FIU Biomedical Engineering
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Biomedical Engineering
Wallace H. Coulter Foundation
Lecture Series

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"Contributions of supplementary eye field to error monitoring during eye movement countermanding"

Dr. Jeffrey D. Schall
E. Bronson Ingram Professor of Neuroscience
Department of Ophthalmology & Visual Sciences
Director, Center for Integrative
Cognitive Neuroscience
University of Vanderbilt

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Lecture: 9:00 AM-10:00 AM

ENGINEERING CENTER
ROOM EC2300

Abstract: I will survey our research investigating how the brain controls and monitors actions. We use a countermanding (or stop signal) task in which macaque monkeys produce a gaze shift to a visual target unless a visual stop signal is presented. Performance of this task can be explained as the outcome of a race between a GO and a STOP process, and we understand how neural events in eye movement circuits instantiate this race. Macaques and humans adapt their performance according to the preceding consequences and context. We have discovered that neurons in an area in medial frontal cortex called the "supplementary eye field (SEF)" signal when errors are made, when reward is expected and when GO and STOP are in conflict. The interpretation of these neurophysiological observations was guided by the discovery in human electrophysiology of an event-related potential called the "error related negativity (ERN)". To build an empirical bridge between monkey neurophysiology and human electrophysiology, my colleague Geoff Woodman and I have recorded EEG from the cranial surface of monkeys and verified the presence of the ERN in macaques. Using a linear electrode array, we have also recorded local field potentials across the layers of SEF from which we can derive current density. We are currently investigating how current density in SEF relates quantitatively to the simultaneously recorded ERN. Using this as a specific example, I hope also to discuss the more general problem of understanding how events in neural circuits relate to EEG and event-related potentials.

Biography Jeffrey D. Schall is the E. Bronson Ingram Professor of Neuroscience at Vanderbilt University. After earning a Ph.D. in Anatomy at the University of Utah, he did postdoctoral research in the Department of Brain & Cognitive Sciences at MIT. Schall's research, supported by grants from the National Eye Institute, the National Institute of Mental Health, the National Science Foundation, and the Air Force Office of Scientific Research, focuses on how the brain makes decisions and controls actions. His research accomplishments have been recognized by awards from the Alfred P. Sloan foundation, the James S. McDonnell foundation and the McKnight Endowment Fund for Neuroscience. In 1998 he received the Troland Research Award from the National Academy of Sciences. He is a fellow of the Association of Psychological Science and of the American Association for the Advancement of Science.

Contact: claudia.estrada1@fiu.edu
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