

Department of Computer Science



Mr. Jia Zhao

Ph.D. candidate
School of Computing Science
Simon Fraser University, Canada



Date: 26 April 2022 (Tuesday)



Time: 10:00am – 11:00am



Registration: <http://bit.ly/bucs-ereg>

(*Zoom details will only be provided to registrants)

Register Now



Building Ubiquitous Backscatter IoT: from Sensors to Networks and to Applications



ABSTRACT

Backscatter communication conveys information through reflecting ambient electromagnetic waves, enabling battery-free communications for sensor nodes. It has been advocated as a key building block for the next generation Internet of Things (IoT) that involve billions of sensors.

Building practical backscatter sensors however faces a series of fundamental challenges. The IoT vision for ubiquitous interconnection, in practice, demands compatibility with such existing wireless technologies as WiFi, connectivity for large-scale and highly dynamic network topologies, and capability of supporting such advanced applications as multimedia sensing and communication. In this talk, I will describe our recent works (in ACM MobiSys and MobiCom, etc.) towards building practical ubiquitous backscatter systems from these three dimensions. We start from an innovative WiFi-compatible backscatter design and implementation via spatial multiplexing, which has been the cornerstone for advanced WiFi (802.11n and beyond). Using this higher-throughput and longer-distance solution, we for the first time demonstrated multi-hop backscatter networking, a fire-new architecture with backscatter sensors relaying for each other to achieve not only robustness but also scalable topology. Driven by advanced acoustic sensing applications, we further demonstrate a microphone array backscatter sensor to explore super lightweight multi-track multimedia streaming, potentially to empower ubiquitous self-sustainable 360-degree audio/video and immersive applications. I will also discuss important future directions in this field, such as using these designs in micro-robots, and connecting this IoT frontend to the AI-based data hub.



BIOGRAPHY

Jia Zhao is a Ph.D. candidate in the School of Computing Science at Simon Fraser University, Canada, advised by Prof. Jiangchuan Liu. His research spans Internet of Things, wireless systems, and computer networks, with a particular interest in backscatter networking, ultra-low power and lightweight multimedia sensor design for wearables and small-scale mobile devices (e.g., micro-robots), and AI-programmable radio hardware design. His work has been published in prestigious wireless, mobile, and networking venues like MobiCom, MobiSys, CoNEXT, INFOCOM, and ToN.

ENQUIRY

Tel: 3411-2385 Email: comp@comp.hkbu.edu.hk Website: <https://www.comp.hkbu.edu.hk/v1/?page=events>