

BIOENGINEERING

PRESENTS

“Wireless Biomedical Devices for Sensing and Navigation”



THURSDAY, May 6th, 2021

12:00 – 1:00 PM

Zoom Link:

<https://ucla.zoom.us/j/97216069429>

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ABSTRACT:

crosscale implantable and wearable devices will transform the field of medicine in the near future. This talk will focus on design and implementation of miniaturized minimally invasive devices for continuous monitoring and closed-loop therapeutic systems. In the first part of this talk, an MRI-inspired approach for precise localization and tracking of small tags, smart pills and sensors inside the body will be presented. The prototype devices called ATOMS (Addressable Transmitters Operated as Magnetic Spins) are designed to behave similar to real atoms in the body without the need for the strong magnetic field of MRI. We will also show how these devices can be used for 3D navigation during high-precision surgeries.

In the second part of the talk, our research efforts focused on efficient neural interfaces will be discussed. We will show how co-design of hardware and machine learning algorithms can pave the way for robust and energy-efficient Brain-Machine Interfaces (BMI). In particular we will discuss our proposed Multi-State Dynamic Recurrent Neural Network (DRNN) decoder to address the challenges of performance, robustness, and hardware implementation.

BIOGRAPHY:

Azita Emami is the Andrew and Peggy Cherng Professor of Electrical Engineering and Medical Engineering at Caltech, and a Heritage Medical Research Institute Investigator. She also serves as the Executive Officer (Department Head) for Electrical Engineering. She received her M.S. and Ph.D. degrees in Electrical Engineering from Stanford University in 1999 and 2004 respectively, and her B.S. degree from Sharif University of Technology in 1996. From 2004 to 2006 she was with IBM T. J. Watson Research Center before joining Caltech in 2007. Her current research interests include integrated circuits and systems, integrated photonics, wearable and implantable devices for neural recording, neural stimulation, sensing and drug delivery. She is currently the associate editor for the IEEE Journal of Solid State Circuits (JSSC), and was an IEEE SSCS distinguished lecturer in 2018 and 2019.