EMBC Workshop Proposal

Workshop Type (select one):

Half Day Workshop

Workshop Title:

Advancing neural interfaces and neurotechnologies towards improved understanding of the brain

Workshop Organizer Name & Affiliation 1:
Deblina Sarkar (Massachusetts Institute of Technology)

Workshop Organizer Name & Affiliation 2:
Guangyu Xu (University of Massachusetts, Amherst)

Workshop Speaker Name & Affiliation 1:

Paul Sajda (Columbia University)

Workshop Speaker Name & Affiliation 2:

Ellis Meng (University of Southern California)

Workshop Speaker Name & Affiliation 3:

Euisik Yoon (University of Michigan, Ann Arbor)

Workshop Speaker Name & Affiliation 4:

Jacob Robinson (Rice University)

Workshop Speaker Name & Affiliation 5:

Ken Shepard (Columbia University)

Workshop Speaker Name & Affiliation 6:

Bin He (Carnegie Mellon University)

Theme (Select one):

Neural and Rehabilitation engineering

Workshop Synopsis— Max 2000 Characters

Neural-interfaces allow researchers to sense and control the activity of diverse neural circuits, permitting quantitative studies of the link between brain activity and behavior. Signaling within neurocircuitry not only transmits electrical signals among neurons but also associates with complex synaptic chemistry. These cellular signaling pathways correlate with each other and play significant roles in regulating neural activity. To enable high-content analysis of the neural activity, efforts are being made to understand the neural basis of brain function with high-precision and multimodality neural interfaces and disruptive neurotechnologies. This workshop is focused on latest neuroengineering advances, emerging multimodal neural interfaces, and improved understanding of the brain across different scales. The topics will include, but not limited to, electrical, optical, chemical, magnetic and ultrasonic approaches of neural recording and neuromodulation, with improved throughput, functionality, tissue invasiveness, biocompatibility. These state-of-the-art neural interfaces and neurotechnologies provide key enabling tools that are suitable for probing the central and peripheral nervous system, which are highly valuable outstanding test-bed for improved understanding of the brain. In the longer term, these novel brain-machine-interfacing efforts are of fundamental cognitive and behavioral neuroscience importance, and would ultimately lead to therapeutic interventions for neurological diseases.