

# Center for Biomedical Imaging

# Annual Report FY2016

(issued 10 April 2017)

The Center for Biomedical Imaging provides the resources to enable basic and clinical scientists to collaborate to discover new insights into normal and disease processes and to apply this knowledge to clinically relevant research.



## Introduction & Background

The Center for Biomedical Imaging (CBI) was established by the Board of Trustees in 2010 as a University Designated center. This decision has enabled MUSC to remain competitive with other academic institutions and to establish the infrastructure and environment to reach the next level in this crucial research area.

The CBI is a resource for basic and clinical scientists collaborating to discover new information about normal and disease processes and how to apply this knowledge to clinically relevant research. Central to the mission objectives of the CBI are 1) service to the MUSC imaging research community, 2) training and mentorship of graduate students and future leaders in biomedical imaging, 3) recruitment of outstanding senior and young investigators, 4) discovery of new clinical applications of imaging and their practice in the clinical arena and 5) promotion of basic research in medical imaging and related fields. The CBI's website can be found at: <http://academicdepartments.musc.edu/cbi/>

The CBI central offices are located on the 2<sup>nd</sup> floor of the Bioengineering Building (BEB) at 68 President Street. In FY2016, the CBI managed six research dedicated advanced imaging devices including a 3T human MRI system, a 7T animal MRI system, an animal PET/CT imaging system, a bioluminescence & fluorescence imaging system and a small animal *in vivo* fluorescence imaging system. Space is divided into two locations: human imaging located at 30 Bee Street and small animal imaging located on the second floor of the BEB. The CBI is open to all investigators in SC and serves as a foundation for the development of numerous applications that benefit from the use of biomedical imaging.

***In fiscal year 2016, the CBI provided imaging support and resources for a total of 76 grants, 56 of which were federal grants to MUSC. The CBI also supports MUSC faculty by offering development time to be used for collaborations and the collection of pilot data. In fiscal year 2016, the CBI underwrote approximately \$288K of this development time for MUSC researchers.***

### **Mission Statement:**

The mission of the CBI is to provide the leadership and infrastructure in the imaging sciences necessary for basic and clinical scientists to collaborate, discover new ways to study normal and disease processes, develop and apply this knowledge to clinically relevant research, and to translate these advances to the patient community while providing a quality graduate education environment.

### **Vision Statement:**

The vision of the CBI is to be recognized as an integrated and multidisciplinary center for biomedical imaging research with mutually supportive and valued interactions among basic science and clinical departments, to recruit outstanding faculty and educate the future leaders of the field.

# Administration

## General:

In FY2016, the leadership of the CBI included:

Dr. Joseph A. Helpern, Director  
Dr. Truman R. Brown, Scientific Director  
Dr. Ann-Marie Broome, Director of Molecular Imaging and  
Dr. U. Joseph Schoepf, Director of Cardiovascular Imaging.

Ms. Haley Godfrey serves as the Administrative Assistant (0.2 FTE) and Mr. Kevin Hildreth as the Fiscal Manager (0.2 FTE).

## CBI Internal Advisory Committee:

The CBI's Internal Advisory Committee (IAC) comprises the CBI Directors as well as both early stage and senior researchers from across the University. Many of these individuals are experienced in participating in large research programs as well as in the management of shared facilities. The IAC advises the Director on the administrative operation of the CBI, coordinates resources, and ensures that the research conducted within the CBI is appropriately prioritized to reflect the overall goals of MUSC.

Current members of the IAC are:

Dr. Kathleen Brady	Dr. Ann-Marie Broome	Dr. Truman Brown
Dr. Phil Costello	Dr. Chris Davies	Dr. Mark Eckert
Ms. Anita Harrison	Dr. Joseph A. Helpern	Dr. Peter Kalivas (Chair)
Dr. Steven Kautz	Dr. Amanda LaRue	Dr. Vincent Pellegrini
Dr. Thomas Uhde		

In FY2016, CBI leadership continued to hold quarterly "town hall meetings" in which all users were able to express their views and opinions.

## Scheduling:

Scheduling of time on imaging systems is performed through a web-based system called Calpendo (<https://musc.calpendo.com/>), that allows researchers with approved IRB or IACUC protocols to examine and schedule CBI equipment and facilities.

# Operations

## Staff:

The following are full- and part-time staff were employed by CBI in FY2016.

R. Deardorff, M.S.	(0.50 FTE)	Lab Manager
M. Van Horn, Ph.D.	(0.76 FTE)	Image Analysis & IT
J. Doose, M. Eng.	(0.50 FTE)	Biomedical Engineer
K. Hildreth	(0.20 FTE)	Fiscal Manager
H. Godfrey	(0.20 FTE)	Admin. Assistant
J. Purl	(1.00 FTE)	MRI Technologist (Siemens 3T)
D. Montgomery	(0.10 FTE)	Program Coordinator I (IRB compliance)
A. Moore, M.S.	(0.85 FTE)	Research Specialist (Animal Imaging - other)
X. Nie, MD.	(1.00 FTE)	Research Specialist (Animal Imaging – 7T MRI)

## Preclinical (Small Animal) Imaging:

Maestro 2 *In Vivo* Imaging: The Maestro 2 *in vivo* imaging system (Caliper Life Sciences) provides state-of-the-art fluorescence imaging of small animals, including the capability to generate anatomic organ maps and to anatomically target co-localization using DyCE, a Caliper-developed all-optical imaging platform.

Xenogen IVIS 200 Bioluminescence Preclinical Imaging System: The IVIS 200 can image up to 5 animals at a time and can provide limited 3D depth information.

Siemens Micro-CT/PET: The Siemens Micro-CT/PET is a dual-modality system to acquire both micro-CT and micro-PET images. Image data can be co-registered so that PET image data can be anatomically localized with the micro-CT imaging data.

Bruker 7T MRI: The BioSpec 70/30 MRI scanner is a multipurpose system for high-resolution MR spectroscopy and imaging operating at 7 Tesla (T). The 7T MRI is ideal for 2D and/or 3D high-resolution anatomical imaging as well as diffusion and diffusion tensor, flow, cardiac, dynamic contrast, functional MRI and chemical shift imaging.

Surgery Room: The Surgery Room is booked concurrently with the 7T MRI and is available for pre-imaging preparation.

## Human imaging Resources:

Siemens 3T TIM Trio MRI Scanner: The Siemens 3T MRI is equipped with integrated fMRI paradigm presentation equipment and offers visual, auditory and olfactory stimulus delivery with tactile and verbal feedback. The scanner and fMRI set-up have been designed to integrate seamlessly with other research MR scanners in South Carolina to allow for multi-center studies. The scanner operates with a 100% mandate for research use and is covered by a master research agreement with Siemens Medical. This scanner is now 9 years old and will need to be replaced/upgraded in the near future. In May of 2016, a \$1,044,116 High End Instrumentation Proposal (HEIP) with Dr. Helpert as the PI was submitted to NIH for to upgrade this system to a Siemens Prisma system.

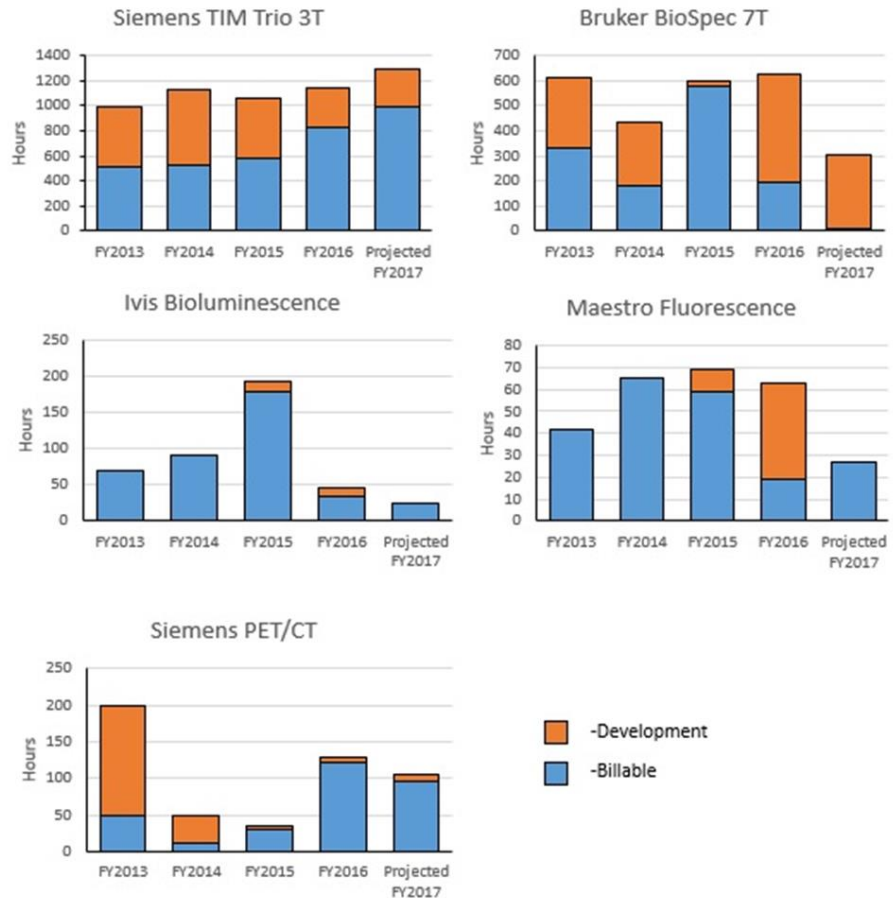
Mock Scanner: The Mock Scanner is a full-size replica of the 3T MRI made from plywood and other building materials to look and sound like the real MRI. The Mock Scanner is available to be used for 'trial runs' with patients who are wary of undergoing the full scanning procedure and can be also booked for use as a training or demonstration tool.

## Equipment Usage:

Shown in the figure below is the hourly usage by system from FY2013 through FY2017 (projected). The Siemens 3T MRI remains the most highly utilized resource, followed by the Bruker 7T MRI. Billable time for the Siemens 3T MRI has been steadily increasing. To alleviate the pressure this has placed on available development time, consideration is being made to expand the CBI's hours of operation into nights and weekends.

CBI Faculty are currently provided two hours of development time per week to be used for the collection of pilot data and for collaboration with other

researchers. The CBI also assists Junior Faculty members across all Colleges at MUSC in developing imaging methodology in their research. Junior Faculty are faculty at the Assistant Professor rank who are not currently, and have never been, the Principle Investigator (PI) of an NIH R01, R21, Program Project or Center (P41) grant proposal. To help defray the costs of scanning, the CBI offers matching development time to Junior Faculty members.



## Faculty

Faculty of the CBI come from all Colleges at MUSC who are using and developing imaging in their research. There are currently 27 faculty members representing various Departments including Radiology and Radiological Sciences, Neurosciences, Health Professions, Otolaryngology, Psychiatry and Behavioral Sciences, Pathology and Laboratory Medicine and Microbiology and Immunology. Collaboration among faculty in the development of new and cross-disciplinary methodologies is strongly encouraged, and faculty members are expected to take part in Study Group meetings, contribute to teaching CBI courses and generally support the overall well-being of the CBI. Each faculty member must give a lecture to the CBI every other year on their research.

Andreana Benitez, Ph.D.	Assistant Professor	Neurology
Leonardo Bonilha, M.D., Ph.D.	Assistant Professor	Neurology
Ann-Marie Broome, Ph.D.	Associate Professor	Radiology
Truman R. Brown, Ph.D.	Professor	Radiology
Dean Connor, Jr., Ph.D.	Assistant Professor	Radiology
Mark Eckert, Ph.D.	Associate Professor	Otolaryngology
Maria Falangola, M.D., Ph.D.	Assistant Professor	Radiology
Mark George, M.D.	Distinguished University Professor	Psychiatry
Colleen Hanlon, Ph.D.	Assistant Professor	Psychiatry
Joseph A. Helpert, Ph.D.	Professor	Radiology
Jens Jensen, Ph.D.	Professor	Radiology
Jane Joseph, Ph.D.	Professor	Neuroscience
Deepak Kumar, Ph.D.	Assistant Professor	Health Professions
Amanda LaRue, Ph.D.	Associate Professor	Pathology
Thomas Naselaris, Ph.D.	Professor	Neuroscience
James Prisciandaro, Ph.D.	Assistant Professor	Psychiatry
Donna Roberts, M.D.	Assistant Professor	Radiology
Joseph Schacht	Assistant Professor	Psychiatry
U. Joseph Schoepf, M.D.	Professor	Radiology
Vittoria Spampinato, M.D.	Associate Professor	Radiology
Sameer Tipnis, Ph.D.	Assistant Professor	Radiology
Mark Van Horn, Ph.D.	Assistant Professor	Radiology
Xue-Zhong Yu, M.D., M.S.	Professor	Microbiology
DeAnna Adkins, Ph.D.	Assistant Professor	Neuroscience
Jeffrey Borckardt, Ph.D.	Associate Professor	Psychiatry
Brett Froeliger, Ph.D.	Assistant Professor	Neuroscience
Xingbao Li, M.D.	Assistant Professor	Psychiatry
Andy Shih, Ph.D.	Associate Professor	Neuroscience

# Education

## Biomedical Imaging Ph.D. Program

In 2014, the CBI received full approval for the Ph.D. in Biomedical Imaging curriculum and currently has 4 students enrolled. The mission of the Biomedical Imaging Ph.D. program is to train students in a basic core of knowledge and skills that will prepare them to become leaders in the application of biomedical imaging technology to problems in basic and clinical research. The program provides a strong foundation in the fundamentals of image acquisition technologies and data analysis methods, while exposing students to the application of specific imaging modalities through a series of individual electives in their chosen area of interest.

The Biomedical Imaging PhD program is designed to provide students with the education and training needed to pursue careers applying cutting edge developments in biomedical imaging to solving scientific and healthcare problems within academia or industry.

Through the CBI, MUSC offers a comprehensive and integrated graduate training program combining biomedical sciences through the College of Graduate Studies core curriculum, with a strong emphasis on imaging science and its biomedical applications leading to a Ph.D. in Biomedical Imaging. The core curriculum is designed to provide a strong foundation in the fundamentals of imaging acquisition technologies, data analysis methods, and research design, all within the context of applying these techniques in clinical and basic research projects in academic and industrial medical and research settings. Through this program, students are able to gain hands-on experience with advanced imaging systems dedicated to both preclinical (bioluminescence, fluorescence, Micro-CT/PET, 7T MRI) and human (3T MRI) research. The students have opportunities to rotate as research assistants in laboratories of faculty who actively conduct research within many departments throughout the University, such as Neurosciences, Psychiatry, Radiology, Rehabilitation, Cardiology, Pediatrics, Surgery, and Oncology. The students are required to demonstrate scientific proficiency in the area of biomedical sciences, with an emphasis on biomedical imaging through the completion of a qualifying examination and an individual doctoral dissertation.

Upon the completion of this degree, graduates have the foundation on which they can build careers as independent investigators or key collaborators who possess a unique combination of skills: a fund of technical knowledge of imaging sciences and its most critical innovations as well as a distinct perspective that is focused on applying these advances in biomedical imaging to a breadth of preclinical and human research areas, from basic physiological processes to phenotypically complex diseases.

Our program begins with two years of didactic coursework during which students master the fundamental physical and biological principles behind biomedical imaging. Through laboratory rotations students identify a faculty mentor and a research topic for their thesis. The facilities at MUSC are quite extensive (bioluminescence, fluorescence, Micro-CT/PET, animal 7T MRI and human 3T MRI), and faculty research interests are broad (Neurosciences, Psychiatry, Radiology, Rehabilitation, Cardiology, Pediatrics, Surgery, and Oncology), allowing students to select a mentor and topic of research closely suited to their interests. More information on this program can be found at: <http://academicdepartments.musc.edu/biomi/>

## Study Groups

*Addiction - Leader: Joseph Schacht, Ph.D.*

The Addiction Study Group is a forum for discussion of neuroimaging of addictive disorders. Topics include 1) discussion of the clinical presentation of disorders including alcohol, nicotine, cocaine, heroin, and prescription opioid abuse and dependence; 2) application of a broad spectrum of neuroimaging modalities, including functional and structural MRI, diffusion tensor and kurtosis imaging, and MRS, and methods, including network connectivity analysis; and 3) opportunities for collaboration among investigators for grant submissions. Meetings have varied formats, including journal club discussion, data presentation, grant ideas forums, and practice job or conference talks. Both clinical and basic science investigators currently involved with addiction neuroimaging projects or hoping to pursue such projects are encouraged to attend.

## User Group Meeting (Nuts & Bolts)

The CBI Nuts and Bolts User Group meets twice a month and provides a forum for in-depth discussions by researchers about imaging, statistical methods, data analysis techniques and administrative issues. The first portion of the meeting is dedicated to discussion of CBI equipment and administrative issues, and the remainder of the meeting typically consists of a presentation of a discussion topic chosen by the group.

## Lectures

The CBI regularly hosts lectures given by both visiting speakers and CBI faculty. Past lectures have included the following:

6/16/15	William Hill, PhD	Bad to the Bone: Age-Related Changes in Mesenchymal Stem Cell miRNAs and Their effect on the CXCL12 (SDF-1) Axis and Osteogenesis	Georgia Regents University
9/15/15	Thomas Naselaris, PhD	Using Mental Imagery to Probe Feedback in the Human Visual System	MUSC
11/2/15	Dale Mugler, PhD	Digital Hermite Functions for Medical Signal and Image Analysis	University of Akron (Ret)
11/17/15	Brian Wandell, PhD	New Methods for measuring activity, connections, and tissue properties in the living human brain	Stanford University
12/01/15	Jeff Barnes, MS	MassArray Technology from Agena Bioscience: A Versatile and Scalable Targeted Genomics Platform	Agena
1/19/2016	Joe Carson, PhD	3D Imaging at Low Cost: A Marriage of Medical and Astronomy Tools	College of Charleston
6/28/2016	Yash Tiwari, PhD	MRI Biomarkers in Experimental Ischemic Stroke	University of Texas



## **Appendix I: Budget**

**FY16 Actual**

Budget Category	Admin 44750	3T 49751	7T 49752	PET-CT 49753	IVIS 49754	Maestro 49755	Totals	% of Category Total
<b>Revenue</b>								
Scan Revenue		\$ 423,392.50	\$ 69,575.00	\$ 6,820.00	\$ 4,512.50	\$ 3,627.50	\$ 507,927.50	59%
Provost Funding		\$ 185,000.00					\$ 185,000.00	21%
Dean's Office Funding	\$ 175,000.00						\$ 175,000.00	20%
<b>Revenue Total</b>	<b>\$ 175,000.00</b>	<b>\$ 608,392.50</b>	<b>\$ 69,575.00</b>	<b>\$ 6,820.00</b>	<b>\$ 4,512.50</b>	<b>\$ 3,627.50</b>	<b>\$ 867,927.50</b>	<b>100%</b>

**Expenses**

<b>Total Payroll (Salaries &amp; Fringe)</b>	<b>\$ 104,370.30</b>	<b>\$ 270,846.14</b>	<b>\$ 80,722.83</b>	<b>\$ 19,646.41</b>	<b>\$ 24,877.71</b>	<b>\$ 24,877.67</b>	<b>\$ 525,341.06</b>	<b>100%</b>
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**Direct Costs**

Service Contracts	\$ (14,557.96)	\$ 166,658.50	\$ 36,500.00	\$ (1,980.00)			\$ 186,620.54	89%
Study Participant Fees		\$ 1,050.00					\$ 1,050.00	0%
Shipping	\$ 35.68		\$ 228.24				\$ 263.92	0%
Xerox Service and Maintenance Agreement	\$ 6,043.42						\$ 6,043.42	3%
Calpendo Licenses	\$ 5,262.25						\$ 5,262.25	2%
Office Supplies	\$ 729.66	\$ 630.25					\$ 1,359.91	1%
Med/Sci/Lab Supplies	\$ 3,489.41	\$ 1,396.49	\$ 2,146.48	\$ 200.88	\$ 645.13	\$ 514.55	\$ 8,392.94	4%
Animal Per Diem			\$ 1,277.96				\$ 1,277.96	1%
Travel	\$ 534.95						\$ 534.95	0%
Bank Charges						\$ 30.31	\$ 30.31	0%
<b>Total Direct Costs</b>	<b>\$ 1,537.41</b>	<b>\$ 169,735.24</b>	<b>\$ 40,152.68</b>	<b>\$ (1,779.12)</b>	<b>\$ 645.13</b>	<b>\$ 544.86</b>	<b>\$ 210,836.20</b>	<b>100%</b>

**Indirect Costs**

30 Bee Street Lease		\$ 29,354.42					\$ 29,354.42	47%
Utilities		\$ 12,383.76					\$ 12,383.76	20%
Commercial Insurance		\$ 240.98					\$ 240.98	0%
General Repairs		\$ 707.10					\$ 707.10	1%
Environmental Sanitation (Steritech)		\$ 736.30					\$ 736.30	1%
Telephone (Centrex & Cellular) and Paging	\$ 3,292.48	\$ 1,141.76	\$ 274.30	\$ 203.53			\$ 4,912.07	8%
Building Maintenance (CBI/CAIR)	\$ 251.55						\$ 251.55	0%
Hazard & Flood Insurance		\$ 6,980.47					\$ 6,980.47	11%
Grant Overrun - Broome				\$ 2,199.00	\$ 2,199.00	\$ 2,199.00	\$ 6,597.00	11%
<b>Total Indirect Costs</b>	<b>\$ 3,544.03</b>	<b>\$ 51,544.79</b>	<b>\$ 274.30</b>	<b>\$ 2,402.53</b>	<b>\$ 2,199.00</b>	<b>\$ 2,199.00</b>	<b>\$ 62,163.65</b>	<b>100%</b>

<b>Total Expenses</b>	<b>\$ 109,451.74</b>	<b>\$ 492,126.17</b>	<b>\$ 121,149.81</b>	<b>\$ 20,269.82</b>	<b>\$ 27,721.84</b>	<b>\$ 27,621.53</b>	<b>\$ 798,340.91</b>	
<b>% of Total Expenses</b>	<b>14%</b>	<b>62%</b>	<b>15%</b>	<b>3%</b>	<b>3%</b>	<b>3%</b>	<b>100%</b>	
<b>Total Revenue less Total Expenses</b>	<b>\$ 65,548.26</b>	<b>\$ 116,266.33</b>	<b>\$ (51,574.81)</b>	<b>\$ (13,449.82)</b>	<b>\$ (23,209.34)</b>	<b>\$ (23,994.03)</b>	<b>\$ 69,586.59</b>	

## **Appendix II: Grants Supported by CBI**

<b>User</b>	<b>Grant Title</b>	<b>Funding Agency</b>
Ablonczy, Zsolt	The Mechanism of the Outer Blood Retina-Barrier Breakdown	NEI
Adams, Zachary	ORWH: SCOR on Sex and Gender Factors Affecting Women's Health	NIDA
Adisetiyo, Vitria	Differential and Predictive Brain Biomarkers of ADHD with High Risk Substance Use Disorders	Klingenstein Third Generation Foundation
Anton, Raymond	Gabapentin for Relapse Prevention: Alc. Withdrawal-Brain Gaba/Glutamate Effects	NIAAA
Anton, Raymond	RC4 Impulsivity and Drinking/Craving: Effect of a Dopamine Stabilizer Medication	NIAAA
Bachman, David	Trans-Cranial Direct Current Stimulation to Treat Aphasia: Phase II Trial	University of SC
Back, Sudie	CAP - Doxazosin in the Treatment of Co-Occurring PTSD and Alcohol Use Disorders	VA
Back, Sudie	Glial Regulators for Treating Comorbid Posttraumatic Stress Disorder and Substance Use Disorders	DOD
benitez, Anya	White Matter Tract Integrity Biomarkers of Neurodegeneration in Aging and MCI	NIA
Bonilha, Leo	Center for the Study of Aphasia Recovery: (C-STAR)	NIDCD
Bonilha, Leo	Presurgical applications of fMRI in Epilepsy	NINDS
Bonilha, Leo	Wide Spectrum Investigation of Stroke Outcome Disparities on Multiple Levels (WISSDOM)	AHA
Borckardt, Jeffery	Opiod Abuse and Chronic Pain: An fMRI Model of Negative Reinforcement	NIDA
Borckardt, Jeffery	RCT of TDCS-Augmented CBT for Veterans with Pain and Opiod Misuse	NIDA
Bowden, Mark	SC Research Center for Recovery from Stroke: Project 2 - Excitatory and Inhibitory RTMS as Mechanistic Contributors to Walking Recovery	NIGMS
Brady, Kathleen	ORWH: SCOR on Sex and Gender Factors Affecting Women's Health	NIDA
Brown, Truman	EEG/fMRI Controlled TMS Real-Time Neural Feedback in Anti-Depressive Treatment	NIMH
Carroll, Steven	Combinatorial Therapy with Receptor Tyrosine Kinase Inhibitors for Malignant Peripheral Nerve Sheath Tumors	Children's Tumor Foundation
Cortese, Bernadette	Trauma-Related Olfactory Cues in Posttraumatic Stress Disorder	NIMH
Cowart, L. Ashley	Roles of Sphingolipids in the Pathophysiology of Obesity and Diabetes	VA
Dwyer, Gregg	Evaluation of Cue-Induced Brain Activation in Pedophilic Offenders	University of Ottawa
Eckert, Mark	Neuroimaging of Age-Related Changes in Speech Recognition	NIDCD
Feng, Wayne	Motor Stroke Rehabilitation Clinical Trial	Halo Neuroscience Corp
Feng, Wayne	S-STREAM: A Multicenter Observational Study to Evaluate the Simplified-Stroke Rehabilitation Assessment of Movement	Daiichi Sankyo
Feng, Wayne	SC Research Center for Recovery from Stroke: Project 3 - Optimizing Transcranial Direct Current Stimulation Current and Electrode Montage for Stroke Patients	NIGMS
Flanagan, Julianne	Building Interdisciplinary Women's Health at MUSC	NICHHD
Froeliger, Brett	Neuroimaging of Nicotine Dependence, Depression, and Emotion Regulation	NIDA
Froeliger, Brett	Translational Neuropsychopharmacology Research of Nicotine Addiction	NIDA
George, Mark	Developing a Potential Clinical Method for Dosing Transcranial Direct Current Stimulation	Other
George, Mark	Focal Electrically-Administered Seizure Therapy (FEAST)	Other
George, Mark	MRI Analysis of Coil Position to Improve the rTMS Treatment of Depression	VA MIRECC
Gregory, Chris	Treating Depression and Enhancing Locomotor Recovery Post-Stroke	NIGMS
Gregory, Chris	Contract for Neuro-Rehabilitation Engineering Services: Skeletal Muscle Plasticity as an Indicator of Functional Performance Post Stroke	VA
Haemmerich, Dieter	Evaluation of RFA + ThermoDox	Celsion Corp

Hanlon, Colleen	Longitudnal Study of Functional Connectivity Among Cocaine Users in Treatment	NIDA
Hanlon, Colleen	Cortical Inhibition and Corpus Callosum Integrity in Cocaine Users	NIDA
Hanlon, Colleen	Cortical rTMS as a Tool to Change Craving and Brain Reactivity to Alcohol Cues	NIAAA
Hanlon, Colleen	Impact of VMPC Brain Stimulation on Outcomes in Treatment-Engaged Cocaine Users	NIDA
Hanlon, Colleen	Longitudinal Study of Functional Connectivity Among Cocaine Users in Treatment	NIDA
Hanlon, Colleen	SC Research Center for Recovery from Stroke: Project 1 - Investigating the Neurobiologic Basis for Loss of Cortical Laterality in Chronic Stroke Patients	NIGMS
Harris, Kelly	Neural Determinants of Sound Encoding in the Aging Ear and Brain	NIDCD
Hinson, Vanessa	Atomoxetine Treatment for Cognitive Impairment in Parkinson's Disease	Other
Holmstedt, Christine	Navigate Embolic Stroke of Unknown Source	Bayer HealthCare
Howe, Philip	TGFB - Signaling Pathways	NCI
Jakymiw, Andrew	MUSC Center for Oral Health Research: Core D Pilot Projects	NIGMS
Kumar, Deepak	Evaluation of Cartilage and Muscle Changes following ACL-reconstruction	Other
LaRue, Amanda	Hematopoietic Stem Cell-Derived Carcinoma Associated Fibroblasts in Tumor	NCI
Li, Xingbao	Developing rTMS as a Potential Treatment for Nicotine Addiction	NIDA
Li, Xingbao	South Carolina Research Center for Recovery from Stroke: Pilot 4 - Paired Associative Stimulation Modulates Motor Excitability and Plasticity in Chronic Stroke Patients	NIGMS
Li, Zihai	Chaperone Mechanisms in Innate Immunity	NIAID
Marriott, Bernadette	Reduction in Suicide Risk: A Double-Blind, Placebo-Controlled Trial of Omega3 Fatty Acid Supplementation among Military Veterans	VA
Mehrotra, Meenal	Regulation of HSCS and HSC-Derived Osteoblasts in Osteogenesis Imperfecta	NIAMSD
Mintzer, Jacobo	A Double Blind, Randomized, Placebo Controlled, Parallel Group Study to Simultaneously Qualify a Biomarker Algorithm for Prognosis of Risk of Developing MCI Due to Alzheimer's Disease and to Test the Safety and Efficacy of Pioglitazone	Takeda
Mintzer, Jacobo	Effects of Traumatic Brain Injury and Post-Traumatic Stress Disorder and Alzheimer's Disease on Brain Tau in Vietnam Veterans using ADNI	DOD
Mintzer, Jacobo	Longitudinal Evaluation of Amyloid Risk and Neurodegeneration - the LEARN Study. A Companion Observational Study to Anti-Amyloid Treatment in Asymptomatic Alzheimer's Disease (A4) Trial	NIA
Moran, Megan	Exploring Sex Differences in the Neural Correlates of PTSD: Impact of Oxytocin	NIMH
Moran, Megan	Neural Substrates of Emotion: Impact of Childhood Trauma and Cocaine Dependence	NIDA
Naselar, Thomas	Representation of Visual Features in Mental Images of Complex Scenes	NEI
O'Carroll, Kevin Staveley	An Orthotopic Murine Model of HCC: Immunotolerance and Prevention	NCI
Prisciandaro, James	A Longitudinal Investigation of Glutamate Dysregulation in Early Stage Alcoholics	Alcoholic Bec. Med Re
Prisciandaro, James	Neuroimaging Mechanisms of Overlap between Alcoholism and Bipolar Disorder	NIAAA
Revuelta, Gonzalo	Identification of Gait and Imaging Markers for Freezing of Gait in Parkinson's Disease	NINDS
Roberts, Donna	SC Research Center for Recovery from Stroke: fMRI Bold Signal as a Biomarker for Optimal Dosing of rTMS of Rehabilitation in Chronic Stroke Patients	NIGMS
Sahlem, Gregory	Clinical Scientists Training in Addictions at MUSC	NIDA
Schacht, Joe	Neural Connectivity and the Transition to Alcohol Dependence	NIAAA
Schacht, Joe	Effects of Cortical Dopamine Regulation on Drinking, Craving, and Cognitive Control	NIAAA
Seo, Na Jin	SC Research Center for Recovery from Stroke	NIGMS
Shih, Andy	Novel Strategies to Enhance MRI Detection of Ultra-Small Brain Lesions in Vascular Dementia	Dana Foundation

Spryopoulos , Demetri	Using Embryonic Stem Cell Fate to Determine Potential Adverse Effects of Petroleum/Dispersant Exposure	Gulf of Mexico Alliance, Inc.
Squeglia , Lindsay	Clinical Scientists Training in Addictions at MUSC	NIDA
Squeglia , Lindsay	Neural Correlates of Behavioral Treatment Targets in Teens with Substance Use Problems and Post-Traumatic Stress	Chairman's Research Development Fund
Tomlinson, Stephen	Antibodies and Complement in Ischemia Reperfusion Injury and Regeneration	NIDDK
Turan, Tanya	Carotid Revascularization and Medical Management for Asymptomatic Carotid Stenosis Trial (CREST-2) Trial	Mayo Clinic
Turan, Tanya	Characterization of Intracranial Atherosclerotic Stenosis Using High Resolution MRI	NINDS
Vaden, Kenneth	Adaptive control of auditory representations in listeners with central auditory processing disorder	Hearing Health Foundation
Yu, Xue-Zhong	Control of GVHD and Leukemia Relapse by Targeting Cell Metabolism	NCI



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