniki, Greece & University of Patras, Greece</i>), Alexandros Ioannis Papadopoulos (<i>University of Ioannina, Greece & Information Technologies Institute, Greece</i>), Antonios Lalas (<i>Centre for Research and Technology - Hellas (CERTH), Greece</i>), Panagiotis Diamantoulakis (<i>Aristotle University of Thessaloniki, Greece</i>), Sotiris Ioannidis (<i>Technical University of Crete, Greece</i>), Christos Liaskos (<i>University of Ioannina, Greece & Foundation of Research and Technology Hellas, Greece</i>), George K. Karagiannidis (<i>Aristotle University of Thessaloniki, Greece</i>)

Session 3

Wednesday, June 17
14:45 - 16:15

Chair:

Dragana Krstic

University of Nis, Serbia

**Performance Evaluation of
Conventional and AI-Aided Detectors
for AmBC in Multi-Tap Channels**

Alperen Arslan (ULAK Communications Inc., Türkiye), Muhammad
Sohaib J. Solaija (Gebze Technical University, Türkiye), Muhammad
Bilal Janjua (Oredata, Turkey), Adnan Kavak (Kocaeli University,
Türkiye)

Session 4

Wednesday, June 17
16:30 - 18:00

Chair:
Milica Petkovic
University of Novi Sad,
Serbia

Student Session 1

**Constant-Envelope Phase Embedding
for Radar-First Dual-Function Systems**

Ceren Çelik, Mustafa Bora Çelik, Orhan Gazi (Ankara Medipol
University, Türkiye)

**Doppler-Based Position Estimation in
LEO Satellite Links**

Orkun Güldalı (Bogazici University, Türkiye), Gokce Duzyol (TÜBİTAK
BİLGEM), İ. E. Pusane (Bogazici University, Türkiye)

**Subcarrier-Level OFDM Waveform
Optimization for Integrated Sensing
and Communications**

Nazmi Eren Varilci, Murat Temiz (Middle East Technical University,
Türkiye)

**Opportunistic Environmental Sensing
via 5G ISAC in Emerging Networks: A
Framework for Resource-Constrained
Urban Deployments**

Vullnet Laniku, Enver Hamiti, Mimoza Ibrani, Bujar Krasniqi (University
of Prishtina, Faculty of Electrical and Computer Engineering, Kosovo)

**Semantic Decision Reliability of
Foundation Model-Based Network
Control Under Corrupted Semantic
State in 6G**

Nefise Alimusaj, Vullnet Laniku, Bujar Krasniqi (University of Prishtina,
Faculty of Electrical and Computer Engineering, Kosovo)

Session 5

Thursday, June 18
09:00 - 10:30

Chair:
**Özlem Tuğfe
Demir**
Bilkent University,
Türkiye

AI for Network Management and Data Analytics

**From Prediction to Policy: An Agentic
AI Framework for Telecom Churn with
XAI-Driven Validation**

Sümeyye Bas (Turkcell Technology, Türkiye)

**Handover Volume Forecasting in
Cellular Networks: A Comparison of
Temporal and Spatio-Temporal Models**

Sumeyye Bas (Turkcell Technology, Türkiye), Fatih Cogen (Turkcell,
Türkiye)

**Pre-Launch Validation of 5G Site
Prioritization Decisions Using PCA and
Autoencoder Models**

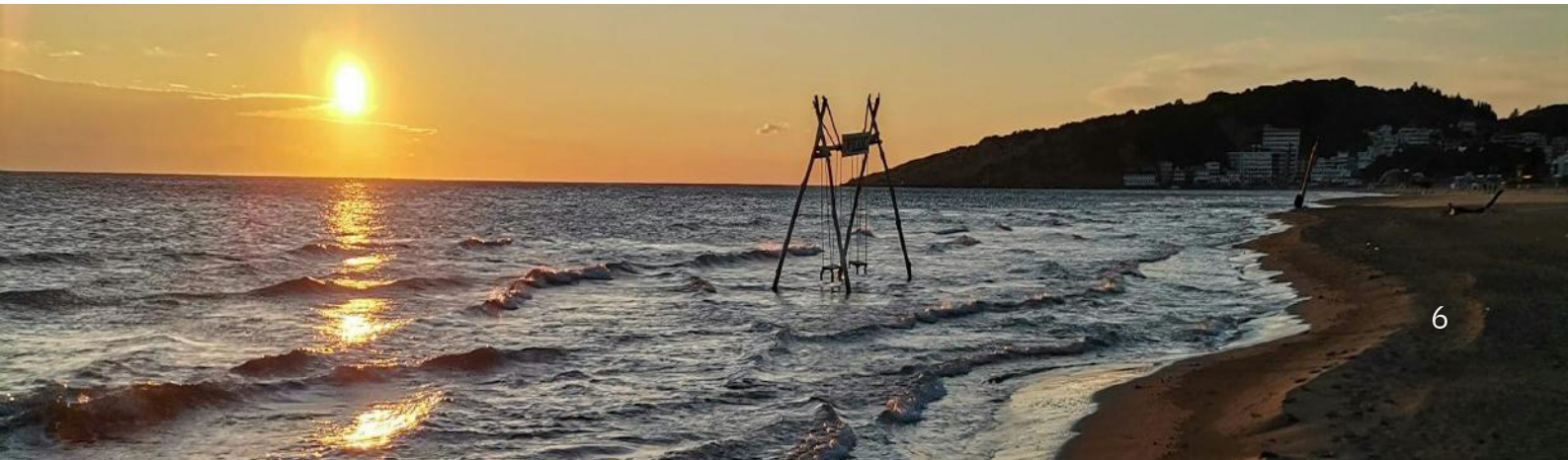
Fatih Cogen (Turkcell, Türkiye), Alpaslan Gokcen (Turkcell Technology,
Türkiye), Berkay Benli, Gunes Kesik, Saliha Sezgin Alp (Turkcell,
Türkiye)

**Learning Energy-Efficient Modular
Arrays under Hardware Non-linearities**

Özlem Tuğfe Demir (Bilkent University, Türkiye), Alva Kosasih (Nokia,
France)

**Intent-Based Resource Scheduling with
Time Negotiation**

Cuong Manh Nguyen, Eric Renault, Nagham Hachem (University
Gustave Eiffel, France)



IoT, Non-Terrestrial and Sustainable Networks

EBChain: Blockchain-Based Peer-to-Peer Energy Bartering System	Abdulrezzak Zekiye (Koç University, Türkiye), Ouns Bouachir (Zayed University, United Arab Emirates), Ozgur Ozkasap (Koç University, Türkiye), Moayad Aloqaily (UAEU, United Arab Emirates)
Dynamic Clustering and Sensor Exclusion for Prolonging Network Lifetime in CRSNs	Alcides Mário Joaquim Tomás (Instituto Nacional de Telecomunicações, Brazil & Inatel, Brazil), José Marcos C. Brito (Inatel, Brazil)
Design and Ground-Based Validation of a Dual-Band Communication Subsystem for the Istanbul 1P PocketQube Satellite	Saeed Nourizadeh Azar (Sabanci University, Türkiye), Süleyman Altınışık (Istanbul Technical University & OBSS Technology, Türkiye), Mikail Erdem (Hamad Bin Khalifa University (HBKU), Qatar), Khalid A. Qaraqe (Hamad Bin Khalifa University & College of Science and Engineering, Qatar)
Non-Uniform Codebook Design for Optical IRS-Assisted VLC Systems	Rashid Iqbal (University of Glasgow, United Kingdom (Great Britain)), Dimitrios Bozanis (Aristotle University of Thessaloniki, Greece), Dimitrios Tyrovolas (Aristotle University of Thessaloniki & University of Patras, Greece), Christos Liaskos (University of Ioannina & Foundation of Research and Technology Hellas, Greece), Muhammad Ali Imran (University of Glasgow, United Kingdom (Great Britain)), George K. Karagiannidis (Aristotle University of Thessaloniki, Greece), Hanaa Abumarshoud (University of Glasgow, United Kingdom (Great Britain))
Average Redundancy Masks Worst-Case Vulnerability in an Operational Urban LoRaWAN	Kemal Akçay (Özyeğin University, Türkiye)

Novel Techniques for Low-latency, Spectral and Energy Efficient Communications

SCD: Segment-CNN-Decision for Signal Detection in Wideband Spectrum with Unknown Interference	Tianyi Zhao, Connor Steigerwald, Johnny Zhang, Danijela Cabric (University of California Los Angeles, USA)
LLM-Driven Network Management Reliability: Case of System Outage Probability in AF Relay Networks under Conditions of Different Types of Fading	Suad Suljovic (MB University, Serbia), Dragana Krstic, Nenad Petrovic (University of Niš, Serbia), Sinisa Minić (Teachers College in Prizren - Leposavic, Serbia), Jovan Vujić (Academy of Technical and Art Applied Studies (ATUSS) Belgrade, Serbia)
SceneSense: Scene-Conditioned Generative AI for RF Channel Prediction	Rudhra Mangleshkumar Joshi (Rowan University, USA), Sean B. Johnson (Rutgers University, USA), Zubair Hafeez (Rowan University, USA), Silvija Kokalj Filipović (Rowan University, USA), Predrag Spasojević (Rutgers University, USA)
RFLAM: Generative Modeling of Time-Varying Massive MIMO Channels for Factory-of-the-Future Environments	Zubair Hafeez, Predrag Spasojević, Sean B. Johnson (Rutgers University, USA), Silvija Kokalj-Filipović (Rowan University, USA)
Machine Learning-Aided Channel Estimation and Hybrid Combining for Ultra-Massive MIMO THz UAV Communications	Iana Shapoval, Wolfgang Gerstacker (Friedrich-Alexander University Erlangen, Germany), Özgür Gürbüz (Sabancı University, Türkiye), Akhtar Saeed (Kadir Has University, Türkiye)

Session 6

Thursday, June 18
11:45 - 13:15

Chair:

Saeed

Nourizadeh Azar

Sabancı University and OBSS,
Türkiye

Special Session 1

Thursday, June 18
15:15 - 16:45

Chair:

Silvija Kokalj-Filipovic

Rowan University, USA

Special Session 2

Thursday, June 18
17:00 - 18:00

Chair:
Elif Calik
*University of Galway,
Ireland*

Intelligent Governance for Sustainable Communication Networks

UAV-assisted traffic rerouting in disaster scenarios (Invited Talk)	Takfarinas Saber (<i>University of Galway, Ireland</i>)
RL-Assisted RAT Layer Management for Energy-Efficient Disaster Recovery in O-RAN	Sümeyye Baş, Uzay Bengi, Gökhan Kalem (<i>Turkcell Technology, Türkiye</i>), Sina Alp (<i>İstanbul OKAN University, Türkiye</i>), Çiçek Çavdar (<i>KTH Royal Institute of Technology, Sweden</i>)
Secure Authentication and Privacy-Preserving Localization for V2X Communications in Next-Generation Vehicular Networks	Muhammad Jamil, Adnan Kavak, Sema Bayraktar, Cansu Canbolat, Guney Aslan (<i>Kocaeli University, Türkiye</i>)

Special Session 3

Friday, June 19
09:00 - 10:30

Chair:
Gordana Gardašević
*University of Banja
Luka, Bosnia and
Herzegovina*

Towards AI-Enabled Internet of Medical Things

A Cost-Effective Wearable Device for EMG and ECG with In-Situ Signal Analysis (Invited Talk)	Mitar Simic, Milan Radovanovic (<i>University of Novi Sad, Serbia</i>).
Federated learning vs centralized approach for lesion detection in mammography images	Nemanja Petrović, Milan Rapaić, Dragana Bajović, Nikša Jakovljević, Ivan Lazić, Tatjana Lončar-Turukalo (<i>University of Novi Sad, Serbia</i>)
Towards an Integrated CRC Risk Prediction using Machine Learning - Driven Digital Twin Framework	Gordana Gardašević, Milana Grbić (<i>University of Banja Luka, Bosnia and Herzegovina</i>), Maša Ždrlević (<i>University of Montenegro, Montenegro</i>), Andrej Mihailović (<i>Kings College London, UK</i>)
A Privacy-Preserving Searchable Encryption Scheme for Distributed Electronic Medical Records	Asude Gülçiçek, Burcu Sonmez (<i>İstanbul Technical University, Türkiye</i>), Gürkan Gür (<i>Zurich University of Applied Sciences, Switzerland</i>), Serif Bahtiyar (<i>İstanbul Technical University, Türkiye</i>)
A Computer Vision-Based System for Automated Counting of Surgical Supplies	Jovana Gavrilović (<i>University of Novi Sad, Serbia</i>), Bojan Božić, Milan Dobrić (<i>University of Belgrade, Serbia</i>), Milovan Bojić (<i>Institute of Cardiovascular Diseases Dedinje, Serbia</i>), Tatjana Lončar-Turukalo (<i>University of Novi Sad, Serbia</i>)
Structuring Clinical Heart Failure Data with Locally Deployed OpenSource LLMs	Georgios Nikolaos Tsakonas, Athanasios Samaras, Alexandra Kosvira, George Giannakoulas, Ioanna Chouvarda (<i>Aristotle University of Thessaloniki, Greece</i>)

Session 7

Friday, June 19
13:30 - 15:15

Chair:
Albert Levi
*Sabancı University,
Türkiye*

Security, Privacy and Trust in Future Networks

Privacy-Conscious WiFi Traffic Classification Using non-DPI Features	Onur Doğan, Öykü Han Batur (<i>Lifemote Networks, Türkiye</i>), Ali Sönmez and H. Birkan Yilmaz (<i>Bogazici University, Türkiye</i>)
Entropy-Based Linking Mechanisms for Browser Fingerprinting	Mert Karaçavuşoğlu, Elif Ecem Şamlıoğlu, Albert Levi (<i>Sabancı University, Türkiye</i>)
Graph-Based Trust Assessment for Secure Service-Oriented 6G Network Architecture	Alessandro Carrega (<i>UNIGE, Italy & CNIT, Italy</i>), Franco R. Davoli (<i>University of Genoa & National Inter- University Consortium for Telecommunications (CNIT), Italy</i>), Mohammaderfan Shahabi (<i>UniGe, Italy</i>)
AI-Driven Clustering and Multi-stage Intrusion Detection for APT Mitigation in IoT Networks	Tanvir Hossain Ovi (<i>University of Chittagong., Bangladesh</i>), A M Mahmud Chowdhury, Kambiz Ghazinour, Murat Simsek (<i>State University of New York at Canton, USA</i>)

FedVAE-KD: A Privacy-Preserving Federated Learning Framework for Scalable Wireless Network Intrusion Detection

Muhammet Yağız (Kırıkkale University, Türkiye), Amira Benamara (Bahçeşehir University, Turkey), Zeynep Deniz and Polat Goktas (Sabanci University, Türkiye)

ChainJam: Receiver-Chain-Aware Protocol-Aware Jamming in DVB-S2

Mustafa Armagan Topcu (Radar, Electronic Warfare and Intelligence Systems Division, ASELSAN Inc., Ankara, Türkiye; Istanbul Technical University, Türkiye), Hakan A. Çırpan (Istanbul Technical University, Türkiye)

Student Session 2

A Self-Healing Digital Twin Framework for Autonomous IoT Node Management

Adnan Grbešić, Marko Dogan (University "Dzemail Bijedic" in Mostar, Bosnia and Herzegovina)

Adaptive Phase and Amplitude Imbalance Correction in Digital SSB Transceivers Using Blind Estimation Algorithms

Osman Ensar Karahan, Ahmet Faruk Karahan, Orhan Gazi (Ankara Medipol University, Türkiye)

Model Predictive Control (MPC)-Based Modulator-Less Digital SSB Switching Method

Ahmet Faruk Karahan, Osman Ensar Karahan, Orhan Gazi (Ankara Medipol University, Türkiye)

Physical Layer Security with Chaos-Based Frequency Modulation

Emir Daşdağ, Mehmet Salih Arslan, Furkan Nail Erciyes, Orhan Gazi (Ankara Medipol University, Türkiye)

Poster Session

Experimental Evaluation of Disruptive and Stealth Jamming on 5G-NR Links

Sharzeel Saleem (University of Liverpool, UK), Mir Lodro (University of Bristol, UK), Miguel López-Benítez (University of Liverpool, UK)

CSI-Free Channel Equalization in High-Mobility Channels via Local-Global Inference

Muhammed Emre Duran and Eslem Didar Metin (Ankara Medipol University, Türkiye), Neriman Acun (Ankara Medipol Üniversitesi, Türkiye), Orhan Gazi (Ankara Medipol University, Türkiye)

MadaGasCar: A Cloud-Connected IoT System for Remote Control of a DC Motor-Driven Vehicle

Hasna Bunar (Informational Technologies, Bosnia and Herzegovina)

From Fine-Tuning to Retrieval: Enhancing Clinical Reliability of LLMs for IoMT-Based Diabetes Care

Sema Bayraktar, Ali Can Doğru, Cansu Canbolat, Adnan Kavak, Günay Aslan, Muhammad Jamil (Kocaeli University, Türkiye)

Session 8

Friday, June 19
15:30 - 16:45

Chair:
Nertil Zhuri
Ritech International AG,
Albania

Poster Session

Thursday, June 18
10:30 - 10:45



TUTORIALS

Tuesday, June 16
09:00 - 12:00

Chair:
Milica Pejanović Đurišić
*University of Montenegro,
Montenegro*

Advanced Signal Processing for Visible Light Communications: Channel Estimation in Practical Scenarios and Machine Learning Approaches

This tutorial explores the fundamental signal processing techniques essential for visible light communication (VLC) systems. Specifically, it covers various channel models encountered in VLC networks, including the thermal model, signal-dependent shot noise (SDSN), and relative intensity noise (RIN). Rather than focusing on their physical interpretations, this tutorial emphasizes the mathematical modeling of these noise types. Then, the effects of these channel impairments on channel estimation and detection techniques are examined. Traditional estimation methods, such as least squares estimators (LS), are reviewed, followed by the introduction of innovative approaches designed to address existing challenges in the literature. Additionally, both optimal and suboptimal detectors are compared in terms of their error performance and computational complexity. This tutorial begins with the ideal case, widely used in the literature, and explores how traditional techniques can be enhanced to lower complexity, thereby better accommodating different types of noise, particularly in SDSN and RIN channels. Finally, the role of machine learning in channel parameter estimation will be explored. Rather than treating machine learning as a "black box", mathematical models are derived to provide deeper insights into its integration within VLC systems. A mathematical framework is also presented for a machine learning-based network to estimate the channel in both ideal and practical VLC scenarios.



Dr. Maysa Yaseen
Lakehead University
Barrie, ON, Canada



Dr. Ayşe Elif Canbilen
Konya Technical
University
Konya, Turkey



Dr. Salama S. Ikki
Lakehead University
Barrie, ON, Canada

Tuesday, June 16
13:00 - 16:00

Chair:
Ilir Čapuni
XL Labs, Montenegro

Massive MIMO Under Fronthaul Constraints: Signal Processing for Limited-Resolution Architectures

This tutorial provides a unified signal-processing perspective on massive MIMO and cell-free massive MIMO systems operating under limited-resolution fronthaul constraints. Motivated by emerging Open RAN architectures, it examines how capacity-limited fronthaul fundamentally reshapes uplink and downlink processing, moving beyond classical centralized MIMO assumptions. The tutorial introduces Busgang-based modeling for quantized uplink reception, stream-adaptive bit and power allocation, and quantization-aware precoding strategies for scalable deployments. It further presents hierarchical splitting architectures that distribute processing between access points and centralized units to reduce fronthaul load while preserving interference management capabilities. Emphasis is placed on conceptual insights into distributed signal processing, bidirectional fronthaul design, and hardware-aware algorithm development, together with emerging learning-enabled approaches. The goal is to bridge theoretical massive MIMO principles with practical fronthaul-limited implementations relevant to beyond-5G and 6G networks.



Dr. Özlem Tuğfe Demir
Bilkent University
Ankara, Türkiye

KEYNOTES

New Communications and Security Capabilities with Curving Beams

In 1979, "Airy" beams were first theorized to curve without violating Maxwell's equations. Today, these curving beams represent a promising approach to overcoming the obstacle avoidance problem in highly directional communications. In this talk, the world's first experimental demonstration of a curving communications link will be presented. Then, new security threats associated with this technology will be introduced. In particular, it will be shown how an adversary using a curving beam to jam a communications link prevents the victim from accurately localizing the source. Consequently, standard countermeasures such as directional nulling will fail. Finally, open research challenges in both security and communications will be discussed.



Edward Knightly

Rice University
Houston, Texas, USA

Wednesday, June 17
10:45 - 11:30

Chair:

**Anthony
Ephremides**

University of Maryland, USA

The IPv6-based New Internet empowering 5G/6G, P2P IoT, Cloud Computing, P2P Blockchain, and Agentic AI

The Internet has flourished since the 90's based on its IPv4 Protocol. However, the public IPv4 address space managed by IANA (<http://www.iana.org>) has been completely depleted back in Feb 1st, 2011. This creates by itself a critical challenge when adding new things and enabling new services on the Internet. Without publicly routable IP addressing, 5G/6G, Cloud Computing, Agentic AI, the Internet of Things and anything that's part of Internet of Everything would be greatly reduced in its capabilities and limit its potential success. Most discussions about IoT have been based on the illusionary assumption that the IP address space is an unlimited resource or it's even taken for granted that IP is like oxygen produced for free by nature. IPv6 provides enhanced features that were not tightly designed or scalable in IPv4 like autoconfiguration, IP mobility, end to end connectivity and e2e services, etc. IPv6 will be addressing the extreme scenarios where IP becomes a commodity service. This new address platform will enable lower cost network deployment of large scale sensor networks, RFID, IP in the car, to any imaginable scenario where networking adds value to commodity. IPv6 deployment is now in full swing with some countries achieving way over 60% penetration such as France, Germany, Belgium, India and China. China and India have over 400 M users using IPv6 without even the users knowing it. Recently, Apple has required its apps developers to use IPv6 only for their apps which is a great shot in the arm of IPv6. There are many inflections happening this decade to influence the design of the first tangible IoT, Cloud Computing, Web of Things and 6G. It will be a combination of IoT, SDN-NFV, Cloud Computing, Edge Computing, Big IoT Data, and 6G, to sift through to realising the paradigm shift from current research-based work to advanced IoT, 5G, and Smart Cities. This talk will be devoted to analyze the transformative impact of IPv6 on the potential mix of IPv6-based IoT, SDN-NFV, Cloud Computing, Big Data, and 5G and its advanced features, highlighting the challenges and the solutions moving forward.



Latif Ladid

IPv6 Forum, University of Luxembourg
Luxembourg

Wednesday, June 17
13:45 - 14:30

Chair:

**Milica Pejanočić
Đurišić**

University of Montenegro,
Montenegro

Thursday, June 18
10:45 - 11:30

Chair:
Georgios Giannakis
University of Minnesota, USA

Enabling Next 6G Systems through Energy-Efficient, Scalable Design and Spectrum Coexistence

Each generation has taken a big step forward and introduced new technologies in order to increase the performance of networks and devices to support the constantly enriched services. In 5G, the telecommunications industry has been particularly focused on improving user experiences such as data rates and latency. However, 6G key objectives have significantly shifted. Operators are requesting improvement of operating costs, energy efficiency, access to mid-spectrum while embedding and leveraging AI/ML technology. This talk will discuss technologies and architectures for energy-efficient mobile and fixed wireless access using new antenna array designs, beamforming modes, ultra-wideband multiple access, and scalable processing architectures to support different coverage and connectivity requirements in 6G cellular and massive IoT connectivity. It will also explore solutions for enabling spectrum sharing in mid-band spectrum between cellular networks and incumbents including radars and satellites.



Danijela Cabric
University of California
Los Angeles, USA

Friday, June 19
11:45 - 12:30

Chair:
Ilir Çapuni
XL Labs, Montenegro

Securing the Invisible Backbone: AI-Powered Detection of Physical-Layer Breaches in Optical Networks

Optical networks form the invisible backbone of global connectivity, carrying vast volumes of critical data across continents and oceans. As these infrastructures become increasingly vital, they are also growing targets for sophisticated physical-layer attacks aimed at eavesdropping and service disruption. In this keynote, advanced AI-driven techniques designed to detect and identify physical-layer breaches in optical networks will be presented. We will explore how machine learning models can distinguish malicious perturbations from normal signal variations, despite the complexity of optical transmission systems. The talk will address key challenges, including environmental noise, equipment heterogeneity, limitations of current monitoring technologies, and the continuously evolving threat landscape. Attendees will gain insights into how AI enables proactive, scalable, and intelligent protection of next-generation optical infrastructure — moving from reactive monitoring to predictive security.



Marija Furdek
Chalmers University of
Technology
Sweden

Panels

Thursday, June 18
14:15 - 15:00

Chairs:

**Wolfgang
Gerstacker**

*Friedrich-Alexander
University, Germany*

**Silvija
Kokalj-Filipovic**

Rowan University, USA

AI for Communications in Challenging Dynamic Wireless Environments



Danijela Cabric

University of California
Los Angeles, USA



Ian Akyildiz

Truva Inc.
USA



Georgios Giannakis

University of Minnesota
USA

Friday, June 19
10:45 - 11:30

Chair:

**Gordana
Gardašević**

*University of Banja Luka,
Bosnia and Herzegovina*

Establishing a Regional Partnership in AI-driven Healthcare Research



Tatjana Lončar Turukalo

University of Novi Sad
Serbia



Andrej Mihailović

University of Montenegro
Montenegro



Ioanna Chouvarda

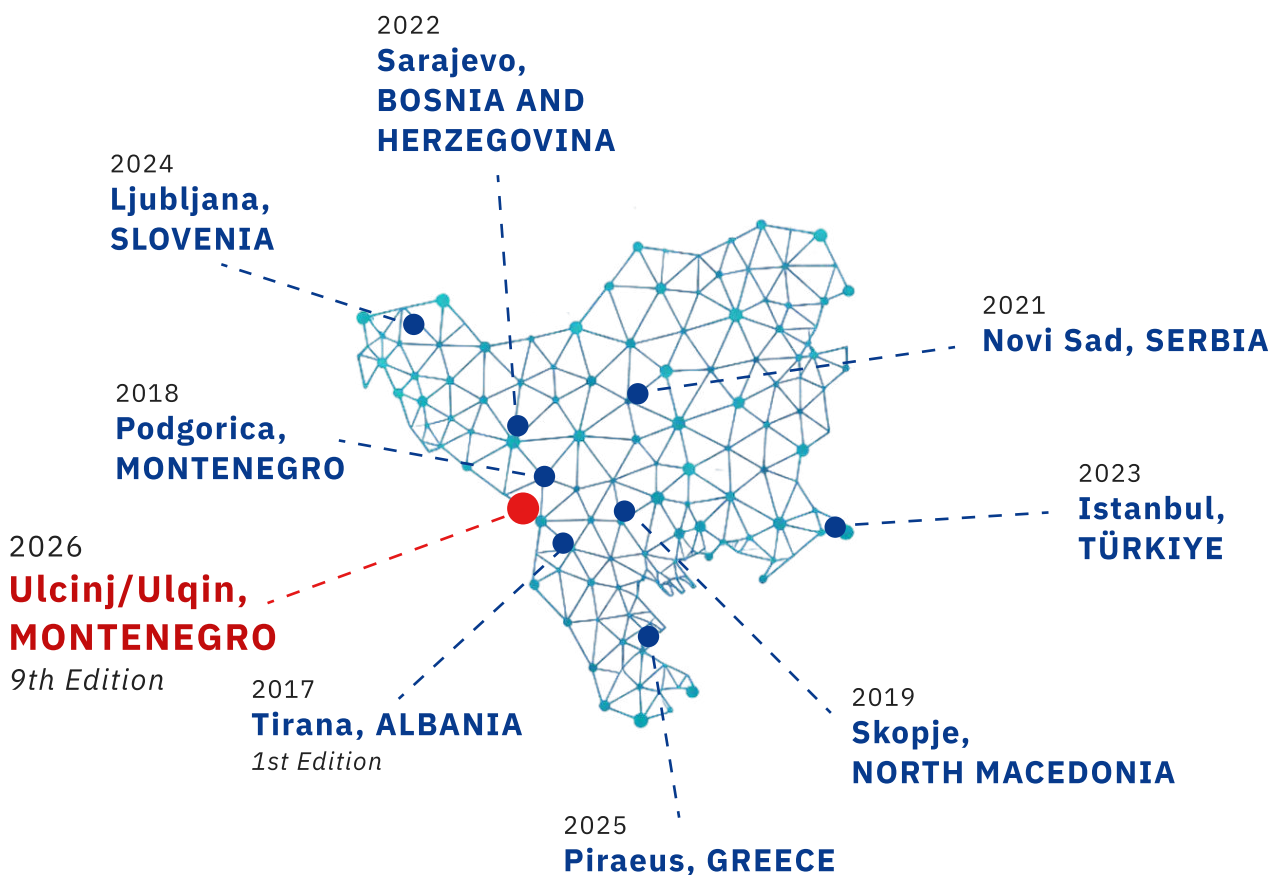
Aristotle University of
Thessaloniki
Greece

BalkanCom MISSION

As the name suggests, the BalkanCom is held annually in a country of the Balkan Peninsula. The goal of the conference is to bring together researchers in academia, research labs, and industry from all over the world to this historical region.

The conference addresses the important challenges in the evolving world of Communications and Networking, while at the same time bolstering the potential and talent that is found in this exciting and dynamic region.

This Ninth edition, fitting not only for the Balkan Peninsula, but globally, reflecting the groundbreaking progress in the ICT domain, will carry forward the spirit of "Balkans without the borders" to support knowledge and technology transfer in the area.



Currency
Euro (€)

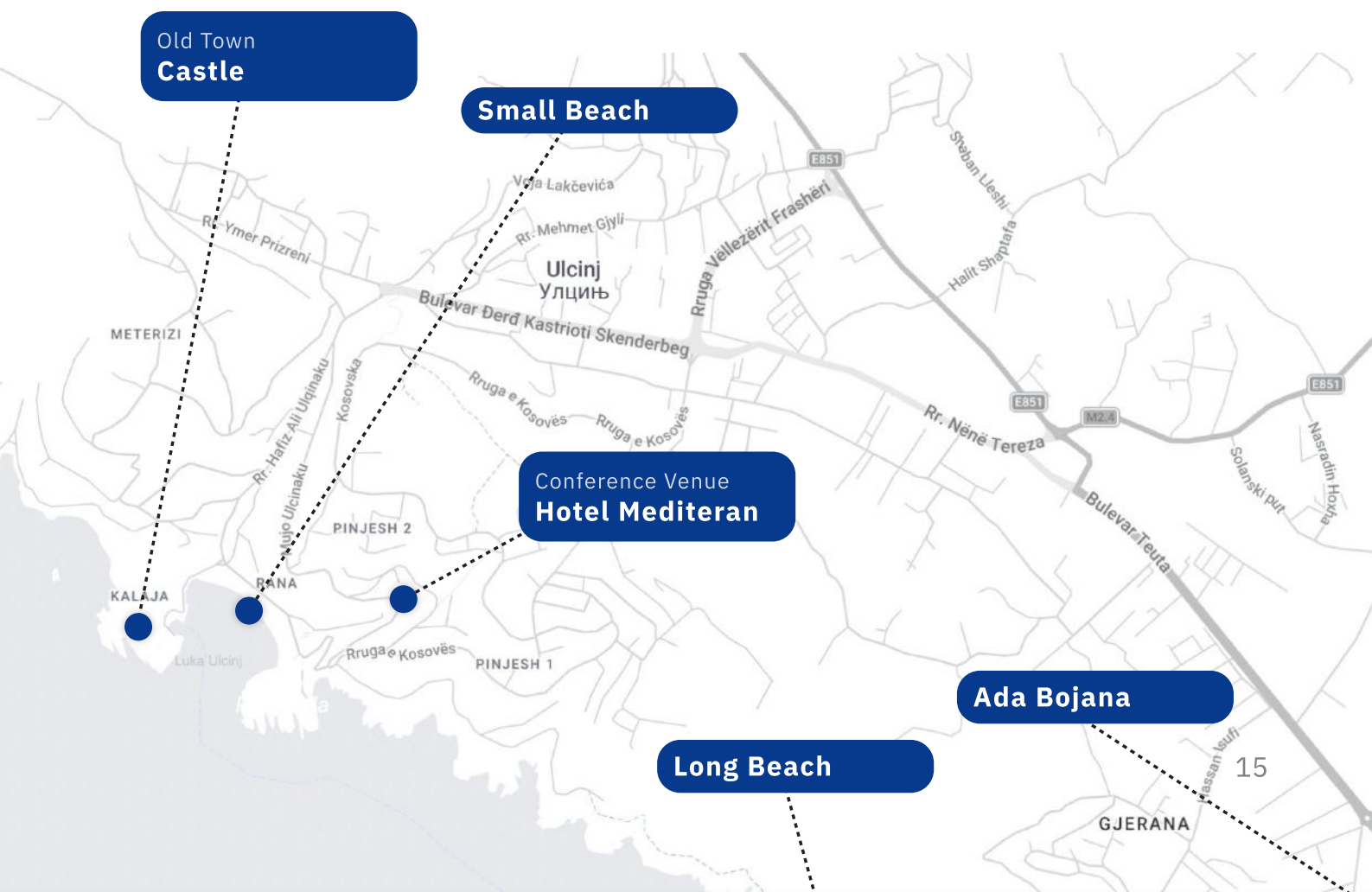
Average Temperatures
highs ~28°C,
lows ~17–18°C

Timezone
CET (UTC+1),
CEST (UTC+2 in
summer)

ULCINJ/ULQIN

Ulcinj/Ulqin stands as one of the most charming coastal cities on the Adriatic, seamlessly blending Mediterranean warmth with a distinct Balkan spirit. Serving as a remarkable backdrop for an international conference, the city naturally balances academic focus with a relaxed coastal atmosphere. Its unique geographic setting brings together historic architectural landscapes and sprawling coastlines, offering attendees an unforgettable experience outside of the technical sessions.

A central crown jewel of the city is the ancient walled Old Town, which sits majestically on a steep promontory directly above a turquoise bay. This historic fortress area reflects centuries of diverse cultural influences, boasting rich Roman-era ruins and deep Ottoman heritage. Exploring its narrow, winding stone streets provides a serene look into the region's dynamic history and offers stunning panoramic views of the sea.



Suggested Activities

Ulcinj Old Town (Kalaja)

Perched majestically on a rocky promontory overlooking the Adriatic, Ulcinj's Old Town is a living monument with over 2,500 years of history. Its ancient cyclopean walls map a layered past of Illyrian, Roman, Venetian, and Ottoman influences. Today, attendees can wander through its narrow, winding streets to explore significant landmarks like the Balšić Tower, the Venice Palace, and the historical Slave Square, all while enjoying panoramic views of the turquoise bay below.



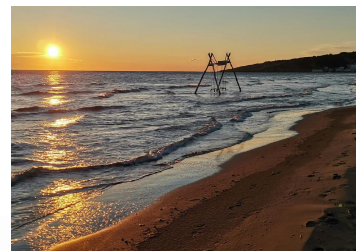
Small Beach (Plazhi i Vogël)

Nestled directly beneath the towering walls of the Old Town, Small Beach is the vibrant heart of Ulcinj's coastline. Measuring nearly 380 meters, this compact stretch of fine sand features calm, shallow waters and is bordered by a lively pedestrian promenade known as the Korzo. With its backdrop of coastal pine forests and close proximity to downtown cafes and seafood restaurants, it offers a convenient and energetic beach experience.



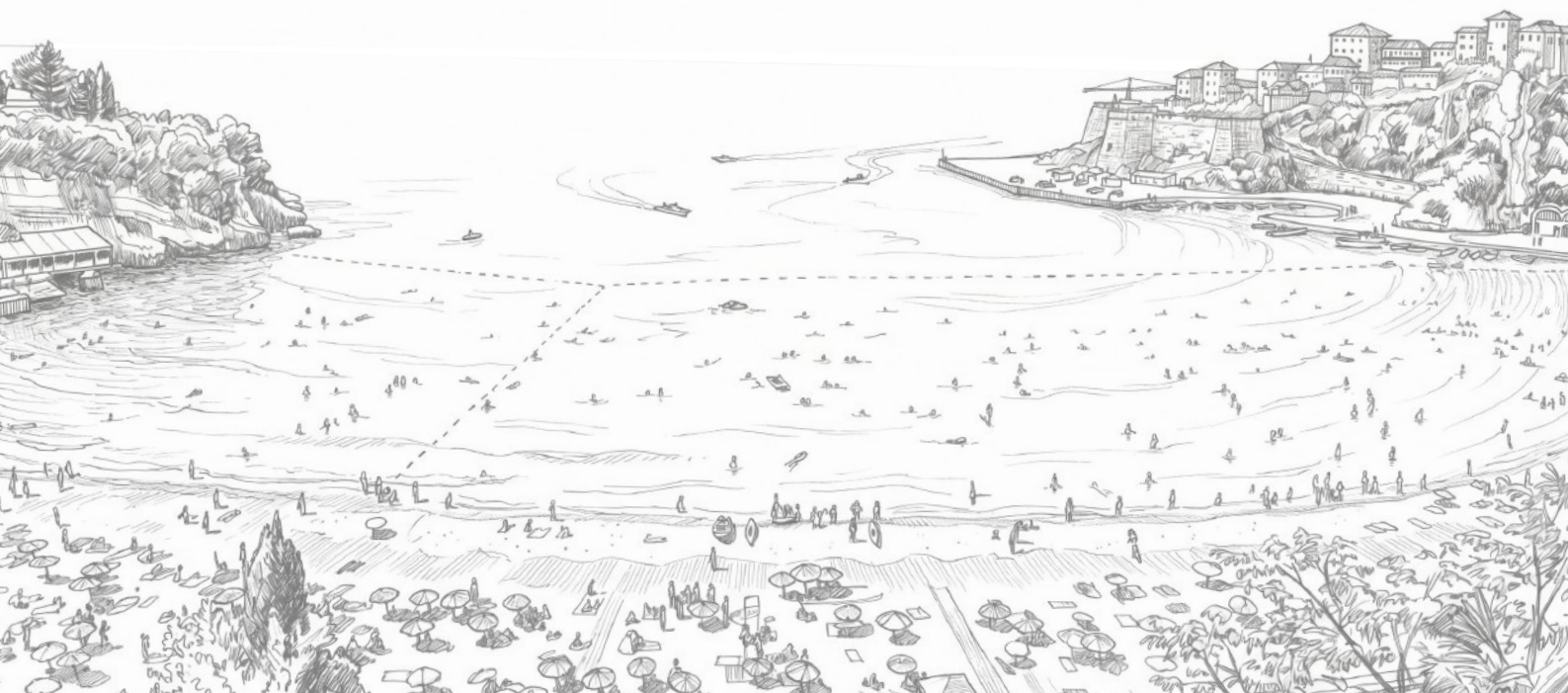
Long Beach (Plazhi i Madh)

Stretching for roughly 13 kilometers, Long Beach is the longest continuous sandy beach in Montenegro and one of the longest in Europe. Its vast expanse of fine volcanic sand runs all the way from Port Milena down to the Bojana River delta. Thanks to consistent afternoon onshore winds and a wide, shallow shoreline, Long Beach has also become a premier European destination for watersports, particularly kite surfing.



Ada Bojana

At the southernmost tip of Montenegro lies Ada Bojana, a unique triangular island formed by the delta of the Bojana River. Bordered by the slow-moving river on two sides and the Adriatic Sea on its third, the island is a tranquil natural reserve. Famous for its pristine three-kilometer sandy beach, untouched wilderness, and rustic over-water seafood restaurants that serve traditional fish soup, it offers a peaceful retreat away from the urban center.







IEEE



BalkanCom 2026

Ninth International Balkan Conference on
Communications and Networking

Ulcinj/Ulqin, Montenegro, June 16-19, 2026

