



Sustainable Communications for Renaissance

Call for Papers

Symposium on Selected Areas in Communications: Reconfigurable Intelligent Surfaces and Smart Environments Track

Track Chair

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Scope and Motivation

The 6th generation of wireless networks (6G) will redefine how wireless communications are conceived by means of a brand-new technology that was recently brought to the attention of the wireless research community: Reconfigurable Intelligent Surface (RIS). RISs are able to pose full control on the propagation environment, always seen as an unalterable black-box. RISs are man-made surfaces of electromagnetic material that are electronically controlled with integrated electronics and wireless communication capabilities.

RISs can go beyond the classical Snell's law: they can programmatically change the propagation properties of the impinging signal wave giving birth to the novel concept of Smart Radio Environment (SRE). A smart radio environment is a wireless network where the environment is turned into a smart reconfigurable space that plays an active role in transferring and processing information. Smart radio environments largely extend the notion of software networks: currently, the operation of wireless networks is software-controlled and elastically optimized to support heterogeneous requirements (e.g., enhanced data rate, high energy efficiency, low latency, ultra-reliability, massive connectivity of objects). In smart radio environments, the wireless environment itself is turned into a software-reconfigurable entity, whose operation is optimized to enable uninterrupted connectivity, quality of service guarantee, and where the information is transmitted without necessarily generating new signals but recycling the existing ones whenever possible. Current implementations include conventional reflect arrays, liquid crystal surfaces, and software-defined metasurfaces. In contrast to any other technology currently being used in wireless and to current design principles of wireless networks, RISs can provide the possibility of shaping and fully controlling the electromagnetic response of the environmental objects that are distributed throughout the network.

This newly established SAC aims at leading to the widespread dissemination of innovative and unpublished research contributions on analytical and algorithmic tools, real-life testbed implementations and experimental activities, research perspectives, and to enable the acceleration in the germination of novel ideas pertaining to the understanding and development of RISs for various applications in wireless communications and networks.

Topics of Interest

This track is aimed at reporting the latest and most promising research advances on modeling, analysis, design, and implementation of RIS-based wireless networks and, to envision new research directions in this emerging field of research. Topics of interest include, but are not limited to:

- Communication-theoretic foundation of RIS-based wireless networks
- Fundamental performance limits of RIS-based wireless networks
- Standardized interfaces with existing network architectures (O-RAN, 3GPP, ETSI)
- Algorithms and protocols design/optimization for RIS-based wireless networks
- Physics- and electromagnetic-compliant modeling of RISs
- Experimental results and testbed implementations of RISs
- Software-defined design and implementation of RIS-based wireless networks
- AI-inspired control and orchestration of RIS-based wireless networks
- Smart energy management of RIS-based wireless networks
- Localization for RIS-based wireless networks
- Optimal deployment for RIS-based wireless networks
- Definition of uses cases, application scenarios, and techno-economic analysis
- Novel and advanced applications of RISs with existing wireless technologies (e.g., small cells, M-MIMO, millimeter-wave communications, visible light communications, THz communication, free space optics, Internet of Things, UAV communications, energy harvesting, etc.)

Important Dates

Paper Submission: 11 October 2022

Notification: 18 January 2023

Camera Ready and Registration: 15 February 2023

Important Note

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

How to Submit a Paper

All papers for technical symposium should be submitted via EDAS. Full instructions on how to submit papers are provided on the IEEE ICC 2023 website: <https://icc2023.ieee-icc.org/>