



Department of Biomedical Engineering  
Graduate Seminar



**Dr. Kevin J. Otto, Ph.D.**

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University of Florida

**Subject: Neuroprosthetic Device Design, Assessment, and Manipulation**

**Abstract:**

Direct interfacing of micro-devices with the nervous system has the potential to provide information for many indications including: sensory loss, cognitive manipulation, and bioelectronic medicine. However, chronic implantation and utilization of neural micro-devices results in a reactive tissue response that both functionally isolates the device from the tissue as well as triggers neuronal apoptosis or migration. The goal of our research is to understand and mitigate this limited functionality. Our research seeks to determine the interdependent effects of device design, electrophysiological recording, electrical stimulation, and the reactive tissue response on the efficacy of neural interfaces. We: 1) conduct psychophysical experiments using multi-channel implants in the nervous system, 2) collect longitudinal electrochemical and electrophysiological, 3) investigate several mitigation strategies, and 4) use advanced histological approaches to evaluate the device-tissue interface. Here we discuss the results of these various approaches and their implications for reliable chronic neural interfacing via micro-devices. We expect that these data will enable further neuroprosthetic development for many potential applications of neural interfaces.

**Bio:**

Dr. Kevin J. Otto received the BS degree in chemical engineering from Colorado State University in 1997, the MS degree in Bioengineering in 2002 and the PhD Degree in Bioengineering in 2003 from Arizona State University, Tempe. From 1997 to 2003 he was a Research Assistant in the Bioengineering Department, Arizona State University, where his work was in the areas of neural engineering and sensory neuroprostheses. From 2003 to 2004 he was a Research Fellow in the Department of Biomedical Engineering, University of Michigan, Ann Arbor where his work focused on brain-machine interface systems and implantable devices. From 2004 to 2006 he was a Post-Doctoral Fellow in the Central Systems Laboratory in the Kresge Hearing Research Institute in the Department of Otolaryngology at the University of Michigan, Ann Arbor where his work focused on cochlear implants. His primary appointment is Professor in the J. Crayton Pruitt Family Department of Biomedical Engineering at the University of Florida where he also serves as the Senior Associate Chair. His research interests include neural engineering, device-tissue interfaces, neurostimulation.

**Date and time: Friday March 5<sup>th</sup>, 2021 @ 11:00 A.M.**

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