

SEMINAR:**Dividing less and conquering more
in the design of mixer RFIC's****Speaker: Prof. Carlos Saavedra***(Queen's University, Kingston, Ontario - Canada)**(Visiting Professor, University of Navarra, San Sebastián, Spain)***Date:** 15 November 2013 @ 9:30 AM**Location:** Room GARDA – Polo Scientifico F. Ferrari – Povo**Note:** The seminar will be held in English**Contact:** Dr. Massimo Donelli (massimo.donelli@disi.unitn.it)

The reigning design paradigm for microwave transceivers is to divide and conquer: the engineer first designs and optimizes the individual components (e.g. the amplifiers, the mixers, the oscillators) and then he or she interconnects those components to create the transceiver. Undoubtedly, this design paradigm has been enormously successful. Yet, by merging certain blocks in the transceiver and then designing those blocks as a single unit, new and interesting circuit concepts emerge. The idea, in short, is to divide less and conquer more. Some of the benefits that can accrue using this design approach include reduced chip area, reduced power consumption, or improvement in specific performance metrics. A central component of a communications transceiver is the frequency converter, or mixer, because it is responsible for upconverting and downconverting the information-bearing signal. If a mixer is combined with the local oscillator circuit, for example, the result is a new circuit known as a self-oscillating mixer (SOM). This talk will focus on innovative ways to merge the mixer with other components that typically surround the mixer in a transceiver. Three CMOS mixer RFIC designs will be described together with measured results. Those circuits are: a mixer-LNA with an average DSB noise figure of 3.9 dB, a dual-band SOM capable of operating at C-band and X-band, and a 12-GHz variable conversion gain mixer.

• About the Speaker

Carlos Saavedra received the Ph.D. degree from Cornell University in Ithaca, New York, in 1998. From 1998 to 2000 he was a Senior Engineer at Millitech Corporation and since 2000 he has been at Queen's University where he is now a Professor. He is an Associate Editor of the IEEE Transactions on Microwave Theory and Techniques and is a member of the Technical Program Committee (TPC) of the IEEE International Microwave Symposium. He served as Chair of the IEEE MTT-S Technical Coordinating Committee on Signal Generation and Frequency Conversion from 2010 to 2013 and he served on the TPC of the IEEE RFIC Symposium from 2008 to 2011.