



IEEE Solid-State Circuits Society SSCS Distinguished Lecture IEEE SSCS/CASS Atlanta Joint Chapter Seminar

Title: On the Design of Circuits for Frequency Synthesizers at Mm-Waves in Ultra-Scaled CMOS

Speaker: Professor Francesco Svelto

Affiliation: Department of Electrical Engineering, Università di Pavia, Italy

Abstract: Transceivers for wireless communications at millimeter-waves are becoming pervasive in several commercial fields. Taking advantage of a cut-off frequency of hundreds of GHz, CMOS technology is rapidly expanding from Radio Frequency to Millimeter-Waves, thus enabling low-cost compact solutions. The question we raise in this talk is whether scaling is just providing advantages at mm-waves or not. We present experimental data of single devices, comparing 65nm and 32nm nodes in a wide-frequency range. In particular, switches used in VCOs for tank components tuning, MOM and AMOS capacitors, inductors. fT and $fMAX$ increase though slower than in the past, ron^*Coff , a figure of merit for switches, improves correspondingly. As a consequence, wide-band circuits benefit from scaling to 32nm. As an example, a frequency divider-by-4, based on differential pairs used as dynamic latches, realized in both technology nodes and able to operate up to 108GHz, is discussed. On the contrary, passive components do not improve and eventually degrade their performances. As a consequence, a conventional LC VCO, relying on tank quality factor, is not expected to improve. In this work we discuss a new topology for Voltage Controlled Oscillators, based on inductor splitting, showing low noise and wide tuning range in ultra-scaled nodes.

Speaker Biography: Francesco Svelto received the Laurea and Ph.D. degrees in electrical engineering from Università di Pavia, Italy, in 1991 and 1995, respectively. During 1995-1997 he hold an industry grant for research in RF CMOS. In 1997 he was appointed Assistant Professor at Università di Bergamo, and in 2000, he joined Università di Pavia, where he is now Professor.

Dr. Svelto has been technical advisor of RFDomus Inc., a start-up he co-founded in 2002 dedicated to highly integrated GPS receivers. After merging with Glonav Inc. (Ireland), RFDomus has been acquired by NXP Semiconductors in 2007.



Since 2006 he has been the Director of a Scientific Laboratory, joint between Università di Pavia and STMicroelectronics, dedicated to research in Microelectronics, with emphasis to mm-wave systems for wireless communications, high-speed serial links and ultra-sound electronics for medical diagnostic. Dr. Svelto has been a member of the technical program committee of the International Solid State Circuits Conference, Custom Integrated Circuits Conference, Bipolar/BiCMOS Circuits Technology Meeting. He is presently a member of the technical program committee of IEEE European Solid State Circuits Conference. He served as Associate Editor of IEEE Journal of Solid State Circuits (2003-2007), and as Guest Editor for a special issue on the same journal in March 2003. He is co-recipient of the IEEE Journal of Solid State Circuits 2003 Best Paper Award and has been elevated to Fellow by IEEE in 2013.

Seminar Time: 1:30PM-3:00PM on Feb 27th 2015

Seminar Location: TSRB 1st Floor Auditorium, Georgia Tech.

Organizer: Dr. Hua Wang, IEEE SSCS/CASS Atlanta Joint Chapter Chair, Assistant Professor, School of ECE, Georgia Technology. Email: hua.wang@ece.gatech.edu. Phone: (404) 385-6003