

Center for Cognitive Aging and Memory Neurophysiology and Neuromodulation Research Core (Director: Adam J. Woods, Ph.D.)

The Neurophysiology and Neuromodulation Core is housed on the first floor of the Institute on Aging Clinical Translational Research Building.

Neurophysiology: The Neurophysiology Facilities in the Core contain a state-of-the-art acoustic and radio frequency shielded faraday chamber for electrophysiology recording procedures with a separate experimenter observation station. The observation station contains extensive live data and subject monitoring equipment. The Core maintains a 64-channel active electrode BrainVision ActiChamp electrophysiology system for electroencephalography (EEG) and event-related potential (ERP) recording, as well as all necessary electrodes, gels, caps, and materials. The Core also maintains BrainVision equipment for simultaneous recording of electrocardiography (ECG), electromyography (EMG), electrooculography (EOG), galvanic skin response (GSR), heart rate, respiration rate, and three-dimensional movement capture (3D Accel). In addition, the Core space contains hair washing and electrode-cleansing facilities for participant prep and equipment maintenance. The Core houses both stationary and mobile data collection and analysis computers. All electrophysiology data collection and analysis equipment are dual designed for onsite or offsite recording, to facilitate projects where participants are unable to travel to the Core for research testing.

Neuromodulation. The Neuromodulation Facilities in the Core contain state-of-the-art transcranial magnetic stimulation and transcranial electrical stimulation equipment. This includes a Magstim SuperRapid Transcranial Magnetic Stimulation system with BrainSight 2 MRI-guided neuronavigation, Soterix and Neuroconn conventional (1x1) and high-definition (4x1) transcranial direct current stimulation (tDCS) units, as well as transcranial alternating and random noise stimulation systems. In addition, the Core maintains an MRI compatible tDCS stimulator in the McKnight Brain Institute Advanced Magnetic Resonance Imaging and Spectroscopy (AMRIS) 3T human neuroimaging facility. The Core also maintains Soterix tDCS and HD-tDCS Explore software for computational modeling of current density and flow to determine optimal electrode locations for study design and implementation. To facilitate large-scale clinical and research trials, the Core maintains access to eight clinical testing rooms on the 1st floor of the Institute on Aging Clinical Translational Research Building and three testing rooms in the Institute on Aging Health Promotions Center.

Consultation and Training. The Neurophysiology and Neuromodulation Core provides consulting services and technical support for grants and pilot studies using electrophysiology or neuromodulation methods, including a battery of sample experiments for clinical and research studies. The Core also provides a well-established training program for researchers new to neurophysiology and neuromodulation methods.