

MISSION CRITICAL COMMUNICATIONS, TASK-ORIENTED COMMUNICATIONS, AI-DRIVEN SENSING, AND THE 12 GHz BAND

In contrast to my previous practice, I would like to begin by highlighting the Industrial Perspectives column. Recent train accidents have underscored the critical importance of safety in the rail industry. To address this, it is timely to introduce a dedicated industry column focusing on the current state and planned evolution of the rail sector, while emphasizing the role of communication and computing technologies in ensuring accident-free operations. This column delves into the status of train automation and train control systems. It also underscores the need for future-proof communication systems, such as the Future Railway Mobile Communication System (FRMCS), and explores the potential of 5G technology in enhancing rail operations and safety.

With an overwhelming number of submissions for the two special topics, “Task-Oriented Communications for Future Wireless Networks” and “AI-Driven Theory, Technology, and Application for Sensing, Interaction, and Digitalization in the 6G Era,” we are delighted to present twenty-three high-quality articles on these topics in the June issue. However, we regret that we do not have sufficient space to accommodate open call articles this time.

The first special issue topic delves into task-oriented communications for future wireless systems, emphasizing the imperative to support diverse quality-of-experience systems for emerging applications. The articles cover various aspects, including semantic communication systems, security challenges in the Semantic Internet of Things (SIoT), privacy protection, deep learning, resource allocation, and 6G communications. It also explores multi-agent systems and reconfigurable intelligent computational surfaces. Overall, it underscores the significance of task-oriented communication, presents novel frameworks and solutions, and identifies promising research opportunities in this domain.

The second special topic explores AI-driven theories, technologies, and applications for sensing, interaction, and digitalization in the context of 6G. The selected articles cover a wide range of topics, including mobile vision analytics, URLLC



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multi-tier computing, AI-enabled Next Generation Networks (NGNs), cyber digital twin-based computing, trusted and explainable AI, intelligent planning for smart factories, proactive content caching, cross-view human intention recognition, resource provisioning for immersive services, and visual end-edge-cloud architecture for low-carbon smart cities.

In Spectrum Policy and Regulatory Issues, we share the news that the U.S. Federal Communication Commission (FCC) has adopted new rules for the 12.2 – 13.25 GHz band, allowing the next generation of terrestrial mobile wireless systems to operate in part of the band. The FCC is seeking input on sharing options for the remaining portion of the band and exploring the feasibility of repacking incumbents and

to enable increased terrestrial mobile broadband use.

We hope you find these articles engaging and encourage you to explore other columns, such as “Book Reviews” and “Scanning the Literature.”

BIOGRAPHY

NIRWAN ANSARI [S'78, M'83, SM'94, F'09] (nirwan.ansari@njit.edu) is a Distinguished Professor of Electrical and Computer Engineering at the New Jersey Institute of Technology (NJIT), received his Ph.D. from Purdue University, his M.S.E.E. from the University of Michigan, and his B.S.E.E. (summa cum laude with a perfect GPA) from NJIT. He is also a Fellow of the National Academy of Inventors. He has published three books and (co-)authored 700 technical publications, over half published in widely cited journals/magazines. He has guest edited a number of special issues covering various emerging topics in communications and networking. He is the Editor-in-Chief of *IEEE Wireless Communications* and has served on the Editorial/Advisory Boards of over 10 journals. His current research focuses on green communications and networking, cloud computing, drone-assisted networking, and various aspects of broadband networks. He was elected to serve on the IEEE Communications Society (ComSoc) Board of Governors as a Member-at-Large, has chaired some ComSoc Technical and Steering Committees, and is currently the Director of ComSoc's Educational Services Board. He has served on many committees, such as the IEEE Fellow Committee, and has actively organized numerous IEEE international conferences/symposia/workshops. Some of his recognitions include several excellence in teaching awards, a few best paper awards, the NCE Excellence in Research Award, several ComSoc Technical Committee technical recognition awards, the NJ Inventors Hall of Fame Inventor of the Year Award, the Thomas Alva Edison Patent Award, the Purdue University Outstanding Electrical and Computer Engineering Award, the NCE 100 Medal, the NJIT Excellence in Research Prize and Medal, and designation as a ComSoc Distinguished Lecturer. He has also been granted more than 40 U.S. patents.