2nd 6G Wireless Summit 2020

17-20 March 2020 | Levi, Finland

Keynote Speakers

Fang Min, ZTE, **Service-Native Challenges toward 6G Network in 2030**

Alain Mourad, Interdigital, **Dissecting Target KPIs Evolution towards 6G**

Roger Nichols. Keysight Technologies, **New Generations of Wireless and Their Impact on Measurement**

Mikael Prytz, Ericsson, **Towards 6G**

Ted Rappaport, NYU Wireless, **Wireless Communication and Applications Above 100 GHz:Opportunities and Challenges for 6G and Beyond**

Harish Viswanathan, Nokia Bell Labs, **Communications in the 6G Era**

Peiying Zhu, Huawei, **6G: The Next Horizon**

Invited Speakers

Behnaam Aazhang, **Can data analytics predict and prevent the onset of seizures in epileptic patients?**

Jesus Alonso-Zarate, CTTC, **Massive Connectivity in 5G and Beyond: Technical Enablers for the Energy and Automotive Verticals**

Slim Alouini, KAUST, **6G: Super-connecting the connected and connecting the unconnected**

Mats Andersson, Forsway, **Forsway Xtend – a Key 5G/6G Technology to Provide Broadband to Rural and Remote Areas**

Bernard Barani, EU, **6G for Europe: Drivers and Motivations**

Qi Bi, China Telecom, **Ten Problems for 6G from the Service Provider's Perspective**

Emil Bjornson, Linköping, **Reconfigurable Intelligent Surfaces: Myths and Realities**

Federico Boccardi, Ofcom, **Beyond 5G/6G : Opportunities for Research and Innovation at the Intersection between Technology and Policy**

Giuseppe Caire, **Efficient Initial Beam Acquisition, Precoding, and Modulation, for Hybrid Digital/Analog mmWave Multiuser MIMO**

Luis Correia, **A View into Mobile Communications in 2030**

Merouane Debbah, Huawei, **The Wireless Road Ahead**

Yansha Deng, KCL, **Learning-based Random Access Control Optimization for Cellular-based Massive IoT**

Aaron Ding, TU Delft, **Lessons on Building Edge AI Solutions towards 6G**

John Farserotu, CSEM, **Smart Wireless Body Area Networks in 6G**

Nicolas Demassieux, Orange, **Why should we do 6G?**

Abhimanyu Gosai, NSF, **Shaping the Ubiquitous, Transparent, and Tactile Wireless Network of the Future**

Heidi Himmanen, Traficom, **Challenges and Opportunities related to Implementation and Trials of 5G for Verticals**

Antti Honkela, UH and Aalto University, **Privacy-preserving Machine Learning and Edge AI**

Josep M. Jornet, Northeastern Uni, **Experimental Demonstration of Ultra-broadband Secure Communications at True Terahertz Frequencies**

Jungsoo Jung, Samsung, **Challenges and Evolution of Next Generation Communications**

Young-Jo Ko, ETRI, **Envisioning 6G from a Technology Perspective**

Marios Kountouris, Eurecom, **Semantic Wireless: a Paradigm Shift in Networked Intelligent Systems**

Harish Krishnaswamy, Columbia University, **Confluence of Electromagnetics, Circuits and Systems Enables the Third Wireless Revolution**

Khaled Letaief, Hongkong University of Science & Technology, **6G: Towards Integrated Intelligence for a Connected World**

Guangyi Liu, China Mobile

Diego Lopez, Telefonica, **Next Steps in the Endless Quest for Network Security**

Pavel Masek, Brno University of Technology, **Unifying Multi-Radio Communication Technologies to Enable mMTC Applications in B5G Networks**

Bho Matthiesen, TU Dresden, **Efficient Global Optimization**

Earl McCune, Eridan, **There is not enough electricity to run 5G – finding the road to 6G**

Takehiro Nakamura, NTTDoCoMo, **5G Evolution and 6G**

Zhisheng Niu, China 6G Expert Group, **China's views on 6G**

Ian Oppermann, **Privacy in a Hyper Connected World – Dealing with Data Sharing**

Ullrich Pfeiffer, University of Wuppertal, **Towards Terahertz/6G Systems-on-a-Chip**

Petar Popovski, Aalborg University, **LEO Small-Satellite Constellations in Post-5G Connectivity**

Mauro Renato Boldi, Telecom Italia, **The Evolution Towards 6G, a European Operator View**

Leena Ruha, University of Oulu, **Novel Machine Learning Approach for Edge Server Placement**

Jyrki Schroderus, Polar, **Challenges of Future Wireless Technologies in Wearable Devices**

Colja Schubert, **ThZ Wireless Communication Systems - Challenges and Applications**

Henning Schulzrinne, Columbia University, **Do We Still Need Wi-Fi in the 6G Era**

Emilio Calvanese Strinati, CEA-Leti, **6G: The next Frontier of Research**

Christoph Studer, Cornell Tech, **Low-Resolution to the Rescue for All-Digital mmWave Massive MIMO**

Rahim Tafazolli, University of Surrey

Sasu Tarkoma, University of Helsinki, **Edge AI: A view from Finland**

Joris Van Driessche, IMEC, **Power-efficient Radio Architectures towards THz Communications**

Geng Wu, Intel**, 6G Network and Air Interface for Mobile Connected Intelligence**

Baiqing Zong, ZTE, **Photonics illuminates 6G**

Invited Papers

Adaptive Detection Probability for mmWave 5G SLAM
Henk Wymeersch (Chalmers University of Technology, Sweden); Gonzalo Seco-Granados (Universitat Autonoma de Barcelona, Spain)

Beyond Age: Urgency of Information for Timeliness Guarantee in Status Update Systems
Xi Zheng, Sheng Zhou and Zhisheng Niu (Tsinghua University, China)

From Learning to Meta-Learning: Reduced Training Overhead and Complexity for Communication Systems
Osvaldo Simeone (King's College London, United Kingdom (Great Britain)); Sangwoo Park (Korea Advanced Institute of Science and Technology, Korea (South)); Joonhyuk Kang (KAIST, Korea (South))

How 6G Technology Can Change the Future Wireless Healthcare
Lorenzo Mucchi (University of Florence, Italy); Sara Jayousi (PIN University of Florence, Italy); Stefano Caputo (University of Florence, Italy); Elisabetta Paoletti and Paolo Zoppi (USL Toscana Centro, Italy); Simona Geli and Pietro Dioniso (MEDEA srl, Italy)

Optimum Resource Allocation in 6G Optical Wireless Communication Systems
Osama Zwaid Alsulami, Amal A. Alahmadi, Sarah Saeed, Sanaa Hamid Mohamed and Taisir El-Gorashi (University of Leeds, United Kingdom (Great Britain)); Mohammed Alresheedi (King Saud University, Saudi Arabia); Jaafar Elmirghani (University of Leeds, United Kingdom (Great Britain))

Regular Papers

5G New Radio Evolution Towards Sub-THz Communications
Oskari Tervo (Nokia Bell Labs, Finland); Toni A Levanen (Tampere University, Finland); Kari Pajukoski (Nokia, Bell-Labs, Finland); Jari Hulkkonen and Pekka J Wainio (Nokia Bell Labs, Finland); Mikko Valkama (Tampere University, Finland)

6G Indicators of Value and Performance
Volker Ziegler (Nokia Bell Labs & CTO, Germany); Seppo Yrjölä (Nokia & University of Oulu, Finland)

6G Network: Towards a Distributed and Autonomous System
Shuo Wang, Tao Sun, Hongwei Yang, Xiaodong Duan and Lu Lu (China Mobile Research Institute, China)

6G subnetworks for Life-Critical Communication
Gilberto Berardinelli (Aalborg University, Denmark); Preben Mogensen (Nokia–Bell Labs, Research Center Aalborg, Sweden); Ramoni O. Adeogun (AAU, Denmark)

A 25 GHz Active Phase Shifter Using 10 bit Cartesian Control
Alok Sethi, Janne P Aikio, Rehman Akbar, Mikko Hietanen, Timo Rahkonen and Aarno Pärssinen (University of Oulu, Finland)

A Chirp-Based Frequency Synchronization Approach for Flat Fading Channels
Ana Belen Martinez and Atul Kumar (Technische Universität Dresden, Germany); Marwa Chafii (ENSEA, France); Gerhard P. Fettweis (Technische Universität Dresden, Germany)

A Cybertwin based Network Architecture for 6G
Quan Yu (Peng Cheng Laboratory, China); Jing Ren (University of Electronic Science and Technology of China, China); Haibo Zhou (Nanjing University, China); Wei Zhang (The University of New South Wales, Australia)

A Deep Reinforcement Learning Framework to Combat Dynamic Blockage in mmWave V2X Networks
Sheng Chen (Tsinghua University, China); Kien Vu (Nokia Networks, Finland); Sheng Zhou and Zhisheng Niu (Tsinghua University, China); Mehdi Bennis (Centre of Wireless Communications, University of Oulu, Finland); Matti Latva-aho (University of Oulu, Finland)

A Differential Dual-band Dual-polarized Antenna for 5G mmWave Communication System
Zeeshan Siddiqui (University of Oulu & Centre for Wireless Communications, Finland); Marko Sonkki, Marko E Leinonen and Jiangcheng Chen (University of Oulu, Finland); Markus Berg (University of Oulu & Excellant LTd., Finland); Aarno Pärssinen (University of Oulu, Finland)

A framework for capability provisioning in B5G
Vilho Räisänen (Nokia Bell Labs, Finland)

An Approximate Expression for the Average AoI in a Multi-Source M/G/1 Queueing Model
Mohammad Moltafet and Markus Leinonen (University of Oulu, Finland); Marian Codreanu (LiU, Sweden)

Antecedents of future 6G mobile ecosystems
Petri Ahokangas (University of Oulu, Finland); Seppo Yrjölä (Nokia & University of Oulu, Finland); Marja Matinmikko-Blue (University of Oulu, Centre for Wireless Communications, Finland); Veikko Seppänen and Timo Koivumäki (University of Oulu, Finland)

Balancing Dynamic Scheduling Overhead to Maximize SDF Performance
Mattis Hasler and Robert Wittig (TU Dresden, Germany); Emil Matus (Dresden University of Technology, Germany); Gerhard P. Fettweis (Technische Universität Dresden, Germany)

Benchmarking Q-Learning Methods for Intelligent Network Orchestration in the Edge
Joel Reijonen, Miljenko Opsenica and Tero Kauppinen (Ericsson, Finland); Miika K.T. Komu (Ericsson Research, Finland); Jimmy Kjällman, Tomas Mecklin, Eero Hiltunen, Jari Arkko and Timo Simanainen (Ericsson, Finland); Mohammed Salem Elmusrati (University of Vasa, Finland)

Beyond 5G Low-Power Wide-Area Networks: A LoRaWAN Suitability Study
Arliones Hoeller, Jr. (University of Oulu, Finland & Federal Institute for Education, Science, and Technology of Santa Catarina, Brazil); Jean Michel S Sant'Ana and Juho Markkula (University of Oulu, Finland); Konstantin Mikhaylov (University of Oulu & Solmu Technologies OY, Finland); Richard Demo Souza (Federal University of Santa Catarina, Brazil); Hirley Alves (University of Oulu, Finland)

Brazil 6G Project - An Approach to Build a National-wise Framework for 6G Networks
José Marcos Brito and Luciano Leonel Mendes (Inatel, Brazil); José Gustavo Gontijo (MCTIC, Brazil)

Cellular and Wi-Fi in Unlicensed Spectrum: Competition leading to Convergence
Sandra Lagen, Natale Patriciello and Lorenza Giupponi (Centre Tecnològic de Telecomunicacions de Catalunya (CTTC), Spain)

Challenges and Technologies for 6G
Gustav Wikström (Ericsson Research, Sweden); Janne Peisa (Oy LM Ericsson Ab, Finland); Patrik Rugeland (Ericsson, Sweden); Nicklas Johansson, Stefan Parkvall, Maksym A. Girnyk, Gunnar Mildh and Icaro da Silva (Ericsson Research, Sweden)

Channel Decoding Based on Complex-valued Convolutional Neural Networks
Lun Li (ZTE Corporation, China)

Characterization of Effects of Door Materials to Integrated Radio Radiation Patterns in Locker Unit
Markku Jokinen (University of Oulu & Centre for Wireless Communications, Finland); Markus Berg (University of Oulu & Excellant LTd., Finland); Heikki Karvonen (University of Oulu, Centre for Wireless Communications, Finland); Marko E Leinonen and Tuomo Hänninen (University of Oulu, Finland); Ari T. Pouttu (Centre for Wireless Communications University of Oulu, Finland)

Characterization of Interconnects on Multilayer High Frequency PCB for D-Band
Vladimir Ermolov and Antti E. I. Lamminen (VTT Technical Research Centre of Finland, Finland); Markku Lahti (VTT Electronics, Finland); David del Río (CEIT and TECNUN, Spain); Jussi Säily (VTT Technical Research Centre of Finland, Finland); Juan F Sevillano (CEIT and TECNUN, Spain)

Coexistence of Orthogonal and Non-orthogonal Multicarrier Signals in Beyond 5G Scenarios
Xinyue Liu, Tongyang Xu and Izzat Darwazeh (University College London, United Kingdom (Great Britain))

CP-DSSS: A Novel Waveform for Multiple Access in IoT
Stephen N Jenkins and Brent Kenney (University of Utah, USA); Arslan J. Majid and Hussein Moradi (Idaho National Laboratory, USA); Behrouz Farhang-Boroujeny (University of Utah, USA)

DDPG-Based Radio Resource Management for User Interactive Mobile Edge Networks
Po-Chen Chen, Yen-Chen Chen, Wei-Hsiang Huang and Chih-Wei Huang (National Central University, Taiwan); Olav Tirkkonen (Aalto University, Finland)

Design of a 20-80 GHz Down-Conversion Mixer for 5G Wireless Communication with 22nm CMOS
Henri Hurskainen (University of Oulu, Finland)

Electromagnetic Measurement Techniques for Materials and Device Used in 6G Wireless Communications
Masahiro Horibe (National Institute of Advanced Industrial Science and Technology & National Metrology Institute of Japan, Japan)

Enhancing Security in 6G Visible Light Communications
Simone Soderi (IMT School for Advanced Studies Lucca, Italy)

Factory Automation: Resource Allocation of an Elevated LiDAR System with URLLC Requirements
Nalin Jayaweera (University of Oulu, Finland); Dileepa Madhubhashana Marasinghe (University of Oulu & Center for Wireless Communications, Finland); Nandana Rajatheva and Matti Latva-aho (University of Oulu, Finland)

Flexible Physical Layer based Resource Allocation for Machine Type Communications Towards 6G
Yalcin Sadi, Serhat Erkucuk and Erdal Panayirci (Kadir Has University, Turkey)

From Connected People, Connected Things, to Connected Intelligence
Yan Chen (Huawei, China); Peiying Zhu (Huawei Technologies, Canada); Gaoning He and Xueqiang Yan (Huawei Technologies, China); Hadi Baligh (Huawei Technologies Canada co. Ltd., Canada); Jianjun Wu (Huawei Technologies Co., Ltd., China)

Grant-Free Access for IoT in Beyond-5G Systems: the Potential of Receiver Diversity
Andrea Munari and Federico Clazzer (German Aerospace Center (DLR), Germany); Osvaldo Simeone (King's College London, United Kingdom (Great Britain)); Zoran Utkovski (Fraunhofer HHI, Germany)

Hierarchical User Clustering for mmWave-NOMA Systems
Dileepa Madhubhashana Marasinghe (University of Oulu & Center for Wireless Communications, Finland); Nalin Jayaweera, Nandana Rajatheva and Matti Latva-aho (University of Oulu, Finland)

High-Efficiency Full-Duplex V2V Communication
Zhifeng Yuan, Yihua Ma, Yuzhou Hu and Weimin Li (ZTE Corporation, China)

Histograms to Quantify Dataset Shift for Spectrum Data Analytics: A SoC Based Device Perspective
Zaheer Khan, Janne Lehtomäki and Chanaka Ashan Ganewattha (University of Oulu, Finland); Shahriar Shahabuddin (Nokia, Finland)

How could 6G Transform Engineering Platforms Towards Ecosystemic Business Models?
Seppo Yrjölä (Nokia & University of Oulu, Finland); Marja Matinmikko-Blue (University of Oulu, Centre for Wireless Communications, Finland); Petri Ahokangas (University of Oulu, Finland)

Hybrid Precoding for 6G Terahertz Communications: Performance Evaluation and Open Problems
Longfei Yan and Chong Han (Shanghai Jiao Tong University, China); Jinhong Yuan (Univ. of New South Wales, Australia)

Identifying Requirements Affecting Latency in a Softwarized Network for Future 5G and Beyond
Idris Badmus (Centre for Wireless Commmunications, University of Oulu, Finland); Abdelquoddouss Laghrissi (Centre for Wireless Communications, University of Oulu, Finland); Marja Matinmikko-Blue (University of Oulu, Centre for Wireless Communications, Finland); Ari T. Pouttu (Centre for Wireless Communications University of Oulu, Finland)

Interoperable GPU Kernels as Latency Improver for MEC
Juuso Haavisto and Jukka Riekki (University of Oulu, Finland)

Mandate-driven Networking Eco-system: A Paradigm Shift in End-to-End Communications
Ingrid Moerman (Ghent University - imec, Belgium); Djamal Zeghlache (Institut Mines-Telecom, Telecom SudParis & UMR 5157 CNRS - Samovar, France); Adnan Shahid (Gent University - imec, Belgium); Joao F. Santos (Trinity College Dublin & CONNECT/CTVR, Ireland); Luiz DaSilva (Trinity College & Trinity College Dublin, Ireland); Klaus David (University of Kassel, Germany); John Farserotu (CSEM, Switzerland); Ad Ridder (Hermes Partnership & Delft University of Technology, The Netherlands); Wei Liu (University Ghent - imec, Belgium); Jeroen Hoebeke (Ghent University - imec, Belgium)

Massive Connectivity in 5G and Beyond: Technical Enablers for the Energy and Automotive Verticals
Charalampos Kalalas (CTTC, Spain); Jesus Alonso-Zarate (Centre Tecnologic de Telecomunicacions de Catalunya - CTTC, Spain)

Nano-Antenna Modelling Based on Plasmonic Charge Distribution for THz-based 6G Applications
Fernando Zanella (National Institute of Telecommunications, Brazil); Hugo R. D. Filgueiras (Instituto Nacional de Telecomunicações - Inatel, Brazil); Guido Valerio (Sorbonne Université, France); César Dartora (Federal University of Paraná - UFPR, Brazil); Andre Mariano (UFPR, Brazil); Arismar Cerqueira S. Jr. (INATEL, Brazil)

Near- to farField EM study for 3x3 dipole lens antenna at 300 GHz with different permittivity lenses
Mikko Kokkonen, Sami Myllymaki and Heli Jantunen (University of Oulu, Finland)

On the use of sub-harmonic mixer in sliding-IF architecture for mm-Wave/THz transceivers
Sumit P Singh, Mostafa Jafari Nokandi, Timo Rahkonen and Aarno Pärssinen (University of Oulu, Finland)

Opportunities and Challenges for Visible Light Communications in 6G
Marcos D Katz and Iqrar Ahmed (University of Oulu, Finland)

Performance and Efficiency Optimization of Multi-layer IoT Edge Architecture
Muneeb Ejaz (Centre for Wireless Communication, University of Oulu, Finland); Tanesh Kumar and Mika E Ylianttila (University of Oulu, Finland); Erkki Harjula (Project Manager, Finland)

Physical-Layer Security in Visible Light Communications
Anil Yesilkaya and Tezcan Cogalan (University of Edinburgh, United Kingdom (Great Britain)); Serhat Erkucuk, Yalcin Sadi and Erdal Panayirci (Kadir Has University, Turkey); Harald Haas (The University of Edinburgh, United Kingdom (Great Britain)); H. Vincent Poor (Princeton University, USA)

Plasmonic Nanoantennas for 6G Intra/Inter-Chip Optical-Wireless Communications
Andreia Aparecida Castro Alves (Federal University of Itajubá, Brazil); Marcello Caldano (Inatel- Instituto Nacional de Telecomunicações, Brazil); J. Siqueira (Inatel, Brazil); Fernando Zanella (National Institute of Telecommunications, Brazil); Jorge Ricardo Mejía-Salazar (Inatel, Brazil); Arismar Cerqueira S. Jr. (INATEL, Brazil)

Power Consumption Analysis for Mobile MmWave and Sub-THz Receivers
Panagiotis Skrimponis (New York University, USA); Sourjya Dutta (New York University & Polytechnic School of Engineering, USA); Marco Mezzavilla (NYU Tandon School of Engineering, USA); Sundeep Rangan (New York University, USA); Seyed Hadi Mirfarshbafan and Christoph Studer (Cornell University, USA); James Buckwalter (University of California - Santa Barbara, USA); Mark J W Rodwell (University of California, Santa Barbara, USA)

Privacy-Aware Blockchain Innovation for 6G: Challenges and Opportunities
Tri Hong Nguyen (Center for Ubiquitous Computing, University of Oulu, Finland); Ngoc Hong Tran (University College Dublin, Ireland); Lauri Lovén and Juha Partala (University of Oulu, Finland); Tahar M Kechadi (University College Dublin, Ireland); Susanna Pirttikangas (University of Oulu, Finland)

Quantized Compressed Sensing via Deep Neural Networks
Markus Leinonen (University of Oulu, Finland); Marian Codreanu (LiU, Sweden)

Reconfigurable Intelligent Surface-Aided Grant-Free Access for Uplink URLLC
Dick Carrillo Melgarejo (Lappeenranta University of Technology, Finland); Charalampos Kalalas (CTTC, Spain); Arthur Sousa de Sena (Lappeenranta University of Technology, Finland); Pedro Henrique Juliano Nardelli (Lappeenranta University of Technology & University of Oulu, Finland); Gustavo Fraidenraich (Unicamp & Communication Department, Brazil)

Relay-Based Blockage and Antenna Misalignment Mitigation in THz Wireless Communications
Giorgos Stratidakis, Evangelos N. Papasotiriou, Haralampos Konstantinis, Alexandros-Apostolos A Boulogeorgos and Angeliki Alexiou (University of Piraeus, Greece)

Secure Joint Communications and Sensing using Chirp Modulation
Saumya Dwivedi and Marco Zoli (Barkhausen Institut gGmbH, Germany); Andre Noll Barreto (Barkhausen Institut gGmbH, Germany & Universidade de Brasilia, Brazil); Padmanava Sen (Research Group Leader, Barkhausen Institut gGmbH, Germany); Gerhard P. Fettweis (Technische Universität Dresden, Germany)

Signal-processing Challenges in Leveraging 100 Gb/s Wireless THz
Pedro Rodriguez-Vazquez (Bergische Uuniversität Wwuppertal, Germany); Marko E Leinonen (University of Oulu, Finland); Janusz Grzyb (University of Wuppertal, Germany); Nuutti Tervo and Aarno Pärssinen (University of Oulu, Finland); Ullrich Pfeiffer (University of Wuppertal, Germany)

Six Key Features of Machine Type Communication in 6G
Nurul Huda Mahmood, Hirley Alves, Onel Luis López and Mohammad Shehab (University of Oulu, Finland); Diana Pamela Moya Osorio (Federal University of São Carlos, Brazil); Matti Latva-aho (University of Oulu, Finland)

Space-Terrestrial Radio Network Integration for IoT
Gilles Charbit (MediaTek Inc, United Kingdom (Great Britain)); Debby Lin (MediaTek Inc., Taiwan); Kader Medles (MediaTek Inc., United Kingdom (Great Britain)); Linda Li (MediaTek Shanghai, China); I-Kang Fu (MediaTek Inc., Taiwan)

Spectrum Challenges for Beyond 5G: The case of Mexico
Lizeth Lopez-Lopez (Universidad Autonoma de San Luis Potosi, Mexico); Marja Matinmikko-Blue (University of Oulu, Centre for Wireless Communications, Finland); Marco Cardenas-Juarez (Autonomous University of San Luis Potosi, Mexico); Enrique Stevens-Navarro (Universidad Autonoma de San Luis Potosi, Mexico); Rafael Aguilar-Gonzalez (Universidad Autónoma Metropolitana - Iztapalapa, Mexico); Marcos Katz (University of Oulu, Finland)

Spectrum Management in the 6G Era: Role of Regulation and Spectrum Sharing
Marja Matinmikko-Blue (University of Oulu, Centre for Wireless Communications, Finland); Seppo Yrjölä (Nokia & University of Oulu, Finland); Petri Ahokangas (University of Oulu, Finland)

Subpacketization-Beamformer Interaction in Multi-Antenna Coded Caching
MohammadJavad Salehi and Antti Tölli (University of Oulu, Finland); Pooya Shariatpanahi (Sharif University of Technology, Iran)

Technology Roadmap for Beyond 5G Wireless Connectivity in D-band
Jean-Baptiste Doré (CEA, France); Didier Belot (CEA-LETI, France); Eric Mercier (CEA LETI, France); Simon Bicaïs (CEA, France); Grégory Gougeon and Yoann Corre (SIRADEL, France); Benoit Miscopein and Dimitri Kténas (CEA, France); Emilio Calvanese Strinati (CEA-LETI, France)

The Role of Blockchain in 6G: Challenges, Opportunities, and Research Directions
Tharaka Mawanane Hewa (University of Oulu, Finland); Gurkan Gur (Zurich University of Applied Sciences (ZHAW) & Bogazici University, Switzerland); Anshuman Kalla (Manipal University Jaipur, India); Mika E Ylianttila (University of Oulu, Finland); An Braeken (Vrije Universiteit Brussel, Belgium); Madhusanka Liyanage (University College Dublin, Ireland & University of Oulu, Finland)

Towards 6G: Evolution of Key Performance Indicators and Technology Trends
Alain Abdel-Majid Mourad (Interdigital Europe Ltd, United Kingdom (Great Britain)); Rui Yang (InterDigital, Inc., USA); Per H. Lehne (Telenor Research, Norway); Antonio de la Oliva (Universidad Carlos III de Madrid, Spain)

Towards Cooperative Data Rate Prediction for Future Mobile and Vehicular 6G Networks
Benjamin Sliwa, Robert Falkenberg and Christian Wietfeld (TU Dortmund University, Germany)

Tri-band Single Chain Radio Receiver for Concurrent Radio
Stephen Henthorn and Timothy O'Farrell (University of Sheffield, United Kingdom (Great Britain)); Sajid Asif (The University of Sheffield, United Kingdom (Great Britain)); Mohammad Reza Anbiyaei (Alzahra University, Iran); Kenneth Lee Ford (University of Sheffield, United Kingdom (Great Britain))

Trust Networking for Beyond 5G and 6G
Raimo Kantola (Aalto University Finland, Finland)

Ultra-Reliable Low-Latency Control Signaling in a Factory Environment
Austin Stevens (University of Utah, USA); Hussein Moradi (Idaho National Laboratory, USA); Behrouz Farhang-Boroujeny (University of Utah, USA)

Unifying Multi-Radio Communication Technologies to Enable mMTC Applications in B5G Networks
Radek Možný (Brno Technical University, Czech Republic); Martin Stusek (Brno University of Technology, Czech Republic); Pavel Masek (Brno University of Technology & Member of WISLAB group, Czech Republic); Konstantin Mikhaylov (University of Oulu & Solmu Technologies OY, Finland); Jiri Hosek (Brno University of Technology, Czech Republic)

Visual Detection-Based Blockage Prediction for Beyond 5G Wireless Systems
Dani Korpi (Nokia Bell Labs, Finland); Perttu Yli-Opas and Mateo Rendón Jaramillo (Aalto University, Finland); Mikko Uusitalo (Nokia Bell Labs, Finland)

Posters

3D Deployment of Multiple UAV Base Stations for Next-Generation Wireless Networks
Sivalingam Thushan and Nandana Rajatheva (University of Oulu, Finland); Kapuruhamy Badalge Shashika Manosha (Centre for Wireless Communications, University of Oulu, Finland); Maheshi Buddhinee Dissanayake (Faculty of Engineering, University of Peradeniya, Sri Lanka & King's College London, United Kingdom (Great Britain)); Matti Latva-aho (University of Oulu, Finland)

6G: Towards Ultra-Low Energy and High Performance Network
Adrian Kliks and Łukasz Kułacz (Poznan University of Technology, Poland)

Admission Control Algorithm for eMBB - URLLC Users Coexistence
Nipuni Ginige (University of Oulu, Finland); Kapuruhamy Badalge Shashika Manosha (Centre for Wireless Communications, University of Oulu, Finland); Nandana Rajatheva and Matti Latva-aho (University of Oulu, Finland)

Arctic vehicular wireless communication testing and development environment
Timo Sukuvaara and Kari Mäenpää (Finnish Meteorological Institute, Finland)

Asymptotic Analysis of MRT Over Double Scattering Channels With MMSE Estimation
Jia Ye (King Abdullah University of Science and Technology, Saudi Arabia); Abla Kammoun (Kaust, Saudi Arabia); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)

Autoencoder based End-to-End Learning of Physical Layer Communications
R. Nuwanthika Sandeepani Rajapaksha, Nandana Rajatheva and Matti Latva-aho (University of Oulu, Finland)

Beam profile characterisation of emitters for terahertz wireless links
Mira Naftaly (National Physical Laboratory, United Kingdom (Great Britain)); Jess Smith (University of Surrey, United Kingdom (Great Britain))

Cavity integrated Terahertz Photonic Topological Insulator for terahertz communication
Abhishek Kumar, Manoj Gupta and Ranjan Singh (Nanyang Technological University, Singapore)

Channel bonding transceivers for 6G future network
Jose Luis Gonzalez Jimenez (Université Grenoble-Alpes/CEA-Leti, France); Cedric Dehos (CEA, France); Nicolas Cassiau (CEA-Leti Minatec Campus, France)

Comparative Analysis of 5G/B5G Enabled Small Cells Deployment in Pakistan
Muhammad Rafay Khan Sial (Superior University, Lahore, Pakistan)

Configured Grant for Semi-Deterministic Traffic for Ultra-Reliable and Low Latency Communications
Bikramjit Singh (Ericsson, Finland); Majid Gerami (Ericsson AB, Sweden)

Cooperative Localization Utilizing Reinforcement Learning for 5G Networks
Ghazaleh Kia and Laura Ruotsalainen (University of Helsinki, Finland)

Crosstalk Cancellation in Structured Light Free Space Optical Communications
Dmitrii Briantcev (King Abdullah University of Science and Technology, KAUST, Saudi Arabia); Abderrahmen Trichili and Boon Ooi (King Abdullah University of Science and Technology, Saudi Arabia); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)

CubeSats for 6G Communication Networks
Nasir Saeed (King Abdullah University of Science and Technology, Saudi Arabia); Ahmed Elzanaty (King Abdullah University of Science and Technology (KAUST), Saudi Arabia); Tareq Y. Al-Naffouri (King Abdullah University of Science and Technology, USA); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)

Dynamic Weight Based Beam Sweeping Algorithm for Initial Access in mmWave 5G
Indika Perera and Nandana Rajatheva (University of Oulu, Finland)

Edge Intelligence for V2X Communications
Adrian Kliks, Pawel Sroka, Pawel Kryszkiewicz and Michal Sybis (Poznan University of Technology, Poland)

Energy-Efficient FG AF Relay Assisted OFDM with Index Modulation
Zhou Jiusi (KAUST, Saudi Arabia); Shuping Dang (King Abdullah University of Science and Technology, Saudi Arabia); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia); Basem Shihada (KAUST, Saudi Arabia)

Exploiting Randomly-located Blockages for Large-Scale Deployment of Intelligent Surfaces
Mustafa A Kishk (King Abdullah University of Science and Technology, Saudi Arabia); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)

From 5G to 6G: Vision, key drivers and research direction
Muhammad Zeeshan Asghar and Khaula Zeeshan (University of Jyvaskyla, Finland); Timo Hämäläinen (University of Jyväskylä, Finland); Pekka Neittaanmäki (University of Jyväskylä, Finland)

Is PHY Research Sick? An Empirical Analysis
Kevin Luo (Kobe University, Japan); Shuping Dang (King Abdullah University of Science and Technology, Saudi Arabia); Basem Shihada (KAUST, Saudi Arabia); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)

Iterative Bayesian-based Localization Mechanism with Mixture Distribution
Henrique Hilleshein (University of Oulu, Finland); Carlos Héracles Morais de Lima (Universirty of Oulu, Finland); Hirley Alves and Matti Latva-aho (University of Oulu, Finland)

Mobile Augmented Reality Enhanced by 5G and Edge Computing
Xiang Su (University of Helsinki & University of Oulu, Finland); Jacky Cao (University of Oulu, Finland); Pan Hui (Hong Kong University of Science and Technology & University of Helsinki, Hong Kong)

Near Optimality of Matched Filter Detection for Cyclic Prefix Direct Sequence Spread Spectrum
Brent Kenney (University of Utah, USA); Arslan J. Majid and Hussein Moradi (Idaho National Laboratory, USA); Behrouz Farhang-Boroujeny (University of Utah, USA)

Non-Terrestrial Communication in the 6G Era
Marco Giordani and Michele Zorzi (University of Padova, Italy)

Optimal 3D Location and Users Association for UAVs-Enabled Networks
Hajar El Hammouti, Doha Hamza Mohamed and Basem Shihada (KAUST, Saudi Arabia); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia); Jeff Shamma (King Abdullah University of Science and Technology (KAUST) & Georgia Institute of Technology, Saudi Arabia)

Optimized Q/V cavity for energy efficient THz modulator
Manoj Gupta, Abhishek Kumar and Ranjan Singh (Nanyang Technological University, Singapore)

Optimum Location of Power Beacons in Massive Wireless Powered Networks
Osmel Martinez Rosabal, Onel Luis López and Hirley Alves (University of Oulu, Finland); Samuel Montejo (Universidad Tecnológica Metropolitana, Chile); Matti Latva-aho (University of Oulu, Finland)

Permutation Channel Modulation
Rahmat Faddli Siregar, Nandana Rajatheva and Matti Latva-aho (University of Oulu, Finland)

Preliminary Results on D Band Penetration Losses
Joonas Kokkoniemi, Juha-Pekka Käräjäoja and Markku Juntti (University of Oulu, Finland)

Prospect Theory for Human-Centric Communications
Kevin Luo (Kobe University, Japan); Shuping Dang (King Abdullah University of Science and Technology, Saudi Arabia); Basem Shihada (KAUST, Saudi Arabia); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)

Provenance-driven Edge Analytics Architecture
Prabhat Ram, Teemu Karvonen, Ella Peltonen, Lauri Lovén and Markku Oivo (University of Oulu, Finland)

Reconfigurable Intelligent Surfaces for Mobile Wireless Localization
Ahmed Elzanaty (King Abdullah University of Science and Technology (KAUST), Saudi Arabia); Anna Guerra (University of Bologna, Italy); Francesco Guidi (CEA LETI, France); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)

RIS vs relay assisted systems: A fair comparison
Jia Ye (King Abdullah University of Science and Technology, Saudi Arabia); Abla Kammoun (Kaust, Saudi Arabia); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)

Seamless Multi-connectivity with User-space Networking Libraries & Control Plane Negotiations
Seppo Hätönen, Ashwin Rao and Sasu Tarkoma (University of Helsinki, Finland)

Spatial Tuning in Terahertz MIMO and RIS Systems
Hadi Sarieddeen and Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia); Tareq Y. Al-Naffouri (King Abdullah University of Science and Technology, USA)

Standardization of Large Intelligent Surfaces for 6G Systems: Opportunities and Challenges
Jose Flordelis (Lund University, Sweden); Erik L Bengtsson (Sony Mobile, Sweden); Kun Zhao (Sony Research Center Lund, Sweden & Aalborg University, Denmark); Olof Zander (Sony Mobile Communications, Sweden); Nafiseh Seyed Mazloum (Sony Research Center Lund, Sweden); Zhinong Ying (Sony Coporation, Sweden); Fredrik Rusek (Lund University, Sweden)

Terahertz Channel Characterization for Vehicular Communications towards 6G
Haofan Yi, Ke Guan, Bo Ai and Danping He (Beijing Jiaotong University, China); Jianwu Dou (ZTE Corporation, China); Zhangdui Zhong (Beijing Jiaotong University, China); Zhengrong Lai (Guangdong Communications and Networks Institute, China)

The Legal Questions for Human and Digital Twin Interactions in the Age of 6G Technology
Basak Ozan Ozparlak (Kadikoy & Ozan&Ozan Law Office, Turkey)

Trust Networking and its Applications in 6G
Maria Riaz, Mandana Ghasemi and Raimo Kantola (Aalto University, Finland); Arkadiusz Biernacki (Silesian University of Technology, Poland)

Ultra-low Latency, Low Energy and Massiveness in the 6G era via CSIT-limited Schemes: a WET Use Case
Onel Luis López, Nurul Huda Mahmood and Hirley Alves (University of Oulu, Finland)

User Association in Millimeter Wave Cellular Networks with Intelligent Reflecting Surfaces
Ehsan MoeenTaghavi, Nandana Rajatheva and Matti Latva-aho (University of Oulu, Finland)

What Should 6G Be?

Shuping Dang (King Abdullah University of Science and Technology, Saudi Arabia); Osama Amin (King Abdullah University of Science and Technology (KAUST), Saudi Arabia); Basem Shihada (KAUST, Saudi Arabia); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)

VLC via Intelligent Reflecting Surfaces: Metasurfaces vs Mirror arrays

Amr Abdelhady and Ahmed Sultan (KAUST, Saudi Arabia); Osama Amin (King Abdullah University of Science and Technology (KAUST), Saudi Arabia); Basem Shihada (KAUST, Saudi Arabia); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)