

IEEE CISSP, Keynote talk

Speaker: Prof. Husheng Li, IEEE Senior member, Elmore School of Electrical and Computer Engineering, Purdue University, US.

Title: The Art of Marriage: How to Integrate Data Communications and Radar Sensing?

Abstract: Joint communications and sensing (JCS), a.k.a. Integrated Sensing and Communications (ISAC), are expected to be a featuring technology in 6G wireless communication networks. It improves the efficiencies of spectrum and energy by sharing the same waveform for both tasks of communications and sensing. The waveform in JCS could be traditional communication waveforms (such as OFDM) or existing radar waveforms (such as FMCW). In this talk, we will discuss waveform design dedicated for JCS, which may go beyond existing waveform designs for individual systems. We focus on two questions, for the marriage of communications and sensing: (a) How to design a natural and enlightening framework for integrating both communications and sensing? To this end, we propose to consider JCS as a broadcast and thus unify several major designs within the same framework. (b) How to characterize the conflict and trade-off between communications and sensing when they are integrated within the same waveform? We will examine several types of conflict, such as randomness-determinism, environmental complexity, and coding-spreading trade-offs. Finally, I will provide an overview on my future research in the area of JCS.

Bio: Husheng Li received his BS and PhD degrees, both in electrical engineering, from Tsinghua University (1998) and Princeton University (2005), respectively. He joined Qualcomm Inc. as a senior engineer after his graduation from Princeton. In 2007, he joined the EECS department of the University of Tennessee, Knoxville, where he was promoted to associated professor and full professor in 2013 and 2019, respectively. In 2022, he joined Purdue University, affiliated in both the School of Aeronautics and Astronautics and the Elmore School of Electrical and Computer Engineering. His research interest includes wireless communications, statistical signal processing, cyber physical systems, networked control, and information theory. He has received numerous best paper awards in journals such as the EURASIP Journal on Wireless Communications and Networking (2015) and conferences such as IEEE ICC (2012) and Globecom (2017).

