

BME Faculty Candidate

Douglas Weber, PhD

**Friday, September 6, 2019
1:00 p.m.-2:00 p.m.**

**Wickenden, Room 321
Case Western Reserve University**



Implantable, injectable, and wearable devices for sensing and controlling neurological functions

Douglas Weber, PhD

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Abstract:

Recent advances in materials, microelectronics, and microfabrication technologies have enabled new and clinically relevant neurotechnologies that measure and regulate neural activity in the brain, spinal cord, and nerves. Devices that measure the activity of sensory neurons can be used to monitor physical and physiological parameters, such as limb posture and movement or bladder volume and pressure, while measuring the activity of motor neurons enables direct neural control over prosthetic limbs and assistive technologies. Conversely, these neural interface technologies can stimulate activity in sensory and motor neurons to create sensory percepts and reanimate paralyzed muscles. Although many of these applications rely currently on devices that must be implanted into the body for precise targeting, ultra-miniaturized devices can be injected through the skin or vascular system to access deep structures without open surgery. Furthermore, improved and alternative technologies for sensing and stimulating neural activity through the skin are extending capabilities of wearable neurotechnologies for monitoring, rehabilitation, and training applications.

Biography:

Doug Weber is an Associate Professor in the Department of Bioengineering and holds a joint appointment in the Department of Physical Medicine and Rehabilitation at University of Pittsburgh. His primary research area is Neural Engineering, including studies of motor learning and control with an emphasis on applications to neurotechnology, physical medicine and rehabilitation. Specific research interests include sensorimotor integration, neural coding of limb mechanics, and neural control of assistive devices, including brain-machine interfaces. Dr. Weber recently completed a 4-year term (2013-2017) as a Program Manager at the Defense Advanced Research Projects Agency (DARPA) where he was a founding member of the Biological Technologies Office. During his tenure at DARPA, Dr. Weber developed and managed a \$300M portfolio of neurotechnology research programs to support the White House BRAIN initiative, launched by President Obama in 2013. Dr. Weber received a Ph.D. in Bioengineering from Arizona State University and completed post-doctoral training in the Centre for Neuroscience at the University of Alberta.