



COBRE Center for Neuromodulation

Equipment Catalog

1.

Neuromodulation Core

Contacts

Linda Carpenter, MD

Director

Eric Tirrell

Neuromodulation Research Facility Operations Manager

Specific Aims

- Provide support, training and assistance to COBRE Project Leaders (PLs) and their teams to promote and facilitate the acquisition of high-quality neuroimaging data
- Provide support training and assistance to COBRE PLs and their teams to promote and facilitate the application of high-quality neuromodulation
- Establish core resources with a trajectory toward self-sustaining and enduring status that will serve the larger neuromodulation research community in Rhode Island

Location

Butler Hospital

345 Blackstone Blvd.
Providence, RI 02906

www.butler.org/directions



2.

Transcranial Magnetic Stimulation (TMS) Device

Neurostar Advanced Therapy System

- First FDA cleared device to treat depression using repetitive TMS
- **Contact Sensing:** provides real-time feedback with TMS coil contact
- **Motor Threshold assist:** manual and automated software to assist in obtaining individual motor thresholds
- Includes TrakStardatabase for TMS reporting, documentation and obtaining stimulation parameters



Magstim

Magstim Rapid² Plus 1

- Biphasic
- Repetitive, Continuous, and Theta burst TMS protocols
- <100 Hz frequency stimulation

MagstimBistim2

- Monophasic
- Paired pulse TMS protocols
- Sub-and supra-threshold conditioning



Magstim Compatible Coils

AirFilmCoil (AFC) –2 active, 2 sham

- Available with active and sham coils
- Delivers repetitive, continuous, and theta burst pulses at high power levels

D702Coil –1

D50 Flat Coil –1

MT D70 Remote Coil –2

Double Cone Coil (DCC)

- Two large cup shaped windings side by side with a flat central section
- Coil geometry allows for better magnetic coupling giving 70% higher induced current
- Useful in stimulating motor cortex areas controlling muscles of lower torso and limbs



Nexstim

- MRI-Navigated Brain Therapy System (NBT)
- TMS combined with 3D brain MRI imaging
- E-field modeling and orientation shown on cortical anatomy
- Capable of delivering repetitive TMS and theta burst protocols
- Includes 6 channels EMG with integrated motor response measurement
- Individual modeling of induced current
- Capable of MRI overlay



Electroencephalography (EEG)ANT

North America

- **EEGO MyLab** computer and amplifier
- **EEGO Sports** – computer and amplifier
- Records up to 64 wet channel montages (gel)
- TMS-compatible
- Accessories -include d for up to 24 bipolar channels for EOG, ECG, EMG, and physiological sensors for respiration, temperature, skin conductance, and acceleration
- High temporal resolution data with sampling rate up to 16 kHz*
- Available in multiple cap sizes (2 small, 2 med, 1 large) for use with adults and children

*EEGO sports maximum sample rate 2048 Hz



StarStim (Neuroelectronics)

- Mobile and wireless EEG with option for customized 8 dry channel electrodes with mastoid reference
- tDCS/tACS-capable of closed loop
- NIC software enables time-frequency analysis in real-time with spectrum, spectrogram, and band power visualization
- Sampling rate of 500 Hz
- Timestamp synchronization with external software



Other Physiological Monitoring: ADInstruments

Powerlab8/35 Data Acquisition Device

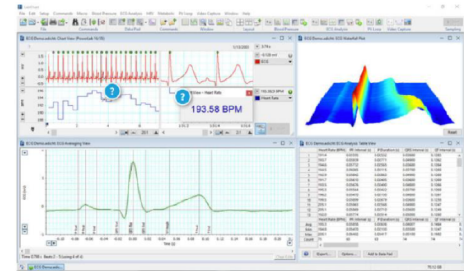
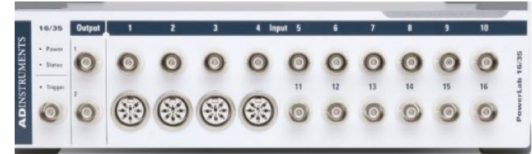
- 8 analog input channels, 8 digital inputs, 8 digital outputs for use of EMG, HRV, GSR data acquisition

Labchart Software

- Physiological data analysis software
- HRV analysis module (add on)

GSR Amplifier

- A fully isolated galvanic skin response (GSR) amplifier with low voltage, 75 Hz AC excitation and automatic zeroing



Neuronavigation: Rogue Research

Brainsight

- Supports multiple MRI file formats
- MNI/Talairach coordinate registration
- Fits multiple overlays
- Region paint tool for 3D brain reconstruction and automatic curvilinear reconstruction
- Automatic skin and surface to identify region of interest (ROI)
- Drop markers or trajectories based on anatomy, functioning peaks, or using MNI or Talairach coordinates
- Built in EMG for recording motor evoked potential (MEP)
- Neuronavigate with TMS to anatomical targets based on experiment with high precision
- Template Brain Option when no MRI available



3.

**External
User Interfaces:
Cambridge
Electronic
Design (CED)**

Each unit with dedicated laptop

Power 1401 Amplifier

- High-performance data acquisition interface
- Records waveform data, digital (event) marker information and can generate waveform and digital outputs simultaneously
- 16 channels of 16-bit waveform input
- Supports wide range of research application including TMS



1902 Isolated Amplifier

- Versatile modular unit designed to work with modern computer-controlled data acquisition systems through CED software
- Applications for EMG, EEG, ECG, ERG, evoked response, TMS studies, skin conductance GSR, tremor measurement amongst others



Signal Software

- Data acquisition and analysis software for TMS stimulus generation, data capture (EMG), control of external equipment, and custom analysis
 - Program customized for ppTMS or other protocols to drive Magstim TMS stimulators
 - Use developed scripts to run individual study experiment
- *Software requires power 1401 amplifier seen in previous slide to use

4.

Transcranial Direct Current Stimulation (tDCS)

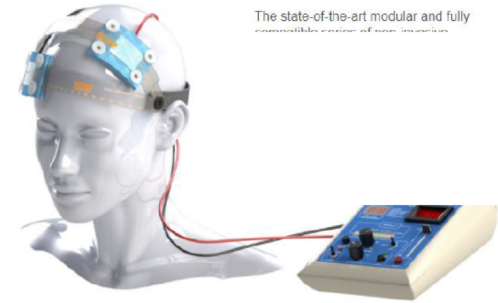
Soterix Medical

1x1 Platform

- Non-invasive electrical brain stimulation to deliver tDCS with impedance monitoring
- Anode and cathode electrodes for precise stimulation
- Active/sham conditions with ramp up/down capabilities with added “tickle” function to produce weak current exposure

4x1 TD-tDCS High Definition Adaptor

- Combined with 1x1 platform
- Focalized tDCS stimulation with sole anode surrounded by 4 cathodes for high definition tDCS



Neurocare: Neuroconn

DC-Stimulator Plus –2 units

- Anode and cathode placement with sponge electrodes for delivery of 1 channel stimulation with continuous impedance monitoring
- Active/sham conditions available for low-grade tDCS experiments



Chattanooga Ionto

- Dualchannel tDCS device to target 2 sites simultaneously
- Ramp up/down functions
- Audible alert notifications for impedance monitoring
- Electrical current can be set in 0.1 mA increments between 0.5 mA and 4mA



Contact

If interested in learning more about the available equipment, resources, and space the Neuromodulation Core at Butler Hospital has to offer, please contact:

Eric Tirrell

etirrell@butler.org

(401) 455-6633

www.butler.org/services/cobre/

Sources

www.neurostar.com

www.magstim.com

www.magstim.com/product-category/coils/

www.nexstim.com

www.magandmore.com

www.ant-neuro.com

www.neuroelectronics.com

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www.ced-co.uk

www.soterixmedical.com

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