

Bioengineering Seminar

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Long-term safety and effectiveness of Neural interface technology

Neuroprosthetic devices, which use neural signals to control prostheses, have the potential to provide an unparalleled capability for disabled individuals to interact with their external environment. Currently, these devices have fallen short of their potential due to a longitudinal decline in their ability to detect neural signals.

The Division of Physics entered into a collaborative research endeavor with DARPA's Reliable Neural Interface Technology (RE-NET) program to develop test platforms to investigate the long-term safety and reliability of neural implants. Through the use of longitudinal cortical electrophysiology, optogenetic manipulations and two-photon imaging, the project will identify biomarkers predictive of long-term implant success. Neural electrode arrays will be implanted in a genomically-controlled mouse model, and single unit and local field potential electrophysiological data will be recorded for 12 months.

Additionally, automatic computerized detection of freely-moving behaviors will be correlated with the electrophysiology to identify features important to motor control. In parallel experiments, in-vivo two-photon imaging from individual animals will observe neuromorphological dynamics and apoptosis. These investigations will identify the factors that are critical to electrode longevity and establish test platforms that can be used to aid the regulatory decisions regarding penetrating neural interfaces.

Friday February 10th, 2012
12:30PM-1:30PM, Room 3507
Nguyen Engineering Building

BIOGRAPHY

Cristin Welle, Ph.D. has been with the FDA for 1 year as a staff fellow. Her B.S. degree in neuroscience is from the College of William and Mary, in Virginia ('04). Her Ph.D. degree is from the University of Pennsylvania in neuroscience ('10).

Her research has focused on cortical neurophysiology and neural interfaces. She is currently a staff fellow in the Division of Physics at the FDA Center for Devices and Radiological Health in Silver Spring, MD.



For any questions please contact Claudia Borke at cborke@gmu.edu, (703) 993-4190