MEng Design Project Announcement – 2018-19 AY

**Project title:** Design of an Acoustic Wireless Communication System

**Brief Description of Design Project Goals:**

**Overview:** Acoustic communication is widely used for underwater communication, but can also be used to demonstrate the working principles of modern wireless communication systems. The goal of this project is to develop a hardware prototype of an acoustic communication system that operates over-the-air using a large number transducers (i.e., loudspeakers that simultaneously act as microphones). The prototype system can be used to demonstrate massive MIMO data transmission, full-duplex communication, as well as recent user localization techniques that rely on deep neural networks and dimensionality reduction.

**Specific MEng Contribution:** The student will learn the fundamentals of acoustic communication and build a prototype system consisting of an array of loudspeakers, amplifiers, filters, and multi-channel analog-to-digital and digital-to-analog converters that communicate via PCIe to MATLAB or Python. The project spends 50% on system specification and hardware design, 30% on measurements, and 20% on software development. The student will be closely supervised by Prof. Studer and two Ph.D. students.

**ECE Field Advisor Name:** Christoph Studer
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**Project Web Site:** http://vip.ece.cornell.edu

**Number of MEng Students Needed:** 2-4

**Required Skills:**

Experience in basic analog circuit design and PCB design is beneficial.

**Estimated Project Time Frame:**

2018-19 Academic Year, Two (2) Semesters