JOINT BIOMEDICAL ENGINEERING SEMINAR SERIES

Friday, March 17th, 2017 (Noon-1pm)

UWM, EMS 295

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CONTEXT-DEPENDENT CODING OF MOTOR BEHAVIOR IN PRIMARY MOTOR AND PREMOTOR CORTICES

We often take the ability to move for granted because the reliability of motor behavior masks the complexities of interacting with our environment. This behavioral consistency is remarkable given the many factors that must be considered when moving the limb and manipulating objects, including the fidelity of sensory feedback, the goals of the task and the state of the limb. In this talk, I will describe recent experimental evidence that examines changes in the activity of populations of neurons in the primary motor and premotor cortices in response to the initiation of a reaching movement (i.e. task context). First, I will show that the dynamics of neural activity evolve orderly across time and space in response to the act of initiating a movement and that disruption of the spatiotemporal progression of neural activity disrupts movement initiation. Finally, using both empirical data and simulation, I will demonstrate that the temporal dynamics in motor cortical activity relate to current limb state and serve to compensate for changing muscle mechanics as the limb begins to move.

Bio: Dr. Suminski received his B.S. degree in biomedical engineering from Milwaukee School of Engineering in 2000 and the Ph.D. degree in biomedical engineering with a specialization in functional imaging from Marquette University and the Medical College of Wisconsin in 2006 where he was an Arthur J. Schmitt Fellow. He completed his postdoctoral training under the guidance of Nicholas Hatsopoulos in the Department of Organismal Biology and Anatomy at the University of Chicago. Dr. Suminski is currently a Senior Scientist in the Department of Neurological Surgery at the University of Wisconsin-Madison where his research focuses on the neural coding of motor behavior at the cell, ensemble and system levels and on the development of novel neuromodulation techniques and brain-machine interfaces.