FIU | Engineering & Computing
FLORIDA INTERNATIONAL UNIVERSITY

Biomedical Engineering
Wallace H. Coulter Foundation
Seminar Series

"Neural interfaces for next generation prostheses"

Dr. Jit Muthuswamy
Associate Professor, Biomedical Engineering
Arizona State University

Friday, September 14th, 2012
LECTURE: 9:00 AM - 10:00 AM

ENGINEERING CENTER
ROOM EC 2300
10555 WEST FLAGLER STREET
MIAMI, FL 33174

Abstract: Following the success of cochlear and visual prostheses, several exciting cortical prostheses applications are likely to emerge in the near future. The neural interfaces required for the success of such next generation brain prostheses will have to be reliable, adaptive, multi-functional, able to facilitate neural regeneration and plasticity and also be plug-and-play. This talk will focus on our efforts at achieving some of the above objectives using MEMS (micro-electromechanical systems), robotics, and gene delivery technologies. We report here the results of our Brain-bot neural interface technology that can adapt its position post-implantation in the brain to maintain proximity with single neurons to increase the reliability, quality and longevity of neuronal recordings. The second half of my presentation will focus on the neural interface motif in the context of functional genomics studies. The overall aim is to develop neural interfaces capable of transfecting exogenous molecules such as siRNAs, plasmids or proteins into targeted neurons. We present our efforts at designing and developing high-throughput living neuron arrays on biochips (on silicon, glass/ITO and quartz substrates) that can simultaneously (i) achieve reliable transfection of genetic constructs into precisely targeted neurons and (ii) perform careful assessment of changes in the electrophysiological phenotype of individual neurons.Funded by NIH (R21NS041681, R21NS051773, R01NS055312, R01NS055312-S1), Whitaker foundation, DARPA and Arizona Biomedical Research Commission.

Biographic: Jit Muthuswamy has a Masters in Electrical Engineering and a Masters in Biomedical Engineering and a PhD in Biomedical Engineering, all from Rensselaer Polytechnic Institute, Troy, NY. He is currently an Associate Professor in Bioengineering in the School of Biological and Health Systems Engineering and an affiliate faculty in Electrical Engineering at Arizona State University, Tempe, AZ. He is a senior member of the IEEE and a member of the Society for Neuroscience. He won the Excellence in Neural Engineering award at the Joint International conference of the IEEE Engineering and Medicine Society and Biomedical Engineering Society in 2002, and the outstanding paper award (along with co-author and student, Nathan Jackson) at the the 41st Annual International Microelectronics and Packaging Society (IMAPS) symposium in 2008. His research interests are in Neural engineering, neural interfaces, and BioMEMS.

Contact: claudia.estrada1@fiu.edu; 305-348-6717
Map: http://campusmaps.fiu.edu/Engineering Center