**Indoor Localization and Vital Signs Sensing with Harmonic RFID System**

**Abstract:** Current technologies have severe limitation to support the vision of Internet of Things (IoT), because sensing of the “things” is still heavily constrained. Based on the harmonic RFID system, in this talk I will highlight our solutions of highly reliable and accurate indoor localization as well as the vital-sign monitoring of ballistocardiogram (BCG), breath rate/effort and blood pressure with the newly discovered method of near-field coherent sensing (NCS), which does not require skin touch or motion restraint to greatly improve the applicability for people and animals. The harmonic RFID system not only inherits the merits of the conventional RFID system such as digital ID integration, reliable packaging, free of maintenance and ready manufacturing infrastructure, but also offers unprecedented high signal-to-noise ratio (SNR) and sensitivity. The sensing system developed has achieved 50-µm ranging resolution with kHz refresh rate, and was able to clearly pick up the weak wrist pulse signal from the artery vibration. This talk will include the supporting RF theory of signals, noises and interferences, as well as the simulation methods and the hardware/software experimental system.

**Biography:** Xiaonan Hui received the B.S. degree from Northeastern University, China in 2012, and the M.S. degree from Zhejiang University, China in 2015, all in electrical engineering. He is currently a 3rd-year Ph.D. student in Prof. Edwin Kan’s research group of Electrical and Computer Engineering, Cornell University. His current research interests include RF-based vital-sign acquisition, high-precision indoor localization, and multi-static RF imaging. His recent work on vital-sign monitoring with NCS not only was featured by Nature, Discover Magazine, Daily Mail, IEEE Spectrum, Cornell Chronicle and other news agencies, but also generated broad industrial interest for automotive and medical applications.

**Date:** April 27, 2018 (Friday)
**Time:**
- Refreshment at 12:00pm
- Talk begins at 12:15 pm
**Place:** Phillips 233

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