



IEEE Solid-State Circuits Society SSCS Distinguished Lecture

Title: Cognitive and Interference Robust Radio Transceiver Chips

Distinguished Lecture Speaker: Professor Eric Klumperink

Affiliation: Department of Electrical Engineering, University of Twente, the Netherlands

Abstract: A Cognitive Radio transceiver senses its radio environment and adaptively utilizes free parts of the radio spectrum. CMOS IC-technology is the mainstream technology to implement smart signal processing and for reasons of cost and size it is attractive to also integrate the radio frequency (RF) hardware in CMOS. This lecture discusses radio transceiver ICs designed for cognitive radio applications, with focus on analog RF. Cognitive radio asks for new functionality, e.g. spectrum sensing and more agility in the radio transmitter and flexibility in the receiver. Moreover, the technical requirements on the building blocks are more challenging than for traditional single standard applications, e.g. in bandwidth, programmability, sensing sensitivity, blocker tolerance, linearity and spurious emissions. Circuit ideas that address these challenges will be discussed, and examples of chips and their achieved performance will be given. Moreover, the radio spectrum is becoming more and more crowded, and radio receivers become interference limited. As there is a demand for multi-mode flexible radio devices, traditional dedicated narrowband filtering no longer satisfies. This lecture reviews several proposed concepts, e.g. linearization techniques, noise and distortion cancelling, frequency-translated N-path filtering, harmonic rejection and spatial interference rejection.

Speaker Biography: Eric Klumperink received his PhD from Twente University in Enschede, The Netherlands, in 1997. He is currently an Associate Professor at the same university where he teaches Analog and RF CMOS IC Design and guides research projects focussing on Cognitive Radio, Software Defined Radio and Beamforming. Eric served as Associate Editor for *TCAS-I* and II, and for the *Journal of Solid-State Circuits*. He is a technical program committee member of ISSCC and RFIC and an IEEE Distinguished Lecturer. He holds several patents, authored and co-authored more than 180 international refereed journal and conference papers, and is a co-recipient of the ISSCC 2002 and the ISSCC 2009 "Van Vessel Outstanding Paper Award".



Seminar Time: 3:30PM-5:00PM on Oct. 14 (Wednesday), 2015

Seminar Location: Broun Hall 235, Dept. of Electrical and Computer Eng., Auburn University

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