

2023 IEEE 24th International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM 2023)

**Boston, Massachusetts, USA
12-15 June 2023**



**IEEE Catalog Number: CFP23WOW-POD
ISBN: 979-8-3503-3166-0**

**Copyright © 2023 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP23WOW-POD
ISBN (Print-On-Demand):	979-8-3503-3166-0
ISBN (Online):	979-8-3503-3165-3
ISSN:	2770-0526

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

2023 IEEE 24th International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM) **WoWMoM 2023**

Table of Contents

Message from the General Chairs	xvi
Message from the TPC Chairs	xvii
Message from the Workshop Chairs	xix
Organizing Committee	xxi
Technical Program Committee	xxiii
Reviewers	xxv
Industry Session	xxvii
Panelists	xxix
N2Women Event	xxxvii
Sponsors	xxxix

Technical Program

Session 1A: Distributed Processing

<p>Slimmable Encoders for Flexible Split DNNs in Bandwidth and Resource Constrained IoT Systems</p> <p style="margin-left: 2em;"><i>Juliano S. Assine (University of California, USA), J.C. S. Santos Filho (Unicamp, Brazil), Eduardo Valle (Unicamp, Brazil), and Marco Levorato (University of California, USA)</i></p>	1
<p>EFFECT-DNN: Energy-Efficient Edge Framework for Real-Time DNN Inference</p> <p style="margin-left: 2em;"><i>Xiaojie Zhang (City University of New York, USA), Motahare Mounesan (City University of New York, USA), and Saptarshi Debroy (City University of New York, USA)</i></p>	10
<p>Online Domain Adaptive Classification for Mobile-to-Edge Computing</p> <p style="margin-left: 2em;"><i>Forough Shirin Abkenar (University of California at Irvine, USA), Leonardo Badia (University of Padova, Italy), and Marco Levorato (University of California at Irvine, USA)</i></p>	21

Information Flow Graph for Distributed Caching without Newcomers over a Broadcast Medium	30
<i>Sandra Zimmermann (TU Dresden, Germany), Paul Schwentek (TU Dresden, Germany), Willi Meißner (TU Dresden, Germany), Christian Vielhaus (TU Dresden, Germany), Juan A. Cabrera (TU Dresden, Germany), Frank H. P. Fitzek (TU Dresden, Germany; Centre for Tactile Internet with Human-in-the-Loop (CeTI)), and Martin Reisslein (Arizona State Univ., USA)</i>	

Session 1B: Activity & Localization

ARLCL: Anchor-Free Ranging-Likelihood-based Cooperative Localization	36
<i>Dimitris Xenakis (University of Bern, Switzerland), Antonio Di Maio (University of Bern, Switzerland), and Torsten Braun (University of Bern, Switzerland)</i>	
SiMWiSense: Simultaneous Multi-Subject Activity Classification Through Wi-Fi Signals	46
<i>Khandaker Foysal Haque (Northeastern University, USA), Milin Zhang (Northeastern University, USA), and Francesco Restuccia (Northeastern University, USA)</i>	
A Picture is Worth 1,000 Millimeters: Combining Vision and Wi-Fi to Improve Localization	56
<i>Shazal Irshad (University of Colorado Boulder), Eric Rozner (University of Colorado Boulder), Apurv Bhartia (Cisco Meraki), and Bo Chen (Cisco Meraki)</i>	
PoseFly: On-Site Pose Parsing of Swarming Drones via 4-in-1 Optical Camera Communication	67
<i>Xiao Zhang (Michigan State University, East Lansing), Griffin Klevering (Michigan State University, East Lansing), and Li Xiao (Michigan State University, East Lansing)</i>	

Session 2A: QoE & QoS

Equalizing Access to Latency-Critical Services Based on In-Network Computing	77
<i>Vincenzo Mancuso (IMDEA Networks Institute, Spain), Paolo Castagno (Università di Torino, Italy), Matteo Sereno (Università di Torino, Italy; Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT), Italy), and Marco Ajmone Marsan (IMDEA Networks Institute, Spain)</i>	
TWIST: Thin-Waist Wireless Testbed for Measuring Interfering Traffic Stream Throughputs	87
<i>Yannis Thomas (Athens University of Economics and Business, Greece) and Stavros Toumpis (Athens University of Economics and Business, Greece)</i>	
Deep Reinforcement Learning with Importance Weighted A3C for QoE Enhancement in Video Delivery Services	97
<i>Mandan Naresh (Birla Institute of Technology and Science Pilani, India), Paresh Saxena (Birla Institute of Technology and Science Pilani, India), and Manik Gupta (Birla Institute of Technology and Science Pilani, India)</i>	

Handling Demand Heterogeneity in UAV-Aided Content Caching in Communication-Challenged Environments	107
<i>Amit Kumar Bhuyan (Michigan State University, USA), Hrishikesh Dutta (Michigan State University, USA), and Subir Biswas (Michigan State University, USA)</i>	

Session 2B: mm-wave

mmSight: Towards Robust Millimeter-Wave Imaging on Handheld Devices	117
<i>Jacqueline M Schellberg (University of South Carolina, USA), Hem Regmi (University of South Carolina, USA), and Sanjib Sur (University of South Carolina, USA)</i>	
Gesture Recognition with mmWave Wi-Fi Access Points: Lessons Learned	127
<i>Nabeel Nisar Bhat (University of Antwerp-imec, Belgium), Rafael Berkvens (University of Antwerp-imec, Belgium), and Jeroen Famaey (University of Antwerp-imec, Belgium)</i>	
D3PicoNet: Enabling Fast and Accurate Indoor D-Band Millimeter-Wave Picocell Deployment	137
<i>Hem Regmi (University of South Carolina, USA) and Sanjib Sur (University of South Carolina, USA)</i>	

Session 3A: Edge Computing

AoI-Optimal Data Collection, Offloading, and Migration in Mobile Edge Networks	147
<i>Jialiang Feng (Sun Yat-sen University, China) and Jie Gong (Sun Yat-sen University, China)</i>	
Disaggregated Mobile Core for Edge City Services	157
<i>Pedro Valente (Instituto de Telecomunicações;Universidade de Aveiro, Portugal), Duarte Raposo (Instituto de Telecomunicações, Portugal), Pedro Rito (Instituto de Telecomunicações, Portugal), and Susana Sargento (Instituto de Telecomunicações;Universidade de Aveiro, Portugal)</i>	
Admission Control with Latency Considerations for 5G Mobile Edge Computing	167
<i>Ye Zhang (Inner Mongolia University, China), Wuyungerile Li (Inner Mongolia University, China), and Winston K.G. Seah (Victoria University of Wellington, New Zealand)</i>	
FuzzyForward: A Novel Multi-Hop Data Forwarding Scheme Using Fuzzy Decision for Edge VANETs	175
<i>Yinglong Li (Zhejiang University of Technology, China), Dan Meng (Zhejiang University of Technology, China), Xinchen Xu (Zhejiang University of Technology, China), Tieming Chen (Zhejiang University of Technology, China), Yanjun Li (Zhejiang University of Technology, China), and Ting Wang (Zhejiang University of Technology, China)</i>	

Session 3B: Wireless

LASA: Location-Aware Scheduling Algorithm in Industrial IoT Networks with Mobile Nodes	185
<i>Marco Pettorali (University of Pisa, Italy), Francesca Righetti (University of Pisa, Italy), Carlo Vallati (University of Pisa, Italy), Sajal K. Das (Missouri University of Science and Technology, USA), and Giuseppe Anastasi (University of Pisa, Italy)</i>	
Context-Aware Heterogeneous Task Scheduling for Multi-Layered Systems	195
<i>Sharon L.G. Contreras (University of California at Irvine, USA) and Marco Levorato (University of California at Irvine, USA)</i>	
On The Impact of Coding Depth in Sliding Window Random Linear Network Coding Schemes	205
<i>Foteini Karetsi (University of Ioannina, Greece), Christos Liaskos (University of Ioannina, Greece; Foundation for Research and Technology - Hellas (FORTH)), Sotiris Ioannidis (Foundation for Research and Technology - Hellas (FORTH); Technical University of Crete, Greece), and Evangelos Papapetrou (University of Ioannina, Greece)</i>	
Cost-Efficient Mobility Management in 5G	215
<i>Anna Prado (Technical University of Munich, Germany), Fidan Mehmeti (Technical University of Munich, Germany), and Wolfgang Kellerer (Technical University of Munich, Germany)</i>	

Session 4A: WiFi & Unlicensed

Evaluating Wifibroadcast for Long-Distance UAV-to-Ground Data Transmission	225
<i>Jannis Mast (Osnabrück University, Germany), Thomas Hänel (Osnabrück University, Germany), Nikolas Wintering (Osnabrück University, Germany), and Nils Aschenbruck (Osnabrück University, Germany)</i>	
A Wi-Fi Energy Model for Scalable Simulation	232
<i>Clément Courageux-Sudan (Univ. Rennes, France), Anne-Cécile Orgerie (Univ. Rennes, France), and Martin Quinson (Univ. Rennes, France)</i>	
FTMRate: Collision-Immune Distance-based Data Rate Selection for IEEE 802.11 Networks	242
<i>Wojciech Ciezobka (AGH University of Krakow, Poland), Maksymilian Wojnar (AGH University of Krakow, Poland), Katarzyna Kosek-Szott (AGH University of Krakow, Poland), Szymon Szott (AGH University of Krakow, Poland), and Krzysztof Rusek (AGH University of Krakow, Poland)</i>	
An Empirical Study of Interference Features in Licensed and Unlicensed Bands for Intelligent Spectrum Management	252
<i>Zhuoran Su (Worcester Polytechnic Institute, MA), Kaveh Pahlavan (Worcester Polytechnic Institute, MA), and Bashima Islam (Worcester Polytechnic Institute, MA)</i>	

Session 4B: Applications

LNMesh: Who Said You need Internet to Send Bitcoin? Offline Lightning Network Payments using Community Wireless Mesh Networks	261
<i>Ahmet Kurt (Florida International University), Abdulhadi Sahin (Florida International University), Ricardo Harrilal-Parchment (Florida International University), and Kemal Akkaya (Florida International University)</i>	
Real-Time Electric Vehicle Intelligent Charging Scheduling Strategy in Real Traffic Scenarios	271
<i>Yue Yang (Heilongjiang University, China), Gang Pan (Heilongjiang University, China), and Jinghua Zhu (Heilongjiang University, China)</i>	
HeadSense: Visual Search Monitoring and Distracted Behavior Detection for Bicycle Riders	281
<i>Zengyi Han (The University of Tokyo, Japan), Xuefu Dong (The University of Tokyo, Japan), Yuuki Nishiyama (The University of Tokyo, Japan), and Kaoru Sezaki (The University of Tokyo, Japan)</i>	
PEPPER: Precise Privacy-Preserving Contact Tracing with Cheap, BLE/UWB Capable Tokens	290
<i>François-Xavier Molina (Inria, France), Vincent Roca (Inria, France), Roudy Dagher (Inria, France), Emmanuel Baccelli (Inria, France; Freie Universität Berlin, Germany), Nathalie Mitton (Inria, France), Antoine Boutet (Inria, France; INSA Lyon, France), and Mathieu Cunche (Inria, France; INSA Lyon, France)</i>	

Work in Progress

WIP: Performance Evaluation of Angle-based Handover in LEO-based NTN	300
<i>Jina Yu (Ajou University, South Korea), Tae-Yoon Kim (Ajou University, South Korea), and Jae-Hyun Kim (Ajou University, South Korea)</i>	
WIP: Two Packet Collision Model Parameter Sets	304
<i>Thomas Hänel (Osnabrück University, Germany), Clemens Hoppenau (Osnabrück University, Germany), Jannis Mast (Osnabrück University, Germany), and Nils Aschenbruck (Osnabrück University, Germany)</i>	
WIP: Multi-Connectivity user Associations in mmWave Networks: a Distributed Multi-Agent Deep Reinforcement Learning Method	308
<i>Shanwei Gao (Wenzhou University, China) and Zhenzhou Tang (Wenzhou University, China)</i>	
WIP: Optimizing Solar-Powered BLE Beacons for Wildlife Monitoring	312
<i>Josef Miller (San Diego State University, USA), Mauro Garcia (San Diego State University, USA), and Baris Aksanli (San Diego State University, USA)</i>	
WIP: Federated Learning for Routing in Swarm Based Distributed Multi-Hop Networks	316
<i>Martha Cash (Worcester Polytechnic Institute, USA), Joseph Murphy (Worcester Polytechnic Institute, USA), and Alexander Wyglinski (Worcester Polytechnic Institute, USA)</i>	

Posters & Demos

Posters

- Poster: Activity Graph Learning for Attack Detection in IoT Networks 320
Mohamed-Lamine Messai (Univ Lyon, France) and Hamida Seba (Univ Lyon, France)
- POSTER: Wi-Fi Indoor Positioning Based on Sparse Autoencoder and Deep Belief Network 323
Jinyang Lou (China University of Petroleum (East China), China), Jinyang Lou (China University of Petroleum (East China), China), Juan Li (China University of Petroleum (East China), China), Bin Jiang (China University of Petroleum (East China), China), Shibao Li (China University of Petroleum (East China), China), and Jianhang Liu (China University of Petroleum (East China), China)
- POSTER: A Low-Complexity Model for IRS-Aided Beyond 5G Wireless Networks 326
Gyana Ranjan Mati (National Institute of Technology, India), Susmita Das (National Institute of Technology, India), and Annapurna Pradhan (National Institute of Technology, India)
- Poster: Privacy-Preserving Joint Communication and Sensing 329
Óscar Martins (University of Coimbra, Portugal), João P. Vilela (University of Porto, Portugal), and Marco Gomes (University of Coimbra, Portugal)
- Poster: Technical Feasibility of Visible Light Communication Systems for Low Bitrate Smart Cities and the Industry 4.0 Applications 332
Véronique Georlette (University of Mons, Belgium) and Véronique Moeyaert (University of Mons, Belgium)

Demos

- Demo: Integrated On-Site Localization and Optical Camera Communication for Drones 334
Xiao Zhang (Michigan State University), Griffin Klevering (Michigan State University), Kanishka Wijewardena (Michigan State University), and Li Xiao (Michigan State University)
- Demo: Universal Soft-Detection Decoder with Ultra-Low Energy Consumption Using ORBGRAND ... 337
Arslan Riaz (Boston University, USA), Zeynep Ece Kizilates (Boston University, USA), Alperen Yasar (Boston University, USA), Furkan Ercan (Boston University, USA), Wei An (Department of Electrical Engineering and Computer Science, USA), Kevin Galligan (Maynooth University, Ireland), Muriel Medard (Department of Electrical Engineering and Computer Science, USA), Ken R. Duffy (Northeastern University, USA), and Rabia Tugce (Boston University, USA)

Demo: Enhancing Network Performance based on 5G Network Function and Slice Load Analysis .	340
<i>Rui Ferreira (Capgemini Engineering;University of Beira Interior, Portugal), João Fonseca (Capgemini Enginnering;University of Aveiro and Instituto de Telecomunicações, Portugal), João Silva (Capgemini Engineering, Portugal), Mayuri Tendulkar (Capgemini Engineering, India), Paulo Duarte (Capgemini Engineering, Portugal), Marco Araújo (Capgemini Engineering, Portugal), Raul Barbosa (Capgemini Enginnering;University of Aveiro and Instituto de Telecomunicações, Portugal), Bruno Mendes (Capgemini Enginnering;University of Aveiro and Instituto de Telecomunicações, Portugal), and Adriano Goes (Capgemini Engineering, Portugal)</i>	
Demo: Object Detection under 5G-Edge Mobility	343
<i>Marco Araújo (Capgemini Engineering, Portugal), João Silva (Capgemini Engineering, Portugal), Pedro M. Santos (CISTER Research Center, Portugal), Himanshu Singh (Capgemini Engineering, India), Deepak Gunjal (Capgemini Engineering, India), João Fonseca (Capgemini Engineering;University of Aveiro and Instituto de Telecomunicações, Portugal), Paulo Duarte (Capgemini Engineering, Portugal), Bruno Mendes (Capgemini Enginnering;University of Aveiro and Instituto de Telecomunicações, Portugal), Raul Barbosa (Capgemini Enginnering;University of Aveiro and Instituto de Telecomunicações, Portugal), Peter Steenkiste (Carnegie Mellon University, USA), Saeid Sabamonir (CISTER Research Center, Portugal), Luis Lam (CISTER Research Center, Portugal), João Pereira (CISTER Research Center, Portugal), and Harrison Kurunathan (CISTER Research Center, Portugal)</i>	
Demo: Edge-based IPFS in a Disaggregated Mobile Core	346
<i>Pedro Valente (Instituto de Telecomunicações;Universidade de Aveiro, Portugal), José Oliveira (Instituto de Telecomunicações;Universidade de Aveiro, Portugal), Duarte Raposo (Instituto de Telecomunicações, Portugal), Pedro Rito (Instituto de Telecomunicações, Portugal), and Susana Sargento (Instituto de Telecomunicações;Universidade de Aveiro, Portugal)</i>	
Demo: Remote Robot Control with Haptic Feedback over the Munich 5G Research Hub Testbed ...	349
<i>Serkut Ayvaşık (Technical University of Munich, Germany), Edwin Babaians (Technical University of Munich, Germany), Arled Papa (Technical University of Munich, Germany), Yash Deshpande (Technical University of Munich, Germany), Alba Jano (Technical University of Munich, Germany), Wolfgang Kellerer (Technical University of Munich, Germany), and Eckehard Steinbach (Technical University of Munich, Germany)</i>	
Demo: The Future of Dog Walking - Four-Legged Robots and Augmented Reality	352
<i>Jannek Steinke (TU Dresden, Germany), Justus Rischke (TU Dresden, Germany), Peter Sossalla (TU Dresden, Germany), Johannes Hofer (TU Dresden, Germany), Christian L. Vielhaus (TU Dresden, Germany), Nico Vom Hofe (TU Dresden, Germany), and Frank H. P. Fitzek (TU Dresden, Germany; Centre for Tactile Internet with Human-in-the-Loop (CeTI); 6G-life)</i>	

Demo:[SeBaSi] System-Level Integrated Access and Backhaul Simulator for Self-Backhauling	355
<i>Amir Ashtari Gargari (University of Padova, Italy), Matteo Pagin (University of Padova, Italy), Andrea Ortiz (Communications Engineering Lab, TU Darmstadt, Germany), Nairy Moghadas Gholian (Wireless Communications and Sensing Lab (WISE), TU Darmstadt, Germany), Michele Polese (Northeastern University, MA), and Michele Zorzi (University of Padova, Italy)</i>	
Demo: Robotics Meets Augmented Reality: Real-Time Mapping with Boston Dynamics Spot and Microsoft HoloLens 2	358
<i>Nico Vom Hofe (TU Dresden, Germany), Peter Sossalla (TU Dresden, Germany), Johannes Hofer (TU Dresden, Germany), Christian L. Vielhaus (TU Dresden, Germany), Justus Rischke (TU Dresden, Germany), Jannek Steinke (TU Dresden, Germany), and Frank H. P. Fitzek (TU Dresden, Germany; Centre for Tactile Internet with Human-in-the-Loop (CeTI); 6G-life)</i>	
Demo: Utilizing SRv6 to Optimize the Routing Behavior for Tactical Networks	361
<i>Eryk Schiller (University of Zurich UZH, Switzerland), Chao Feng (University of Zurich UZH, Switzerland), Rafael Hengen Ribeiro (University of Zurich UZH, Switzerland), Francesco Marino (RUAG Schweiz AG, Switzerland), Martin Buck (RUAG Schweiz AG, Switzerland), and Burkhard Stiller (University of Zurich UZH, Switzerland)</i>	

WoWMoM Workshop Program

WoLoLo Session

Opportunistic Routing in LoRa-based Wireless Mesh Networks	364
<i>Sascha Rösler (Technische Universität Berlin, Germany), Anatolij Zubow (Technische Universität Berlin, Germany), and Falko Dressler (Technische Universität Berlin, Germany)</i>	
An Investigation of 5G, LTE, LTE-M and NB-IoT Coverage for Drone Communication Above 450 Feet	370
<i>Radheshyam Singh (Technical University of Denmark Kongens Lyngby, Denmark), Jes H. Jepsen (University of Southern Denmark, Denmark), Kalpit D. Ballal (Technical University of Denmark Kongens Lyngby, Denmark), Stanley Nwabuona (Technical University of Denmark Kongens Lyngby, Denmark), Michael Berger (Technical University of Denmark Kongens Lyngby, Denmark), and Lars Dittmann (Technical University of Denmark Kongens Lyngby, Denmark)</i>	
MAPPO-Based Cooperative UAV Trajectory Design with Long-Range Emergency Communications in Disaster Areas	376
<i>Yue Guan (Guizhou University, China), Sai Zou (Guizhou University, China), Kai Li (CISTER Research Centre, Portugal), Wei Ni (CSIRO, Australia), and Bochun Wu (Fudan University, China)</i>	
Effects of Lossy Compression on the Age of Information in a Low Power Network	382
<i>Frederick M. Chache (The Pennsylvania State University, USA; Arcfield, USA), Sean Maxon (U.S. Naval Research Laboratory, USA), Ram M. Narayanan (The Pennsylvania State University, USA), and Ramesh Bharadwaj (U.S. Naval Research Laboratory, USA)</i>	

ELORA: Even Longer Range Sensor Networking Through Modulated Concurrent LoRa Transmissions.....	388
<i>Daniel Szafranski (Clausthal University of Technology, Germany) and Andreas Reinhardt (Clausthal University of Technology, Germany)</i>	

SRCNAS Session

A Study on the Influence of 5G Network Planning on Communication in Urban Air Mobility	394
<i>Shashini Thamarasie Wanniarachchi (Hamburg University of Technology(TUHH), Germany) and Volker Turau (Hamburg University of Technology(TUHH), Germany)</i>	
Urban Air Mobility Link Budget Analysis in 5G Communication Systems	400
<i>Huw Whitworth (Cranfield University, United Kingdom), Saba Al-Rubaye (Cranfield University, United Kingdom), and Antonios Tsourdos (Cranfield University, United Kingdom)</i>	
Efficient Control-Channel Security for the Aeronautical Communications System LDACS	407
<i>Nils Mäurer (German Aerospace Center (DLR), Germany), Thomas Gräupl (German Aerospace Center (DLR), Germany), and Corinna Schmitt (Universität der Bundeswehr München, Germany)</i>	

NTN-6G Session

Satellite-Assisted Multi-Connectivity in Beyond 5G	413
<i>Mikko Majamaa (Magister Solutions, Finland), Henrik Martikainen (Magister Solutions, Finland), Jani Puttonen (Magister Solutions, Finland), and Timo Hämäläinen (University of Jyväskylä, Finland)</i>	
Coordinated Dynamic Spectrum Sharing Between Terrestrial and Non-Terrestrial Networks in 5G and Beyond	419
<i>Henrik Martikainen (Magister Solutions Ltd., Finland), Mikko Majamaa (Magister Solutions Ltd., Finland), and Jani Puttonen (Magister Solutions Ltd., Finland)</i>	

SC2 Session

Quantum-Enabled Blockchain for Data Processing and Management in Smart Cities	425
<i>Uttam Ghosh (Meharry Medical College, USA), Debashis Das (University of Kalyani, India), Pushpita Chatterjee (Howard University, USA), and Sachin Shetty (Old Dominion University, USA)</i>	
DP2AS-Definitive Privacy-Preserving Analytical Scheme for Healthcare Data Processing	431
<i>Chandu Thota (University of Nicosia, Cyprus), Constandinos X Mavromoustakis (University of Nicosia, Cyprus), and Jordi Mongay Batalla (Warsaw University of Technology and National Institute of Telecommunications, Poland)</i>	
NOMA-Based Dual-UAV Data Collection in Wireless Powered IoT Networks	439
<i>Pengfei Du (Xihua University, China), Shijia Chen (Xihua University, China), Haotong Cao (The Hong Kong Polytechnic University, China), and Xuejun Zhang (Beijing University of Aeronautics and Astronautics, China)</i>	

Extended Adaptive Data-Rate (X-ADR) Technique for Optimal Resource Allocation in Smart City Applications	445
<i>Nikumani Choudhury (Birla Institute of Technology & Science Pilani, India), Manik Gupta (Birla Institute of Technology & Science Pilani, India), Moustafa M. Nasralla (Prince Sultan University, Saudi Arabia), and Satoshi Fujita (Hiroshima University, Japan)</i>	
A Weather Oriented Pre-Tuning Methodology For Long-Term Traffic Speed Estimation	451
<i>Enes Bilgin (Yıldız Technical University, Turkiye), H. Irem Turkmen (Yıldız Technical University, Turkiye), and M. Amac Guvensan (Yıldız Technical University, Turkiye)</i>	
Missing Traffic Speed Data Imputation Using Road Segment Characteristics for Long-Term Traffic Speed Prediction	457
<i>Mustafa M. Kara (Yıldız Technical University, Turkey), H. Irem Turkmen (Yıldız Technical University, Turkey), and M. Amac Guvensan (Yıldız Technical University, Turkey)</i>	

SLICO Session

Towards Safe Cooperative Autonomous Platoon Systems using COTS Equipment	464
<i>Harrison Kurunathan (CISTER Research Unit - Instituto Superior de Engenharia do Porto (ISEP), Portugal), José Santos (CISTER Research Unit - Instituto Superior de Engenharia do Porto (ISEP), Portugal), Duarte Moreira (CISTER Research Unit - Instituto Superior de Engenharia do Porto (ISEP), Portugal), and Pedro M. Santos (CISTER Research Unit - Instituto Superior de Engenharia do Porto (ISEP), Portugal)</i>	
An Intelligent Mechanism for Monitoring and Detecting Intrusions in IoT Devices	470
<i>Vitalina Holubenko (LIS, Instituto Pedro Nunes;University of Coimbra, Portugal) and Paulo Silva (LIS, Instituto Pedro Nunes;University of Coimbra, Portugal)</i>	
Millimeter-Wave Testbed and Modeling in NeXt Generation URLLC Communications	480
<i>Eurico Dias (University of Aveiro and Instituto de Telecomunicações, Portugal), Duarte Raposo (Instituto de Telecomunicações, Portugal), Homa Esfahanizadeh (EECS, MIT, Cambridge, USA), Alejandro Cohen (ECE, Technion, Israel), Vipindev Adat Vasudevan (EECS, MIT, Cambridge, USA), Tânia Ferreira (University of Aveiro and Instituto de Telecomunicações, Portugal), Miguel Luís (Instituto Superior de Engenharia de Lisboa and Instituto de Telecomunicações, Portugal), Susana Sargento (University of Aveiro and Instituto de Telecomunicações, Portugal), and Muriel Médard (EECS, MIT, Cambridge, USA)</i>	

TwinNets Session

A Digital Twin Network for Computational Neuroscience Simulators: Exploring Network Architectures for Acceleration of Biological Neural Network Simulations	483
<i>Vida Sobhani (RWTH Aachen University, Germany), Kevin Kauth (RWTH Aachen University, Germany), Tim Stadtmann (RWTH Aachen University, Germany), and Tobias Gemmeke (RWTH Aachen University, Germany)</i>	

An IoT-based Framework for the Enjoyment and Protection of Cultural Heritage Artifacts	489
<i>Francesco Colace (University of Salerno, Italy), Dajana Conte (University of Salerno, Italy), Gianluca Frasca-Caccia (University of Salerno, Italy), Angelo Lorusso (University of Salerno, Italy), Domenico Santaniello (University of Salerno, Italy), and Carmine Valentino (University of Salerno, Italy)</i>	
Network Digital Twin for Non-Public Networks	495
<i>Marc Mollá Roselló (Ericsson, Spain), Jorge Vazquez Cancela (Gestamp, Spain), Isaac Quintana (Ericsson, Spain), and Manuel Lorenzo (Ericsson, Spain)</i>	
Author Index	501