

University of Rochester
Department of Electrical and Computer Engineering Colloquia

Back to the “War of Currents”: Can AC Computing be an Alternative for Wirelessly Powered Devices?

Dr. Emre Salman

Wednesday, May 10th
12:00PM – 1:00 PM
Computer Studies Building (CSB) 209

Abstract: Energy autonomy is one of the fundamental challenges facing future Internet-of-things (IoT). Relying on existing battery technologies is not only impractical, but also insufficient due to stringent constraints on form factor and limited power densities of conventional electrochemical charge storage techniques. Wireless/RF power harvesting has recently received considerable attention due to the ubiquity of RF energy around the world such as mobile phones, TV/radio broadcast, and mobile base stations. A primary issue in existing wireless power harvesting methods is the strong dependence of the harvested power on the distance between the source and the load due to signal attenuation throughout the space. In this talk, I will present a novel vision on developing an efficient computing paradigm for wirelessly powered IoT devices. The proposed method investigates the direct use of AC power for computing while increasing the energy efficiency by more than an order of magnitude. This significant increase in energy efficiency enhances the on-site IoT device intelligence, thereby allowing for local decision-making mechanisms. At the end of the talk, I will introduce several exciting future directions at the intersection of circuits, communication, and electro-mechanics.

Bio: Emre Salman is an associate professor at the Department of Electrical and Computer Engineering at Stony Brook University (SUNY), where he directs the Nanoscale Circuits and Systems Laboratory and serves as the industry liaison for the Department. He received the PhD degree from the University of Rochester in 2009 and the BSc degree from Sabanci University, Turkey in 2004. His broad research interests include energy efficient integrated circuits (ICs) for emerging applications such as Internet-of-things and bioelectronics. Emre received NSF CAREER Award in 2013, Outstanding Young Engineer Award from IEEE Long Island in 2014, and multiple Outreach Initiative Awards from IEEE Circuits and Systems Society. He is a Stony Brook University Discovery Prize finalist and recipient of a best paper award from Semiconductor Research Corporation (SRC) TECHCON in 2016. Emre has authored and co-authored one tutorial book, two book chapters, more than 55 papers in refereed IEEE/ACM journals and conferences, and holds two issued, two pending US patents. He is a senior member of IEEE.

Pizza and soda will be provided.