



ECE Seminar Series

A Journey from Mobile Platforms to Self-Powered Energy-Neutral Wearable Systems



Umit Y. Ogras, Ph.D.

Associate Professor

Electrical and Computer Engineering

University of Wisconsin-Madison

June 10, 2022 at 10 am

Location: Zoom/HEC 450

<https://ucf.zoom.us/j/95936456259?pwd=U2RwRTdUNUxiZWt2djRXtmtzb2hWdz09>

Meeting ID: 959 3645 6259 Passcode: 517108

Abstract:

We experience a major form-factor shift in electronic systems every 10 to 15 years. The most recent examples are the mobile platforms powered by heterogeneous system-on-chips (SoCs), while the next one is yet to dominate the market. Despite their impressive performance, mobile platforms still suffer from tight thermal constraints and resulting power consumption limitations. Furthermore, the complexity of current designs surpasses our ability to control the power management knobs optimally. The first part of this talk will overview a few recent results on the modeling, analyzing, and optimizing power-temperature dynamics of multiprocessor SoCs. The second part will overview "Systems-on-Polymer" as a candidate technology to drive the next wave of computing. This approach has recently been introduced to combine the advantages of flexible and traditional silicon technologies. We will present optimal energy harvesting and management techniques using flexible materials for energy-neutral edge devices. These devices will be illustrated using edge-AI applications, including mmWave-based rehabilitation, gait analysis, and activity recognition.

Dr. Ogras is an Associate Professor in the Department of Electrical and Computer Engineering at the University of Wisconsin-Madison. He worked at the Arizona State University as a faculty member between 2013-2020 and at Intel as a research scientist between 2008-2013 after receiving his Ph.D. degree in computer engineering from Carnegie Mellon University in 2007. His research interests include embedded systems, wearable computing, heterogeneous multicore architectures, low-power VLSI, and flexible hybrid electronics. Dr. Ogras received Intel 2021 Outstanding Researcher Award, DARPA Director's Fellowship and Young Faculty Awards, NSF CAREER Award, and best paper awards at 2021 ACM TODAES, 2019 CASES, 2017 CODES+ISSS, 2012 IEEE T-CAD, and 2011 IEEE T-VLSI.