SAC Symposium: Backhaul and Fronthaul Communications Networks

Co-Chairs

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Scope and Motivation

To cope with the exponential growth of demand on wireless communications, along with improving the spectral efficiency and capacity, mobile operators will need to densify the network with increasing number of base stations, using diverse technology. This densification comes however with new challenges, as a much larger number of radio units needs to be connected to the fixed network infrastructure, including operators' central offices, edge and central clouds. In order to satisfy the quality-of-service requirements for a massive number of devices, there is a need to scale-up the capacity, latency and reliability (which also depend on the functional split adopted by the radio protocol stack), while keeping costs reasonable. Both fibre-based and wireless technologies are currently being considered for providing the best trade-off between cost and performance.

Topics of Interest

This symposium aims to foster research and innovation in the field of backhaul/fronthaul networking and communications, and provides a platform for dissemination of fundamental and applied results. We will address all 5G, 5G Advanced and 6G aspects of the backhaul/fronthaul networks from the academic and industrial perspectives. The call for papers is motivated by the network densification requirements, for which backhaul/fronthaul communication is a true enabler. We invite submissions on the area of fibre based backhaul and fronthaul, including both transmissions systems and architectures, using different RAN functional splits, and focusing both on use of digital and analog radio over fibre techniques. We also invite submissions on solutions where the backhaul and fronthaul is delivered using wireless communications. We encourage researchers to submit recent high-quality findings including the following non-exhaustive list of topics:

- Backhaul/Fronthaul over Passive Optical Networks (PONs)
- Fibre-based architectures and technology for backhaul and fronthaul
- Use of analog radio over fibre (ARoF) for bandwidth efficient transport of wireless signals
- Novel fibre-based optical access architectures for low latency mobile and edge cloud connectivity

- Novel confluent high capacity access architectures for dynamic provisioning of highly heterogeneous mobile networks
- Backhaul/Fronthaul architectures and technologies making use of converged access and metro networks
- Backhaul and fronthaul network using free space optics (FSO) technology
- Integrated access and backhaul (IAB) networks and IAB standardization
- Use of novel wireless technology for backhaul/fronthaul, including MIMO, massive MIMO, beamforming and quantization
- Backhaul/fronthaul design requirements for rural and sparsely populated area and for public safety
- Routing and topology adaptation, transmission protocols in backhaul/fronthaul networks
- Backhaul/fronthaul communication as an enabler for cloud, fog or edge computing
- Meshed communication in backhaul/fronthaul networks
- PHY security and mobility management in backhaul/fronthaul networks
- Green backhaul/fronthaul, and energy consumption models for new backhaul/fronthaul technologies
- Experimentation, testbed findings and performance characterizations of backhaul/fronthaul networks
- Non-terrestrial networks, internet-of-things (IoT) enabled backhaul/fronthaul
- Hybrid backhaul/fronthaul using a mix of fibre-based and wireless technologies
- Resource management in backhaul/fronthaul networks
- Caching in backhaul/fronthaul networks
- Use of AI and machine learning in adaptive fixed and wireless backhaul and fronthaul
- Use of backhaul/fronthaul networks for joint communications and sensing
- Interference management in wireless backhaul/fronthaul networks

Biography of the Chair

Marco Ruffini is full Professor at Trinity College Dublin, Principal Investigator and part of the CONNECT Telecommunications Research centre. He leads the Optical Network and Radio Architecture group at Trinity College Dublin and the new OpenIreland beyond 5G testbed research infrastructure. , which brings next generation technologies like OpenRAN, OpenOptical, edge cloud and intelligent network control to a city-wide testbed. He authored over 200 international publications, 10 patents, contributed to industry standards and secured research funding for over € 14 million.

How to Submit a Paper

All papers for technical symposia should be submitted via EDAS. Full instructions on how to submit papers and important deadlines are posted at https://icc2025.ieee-icc.org/

Journal Publication Opportunity

The authors of selected papers from this symposium will be invited to submit an extended version of their work for fast track and possible publication in the Optica Journal of Optical Communications and Networking, and in the IEEE Open Journal of the Communications Society.