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# Integrated Sensing and Communication in FutureG Systems

**BY Xiaochan Xue**

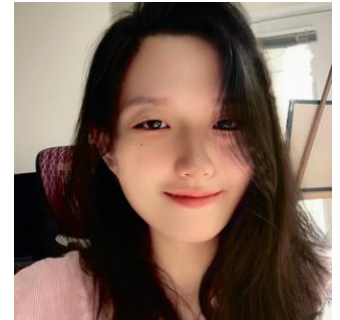
Tenure-Track Assistant Professor, Department of Electrical and Computer Engineering, University of Hawaii at Mānoa

## ABSTRACT

As wireless networks evolve toward 6G, Integrated Sensing and Communication (ISAC) aims to unify RF sensing and data transmission within shared spectrum and hardware resources. This talk reviews ISAC techniques including waveform design with a focus on practical trade-offs and deployability. Based on philosophy-based categorization, we review current approaches based on design philosophy, grouping them into communication-centric modifications, hybrid OFDM–chirp, and balanced OFDM–FMCW waveform designs. We will then examine waveform, communication, and sensing metrics, highlighting how PAPR, spectral shaping, BER/EVM, and sensing accuracy jointly constrain design choices. Finally, we identify critical open challenges in multiple aspects and outline integration opportunities with emerging technologies such as reconfigurable intelligent surfaces, AI-driven optimization, and Open RAN. Our assessment indicates that moving from promising prototypes to robust NextG deployments will require waveform designs that are not only spectrally efficient, but also hardware-aware, interference-resilient, and aligned with privacy constraints.

## BIOGRAPHY

Dr. Xiaochan Xue is a tenure-track Assistant Professor in the Department of Electrical and Computer Engineering at the University of Hawaii at Mānoa. She received a Ph.D. degree at Stevens Institute of Technology in 2025. Her research lies at the intersection of wireless communication, cybersecurity, and artificial intelligence. Her research group leverages mmWave sensing, Integrated Sensing and Communication (ISAC), and Physical-Layer Security (PLS) to enable real-time, contactless, and privacy-preserving applications. They build secure, intelligent, and efficient wireless systems for 5G, Sub-6G, NextG, and beyond by combining AI/ML with advanced physical-layer techniques. Dr. Xue and his team prototype on O-RAN testbeds and edge IoT platforms. Her research exploits Generative AI as both a tool (data augmentation, waveform and beam co-design) and a threat (adversarial RF examples, LLM-driven control attacks) to harden wireless and CPS, and to advance biomedical sensing such as contactless vitals and activity monitoring.



## EVENT DETAILS

### DATE:

Wednesday, December 10, 2025

### TIME:

3 - 4 p.m.

### LOCATION:

4<sup>th</sup> Floor Conference Room  
205 Lexington Ave.  
Katz School of Science and Health

### ATTENDANCE:

This event is open to all  
Yeshiva faculty, students, staff  
and invited guests

### CONTACT:

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