CALL FOR PAPERS AND PROPOSALS

Selected Areas in Communications
Reconfigurable Intelligent Surfaces

Symposium Chair

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Scope and Motivation

With the current deployment of the fifth generation (5G) of communication systems, it is now a critical time to identify enabling technologies for the sixth generation (6G) of communication systems. 6G systems are expected to fulfill more stringent requirements than 5G systems, on transmission capacity, reliability, latency, coverage, energy consumption, and connection density. Existing 5G technologies, such as millimeter-wave communications, massive multi-input multi-output systems, ultra-dense heterogeneous networks, are mainly focused on the system design at the transmitter and receiver sides, and on the deployment of additional network infrastructure with power amplification and digital signal processing capabilities, and backhaul availability. The purpose of currently available 5G technologies is mainly to cope with or to capitalize on often-unfavorable wireless propagation environments. In fact, the wireless environment has been conventionally modeled as an exogenous entity that cannot be controlled but can only be adapted to. According to this design paradigm, communication engineers usually design transmitters, receivers, and transmission protocols based on the specific properties of the wireless channels and for achieving desired and target performance.

Recently, **reconfigurable intelligent surfaces (RISs)** have emerged as a promising technology for their capability of customizing the wireless propagation environment through nearly passive signal transformations. An RIS is a planar structure that is engineered to have properties that enable the dynamic control of the electromagnetic waves, through, e.g., signal reflections, refractions, focusing, collimation, and their combination. In wireless communications, RISs are intended to realize so-called **programmable and reconfigurable wireless propagation environments**, i.e., wireless environments that are not viewed and treated as random uncontrollable entities but become part of the network design parameters that are subject to optimization for supporting diverse performance metrics and quality of service needs to fulfill the stringent requirements of 6G networks. Recent applications of RISs in wireless communications include their user as nearly passive relay-type surfaces, signal-RF multi-stream multi-antenna transmitters, and reconfigurable ambient backscatters.

This newly established track is aimed to lead to the widespread dissemination of innovative and unpublished research contributions on analytical and algorithmic tools, 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 aims to foster research and innovation surrounding the modeling, analysis, design, and development of RISs. The track welcomes original, previously unpublished, research works pertaining to the theoretical and practical aspects of RISs. Topics of interest include, but are not limited to:

- Communication-theoretic foundation
- Fundamental performance limits
- Optimization and resource allocation
- Signal processing and channel estimation
- Physics- and electromagnetic-consistent modeling and optimization
- Algorithms and protocols design and optimization
- Software-defined design and implementation
- AI-inspired optimization, resource allocation, and orchestration
- Integration of communication, sensing, radar, and localization
- Channel modeling and ray tracing
- System-level modeling and simulations
- Experimental measurements and testbed implementations
- Definition of uses cases and application scenarios
- Application to and integration with other wireless technologies (e.g., small cells, Massive MIMO, millimeter-wave communications, visible light communications, THz communications, IoT, UAV-aided communications, energy harvesting and wireless power transfer, etc.)

Important Dates

Paper Submission: 15 April 2022

Notification: 25 July 2022

Camera Ready and Registration: 1 September 2022

How to Submit a Paper

All papers for technical symposia need to be submitted via EDAS. Full instructions on how to submit papers are provided on the 2022 IEEE GLOBECOM website: https://globecom2022.ieee-globecom.org/.