



**THE CHINESE UNIVERSITY OF HONG KONG**  
Department of Information Engineering  
*Seminar*

**From Software to Hardware and Back:  
Lessons Learned From Building Three Generations of RFID Systems**  
by  
**Prof. Longfei Shangguan**  
University of Pittsburgh, USA

**Date : 10 August 2023 (Thursday)**

**Time : 2:00 pm – 3:00 pm**

**Venue : Rm 801, Ho Sin Hang Engineering Building, CUHK**

Abstract

Owing to its low cost, small form factor, and high energy efficiency, RFID has emerged as a key enabler for the Internet of Things (IoT). However, existing RFID systems can only detect the presence of a tagged object within a few meters of radio range while lacking the capability to pinpoint its precise location and communicate over a long distance. In this talk, the speaker will share his experience in building three generations of RFID systems, each addressing a set of challenges and targeting a different application. First, he will present a high-precision RFID localization system for asset management in libraries and warehouses. The prototyping system has been deployed in the Peking Capital International Airport for baggage surveillance. He will then talk about PLoRa, an ambient RFID system that expands the communication range of conventional RFID systems from tens of meters to kilometer-scale. The prototyping system has been deployed in Mount Qinling for Golden Monkey monitoring. Finally, the speaker will discuss how his team leverages backscatter communication, the core technique behind RFID systems, to charge the medical implants residing deep inside the human body. The speaker will conclude the talk with lessons he learned from building these systems and discuss how he leverages these lessons to expand his research.

Biography

Dr. Shangguan is an assistant professor at the University of Pittsburgh. His research interests lie in low-power wireless networks and embedded systems. Dr. Shangguan received his Ph.D. degree from the Hong Kong University of Science and Technology in 2015.

**\*\* ALL ARE WELCOME \*\***