Organizer Information

Organizers:
Name and affiliation 1: Jun Fang (JunFang@uestc.edu.cn), University of Electronic Science and Technology of China
Name and affiliation 2: Hongbin Li (hli@stevens.edu), Stevens Institute of Technology

Session Information

Tentative title: Signal Processing for IRS-Assisted Millimeter Wave Communications

Summary and rationale of proposed special session: Millimeter Wave (mmWave) is considered as a key technology for 5G-and-beyond mobile cellular networks. It has the potential to offer gigabits-per-second communication data rates by exploiting the large bandwidth available at mmWave frequencies. However, the vulnerability of mmWave signals to even small obstacles can cause severe performance degradation and even result in link outage, thus presenting a major challenge for the deployment of mmWave systems. Recently, intelligent reflecting surface (IRS), also referred to as reconfigurable intelligent surface (RIS), has been innovatively introduced to assist mmWave communications. While IRS has the potential to address the blockage issue and substantially improve the spectral efficiency, it also makes channel estimation and beamforming for IRS-assisted mmWave systems much more challenging. Also, IRS-assisted mmWave systems provides a promising opportunity for co-design of sensing and communication functionalities, which has a number of applications including vehicular networks, indoor positioning, etc.. This special session seeks new signal processing contributions to address these challenges of future IRS-assisted mmWave systems.

Description of the research area: Research area of this special session focuses on signal processing for IRS-assisted mmWave communications.

Special, unique or distinctive features of the Special Session: This special session has two distinctive features. On one hand, it will foster synergies to address some fundamental and urgent challenges in IRS-assisted mmWave communications by exploiting recent advances in deep learning and sparse signal processing. On the other hand, it will help advance integrated sensing and communication (ISAC) theories and algorithms by exploiting the promising characteristics in IRS-assisted mmWave systems.
Invited Paper Information

Invited authors #1: Boyu Teng, Xiaojun Yuan, Rui Wang, Shi Jin
Tentative Paper Title #1: Bayesian user tracking for RIS aided mmWave MIMO systems

Invited authors #2: Zijian Chen, Ming-Min Zhao, Kaidi Xu, Yunlong Cai, Min-Jian Zhao
Tentative Paper Title #2: Beamforming design for intelligent reflecting surface aided full-duplex relay systems

Invited authors #3: Peilan Wang, Zhouran Wu, Jun Fang, Hongbin Li
Tentative Paper Title #3: Two-Timescale Beamforming for IRS-assisted MmWave systems: A Deep Unrolling-Based Stochastic Optimization Approach

Invited authors #4: Sucheol Kim, Hyeongtaek Lee, Jihoon Cha, and Junil Choi
Tentative Paper Title #4: Channel estimation for intelligent reflecting surface assisted mmWave systems using analog feedback

Invited authors #5: Zhen Chen, Jie Tang, Xiaoyu Du, Xiu Yin Zhang, Qingqing Wu, Kai-Kit Wong
Tentative Paper Title #5: Joint location and channel error optimization for multi-RIS assisted MIMI systems

Invited authors #6: André L. F. de Almeida (to be determined)
Tentative Paper Title #6:

Biography of organizers in IEEE format

{Jun Fang}(SM'19) received the B.S. and M.S. degrees from the Xidian University, Xi'an, China in 1998 and 2001, respectively, and the Ph.D. degree from the National University of Singapore, Singapore, in 2006, all in electrical engineering.

During 2006, he was a postdoctoral research associate in the Department of Electrical and Computer Engineering, Duke University. From January 2007 to December 2010, he was a research associate with the Department of Electrical and Computer Engineering, Stevens Institute of Technology. Since 2011, he has been with the University of Electronic of Science and Technology of China. His research interests include compressed sensing and sparse theory, massive MIMO/mmWave communications, and statistical inference.

Dr. Fang was the recipient of the IEEE Jack Neubauer Memorial Award in 2013 for the best systems paper published in the IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY. He served as an Associate Technical Editor for IEEE COMMUNICATIONS MAGAZINE from 2012 to 2020. He is currently a Member of the IEEE SPS Sensor Array and Multichannel TC, and a Senior Associate Editor for IEEE SIGNAL PROCESSING LETTERS.

{Hongbin Li}(M'99-SM'08-F'19) received the B.S.~and M.S.~degrees from the University of Electronic Science and Technology of China, in 1991 and 1994, respectively, and the Ph.D. degree from the University of Florida, Gainesville, FL, in 1999, all in electrical engineering.
From July 1996 to May 1999, he was a Research Assistant in the Department of Electrical and Computer Engineering at the University of Florida. Since July 1999, he has been with the Department of Electrical and Computer Engineering, Stevens Institute of Technology, Hoboken, NJ, where he became a Professor in 2010. He was a Summer Visiting Faculty Member at the Air Force Research Laboratory in the summers of 2003, 2004 and 2009. His general research interests include statistical signal processing, wireless communications, and radars.

Dr. Li received the IEEE Jack Neubauer Memorial Award in 2013 from the IEEE Vehicular Technology Society, Outstanding Paper Award from the IEEE AFICON Conference in 2011, Provost's Award for Research Excellence in 2019, Harvey N. Davis Teaching Award in 2003, and Jess H. Davis Memorial Research Award in 2001 from Stevens Institute of Technology, and Sigma Xi Graduate Research Award from the University of Florida in 1999. He has been a member of the IEEE SPS Signal Processing Theory and Methods Technical Committee (TC) and the IEEE SPS Sensor Array and Multichannel TC, an Associate Editor for Signal Processing} (Elsevier), IEEE Transactions on Signal Processing, IEEE Signal Processing Letters, and IEEE Transactions on Wireless Communications, as well as a Guest Editor for IEEE Journal of Selected Topics in Signal Processing and EURASIP Journal on Applied Signal Processing. He has been involved in various conference organization activities, including serving as a General Co-Chair for the 7th IEEE Sensor Array and Multichannel Signal Processing (SAM) Workshop, Hoboken, NJ, June 17-20, 2012. Dr.-Li is a member of Tau Beta Pi and Phi Kappa Phi.