



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Research Seminar

Leveraging Array Signal Processing in the Wireless Internet of Things

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12-1pm Friday 18th May 2015

Abstract: Phased array signal processing has long been employed outdoors in radar, underwater in sonar, and underground in seismic monitoring. Today, it has the potential to revolutionize the Internet of Things (IoT) by giving us the ability to track every one of the billions of IoT devices indoors, and meet their exploding bandwidth requirements. But to make the shift to indoor wireless networks, it must cope with strong multipath radio reflections, packetized data transmissions, and commodity hardware platforms. In this talk I will describe two relevant systems through the lens of system-building and experimentation. First, I will describe an indoor location system that uses solely the existing Wi-Fi infrastructure to achieve a median location accuracy of 23 centimeters, and sub-second response time, allowing Wi-Fi-enabled devices to be tracked in real-time. Next, I will present a MIMO-based Sphere Decoder system that leverages novel search algorithms and geometric reasoning to increase wireless throughput, the first of its kind that scales to 256-QAM constellation densities with computational demands that are practically realizable in current ASIC hardware. Finally, I will conclude with a vision of how these techniques will support exciting IoT applications such as video analytics over billions of indoor wireless cameras.

Short Bio: Kyle Jamieson is a Senior Lecturer in the Department of Computer Science at University College London (UCL). His research interests are in building wirelessly networked systems for the real world that cut across the boundaries of digital communications and networking. Prior to joining UCL, he received the B.S., M.Eng., and Ph.D. (2008) degrees in Computer Science from the Massachusetts Institute of Technology. He then received a Starting Investigator fellowship from the European Research Council in 2011, Best Paper awards at USENIX 2013 and CoNEXT 2014, and a Google Faculty Research Award in 2015. Web: <http://www0.cs.ucl.ac.uk/staff/k.jamieson>

Venue: Seminar Room, Dunlop-Oriel House/CTVR.

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