

Special Issue on Reconfigurable Intelligent Surface for B5G & 6G

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Reconfigurable intelligent surface (RIS) or intelligent reflecting surface (IRS) is recently recognized as one of the most promising technologies to effectively increase coverage and improve communication performance for future wireless communications beyond 5G and 6G (B5G & 6G). Specifically, the RIS is a planar surface consisting of an array of passive reflecting elements, each of which can independently induce a controllable reflection coefficient on the incident signal. By installing an RIS on the facade of buildings, an additional virtual line of sight (LoS) link can be established between the base station (BS) and the user. By judiciously adjusting the phase shifts of the reflecting elements, the reflected signal can be constructively superimposed with the signal from the direct path to enhance the desired signal power or destructively mitigate unfavourable signals such as multi-user interference or signal leakage to eavesdroppers. The RIS is less expensive to deploy than conventional active transmitters since its reflecting elements only passively reflect the incoming signal without any signal processing operations and does not require costly and power-hungry radio frequency (RF) chains. Moreover, it is lightweight and has limited layer thickness, so it can be easily integrated into the environment. Despite the above-mentioned appealing advantages of RIS, it also brings some new signal processing challenges such as channel estimation, robust transmission design, angle/position estimation, distributed algorithm design, etc.

This special issue of JCN presents three high quality research articles related to the area of Reconfigurable Intelligent Surface for B5G & 6G. In the following we want to introduce the three papers included in this Special Section.

The first paper “*Energy Minimization for UAV Communication Systems Assisted With Multiple IRSs*”, coauthored by Hyesang Cho and Junil Choi, several techniques to minimize the UAV energy consumption in a general multiple IRS multiple UE scenario are proposed. A tight bound for the ergodic achievable rate with multiple IRSs is derived, which was used to generate tractable optimization problem. Also, a low complexity algorithm that mimics the behavior of the IRS matching case is proposed, e. g. The second paper “*Secure Wireless Communications in The Multi-user MISO Interference Channel Assisted by Multiple Reconfigurable Intelligent Surfaces*”, coauthored by Ya Liu *et. al*, an alternating optimization approach is employed to address the non-convexity the minimum secrecy rate maximization problem. The convergence of the proposed iterative optimization algorithm is proved. The third paper “*Generalized Superimposed Training for RIS-aided Cell-free Massive MIMO-OFDM Networks*”, coauthored by Hanxiao Ge *et. al*, a generalized superimposed training is proposed for an uplink cell-free multiple-input multipleoutput orthogonal frequency-division multiplexing system, which is aided by reconfigurable intelligent surfaces to enhance the spectral efficiency in the system.

The Guest Editors want to express their thanks to all authors who submitted manuscripts to this Special Section, as well as all the reviewers for their competent and timely reviews. Our thank goes to the Journal of Communications Networks for the opportunity to establish this Special Section and to Eunhye Kim for her support and guidance during the whole editorial process.



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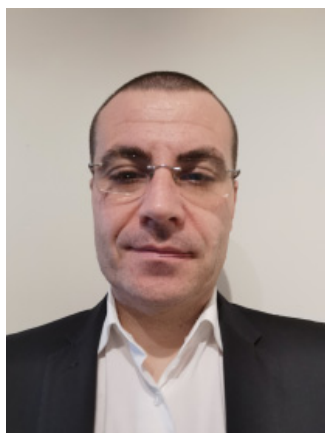
low latency communication (URLLC), machine learning, UAV, Internet of Things, and mobile edge computing. He has published over 120 IEEE journal papers. He is currently an Editor of IEEE Transactions on Vehicular Technology, IEEE Wireless Communication Letters, IEEE Communications Letters and IEEE ACCESS. He serves as the guest editor for IEEE Journal on Selected Areas in Communications on the special issue on xURLLC in 6G: Next Generation Ultra-Reliable and Low-Latency Communications. He also serves as a leading guest editor of IEEE Journal of Selected Topics in Signal Processing (JSTSP) Special Issue on Advanced Signal Processing for Reconfigurable Intelligent Surface-aided 6G Networks, leading guest editor of IEEE Vehicular Technology Magazine on the special issue on Backscatter and Reconfigurable Intelligent Surface Empowered Wireless Communications in 6G, leading guest editor of IEEE Open Journal of Vehicular Technology on the special issue of Reconfigurable Intelligent Surface Empowered Wireless Communications in 6G and Beyond, and leading guest editor of IEEE ACCESS Special Issue on Reconfigurable Intelligent Surface Aided Communications for 6G and Beyond. He is Workshop organizer in IEEE ICC 2021 on the topic of Reconfigurable Intelligent Surfaces for

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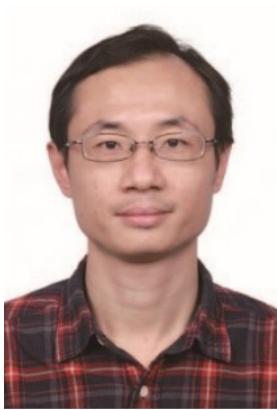


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