Analog and Mixed-Signal Center
3128 TAMU
College Station, TX 77843-3128

Tel. (979) 845-7498
Fax. (979) 845-7161
E-mail:s-sanchez@tamu.edu

A|M | ELECTRICAL & COMPUTER ENGINEERING
TEXAS A&M UNIVERSITY

S E M I N A R

Room 1035 ETB

September 25, 2017, 1:50 – 2:50 P.M.

RF Energy Harvesting System: Design Challenges and Solutions

by

Zizhen Zeng
Texas A&M University
AMSC

Abstract: Energy harvesting technique is one of important enabling solutions for Internet-of-Things (IOT) applications. Among multiple available energy source, such as solar, thermal, vibration and RF energy. The RF energy are arousing more and more research attention because of its ambience and predictability even considering its relative low power density. The first part of seminar is going to introduce a triple-band RF energy harvesting system. The proposed system is designed to harvest RF energy in GSM850, GSM900, GSM1800, GSM1900, Wi-Fi, Bluetooth, and LTE standard communication bands and in filed testing, it can harvest 627 nW at 1.2 m away from triple frequency sources with signal power of 10 mW per source at 0.86 GHz, 1.8 GHz, and 2.44 GHz. The second part of seminar is going to introduce a reconfigurable rectifier with adjustable conversion ratio without changing matching network. Based on this, a WLAN (2.4 GHz) RF energy harvesting system is proposed with the maximum power point tracking (MPPT). The entire system is implemented in an GF 180nm CMOS process. Post-layout simulation results show that with MPPT, the reconfigurable rectifier can achieve sensitivity at 1-V output voltage with -22dBm input power and peak efficiency of 38.4% with -2dBm input power.

Zizhen Zeng was born in Guangdong, China. In 2014, he received his bachelor degree from Beihang University (previously known as Beijing University of Aeronautics and Astronautics), Beijing, China. And MSc. degree from Hong Kong University of Science and Technology in 2015, where he worked as research assistance from 2014 to 2016 in Smart Sensory Integrated Systems Lab (S2IS) under guidance of Prof. Amine Bermak. He is currently working toward Ph. D degree at Texas A&M University under guidance of Prof. Edgar Sanchez-Sinencio. His research interests are including low power circuit design techniques for wireless communication, sensors, and biomedical applications.