



# **SSCS Distinguished Lecture**

## **Analog techniques for ultra-low-power transceivers**



**Professor Antonio Liscidini**  
University of Toronto, Canada

**Date:** Monday December 5, 2016

**Time:** 10:30 AM

**Place:** Conference Room DEIB, Politecnico Milano (Via Ponzio 34, Milano)

### **Abstract:**

The talk is divided in two parts, the former dedicated to RF front-end for ultra-low-power wireless transceivers, the latter to the base-band section and the challenging problem of channel selection filtering.

### **How to transform a simple LC-VCO into complete analog RF front-ends**

LC harmonic oscillators are widely used in wireless communications to generate reference signals inside the radio. It will be shown how such structures can be transformed into complete RF front-ends with just some minor modifications from the original topology. Initially, the LC oscillator will be transformed into an RX front-end exploiting its intrinsic property to work as a mixer. After that a Class-C LC oscillator will be merged with a power amplifier to realize a TX front-end suitable for FSK and GFSK transmitter. Measurements results on two prototypes tailored to BLE application will be shown.

### **Adaptive filters and passive switched capacitors**

In the second part of the talk, two emerging techniques used for the design of channel selection filters in wireless receivers will be discussed. Initially, a novel an adaptive filter architecture will be presented. The filter succeeds to shape the filtering profile as function of the operative scenario without the need of any control loop. After that, passive switched capacitors filters will be analyzed. A new intuitive continuous-time model will be introduced. The model easily allows to design high-order topologies even with complex conjugates poles without the need of any active device. Measurements results on two different prototypes will be provided.

### **Speaker's Bio:**

Antonio Liscidini received his Ph.D. in Electrical and Computer Engineering at the University of Pavia in 2006. He is assistant professor in the Edward S. Rogers Sr. Department of Electrical & Computer Engineering of the University of Toronto. His research interests are in the implementations of transceivers and frequency synthesizers for cellular and ultra low power applications. He received the Best Student Paper Award at IEEE 2005 Symposium on VLSI Circuits and co-authored the Best Invited Paper Award at 2011 IEEE Custom Integrated Circuit Conference. From 2008 to 2011, he served as Associate Editor of the IEEE Transactions on Circuits and Systems II: Express Briefs and he served as Guest Editor of IEEE Journal of Solid State Circuits. He is member of the TPC of the European Solid State Circuit Conference and of the International Solid State Circuit Conference (ISSCC).

