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Monday, December 4 9:00 - 9:30

K1: Keynote

Dr. Stefano Cioni, Communications Engineer, European Space Agency, Noordwijk, The Netherlands
          Chair: Marco Giordani (University of Padova, Italy)

Title: The 3GPP NTN standardization journey: from 5G to 6G

In March 2017, the first study item on Non-Terrestrial Networks (NTN) was approved. Today, the latest 5G Release 17 will be remembered as the first that specifies a set of enhancements and adaptations to support mobile broadband services via satellite direct access. This speech will present the challenges due to the satellite propagation environments and discuss some of the new technical enhancements introduced in Release 17. Finally, the presentation will conclude with the highlights on the emerging concepts and directions towards to a unified 6G network encompassing terrestrial and satellite mobile systems.

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Monday, December 4 9:00 - 10:30

WS03-1: Trustworthy AI for Wireless

Keynote Speaker: Prof. Walid Saad

Room: 403

Chair: Jakob Hoydis (NVIDIA, France)

Next-generation wireless systems, such as 6G and beyond, are expected to tightly embed artificial intelligence (AI) into their design, creating a new breed of AI-native wireless systems. Remarkably, despite significant academic, industrial, and standardization efforts dedicated to AI-native wireless systems in the past few years, the very definition of such systems remains ambiguous. Moreover, to date, most existing efforts in this space remain as incremental extensions to existing "AI for wireless" paradigms, i.e., using existing tools like autoencoders, diffusion models, or even large-language models to replicate known wireless functions. However, these tools have several limitations including the black-box nature of the AI models, their curve-fitting nature, which can limit their ability to reason and adapt, their reliance on large amounts of training data, their energy inefficiency, and their poor generalizability to new, unseen and out-of-domain/out-of-distribution data points. To overcome these limitations, in this talk, we present a forward-looking vision that addresses these shortcomings by introducing a novel framework for building AI-native wireless networks grounded in the rigorous tools of causal reasoning. The proposed framework will help embed generalizability, explainability, and reasoning into tomorrow's AI-native wireless networks. We start by explaining some of the key concepts of causal reasoning-based AI-native wireless networks, while providing simplistic examples. Then, we illustrate such a design by drawing a connection with the emerging idea of semantic communications. We show how, by embracing causal reasoning with semantic communication, we can usher in a new era of knowledge-driven, reasoning wireless networks that are more sustainable and resilient than today's data-driven, knowledge-agnostic networks. We particularly present our recent key results in this area, with foundations in AI, theory of mind, and game theory, that showcase how the proposed causal reasoning approach for semantic communications can reduce the volume of data circulating in a network while improving reliability, two critical requirements for emerging wireless services, such as connected intelligence and digital twins. We conclude with a discussion on future opportunities in this exciting area.

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> Chair: Gunes Karabulut Kurt (Ecole Polytechnique de Montreal, Canada)

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Opening

Dr. Doohwan Lee

Room: 402

Chair: Doohwan Lee (NTT, Japan)

Monday, December 4 2:00 - 2:30

K2: Mini-Tutorial Young Professional

Dr. Melisa Maria Lopez Lechuga, Aalborg University, Denmark

Chair: Marco Giordani (University of Padova, Italy)

Title: "Bridging the Digital Divide: Empirical Insights into Terrestrial and Non-Terrestrial Networks Integration in Rural Areas"

The digital transformation observed in recent years has led to a series of emerging connectivity-based use cases, emphasizing the growing need for ubiquitous coverage. However, 85% of the world's surface still lacks connectivity. Integrating Terrestrial Networks (TN) and Non-Terrestrial Networks (NTN) is crucial for addressing this gap in rural areas. This tutorial introduces empirical findings on cellular-satellite multi-connectivity, following a brief state-of-the-art review. Through multiple experimental campaigns with real deployments in rural areas, we assess the performance of cellular-satellite multi-connectivity. Results reveal that single-connectivity configurations fall short of meeting latency and throughput requirements for specific rural industries. Conversely, cellular-satellite multi-connectivity proves effective in overcoming these limitations.

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WS03-3: AI based Network Architectures

Keynote Speaker: Dr. Aymen Naguib

Chair: Ayman Naguib (Apple Inc., USA)

The dawn of 6G presents an opportunity to redefine our understanding of "Cell-Free" networks. The current focus on merely altering the physical layer barely scratches the surface of its true potential. This talk will introduce our vision of Cell-Free architecture for 6G. We envision a Cell-Free system with a richer protocol stack distribution, going beyond current mainstream perspectives. It's not just an evolution; it's a transformative leap that showcases the depth of what Cell-Free can potentially offer in 6G.

But with bold ideas come significant challenges. As we explore this broader vision of Cell-Free, we encounter complexities of scalability, stringent coordinations demands, and the architecture dynamism, all of which call for innovative solutions. This is where the role of AI can be crucial. It's more than just an enhancement; AI will be an enabler, ensuring our networks are equipped to address these challenge

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WS10-1: Unconventional IoT applications

Prof. Abdellah Chehri (Keynote Speaker)

Chair: Carlos T. Calafate (Universidad Politécnica de Valencia, Spain)

Title: IoT and Artificial Intelligence Experimental Testbeds: Filling the Gap

Abstract: Internet of Things (IoT) is a widely discussed topic, as it encompasses embedded devices, smart objects, and smart users that are interconnected through a communication infrastructure. It is gaining significant attention and popularity. This leads to the emergence of several paradigms, including smart cities, smart homes, smart transportation systems, Industrial applications, smart grids, and smart logistics, to name just a few. Data processing through IoT smart devices is more significant compared to information processing capacity. Data becomes humongous, even coming from a single source. Besides, unstructured data from production reports or external sources must also be integrated to analyze and optimize

the production process. Therefore, when data emanates from all heterogeneous sources, its magnitude makes it harder to process up-to a needed scale. IoT testbeds are sophisticated platforms that enable extensive experimentation, debugging, and deployment of IoT applications on a large scale. Testbeds offer researchers and developers a platform to test and improve new technologies, making it easier to adopt and commercialize them. This tutorial begins with an introduction to IoT, followed by a comprehensive examination of the latest applications of IoT. Next, we will present a comprehensive overview of the requirements and features that IoT testbeds offer. We will explore the different experimental facilities currently available to the research community. In this discussion, we will explore the various capabilities and services offered by each testbed, with a particular emphasis on its AI-related features.

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Keynote Talk - Intelligent Management of Future IIoT Networks

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Room: 403

Chair: Cedric Westphal (Huawei Innovation Center, USA)

Intelligent Management of Future IIoT Networks: A tale of IT/OT convergence, DevOps, and SDN

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Keynote Speaker Prof. Marco Di Renzo

Room: 410

Chair: Keshav Singh (National Sun Yat-sen University, Taiwan)

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Friday, December 8 9:00 - 10:30

WS14-1: Next Generation Multiple Access (NGMA) for Future Wireless Communications 1

Keynote + Paper Session
Keynote: Prof. Kai-Kit Wong

Room: 407

Chairs: Xidong Mu (Queen Mary University of London, United Kingdom (Great Britain)),
Yixuan Zou (Queen Mary University of London, United Kingdom (Great Britain))

Keynote title: Fluid Antenna System for Extreme Massive Connectivity Abstract: "Be formless … shapeless, like water!", which were the words used by Bruce Lee, as he was revealing the philosophy of Jeet Kune Do, the martial arts system Lee founded in 1967. Many parallels can be drawn in wireless communications technologies where engineers have been seeking greater flexibility in using the spectral and energy resources for improving network performance. In this talk, I will speak on some new ideas for improving wireless communications performance, using a novel antenna technology, referred to as fluid antenna and its great potential to achieve extreme massive connectivity that is not possible by other technologies we know so far.

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Room: 403

Chair: Luca Foschini (University of Bologna, Italy)

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> Chair: Cedric Westphal (Huawei Innovation Center, USA)

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WS14-2: Next Generation Multiple Access (NGMA) for Future Wireless Communications 2

Paper Session

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> Chair: Alvin Y. Sukmadji (University of Toronto, Canada)

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A Novel Design for Geometric Constellation Shaping...1554

> Yinhua Jia (Qualcomm Technologies, Inc., China); Liangming Wu and Changlong Xu (Qualcomm, USA); Wei Liu (Qualcomm Technologies, Inc., USA); Hao Xu (Qualcomm Technologies Inc., USA); Thomas Richardson (Qualcomm Flarion Inc., USA)

Generalized Spatially-Coupled Product-Like Codes using Zipper Codes with Irregular Degree...1560

> Alvin Y. Sukmadji, Frank R. Kschischang and Mohannad Shehadeh (University of Toronto, Canada)

A New Joint Source-Channel Coding in the Short Blocklength Regime...1566

> Qianfan Wang, Yanzhi Chen, Jifan Liang and Baodian Wei (Sun Yat-Sen University, China); Xiao Ma (Sun Yat-sen University, China)

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WS17-2: Semantic Communication for 6G 2

Room: 409

MDVSC---Wireless Model Division Video Semantic Communication for 6G...1572

Zhicheng Bao, Haotai Liang, Chen Dong and Xiaodong Xu (Beijing University of Posts and Telecommunications, China); Geng Liu (Smart Shine Microelectronics Technology Co., Ltd., China)

Semantic Communications for Joint Image Recovery and Classification...1579

Zhonghao Lyu (The Chinese University of Hong Kong, Shenzhen, China); Guangxu Zhu (Shenzhen Research Institute of Big Data, China); Jie Xu (The Chinese University of Hong Kong (Shenzhen), China); Bo Ai (Beijing Jiaotong University, China); Shuguang Cui (The Chinese University of Hong Kong, Shenzhen & CUHKSZ-FNii, China)

Resource Allocation for Semantic-Aware Mobile Edge Computing Systems...1585

Yihan Cang and Ming Chen (Southeast University, China); Zhaohui Yang (Zhejiang University, China); Yuntao Hu and Yinlu Wang (Southeast University, China); Zhaoyang Zhang (Zhejiang University, China); Kai Kit Wong (University College London, United Kingdom (Great Britain))

Semantic Multi-Resolution Communications...1591

Matin Mortaheb (University of Maryland, USA); Mohammad Ali Khojastepour (NEC Laboratories America, USA); Srimat Chakradhar (NEC Research Labs, USA); Sennur Ulukus (University of Maryland, USA)

Optimal Semantic-aware Sampling and Transmission in Energy Harvesting Systems Through the AoII...1597

Abolfazl Zakeri (University of Oulu, Finland); Mohammad Moltafet (University of California Santa Cruz (UCSC), USA); Marian Codreanu (Linkoping University, Sweden)

Spatiotemporal Attention-based Semantic Compression for Real-time Video Recognition...1603

Nan Li (Aarhus University, Denmark); Mehdi Bennis (Centre of Wireless Communications, University of Oulu, Finland); Alexandros Iosifidis and Qi Zhang (Aarhus University, Denmark)

Friday, December 8 2:00 - 3:30

WS12-3: RIS-empowered 3CLS, Session 3

Advanced Design-2
Keynote Speaker: Prof. Rui Zhang

Chair: Qingqing Wu (Shanghai Jiao Tong University, China)

KEYNOTE TITLE: INTELLIGENT SURFACES FOR WIRELESS COMMUNICATIONS: LIVING AT THE INTERFACE OF ELECTROMAGNETIC AND COMMUNICATION THEORIES

On Partitioning Enabled IRS-Assisted Co-operative NOMA with Mode Switching...1609

Debakshi Dey and Kamal Agrawal (Indian Institute of Technology Delhi, India); Anand Jee and Shankar Prakriya (Indian Institute of Technology, Delhi, India)

Intelligent Reflecting Surface Aided High-Speed Train Communications with Relaying: Joint Active and Passive Beamforming Design...1615

Jie Feng and Beixiong Zheng (South China University of Technology, China); Changsheng You (Southern University of Science and Technology, China); Xue Xiong, Jie Tang and Fangjiong Chen (South China University of Technology, China)

Binary Power Control and Passive Beamforming for RIS-Assisted Spectrum Sharing Network...1621

Priyanka Das and Sumukha Kashyap (International Institute of Information Technology Bangalore, India); Rimalapudi Sarvendranath (IIT Guwahati, India); Amrita Mishra (International Institute of Information Technology Bangalore, India)

Max-Min Fairness in STAR-RIS Assisted WPCNs...1627

Guangyu Zhu (Beijing University of Posts and Telecommunications, China); Xidong Mu (Queen Mary University of London, United Kingdom (Great Britain)); Li Guo, Ao Huang and Shibiao Xu (Beijing University of Posts and Telecommunications, China)

Friday, December 8 2:00 - 3:30

WS15-3: Next Generation Networks

Chair: Cedric Westphal (Huawei Innovation Center, USA)

Decomposition Based Interference Management Framework for Local 6G Networks...1633

Samitha Gunarathne, Thushan Sivalingam, Nurul Huda Mahmood, Premanandana Rajatheva and Matti Latva-aho (University of Oulu, Finland)

Federated Learning based Flow Aware AQM for 5G Networks and Beyond...1639

Shreyanshu Agarwal and Vasanth Kanakaraj (Samsung R&D Institute India-Bangalore, India); Sukhdeep Singh (Samsung R&D India - Bangalore, India); Jay Dilipbhai Rathod (Samsung R&D India-Bangalore, India); Issaac Kommineni (Samsung R&D Institute India-Bangalore, India)

Binary MIMO Detection via Extreme Learning Machines in 5G Network and Beyond...1644
    Umair Mujtaba Qureshi (Chinese University of Hong Kong, Hong Kong); Wai-Yiu Keung (The Chinese University of Hong Kong, Hong Kong)

The Band Selection decision for 6GHz using RSSI and Channel Utilization...1650
    Seongsu Choi (Mobile eXperience Business, Samsung Electronics, Republic of Korea, Korea (South)); Madhan Raj Kanagarathinam (Samsung Research Institute India Bangalore, India & Indian Institute of Technology Madras, India); Jayendra Reddy Kovvuri (Samsung R&D Institute, Bangalore, India); Krishna M. Sivalingam (Indian Institute of Technology Madras, India)

Blockchain and Zero-Sum Game-based Energy Trading Scheme for Electric Vehicles...1656
    Riya Kakkar (Institute of Technology, Nirma University, India); Tejal Rathod and Jigna Hathaliya (Nirma University, Ahmedabad, Gujarat, India); Rajesh Gupta and Nilesh Kumar Jadav (Institute of Technology, Nirma University, India); Sudeep Tanwar (Institute of Technology Nirma University Ahmedabad Gujarat, India); Smita Agrawal (Institute of Technology, Nirma University, India); Joel J. P. C. Rodrigues (Senac Fac of Ceará, Brazil & Instituto de Telecomunicações, Portugal)

FogEye: Towards Performance Efficient Fog Networking Telemetry...1662
    Simian Chen (ShenZhen University, China); Dongbiao He (Sangfor Technologies Inc, China); Zhongxing Ming (Guangdong Laboratory of Artificial Intelligence and Digital Economy (SZ), China); Laizhong Cui (Shenzhen University, China)

Friday, December 8 2:00 - 3:30
WS16-3: Channel Coding 3

Room: 406
    Chair: Li Chen (Sun Yat-sen University, China)

Step-GRAND: A Low Latency Universal Soft-input Decoder...1668
    Syed Mohsin Abbas (The Hong Kong University of Science and Technology (HKUST), Hong Kong); Chi-Ying Tsui (Hong Kong University of Science and Technology, Hong Kong); Marwan Jalaleddine and Warren Gross (McGill University, Canada)

Perturbation-enhanced SCL decoder for Polar codes...1674
    Xianbin Wang, Huazi Zhang and Jiajie Tong (Huawei Technologies, Co. Ltd., China); Jun Wang (Huawei Technologies Co. Ltd, China); Jianglei Ma (Huawei, Canada); Wen Tong (Huawei Technologies Canada Co., Ltd., Canada)

Low-Complexity Chase Decoding of Hermitian Codes with Re-encoding Transform and

Fast Factorization...1680

> Jiwei Liang (Sun Yat-Sen University, China); Li Chen (Sun Yat-sen University, China)

A High Flexibility Decoding Structure with High Hardware Utilization Efficiency for QC-LDPC...1686

> Zhenliang Ye, Xiongfei Zhai, Jinhong Mo and Guojun Han (Guangdong University of Technology, China)

Soft-Output Deep Neural Network-Based Decoding...1692

> Dmitry Artemasov, Kirill Andreev, Pavel Rybin and Alexey A. Frolov (Skolkovo Institute of Science and Technology, Russia)

Guessing Random Additive Noise Decoding with Quantized Soft Information...1698

> Peihong Yuan (MIT, USA); Ken R. Duffy (Northeastern University, USA); Evan Gabhart and Muriel Médard (MIT, USA)

Friday, December 8 2:00 - 3:30

WS18-1: Sustainable and Intelligent Green IoT for 6G and Beyond 1

Room: 404

> Chair: Aryan Kaushik (University of Sussex, United Kingdom (Great Britain))

WS18-1.1 *Mission Time Minimization for Multi-UAV-Enabled Wireless Powered Data Collection Systems...1704*

> Guangyu Zhu (Beijing University of Posts and Telecommunications, China); Xidong Mu (Queen Mary University of London, United Kingdom (Great Britain)); Li Guo and Shibiao Xu (Beijing University of Posts and Telecommunications, China)

WS18-1.2 *Resource Optimization for Integrated Terrestrial Non-Terrestrial Networks Involving IRS...1710*

> Wali Ullah Khan, Asad Mahmood and Eva Lagunas (University of Luxembourg, Luxembourg); Muhammad Ali Jamshed (University of Glasgow, Glasgow G12 8QQ, United Kingdom (Great Britain)); Symeon Chatzinotas and Björn Ottersten (University of Luxembourg, Luxembourg)

WS18-1.3 *Active Reconfigurable Intelligent Surface-Assisted Bistatic Backscatter Communications...1716*

> Yanchi Chen, Jun Wang and Ying-Chang Liang (University of Electronic Science and Technology of China, China)

WS18-1.4 *QoS-Aware BPSK Modulation for Sustainable Backscattering in Energy*

Harvesting IoT Systems...1722

> Amus Chee Yuen Goay (The University of New South Wales, Australia); Deepak Mishra (University of New South Wales (UNSW) Sydney, Australia); Aruna Seneviratne (University of New South Wales, Australia)

Friday, December 8 2:00 - 3:30

WS19-1: Native AI in 6G

Room: 405

> Chair: Rongpeng Li (Zhejiang University, China)

Centralized Digital Predistortion in 6G: Distributed Task Offloading and Scheduling for Complexity-Reduced PA Linearization...1728

> Pengyi Jia, Jiazhi Chen and Xianbin Wang (Western University, Canada); Ming Jian and Peyman Neshaastegaran (Huawei Technologies Co. LTD., Canada)

AI-enabled Offloading Decision-Making and Resource Allocation Optimization under Emergency Scenarios...1734

> Mengqian Cheng, Xiaoqin Song and Lei Lei (Nanjing University of Aeronautics and Astronautics, China)

Hybrid Strategy-based AoI-Aware Collaborative Edge Computing Algorithm in Federated Mode...1740

> Changao Ye, Xiaoqin Song, Lijuan Zhang and Wenjing Zhang (Nanjing University of Aeronautics and Astronautics, China)

Energy-Efficient Federated Transfer Learning in 6G Native AI Networks...1746

> Meihui Hua, Tianjiao Chen, Na Li and Zhang Huimin (China Mobile Research Institute, China)

Deep Learning based Modulation Classification in Radio Access Network...1752

> Hongqing Guo and Shengliang Peng (Huaqiao University, China); Tongyun Li and Michael J Crisp (University of Cambridge, United Kingdom (Great Britain)); Richard Penty (Cambridge University, United Kingdom (Great Britain))

Energy-efficient Resource Allocation for 6G Hybrid Network Based on Native AI...1758

> Kuo Cui, Jing Wang, Yitong Liu, Yuehong Gao and Hongwen Yang (Beijing University of Posts and Telecommunications, China); Zhimin He (China Mobile Research Institute, China)

Friday, December 8 2:00 - 3:30

WS20-1: FutureG Experimental Test Platforms for Advanced Systems Implementation and Research

Room: 407

Multi-Cluster Orchestration of 5G Experimental Deployments in Kubernetes over High-Speed Fabric...1764

Ilias Syrigos (University of Thessaly, Greece); Nikos Makris (University of Thessaly & CERTH, Greece); Thanasis Korakis (University of Thessaly, Greece)

i-CORA - a Large-Scale Experimentation Platform for End-to-End 5G Services...1770

Min Xie (Telenor Research & Telenor Group, Norway); Muhammad Faheem Awan, Jane Frances Pajo and Abdelhakim Cherifi (Telenor Research and Innovation, Norway); Eric Lajoie (RedHat, Norway); John Gill (Emblasoft, Norway)

Design and Implementation of Next-generation Research Platforms...1777

Fransiscus Asisi Bimo and Ray-Guang Cheng (National Taiwan University of Science and Technology, Taiwan); Chien-Chao Tseng (National Chiao-Tung University, Taiwan); Cheng-Rong Chiang, Chih-Hsiang Huang and Xiu-Wei Lin (National Taiwan University of Science and Technology, Taiwan)

SLICES Data Management Infrastructure for Reproducible Experimental Research on Digital Technologies...1783

Yuri Demchenko (University of Amsterdam, The Netherlands); Sebastian Gallenmüller (Technical University of Munich, Germany); Serge Fdida (Sorbonne University, France); Panayiotis Andreou (University of Central Lancashire, Cyprus); Damien Saucez (Inria, France); Thijs Rausch (University of Amsterdam, Ukraine)

Multi-RAT enhanced Private Wireless Networks with Intent-Based Network Management Automation...1789

Amin Emami, Hilary Frank, Wenhao He, Anderson Bravalheri, Adrian-Cristian Nicolaescu, Haiyuan Li, Hamid Falaki, Shuangyi Yan, Reza Nejabati and Dimitra Simeonidou (University of Bristol, United Kingdom (Great Britain))

Remote Orchestration of NextG Services Across the Global Internet: An Experimental Study...1795

Shalini Choudhury (Rutgers University, USA); Prasad Netalkar (WINLAB, Rutgers University, USA); Frank Slyne and Diarmuid Collins (Trinity College Dublin, Ireland); Sumaiya Binte Ali and Daniel Kilper (Trinity College Dublin & CONNECT Centre, Ireland); Ivan Seskar (WINLAB, Rutgers University, USA); Dipankar Raychaudhuri (Rutgers University, USA)

Friday, December 8 2:00 - 3:30

WS21-1: Edge-AI-IoT 1

Room: 408

WS21-1.1 *Hierarchical Extended Kalman Filter Cooperative Positioning Algorithm for UAV Swarm...1801*

QingHua Luo (Harbin Institute of Technology at WeiHai & The Hong Kong Polytechnic University, China); Shenghui Li, Xiaozhen Yan and Xinyue Zhou (Harbin Institute of Technology, China)

WS21-1.2 *A Survey on Security and Privacy of Multimodal LLMs - Connected Healthcare Perspective...1807*

Md Abdur Rahman (University of Prince Mugrin, Saudi Arabia)

WS21-1.3 *Efficient Deep Learning Model for Brain Tumor Classification with Explainable AI...N/A*

Ishan Budhiraja (Bennett University, Greater Noida, India); Deepanshi Chaudhary (Bennett University, India); Ruchika Arora (SR University, India)

WS21-1.4 *Cloud RAN Based Privacy Preserving Federated Cross Domain Anomaly Detection in IoT Devices Logs...1820*

Zarka Bashir (Indian Institute of Technology Hyderabad, India); Swaraj Kumar (Samsung R&D Institute, India); Vishal Murgai (Samsung R&D Institute, India-Bangalore, India); Sukhdeep Singh (Samsung R&D India - Bangalore, India)

WS21-1.5 *EAR: An Energy Efficient Human Activity Recognition from Wearable Devices...1826*

Shruti Mishra (IIT Ropar, India); Sujata Pal (Indian Institute of Technology Ropar, India)

WS21-1.6 *HEAL-SDN: Artificial Neural Network-based Secure Data Exchange Framework for SDN Controllers in Healthcare...1832*

Malaram Kumhar (Institute of Technology Nirma University Ahmedabad, India); Jitendra Bhatia (Nirma University, India); Nilesh Kumar Jadav (Institute of Technology, Nirma University, India); Ali Asgar Padaria (Nirma University, India); Rajesh Gupta (Institute of Technology, Nirma University, India); Sudeep Tanwar (Institute of Technology Nirma University Ahmedabad Gujarat, India); Joel J. P. C. Rodrigues (Senac Fac of Ceará, Brazil & Instituto de Telecomunicações, Portugal)

Friday, December 8 2:00 - 3:30

WS22-1: Physical-Layer Schemes for Security and Privacy in Beyond 5G/6G and Internet of Things Networks

(PHYSEC)

Cooperative Jamming for Physical Layer Security Enhancement Using Deep Reinforcement Learning...1838

Sayed Amir Hoseini, Faycal Bouhafs, Neda Aboutorab and Parastoo Sadeghi (University of New South Wales, Australia); Frank den Hartog (University of New South Wales & DoVes Research, Australia)

Grain-128PLE: Generic Physical-Layer Encryption for IoT Networks...1844

Marcus de Ree (Germany); Georgios Mantas (Instituto de Telecomunicações - Pólo de Aveiro, Portugal); Jonathan Rodriguez (Instituto de Telecomunicações, Portugal)

Secure Transmission for MIMO THz Communication System...1850

Shubha Sharma (Nanyang Technological University, Singapore); Jun Siang Ong (Nanyang Technological University Singapore, Singapore); A S Madhukumar (Nanyang Technological University, Singapore)

Secret Key Generation Assisted by Reconfigurable Intelligent Surfaces for Quasi-static Channel...1856

Lijun Yang, Tiancheng Zhu and Zishuo Chen (Nanjing University of Posts and Telecommunications, China); Haitao Lu (ZTE Corporation, China)

Signal Domain Multi-Component Based Secure Hybrid Precoding for mmWave Systems...1862

Heng Dong, Xiaojie Fang and Siyi Li (Harbin Institute of Technology, China); Xuejun Sha (Communication Research Center, Harbin Institute of Technology, China); Zhuoming Li (Harbin Institute of Technology, China)

Quant-Meta: Quantum Key distribution Framework for Telesurgery in Metaverse Environment...1868

Pronaya Bhattacharya (Amity School of Engineering and Technology, Amity University, India); Vishakha K Ralegankar (Nirma University, India); Rajesh Gupta (Institute of Technology, Nirma University, India); Sudeep Tanwar (Institute of Technology Nirma University Ahmedabad Gujarat, India); Joel J. P. C. Rodrigues (Senac Fac of Ceará, Brazil & Instituto de Telecomunicações, Portugal)

Friday, December 8 4:00 - 5:30

WS12-4: RIS-empowered 3CLS, Session 4

Sensing and Positioning

Chair: Omid Taghizadeh (Lenovo (Deutschland) GmbH, Germany)

Fully-Passive versus Semi-Passive IRS-Enabled Sensing: SNR Analysis...1874

 Xianxin Song (The Chinese University of Hong Kong, Shenzhen, China); Xinmin Li
 (Southwest University of Science and Technology, China); Xiaoqi Qin (Beijing
 University of Posts and Telecommunications, China); Jie Xu (The Chinese University of
 Hong Kong (Shenzhen), China)

Full-Duplex Operation of ISAC: Self-Interference Reduction from the Lens of IRS...1880

 Ehsan Tohidi (Fraunhofer HHI, Germany); Ramez Askar (Fraunhofer Institute for
 Telecommunications, Heinrich Hertz Institute, Germany); Zoran Utkovski (Fraunhofer
 HHI, Germany); Slawomir Stanczak (Technische Universität Berlin & Fraunhofer
 Heinrich Hertz Institute, Germany)

CsiNet-Former Network for Bilateral User 3D Localization in STAR-RIS-Assisted MISO
Systems...1886

 Jianzheng Li, Weijiang Wang, Rongkun Jiang and Shihan Huang (Beijing Institute of
 Technology, China)

RIS-assisted Environment Aware Positioning in 6G Wireless Networks...1892

 Atiquzzaman Mondal (Indian Institute of Information Technology Guwahati, India);
 Sudip Biswas (Indian Institute of Information Technology, Guwahati, India)

Enhancing NLoS RIS-Aided Localization with Optimization and Machine Learning...1898

 Rafael A. P. Aguiar (INESC TEC & University of Porto, Portugal); Nuno M. Paulino and
 Luis M. Pessoa (INESC TEC & Faculty of Engineering, University of Porto, Portugal)

Vehicle-Mounted Intelligent Surface for Cooperative Localization in Cellular Networks...1904

 Kaitao Meng (University College London, United Kingdom (Great Britain)); Qingqing
 Wu and Wen Chen (Shanghai Jiao Tong University, China); Deshi Li (Wuhan University,
 China)

Friday, December 8 4:00 - 5:30

WS13-3: Channel Modeing Methodology

Room: 403

 Chair: Jian Li (Huawei Technologies Co., Ltd., China)

DataAI-6G: A System Parameters Configurable Channel Dataset for AI-6G Research...1910

 Zibing Shen and Li Yu (Beijing University of Posts and Telecommunications, China);
 Yuxiang Zhang (Beijing University of Posts & Telecommunications, China); Jianhua
 Zhang (Beijing University of Posts and Telecommunications, China); Zhen Zhang (Inner
 Mongolia University, China); Xidong Hu (Beijing University of Posts and
 Telecommunications, China); Shuangfeng Han (China Mobile, China); Jing Jin (CMRI,

China); Guangyi Liu (China Mobile Research Institute, China)

Transformer-based GAN for Terahertz Spatial-Temporal Channel Modeling and Generating...1916

Zhengdong Hu, Yuanbo Li and Chong Han (Shanghai Jiao Tong University, China)

A Novel Hybrid Fingerprint-Based Indoor Localization Scheme with Hierarchical Training...1922

Fan Yu, Mingqi Guo, Ping Wang, Guangzheng Jing, José Rodríguez-Piñeiro and Xuefeng Yin (Tongji University, China)

A Ray-Launching Algorithm for Polarized Wireless Channel Prediction...1928

Gang Yu and Lingyou Zhou (University of Sheffield, United Kingdom (Great Britain)); Jiliang Zhang (Northeastern University, China); Jie Zhang (University of Sheffield, Dept. of Electronic and Electrical Engineering, United Kingdom (Great Britain))

Complex Permittivity Extraction of Building Materials from Transmission/Reflection Measurements at Sub-THz Band...1934

Yang Wang, Yueyang Liu and Xi Liao (Chongqing University of Posts and Telecommunications, China); Ziming Yu (Huawei Technologies CO., LTD, China); Guangjian Wang (Huawei Technologies Co., Ltd., China); Jie Zhang (University of Sheffield, Dept. of Electronic and Electrical Engineering, United Kingdom (Great Britain))

Performance Analysis of A uRLLC System Based on A Quasi-static GBSM...1940

Yang Ou, Xichen Mao and Jie Huang (Southeast University, China); Cheng-Xiang Wang (Southeast University, China & Purple Mountain Laboratories, China)

Friday, December 8 4:00 - 5:30

WS14-3: Next Generation Multiple Access (NGMA) for Future Wireless Communications 3

Paper Session

Room: 406

Chairs: Xidong Mu (Queen Mary University of London, United Kingdom (Great Britain)), Yixuan Zou (Queen Mary University of London, United Kingdom (Great Britain))

Outage Performance of HARQ-CC-Assisted IRS-NOMA Systems...1946

Bin Dai (Nanjing University of Posts and Telecommunications, China); Xinwei Yue (Beijing Information Science and Technology University (BISTU), China); Zhen Mei (Nanjing University of Science and Technology, China); Francis C.M. Lau (The Hong Kong Polytechnic University, Hong Kong); Yulong Zou (Nanjing University of Posts and

Telecommunications, China); Tian Li (The 54th Research Institute of CETC, China)

BER Analysis for a MIMO-NOMA System Using QPSK Modulation and Linear MMSE Detection...1952

Chin-Liang Wang and Yu-Cheng Ding (National Tsing Hua University, Taiwan)

DMPACT: A Data Detection Solution for NOMA-Based Uplink Cell-Free MIMO Networks...1958

Ti-Yu Chen (National Taiwan University, Taiwan); Chia-Hao Yu (MediaTek, Taiwan); Tzi-Dar Chiueh (National Taiwan University, Taiwan)

RS-Net: Neural Network-enhanced Receivers for MIMO Rate Splitting Multiple Access...1964

Dheeraj Raja Kumar (Centre Tecnològic de Telecomunicacions de Catalunya & Universitat Politecnica de Catalunya, Spain); Carles Antón-Haro (Centre Tecnologic de Telecomunicacions de Catalunya (CTTC), Spain); Xavier Mestre (Centre Tecnològic de Telecomunicacions de Catalunya (CTTC), Spain)

Deep Learning-Based Spectral and Energy Efficiency Optimization for CoMP in HetNets...1970

Donghyeon Kim and Haejoon Jung (Kyung Hee University, Korea (South)); In-Ho Lee (Hankyong National University, Korea (South))

Per-Replica Power Diversity in Grant-Free Multiple Access: Design and Performance Evaluation...1976

Estefania Recayte (German Aerospace Center - DLR, Germany); Federico Clazzer (German Aerospace Center (DLR), Germany)

Friday, December 8 4:00 - 5:30

WS18-2: Sustainable and Intelligent Green IoT for 6G and Beyond 2

Room: 404

Chair: Aryan Kaushik (University of Sussex, United Kingdom (Great Britain))

A panel on NTN IoT and Use Cases for 6G and Beyond

WS18-2.1 *A Comparative Analysis of MU-NOMA IRS- and Relay-Assisted Symbiotic Radio IoT Networks...1982*

Derek Kwaku Pobi Asiedu (IMT-Atlantique, France); Samuel Kwamena Menanor and Prince Anokye (Hanbat National University, Korea (South)); Mustapha Benjillali (INPT, Morocco); Kyoung-Jae Lee (Hanbat National University, Korea (South)); Samir Saoudi (IMT Atlantique, France)

WS18-2.2 *Optimizing Resource Utilization using Vector Databases in Green Internet of*

Things...1988

Dinesh Kumar Sah (Indian Institute of Technology (ISM) Dhanbad, India)

WS18-2.3 *Efficient and Resilient Data Synchronization with Timestamp Compression in IoT Systems...1994*

Pengyi Jia, Yue Wen and Xianbin Wang (Western University, Canada)

WS18-2.4 *Performance Analysis of STAR-RIS Enhanced CoMP-NOMA Multi-Cell Networks...2000*

Muhammad Umer (National University of Sciences and Technology, Pakistan); Muhammad Ahmed Mohsin (National University of Science and Technology, Pakistan); Syed Ali Hassan (National University of Sciences and Technology, Pakistan); Haejoon Jung (Kyung Hee University, Korea (South)); Haris Pervaiz (University of Essex, United Kingdom (Great Britain))

WS18-2.5 *Reconfigurable Intelligent Surfaces Enhanced NOMA D2D Communications Underlaying UAV Networks...2006*

Wali Ullah Khan, Eva Lagunas and Asad Mahmood (University of Luxembourg, Luxembourg); Zain Ali (King Abdullah University of Science and Technology, Saudi Arabia); Symeon Chatzinotas and Björn Ottersten (University of Luxembourg, Luxembourg)

WS18-2.6 *Enhancing Industrial 4.0 Connectivity: A D2D-Based Algorithm for Blind Spot Mitigation in 5G Future Networks Enabled Smart Industry...2012*

Muhammad Farhan Khan (University College Cork, Ireland); Adeel Iqbal (COMSATS University Islamabad, Pakistan); Adnan Rashid (Politecnico di Bari, Italy); Atif Shakeel (COMSATS University Islamabad, Pakistan)

Friday, December 8 4:00 - 5:30

WS19-2: Digital twin and large model in 6G

Room: 405

Chair: Rongpeng Li (Zhejiang University, China)

A Multi-dimensional Resource Cooperative Allocation Scheme Based on Wireless Digital Twin Network...2018

Qingbi Zheng and Guangyu Li (China Mobile Research Institute, China); Yitong Liu, Yuehong Gao, Kuo Cui and Jinyang Liu (Beijing University of Posts and Telecommunications, China)

Multi-Agent Probabilistic Ensembles with Trajectory Sampling for Connected

Autonomous Vehicles...2025

    Ruoqi Wen and Jiahao Huang (Zhejiang University, China); Zhifeng Zhao (Zhejiang Lab, China)

Semi-Federated Learning Based Digital Twin in Large-Scale Heterogeneous Industrial Internet of Things...2031

    Xiaozheng Li and Xiangxue Ma (Shandong Jianzhu University, China); Haixia Zhang and Dongfeng Yuan (Shandong University, China)

Integration of Scaled Real-world Testbeds with Digital Twins for Future AI-enabled 6G Networks...2037

    Cedrik Krieger (TU Dortmund University, Germany); Harun Teper (Technical University of Dortmund, Germany); Julia Freytag (Fraunhofer IML, Germany); Irfan Fachrudin Priyanta (TU Dortmund University & Chair of Material Handlings and Warehousing, Germany); Philipp Schulte (Fraunhofer IML, Germany); Moritz Roidl, Jian-Jia Chen and Christian Wietfeld (TU Dortmund University, Germany)

Optimization of Broadcast Beams in Massive MIMO: Learning from A Digital Twin...2043

    Yuxuan Li, Cheng Zhang and Yongming Huang (Southeast University, China); Qingbi Zheng (China Mobile Research Institute, China)

AI Large Model and 6G Network...2049

    Liexiang Yue and Tianjiao Chen (China Mobile Research Institute, China)

Friday, December 8 4:00 - 5:30

WS20-2: Communication and Computing Integrated Networks

Room: 407

    Chairs: Yongming Huang (Southeast University, China), Nurit Sprecher (Nokia, Israel), Qi Sun (China Mobile Research Institute, China), Yifei Yuan (China Mobile Research Institute, China)

Task-Oriented Offloading and Resource Allocation in Edge Computing with Economic Constraint...2055

    Wenjing Xu, Wei Wang and Qihui Wu (Nanjing University of Aeronautics and Astronautics, China)

Mobility-Aware Dynamic Service Migration in Communication and Computing Integrated VNETs...2061

    Haoran Liu, Ning Jiang, Fengxian Guo and Shi Yan (Beijing University of Posts and Telecommunications, China); Mugen Peng (Beijing University of posts & Telecommunications, China)

Coding Unit Partitions using Depth-wise Separable Convolution in Versatile Video Coding (VVC)...2067

Jyotirmoy Karjee (Samsung, Bangalore, India); Aryan Dubey (Sansung R&D Institute Bangalore, India); Anurag Chaudhary (Samsung R&D Institute, India)

Computing Task Orchestration in Communication and Computing Integrated Mobile Network...2073

Ziqi Chen (China Mobile & China Mobile Research Institute, China); Yi Ren (Johns Hopkins University, USA); Qi Sun (China Mobile Research Institute, China); Nan Li (China Mobile Communications Corporation & China Mobile Research Institute, China); Yantao Han (China Mobile, China); Yuhong Huang (China Mobile Research Institute, China); Hongtao Li (Beijing University of Posts and Telecommunications, China); Chih-Lin I (China Mobile Research Institute, China)

Joint optimization of training job placement and SFC orchestration for ML services in ZTN...2079

Xuening Shang (Beijing Jiao Tong University, China); Deyun Gao and Dong Yang (Beijing Jiaotong University, China); Chuan Heng Foh (University of Surrey, United Kingdom (Great Britain))

A local positioning architecture for communication and computing integrated 5G networks...2085

Xinyi Wang (China Mobile Research Institute, China); GuiYing Wang (CHINA MOBILE, China); Rui Wang, Long Zhang, Jinxia Cheng and Wei Deng (China Mobile Research Institute, China); Yantao Han (China Mobile, China); Xu Zhou (China Mobile Group Chongqing Co., China)

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Mohammad Kohankhaki (INDA, RWTH Aachen University, Germany); Ahmad Ayad (RWTH Aachen University, Germany); Mahdi Mahmoud Barhoush (Kopernikusstraße 16 & RWTH University, Germany); Anke Schmeink (RWTH Aachen University, Germany)

WS21-2.2 *An Explainable AI Framework for Artificial Intelligence of Medical Things...2097*

Al Amin and Kamrul Hasan (Tennessee State University, USA); Salaeh Zein-Sabatto (Ten State U, USA); Deo Chimba (Tennessee State University, USA); Imtiaz Ahmed

(Howard University, USA); Tariqul Islam (Syracuse University, USA)

WS21-2.3 *Context-Aware Hard and Slow Fall Detection...N/A*

Sinda Besrour (University of Moncton, Canada); Gael S. Mubibya (Université de Moncton, Canada); Zikuan Liu and Jalal N Almhana (Universite de Moncton, Canada)

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Saad El Jaouhari (ISEP, France)

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Ibrahim Alrashdi and M M Kamruzzaman (Jouf University, Saudi Arabia); Md Altab Hossin (Chengdu University, China)

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Md Altab Hossin (Chengdu University, China); M M Kamruzzaman, Abdulaziz Marzouq Alsharari, Ayman Almjnoony and Ibrahim Alrashdi (Jouf University, Saudi Arabia)

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Chair: Ang Gao (Northwestern Polytechnical University, China)

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Shaobo Ma and Wei Liang (Northwestern Polytechnical University, China); Boxuan Zhang (Northwestern Polytechnique University, China); Xuan Xue (Xidian University, China); Ang Gao (Northwestern Polytechnical University, China)

Secrecy Performance Analysis for OTFS Modulation Based Downlink LEO Satellite Communication...2135

Zan Li and Junfan Hu (Xidian University, China); Jia Shi (China); Haochen Niu (Xidian University, China)

Uplink Security Analysis of Hybrid RF-FSO Cooperative Satellite-Aerial-Terrestrial