PROJECT TITLE: EEG characterization of sensory processing delays in Multiple Sclerosis

FACULTY NAME: Scott Beardsley

STUDENT NAME: Richard Schroeder (Biomedical Engineering)

TIMEFRAME OF PROJECT: 6/2/14-8/22/14

RESEARCH SUMMARY: The goal of the proposed research was to develop an experimental paradigm that combined electroencephalography (EEG) with goal-directed reach tasks to test the hypothesis tremor in Multiple Sclerosis (MS) results from a mismatch between expected and actual visual processing delays. Over an 11-week period, Mr. Schroeder worked with a Ph.D. student, Megan Heenan, to develop and test an experimental protocol to measure and characterize the spatiotemporal changes in neural processing that occur during goal-directed reach tasks. As part of the protocol design, Mr. Schroeder learned the physiological basis of EEG signals and worked with Dylan Snyder (Ph.D. student) to gain experience in the set-up, acquisition, and analysis of EEG signals during goal-directed movement. Brain activity was obtained from two healthy subjects using a 64-channel EEG system as they performed a series of goal-directed tracking tasks. Preliminary analysis was completed to characterize the visual and proprioceptive delays in sensory processing in response to movement errors and spatially localize the onset of error processing during movement.

RESEARCH OUTCOME: The preliminary results from the research project are being used as pilot data for an NIH proposal.

LOCATION OF RESEARCH ACTIVITIES: Integrative Neural Systems Laboratory (EH 361; Cramer Rm. 138); Falk Neurorehabilitation Engineering Research Center (Cramer Hall)

COLLEGE RESOURCES: 64-channel EEG cap (Falk Neurorehabilitation Engineering Research Center)

COMMENTS: The project provided Mr. Schroeder with experience in the design of motor control experiments and the measurement/analysis of EEG signals. Mr. Schroeder has indicated an interest in continuing in this general area of research as he pursues a Master’s degree.