THE DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING PRESENTS:

PROFESSOR AHMED M. ELTAWIL

LOW POWER, HIGH THROUGHPUT APPROACHES FOR 5G COMPUTING AND COMMUNICATION PLATFORMS

ABSTRACT

Enabling the 5G vision of a wirelessly interconnected ecosystem involving every aspect of our life including society, machines and the supporting infrastructure, requires innovation and optimization at all levels of the hierarchy. In this talk, we first consider the system from a link enhancement perspective, where we present recent results directed at enabling Full-duplex communications. Currently systems operate in "Half duplex mode" to avoid self-saturation, where the high-powered transmitter saturates the receive path. Full-duplex transmission promises to double the spectral efficiency by allowing bidirectional communications to be carried out over the same resources. Several recent research efforts have demonstrated that the key challenge in practical full-duplex systems is the un-cancelled self-interference power caused by a combination of hardware imperfections. We discuss recent work that identifies system limitations, performance, optimizations, and the practicality of proposed architectures.

In the second part of the talk, we consider the Achilles heel of wireless systems, namely, power consumption. Traditionally, reliability is attributed to higher power consumption. We show that this is not necessarily true. In fact, one can design systems to be both reliable (within desired specifications) and low power. We present a unique approach for power management which factors in the built-in algorithmic resilience to errors inherent in all wireless designs. This error tolerance can be utilized and co-designed with the hardware circuitry in mind to provide resilience not only to channel induced errors but also to hardware induced faults (due to low power modes), thus expanding the adaptation space to unexplored domains.

BIOGRAPHY

Ahmed M. Eltawil is a Professor at the University of California, Irvine. He has been with the Department of Electrical Engineering and Computer Science since 2005 where he is the founder and director of the Wireless Systems and Circuits Laboratory. His current research interests are in the general area of low power digital circuit and signal processing architectures with an emphasis on mobile systems. In addition to his department affiliation, he is also affiliated to a number of research centers across the University of California, Irvine. He received the Doctorate degree from the University of California, Los Angeles, in 2003 and the M.Sc. and B.Sc. degrees (with honors) from Cairo University, Giza, Egypt, in 1999 and 1997, respectively. Dr. Eltawil has been on the technical program committees and steering committees for numerous workshops, symposia, and conferences in the areas of low power computing and wireless communication system design. He received several awards, as well as distinguished grants, including the NSF CAREER grant in 2010 supporting his research in low power systems.

FEBRUARY 12, 2018

WCH 205/206

11:10 A.M. - 12:00 P.M.

FOR MORE INFORMATION VISIT US AT WWW.EE.UCR.EDU