
**Neural Interface Development and Bi-directional Modeling for Multi-modal Interfaces**

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## LECTURE ABSTRACT

The brain is a complex system comprised of billions of neurons that work coherently together to control our behavior and general function. The advent of techniques such as multi-electrode recordings, microstimulation and neural imaging has provided powerful tools for modern systems neuroscience to study learning and neural adaptation, and importantly how neural function is compromised in the diseased state. In this talk, I will focus on neural interface development for neural recording at different scales, and how these interfaces can be used as tools to study brain states and generate neurotherapeutic devices to treat circuit-wide disorders. I will also present recent results on bi-directional modeling of neural activity simultaneously recorded at multiple scales, leveraging both machine learning and biologically-inspired approaches.

## SPEAKER BIOSKETCH

Samantha R. Santacruz, Ph.D., is currently an Assistant Professor at the University of Texas at Austin, working on developing systems-based neurotherapies and brain-machine interfaces to both treat neural pathologies and to better understand the neural mechanisms responsible. Dr. Santacruz received her B.A. degree with honors in Applied Mathematics from UC Berkeley in 2006, her M.S. degree in Electrical Engineering from Rice University in 2010, and her Ph.D. degree in Electrical Engineering at Rice University in 2014. She was awarded the Best Thesis Award for her doctoral work on engineering new methods of deep brain stimulation. She completed her postdoctoral work in Dr. Jose Carmena's lab at UC Berkeley. In 2020 she was selected as one of 85 participants in the National Academy of Engineering US Frontiers of Engineering Symposium.

Contact Dr. Wei-Chuan Shih (wshih@uh.edu) for additional information