

## **Title: Peripheral Nerve Interface Device for Robotic Arms**

### **Summary:**

The state-of-the-art robotic upper-limb prostheses have advanced far ahead of the technology available for interfacing the robotic arms with the nervous system. There is a strong demand for the ability to translate patient intents into robotic arm movement controls and providing haptic feedbacks back to the brain. The lifespan of state-of-practice neural probes is typically less than a year due to tissue encapsulation around the probes, dislocation, probe deterioration, severed nerve regression, and other factors. This work focuses on a new neural sensor array design that addresses the limited lifespan issues by providing both electrical interfaces and chemical stimulations. The neural probe arrays are designed with built-in reservoirs for growth factors and other neurological and biological agents and microfluidic channels for drug delivery. The growth factors are designed to impede nerve regression while other drugs could be used to suppress immune and foreign-object responses to the presence of the neural probe. Ultimately, the neural probe arrays will be deployed and implanted with the goal of multi-year chronic uses. The technical challenges and solutions on integrating fluidic delivery system into the electrode arrays will be discussed.

### **Short Bio:**

William C. Tang received his BS, MS, and Ph.D. in EECS from the University of California at Berkeley in 1980, 1982, and 1990, respectively. Since his graduation, he has continued his contribution to the MEMS field in the automotive industry at Ford Research Laboratory and Ford Microelectronics, Inc., and later in MEMS for space exploration at the Jet Propulsion Laboratory. In July 1999, he served as the MEMS Program Manager at the Defense Advanced Research Projects Agency (DARPA). Since July 2002, he has been on faculty with the Biomedical Engineering (BME) Department at the University of California, Irvine, with a joint appointment at the Electrical Engineering and Computer Science Department. In March 2008, he was appointed the first Associate Dean for Research for the Henry Samueli School of Engineering. His current research interests are in micro- and nano-scale technologies for biomedical research. Dr. Tang is a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE), the Founding Chair of the Orange County Chapter of the IEEE Engineering in Medicine and Biology Society (EMBS), a Fellow and Chartered Physicist with the Institute of Physics (IOP), and a Fellow of the American Institute for Medical and Biological Engineering (AIMBE).