Intelligent and Converged Networks

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Special Issue on Reconfigurable Intelligent Surface Aided Wireless Communications

Reconfigurable Intelligent Surface (RIS), also known as intelligent reflecting surface or large intelligent surface, is an emerging new physical-layer technology in the field of wireless communications. The basic idea of RIS is to deploy a reconfigurable passive array in the environment to manipulate the propagation of electron-magnetic (EM) waves. RIS promises a new design paradigm for wireless communications, where the wireless propagation environment can be dynamically controlled, which is substantially different from the conventional design that focuses only on the transmitter and receiver. RIS is expected to solve the blockage problem, increase the channel capacity, promote the wireless coverage, and improve the energy efficiency for the future communication systems. Thus, it is regarded as a promising potential technology to realize the future intelligent communications from the physical layer.

For RIS-aided wireless communications, some of the current methodologies in conventional communication systems need to be revised, and some novel solutions are required to realize the potential benefits of the RIS. Although the number of publications about RIS has recently sharply increased, there are still many challenging issues to be extensively investigated, such as the RIS channel modelling, fundamental performance limits, the system design, joint optimization of the RIS and the transceivers, channel state information acquisition, and interdisciplinary applications. The goal of this special issue is to attract high-quality papers of original research on RIS-aided wireless communications.

Potential topics include, but are not limited to, the following:
- RIS channel measurement and modelling
- RIS channel capacity and performance limits
- System and hardware architecture of RIS
- RIS-aided cell-free network
- Joint precoding of the RIS and the transceivers
- RIS channel estimation and channel feedback
- Indoor channel characterization
- Ambient backscatter communication
- Low-complexity signal processing tools for RIS
- Multiple access for RIS
- Resource allocation for RIS
- Interplay between AI and RIS
- RIS Prototyping and experimental results
- Interdisciplinary study between RIS and security, positioning, VLC, NOMA, etc.

Important Dates:
- Manuscript submission deadline: 15-Oct-2021
- Notification of reviews: 31-Dec-2021
- Submission of final revised paper: 31-Jan-2022
- Notification of acceptance: 31-Mar-2022
- Publications (Tentative): 30-Apr-2022

Submission Guidelines:

Accepted papers will be published in the IEEE *Xplore* Digital Library as open access. No page charges will be requested for publications. No page limitations are set for paper submissions and publications.

Paper submission link: https://mc03.manuscriptcentral.com/icnjournal. The manuscript type should be selected as "Special Issue on Reconfigurable Intelligent Surface Aided Wireless Communications".

Submission templates in LaTeX and Word available at:
http://icn.tsinghuajournals.com/EN/column/column8081.shtml.

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Guest Editors' short CVs

Linglong Dai received the B.S. degree from Zhejiang University, Hangzhou, China, in 2003, the M.S. degree (with the highest honor) from the China Academy of Telecommunications Technology, Beijing, China, in 2006, and the Ph.D. degree (with the highest honor) from Tsinghua University, Beijing, China, in 2011. From 2011 to 2013, he was a Postdoctoral Research Fellow with the Department of Electronic Engineering, Tsinghua University, where he was an Assistant Professor from 2013 to 2016 and has been an Associate Professor since 2016. His current research interests include massive MIMO, reconfigurable intelligent surface (RIS), millimeter-wave communications, THz communications, and machine learning for wireless communications. He has coauthored the book "MmWave Massive MIMO: A Paradigm for 5G" (Academic Press, 2016). He has authored or coauthored over 60 IEEE journal papers and over 40 IEEE conference papers. He also holds 19 granted patents. He was listed as a Highly Cited Researcher by Clarivate in 2020. He has received five IEEE Best Paper Awards at the IEEE ICC 2013, the IEEE ICC 2014, the IEEE ICC 2017, the IEEE VTC 2017-Fall, and the IEEE ICC 2018. He has also received the Tsinghua University Outstanding Ph.D. Graduate Award in 2011, the Beijing Excellent Doctoral Dissertation Award in 2012, the China National Excellent Doctoral Dissertation Nomination Award in 2013, the URSI Young Scientist Award in 2014, the IEEE Transactions on Broadcasting Best Paper Award in 2015, the Electronics Letters Best Paper Award in 2016, the National Natural Science Foundation of China for Outstanding Young Scholars in 2017, the IEEE ComSoc Asia-Pacific Outstanding Young Researcher Award in 2017, the IEEE ComSoc Asia-Pacific Outstanding Paper Award in 2018, the China Communications Best Paper Award in 2019, and the IEEE Communications Society Leonard G. Abraham Prize in 2020. He is an Area Editor of IEEE Communications Letters, and an Editor of IEEE Transactions on Communications and IEEE Transactions on Vehicular Technology. Particularly, he is dedicated to reproducible research and has made a large amount of simulation code publicly available.

Chan-Byoung Chae received the Ph.D. degree in ECE from The University of Texas at Austin in 2008. He was a Research Engineer with the Telecommunications R&D Center, Samsung Electronics, Suwon, South Korea, from 2001 to 2005. He was with Harvard University, Cambridge, MA, USA, from 2008 to 2009, as a Post-Doctoral Research Fellow, and Bell Labs, Alcatel-Lucent, Murray Hill, NJ, USA from 2009 to 2011, as a Member of Technical Staff. He was a member of the Wireless Networking and Communications Group (WNCG), The University of Texas at Austin. He is currently an Underwood Distinguished Professor with the School of Integrated Technology, Yonsei University, South Korea. He was a recipient/co-recipient of the Young Engineer Award from the IEEE VTS Daniel E. Noble Fellowship Award in 2008, the IEEE ComSoc AP Outstanding Young Researcher Award in 2012, the KICS Haedong Young Scholar Award in 2013, the IEEE Signal Processing Magazine Best Paper Award in 2013, the IEIE/IEEE Joint Award for Young IT Engineer of the Year in 2014, the IEEE INFOCOM Best Demo Award in 2015, the Yonam Research Award from LG Yonam Foundation in 2016, the Award of Excellence in Leadership of 100 Leading Core Technologies for Korea 2025 from the NAEK in 2017, the National Academy of Engineering of Korea (NAEK) in 2019, the IEEE DySPAN Best Demo Award in 2018, and the IEEE/KICS Journal of Communications and Networks Best Paper Award in 2018. He has been serving as an Editor for

IEEE Communications Magazine since 2016, IEEE Transactions on Wireless Communications since 2012, IEEE Transactions on Molecular, Biological, and Multi-Scale Communications since 2015, IEEE Wireless Communications Letters since 2016, and IEEE/KICS Journal of Communications and Networks since 2012. He is currently an Editor-in-Chief of IEEE Transactions on Molecular, Biological, and Multi-Scale Communications and a Senior Editor of IEEE Wireless Communications Letters. He is an IEEE Fellow since 2021.

Shi Jin received the B.S. degree in communications engineering from Guilin University of Electronic Technology, Guilin, China, in 1996, the M.S. degree from Nanjing University of Posts and Telecommunications, Nanjing, China, in 2003, and the Ph.D. degree in information and communications engineering from the Southeast University, Nanjing, in 2007. From June 2007 to October 2009, he was a Research Fellow with the Adastral Park Research Campus, University College London, London, U.K. He is currently with the faculty of the National Mobile Communications Research Laboratory, Southeast University. His research interests include space time wireless communications, random matrix theory, and information theory. He served as an Associate Editor for the IEEE Transactions on Wireless Communications, and IEEE Communications Letters, and IET Communications. Dr. Jin and his co-authors have been awarded the 2011 IEEE Communications Society Stephen O. Rice Prize Paper Award in the field of communication theory and a 2010 Young Author Best Paper Award by the IEEE Signal Processing Society.

Marco Di Renzo received the Laurea (cum laude) and Ph.D. degrees in electrical engineering from the University of L'Aquila, Italy, in 2003 and 2007, respectively, and the Habilitation à Diriger des Recherches (Doctor of Science) degree from University Paris-Sud, France, in 2013. Since 2010, he has been with the French National Center for Scientific Research (CNRS), where he is a CNRS Research Director (CNRS Professor) in the Laboratory of Signals and Systems (L2S) of Paris-Saclay University – CNRS and CentraleSupelec, Paris, France. In ParisSaclay University, he serves as the Coordinator of the Communications and Networks Research Area of the Laboratory of Excellence DigiCosme, and as a member of the Admission and Evaluation Committee of the Ph.D. School on Information and Communication Technologies. Currently, he serves as the Editor-in-Chief of IEEE Communications Letters, and is a Distinguished Lecturer of the IEEE Vehicular Technology Society and IEEE Communications Society. Also, he serves as the Founding Chair of the Special Interest Group on Reconfigurable Intelligent Surfaces of the Wireless Technical Committee of the IEEE Communications Society, and is the Founding Lead Editor of the IEEE Communications Society Best Readings in Reconfigurable Intelligent Surfaces. He is a Highly Cited Researcher (Clarivate Analytics, Web of Science), a World's Top 2% Scientist from Stanford University, a Fellow of the IEEE, and a Fellow of the IET. He has received several individual distinctions and research awards, which include the IEEE Communications Society Best Young Researcher Award for Europe, Middle East and Africa, the Royal Academy of Engineering Distinguished Visiting Fellowship, the IEEE Jack Neubauer Memorial Best System Paper Award, the IEEE Communications Society Young Professional in Academia Award, the SEE-IEEE Alain Glavieux Award, and a 2019 IEEE ICC Best Paper Award. In 2019, he was a recipient of a Nokia Foundation Visiting Professorship for conducting research on metamaterial-assisted wireless at Aalto University, Finland. He is an IEEE Fellow since 2020.

Rui Zhang received the B.Eng. (first-class Hons.) and M.Eng. degrees from the National University of Singapore, Singapore, and the Ph.D. degree from the Stanford University, Stanford, CA, USA, all in electrical engineering. From 2007 to 2010, he worked at the Institute for Infocomm Research, ASTAR, Singapore. Since 2010, he has been working with the National University of Singapore, where he is now a Professor in the Department of Electrical and Computer Engineering. He has published over 200 journal papers and over 180 conference papers. He has been listed as a Highly Cited Researcher by Thomson Reuters/Clarivate Analytics since 2015. His current research interests include UAV/satellite communications, wireless power transfer, reconfigurable MIMO, and optimization methods. He was the recipient of the 6th IEEE Communications Society Asia-Pacific Region Best Young Researcher Award in 2011, the Young Researcher Award of National University of Singapore in 2015, and the Wireless Communications Technical Committee Recognition Award in 2020. He was the co-recipient of the IEEE Marconi Prize Paper Award in Wireless Communications in 2015 and 2020, the IEEE Communications Society Asia-Pacific Region Best Paper Award in 2016, the IEEE Signal Processing Society Best Paper Award in 2016, the IEEE Communications Society Heinrich Hertz Prize Paper Award in 2017 and 2020, the IEEE Signal Processing Society Donald G. Fink Overview Paper Award in 2017, and the IEEE Technical Committee on Green Communications & Computing (TCGCC) Best Journal Paper Award in 2017. His co-authored paper received the IEEE Signal Processing Society Young Author Best Paper Award in 2017. He served for over 30 international conferences as the TPC co-chair or an organizing committee member, and as the guest editor for 3 special issues in the IEEE Journal of Selected Topics in Signal Processing and the IEEE Journal on Selected Areas in Communications. He was an elected member of the IEEE Signal Processing Society SPCOM Technical Committee from 2012 to 2017 and SAM Technical Committee from 2013 to 2015, and served as the Vice Chair of the IEEE Communications Society Asia-Pacific Board Technical Affairs Committee from 2014 to 2015. He served as an Editor for the IEEE Transactions on Wireless Communications from 2012 to 2016, the IEEE Journal on Selected Areas in Communications: Green Communications and Networking Series from 2015 to 2016, the IEEE Transactions on Signal Processing from 2013 to 2017, and the IEEE Transactions on Green Communications and Networking from 2016 to 2020. He is now an Editor for the IEEE Transactions on Communications. He serves as a member of the Steering Committee of the IEEE Wireless Communications Letters. He is a Distinguished Lecturer of IEEE Signal Processing Society and IEEE Communications Society. He is an IEEE Fellow since 2017.