USC Viterbi School of Engineering
Ming Hsieh Department of Electrical Engineering

Integrated Systems Seminar Series

sponsored by the Ming Hsieh Institute

Designing RF Transceivers to be Manufacturable at Low Cost and The New Enhanced "Atomic Clock" WWVB Broadcast and Fully-Digital Multi-Mode Receivers for it

Dr. Oren Eliezer
CTO, Xtendwave.

Friday September 27, 3:30 – 5:00 PM, EEB 248

Mobile devices are based on highly integrated transceiver system-on-chip (SoC) ICs, where the RF circuitry, additional analog functions, and a considerable amount of digital logic (including a processor and memory), all share the same CMOS die. Furthermore, they often include more than one radio, such as GPS, WLAN, Bluetooth and FM, thereby further increasing the potential for self-interference and necessitating careful design practices to allow satisfactory coexistence of all functions on the SoC. This seminar presents approaches for design-for-manufacturability (DfM) that lead to timely and profitable results in the design of consumer-market transceiver SoCs in advanced CMOS processes.

The National Institute for Standards and Technology (NIST) has been broadcasting the date and time from their accurate atomic source for many decades using a simple amplitude/pulse-width modulation scheme. In October 2012 an enhanced broadcasting system, designed by Xtendwave under a government grant, was introduced at the station, demonstrating several orders of magnitude of improvement in link margin. This seminar presents many interesting challenges associated with this modernized digital communications system, as well as novel radio architecture and antenna ideas that are being developed for it at Xtendwave. The seminar will include a real-time reception demonstration of the receiver CMOS IC designed by Xtendwave, which exhibits a 140dB dynamic range, the widest in consumer-market receiver ICs.

Dr. Oren Eliezer received his BSEE and MSEE degrees in Electrical Engineering from the Tel-Aviv University in Israel in 1988 and 1996 respectively, and his PhD from the University of Texas at Dallas (UTD) in 2008. He served in The Israel Defense Forces from 1988 to 1994, where he specialized in wireless communications. After his military service he cofounded Butterfly Communications in Israel and served as the company's chief engineer. Following Butterfly's acquisition by Texas Instruments (TI) in 1999, he was relocated to Dallas in 2002, where he took part in the development of TI's Digital RF Processor (DRP™) technology and was elected Senior Member of the Technical Staff. Since 2009 he is the Chief Technology Officer of Xtendwave in Dallas, and participates in the research at the Texas Analog Center of Excellence at UTD. His areas of expertise are in communications, digital transceivers, interference mitigation, and low-cost productization of transceiver SoCs. He has authored and coauthored over 50 conference and journal papers and over 45 issued and pending patents.