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Primary Research Interest:	Psychology
Description of Research:	The objective of this research experience is to directly investigate the effects of an aerobic exercise regimen on motor performance in the upper extremity using modern neuroimaging techniques. The purpose of the proposed research project is to continue multimodality neurophysiological inquiry and investigate the effects of aerobic activity on interhemispheric communication during unimanual movement. Additionally, the present study will evaluate the effects of both short-term (12 weeks) and longer-term exercise (6 months) programs on motor performance level and interhemispheric communication. The study will employ functional magnetic resonance imaging (fMRI), transcranial magnetic stimulation (TMS) to explore possible differences in interhemispheric communication after behavioral and exercise interventions. We expect that increased levels of aerobic fitness will result in improved upper extremity motor performance and decreased loss of interhemispheric inhibition typical of sedentary aging adults.
Relevance to VA:	New research has shown that upper extremity performance is associated with aging-related losses in interhemispheric inhibition. Our lab has recently shown that these changes may not be inevitable or immutable. New evidence indicates increased levels of physical fitness through aerobic activity may mitigate losses in interhemispheric inhibition and improve motor performance. We believe this research is critical to our understanding of normal motor organization and how it changes due to aging processes will inform our capability for reclamation of motor capacity due to neural pathology, as cortical activation patterns may vary according to biological age. The goal is that this work will eventually be applied to rehabilitation of motor deficits, which occur with increased incidence within and beyond middle age.