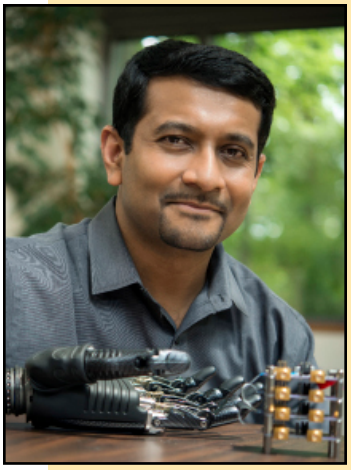

Siddhartha Sikdar, PhD

Professor, Department of Bioengineering

Director, Center for Adaptive Systems of Brain-Body Interactions (CASBBI)

Education

Ph.D., Electrical Engineering, University of Washington, Seattle

Key Interests

Imaging | Prosthetics | Chronic Pain | Brain-Body Interactions | Ultrasound | Nervous System | Musculoskeletal System | Stroke | Amputation | Spinal Cord Injury

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SELECT PUBLICATIONS

- S. Sikdar *et al.*, Novel applications of ultrasound technology to visualize and characterize myofascial trigger points and surrounding soft tissue. *Archives of Physical Medicine and Rehabilitation.* 90(11), 1829-1838 (2009).
- S. Sikdar *et al.*, Novel method for predicting dexterous individual finger movements by imaging muscle activity using a wearable ultrasonic system. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*. 22(1), 69-76 (2014).
- S. Sikdar *et al.*, Quantification of muscle tissue properties by modeling the statistics of ultrasound image intensities using a mixture of gamma distributions in children with and without cerebral palsy. *Journal of Ultrasound in Medicine*. 37(9), 2157-2169 (2018).

Research Focus

The overarching focus of my research is the investigation of brain-body interactions through imaging. I lead an interdisciplinary research group, the Biomedical Imaging Laboratory (BMIL), that conducts pre-clinical research for developing new technology as well as translational research on human subjects. In particular, we are studying the interactions between the central and peripheral nervous system and the musculoskeletal system in a number of clinical conditions of major public health significance, such as chronic pain, stroke, spinal cord injury, and amputation. The group uses state-of-the-art ultrasound and laser instrumentation for developing new ultrasound, optical, and hybrid imaging techniques. BMIL's research has potential applications in noninvasive diagnosis, screening, and treatment monitoring for a number of diseases, understanding underlying mechanisms of disease, and for developing assistive technologies to improve function and quality of life in individuals with disability.

Current Projects

- Investigation of a new sensing paradigm based on ultrasonic imaging of dynamic muscle activity to control biomechatronic systems, such as multiarticulating prosthetic hands
- Development of a novel hybrid exoskeleton for patients with spinal cord injuries that integrates functional electrical stimulation with robotic actuation and utilizes wearable ultrasound imaging sensors for measuring muscle fatigue
- Development and evaluation of a novel sonomyographic sensing and control system for enabling upper extremity amputees achieve dexterous intuitive control of prosthetic hands
- Planning for a future Engineering Research Center for technology-empowered communities of recovery around individuals with substance use disorders
- Investigating the role of hemodynamic factors and cerebral perfusion on cognitive function deficits in individuals with asymptomatic carotid atherosclerosis