

# Center for Biomedical Imaging

# Annual Report FY2021

(issued August 2021)

The Center for Biomedical Imaging provides resources for enabling 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* under the direction of the Provost for Research. This decision has enabled MUSC to remain competitive with other academic institutions and to establish the infrastructure and environment to support this crucial research area.

The CBI facilities are located on the second floor of the Bioengineering Building at 68 President Street and in the 30 Bee Street Building. 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 postdocs to help develop 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 [here](#).

*In fiscal year 2021, the CBI provided imaging support and resources for a total of 46 grants, 35 of which were NIH grants to MUSC (Appendix III). The CBI also supports MUSC faculty by providing development time to be used for collaborations and the collection of pilot data. In fiscal year 2021, the CBI underwrote approximately \$158K 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, to discover new ways to study normal and disease processes, to develop and apply this knowledge to clinically relevant research, and to translate these advances to the patient community while providing a quality education and training environment.

### **Vision Statement:**

The vision of the CBI is to serve the MUSC community as an integrated and multidisciplinary center for biomedical imaging research with mutually supportive and valued interactions among basic science and clinical departments.

# Administration

## Leadership:

In FY2021, the leadership of the CBI consisted of:

Dr. Jens H. Jensen, Interim Director  
Dr. Hesheng Liu, Associate Director  
Dr. Truman R. Brown, Scientific Director

## 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 goals of the CBI reflect the overall priorities of MUSC.

Members of the IAC in FY2021 were:

Dr. Andreana Benitez	Dr. Peter Kalivas
Mr. Joseph Bennett	Dr. Steven Kautz
Dr. Kathleen Brady	Dr. Hesheng Liu
Dr. Truman Brown	Dr. Lisa McTeague
Dr. Christopher Cowan (Chair)	Dr. Lindsay Squeglia
Dr. Craig Crosson	Dr. Thomas Uhde
Dr. Jens Jensen	

CBI leadership holds regular "Advisory Committee Meetings" as well as "Town Hall Meetings" in which all users are able to express their views and opinions. These meetings were held on:

### CBI Advisory Committee

September 11, 2020  
December 15, 2020  
March 15, 2021  
June 21, 2021

### Town Hall

September 29, 2020  
January 12, 2021  
April 13, 2021

## Business Management:

In FY21, business operations for the CBI were managed by Emily Clark under the supervision of Joseph Bennett, who is the administrative manager for the Department of Neuroscience.

# Operations

## Faculty & Staff:

The following faculty & staff were fully or partially supported by the CBI in FY2021:

Bennett, Joseph	Administrative Manager
Brown, Truman	Professor, Scientific Director
Clark, Emily	Administrative Coordinator II
Coatsworth, James	3T MRI Program Manager
Doose, Jayce	Biomedical Engineer
Falangola, Fatima	Assistant Professor
Fleury, Tom	Facilities/Information Manager
Henderson, Scott	3T MRI Program Manager
Jensen, Jens	Professor, Interim Director
Nie, Xingju	7T MRI Research Specialist
Roberts, Donna	Professor
Smalls, Vonetta*	Administrative Assistant
Waddell, Zoe*	Administrative Assistant

\*part-year only

## Human imaging Resources:

Human MRI studies take place in the CBI's 30 Bee St. facility, which houses a 3 Tesla (T) Prisma<sup>fit</sup> MRI system, five interview rooms, office space, a mock scanner, an electronics lab, and a waiting area for subjects. In FY2017, the CBI upgraded the Siemens MAGNETOM Trio 3T MRI system to a Siemens MAGNETOM Prisma<sup>fit</sup> 3T MRI system. This upgrade has significantly benefited a multitude of National Institutes of Health (NIH) funded researchers (as well as researchers funded from other sources) in the fields of substance abuse, addiction, aging, Alzheimer's disease, Parkinson's disease, attention-deficit hyperactivity disorder and stroke in addition to basic science brain research. The scanner operates with a 100% mandate for research and is covered by a Master Research Agreement with Siemens.

The current system is the only human MRI research scanner at MUSC, and one of only two human research scanners in South Carolina. The mock scanner is a full-size replica of the 3T MRI made from plywood and other building materials designed to look and sound like a real system. It 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.

## Preclinical (Small Animal) Imaging Resources:

The Bruker BioSpec 70/30 MRI scanner is a multipurpose system for high-resolution MR spectroscopy and imaging of small animals. This magnet operates at a field level of 7T and is

located on the second floor of the Bioengineering Building. The 7T MRI is ideal for 2D and/or 3D high-resolution anatomical imaging as well as diffusion, flow, cardiac, dynamic contrast, functional, and chemical shift imaging. Adjacent to the scanner is a surgery room that is available to support imaging studies.

The 7T system is now 14 years old and no longer fully supported by the manufacturer. The cold head was upgraded in FY20, but the electronics are obsolete and would be difficult to repair. A major upgrade of the electronics may be needed within a few years in order to keep the scanner in operation. During the past year, 6 funded studies and several pilot projects utilized this resource.

**Scheduling:**

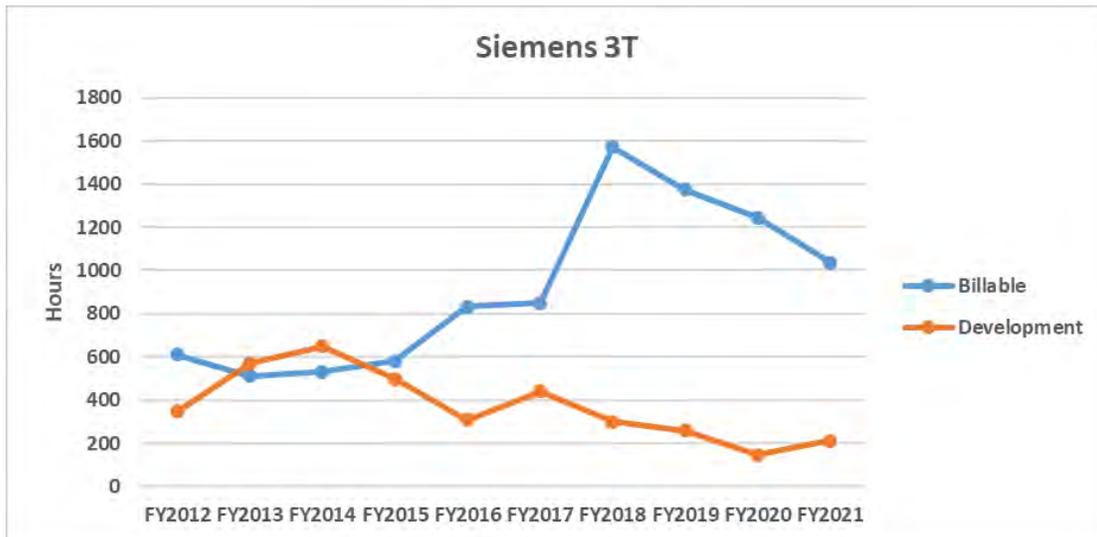
Scheduling of time on imaging systems is performed through a web-based system called Calpendo (<https://musccalpendo.com/>) that allows researchers with approved protocols to reserve time for using CBI resources.

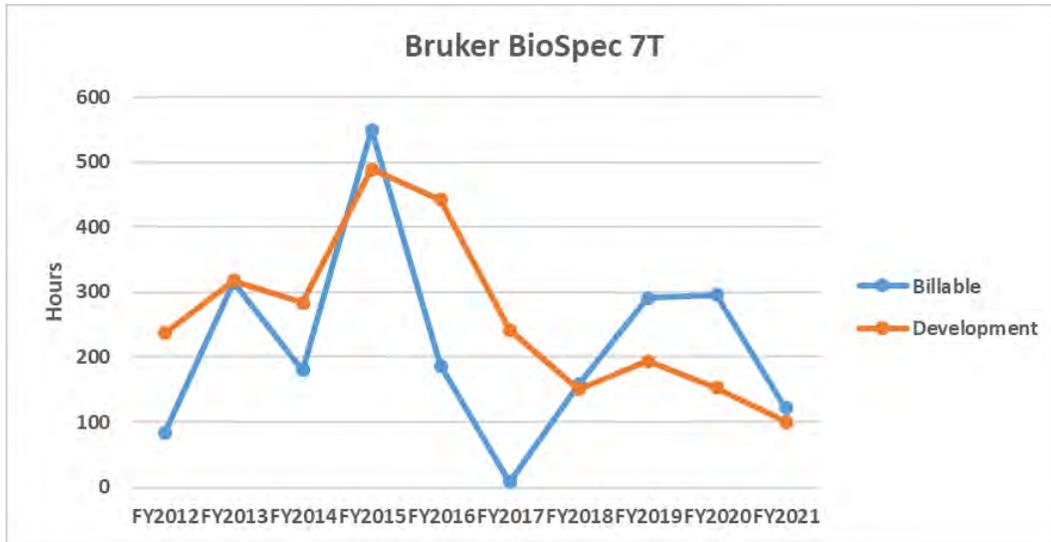
**MRI Safety Training:**

The CBI staff conducts regular safety training classes for researchers who use CBI resources. In FY21, these were held on 7/14/20, 8/13/20, 9/16/20, 10/14/20, 11/11/20, 12/16/20, 1/20/21, 2/17/21, 3/17/21, 4/14/21, 5/19/21, and 6/16/21.

**Equipment Usage:**

Shown in the figures below are the annual scanner hours used by researchers from FY2012 through FY2021 for the Siemens 3T and Bruker BioSpec 7T MRI systems. The blue lines show the number of billable hours, and the red lines indicate development time hours.





**Impact of COVID-19 Pandemic:**

The COVID-19 pandemic had a large impact on CBI operations in FY21, particularly for the human 3T MRI system. While the CBI continued to stay open and available to researchers throughout this crisis, most human imaging studies were suspended during a substantial portion of the year, particularly in the summer of 2020. As a result, the number scan hours for the 3T was the lowest since FY2017. Nonetheless, the monthly 3T scan volume still averaged over 100 hrs and was at near normal levels for the last 6 months of FY2021. The financial impact of the reduced scan revenue was substantial, but with cost savings measures and including the regular institutional support of up to \$150K/yr, the deficit for FY2021 was just slightly over \$6K (see Appendix I).

In response to the pandemic, the CBI has developed comprehensive procedures for safe operations. These are detailed in the CBI COVID-19 Mitigation Policy (Appendix II) that all researchers using the human scanner have been required to follow. As of the writing of this report, the COVID-19 Mitigation Policy is still in effect, but has been slightly modified in consideration of the availability of effective vaccines. CBI leadership will continue to monitor the situation closely and make adjustments as circumstances warrant. In particular, the CBI follows all MUSC COVID-19-related mandates.

**Early Stage Investigator Program:**

MUSC researchers who qualify as early stage investigators (ESI), according to criteria established by the NIH, are eligible to receive subsidies that partially defray the cost of MRI scans for certain types of small grants. In FY2021, the CBI provided a total of \$52,195 in ESI subsidies to 8 MUSC faculty and postdocs. This program allows young imaging scientists with limited financial resources to pursue studies that would otherwise not be possible.

**Cancellation Reduction Incentive Scheduling Program:**

In order to encourage responsible scheduling practices for scans on the 3T MRI system, a Cancellation Reduction Incentive Scheduling Program (CRISP) was established in January of 2020. CRISP provides credits for principal investigators based on their “last minute” (i.e., less than 72 hrs prior to scheduled scan time) cancellation rate. In FY2021, CRISP credits totaled \$2,952.

## CBI Faculty

The CBI is a multidisciplinary group of 24 faculty members and 8 staff representing various clinical and basic science departments at MUSC. Collaboration among faculty in the development of new and cross-disciplinary methodologies is strongly encouraged.

Faculty members contribute imaging-related seminar lectures, provide advice to the CBI leadership, and generally support the overall well-being of the CBI. They are expected to take part in regularly scheduled educational meetings, including the regular CBI seminars series, which provides a forum for researchers to have in-depth technical discussions. Each faculty member is asked to give a lecture on their research to the CBI community approximately every two to three years. The CBI faculty for FY21 are listed below:

Benitez, Andreana, PhD	Assistant Professor	Neurology
Bonilha, Leonardo, MD/PhD	Professor	Neurology
Borckardt, Jeffrey, PhD	Professor	Psychiatry
Brown, Truman, PhD	Professor, Scientific Director	Radiology
Eckert, Mark, PhD	Professor	Otolaryngology
Falangola, Maria, MD/PhD	Assistant Professor	Neuroscience
George, Mark, MD	Distinguished University Prof.	Psychiatry
Harris, Kelly, PhD	Associate Professor	Otolaryngology
Helpern, Joseph, PhD	Professor Emeritus	Neuroscience
Hubbard, Catherine, PhD	Assistant Professor	Neuroscience
Jenkins, Dortha, MD	Professor	Pediatrics
Jensen, Jens, PhD	Professor, Interim Director	Neuroscience
Joseph, Jane, PhD	Professor	Neuroscience
LaRue, Amanda, PhD	Professor	Pathology & Lab. Med.
Li, Xingbao, MD	Assistant Professor	Psychiatry
Liu, Hesheng, PhD	Professor, Associate Director	Neuroscience
McTeague, Lisa, PhD	Associate Professor	Psychiatry
Prisciandaro, James, PhD	Associate Professor	Psychiatry
Roberts, Donna, MD	Professor	Psychiatry
Rowland, Nathan, MD/PhD	Assistant Professor	Neurosurgery
Spampinato, Vittoria, MD	Professor	Radiology
Squeglia, Lindsay, PhD	Associate Professor	Psychiatry
Tipnis, Sameer, PhD	Professor	Radiology
Yu, Xue-Zhong, MD	Professor	Microbiology

## Education

### Biomedical Imaging PhD Program

The CBI developed a Biomedical Imaging PhD Program under the direction of Truman Brown. It began enrolling students 2016, but has since suspended enrolling new students due to insufficient faculty with the necessary expertise to support a full imaging-focused curriculum. Nonetheless, 3 students have completed PhDs under this program (2 in 2019, and 1 in 2020). A fourth student (Hunter Moss) was awarded an F32 grant and is expected to defend his dissertation in 2022.

### CBI Seminars

The CBI regularly hosts lectures given by both visiting speakers and CBI faculty. For the past three years, these have been organized by Kelly Harris and Lisa McTeague. CBI seminars for FY21 are listed below:

Date	Presenter	Title	University
9/9/2020	Catherine S. Hubbard, PhD	Chronic Pain Changes the Brain	MUSC
10/14/2020	Sepideh Sadaghiani, PhD	Intrinsic connectivity across spatiotemporal scales: integrating fMRI, EEG, and ECoG	University of Illinois at Urbana-Champaign
11/11/2020	Ezequiel Gleichgerrch, MD/PhD	Computational neuroimaging for temporal lobe epilepsy: from bench to bedside	MUSC
12/9/2020	Matthias Nau, PhD	Deep Mreye - MR-based on eye tracking without eye tracker	NIMH Intramural Research Program
1/13/2021	Thomas Naselaris, PhD	Complete models of individual brains- The "Toward" is implied	MUSC
2/10/2021	Suzanne N. Haber, PhD	From monkey anatomy to human neuroimaging: insights into the circuits underlying decision-making, psychiatric disease and neuromodulation	University of Rochester Medical Center
3/10/2021	Babak Ardekani, PhD	Survival analysis in mild cognitive impairment	Nathan S. Kline Institute

4/14/2021	Vincent D. Costa, PhD	Effects of pathway specific chomogenetic inhibition on resting-state fMRI in rhesus macaques	Oregon Health & Science University
5/12/2021	Michael D. Fox, MD/PhD	Causal mapping of human brain function using lesion and brain stimulation	Brigham and Women's Hospital, Harvard Medical School
6/9/2021	Andreas Keil, PhD	Advanced analyses of EEG data: Conceptual and neurophysiological impication for translational studies	University of Florida

# Appendix I: Budget

<b>FY21 EOY Budget</b>					
Budget Category	ADMIN	3T	7T	Totals	% of Category Total
<b>Revenue</b>					
Scan Revenue	\$ -	\$ 636,775	\$ 21,250	\$ 658,025	
<b>Revenue Total</b>	<b>\$ -</b>	<b>\$ 636,775</b>	<b>\$ 21,250</b>	<b>\$ 658,025</b>	
<b>Expenses</b>					
<b>TOTAL PERSONNEL</b>	<b>\$ 41,699</b>	<b>\$ 408,253</b>	<b>\$ 103,138</b>	<b>\$ 553,090</b>	
50202 Utilities	\$ -	\$ 8,999	\$ -	\$ 8,999	3.44%
50204 Repairs	\$ -	\$ 2,324	\$ -	\$ 2,324	0.89%
50207 Security System	\$ -	\$ -	\$ -	\$ -	0.00%
50207 Other Contractual Service	\$ -	\$ 135,292	\$ -	\$ 135,292	51.79%
50209 Telephone (Centrex)	\$ 1,060	\$ 722	\$ 132	\$ 1,914	0.73%
50216 SUBSIDY Internal Service Charges*	\$ 54,893	\$ -	\$ 727	\$ 55,620	21.29%
50236 Travel	\$ -	\$ -	\$ -	\$ -	0.00%
50242 Building Maintenance	\$ -	\$ 11,070	\$ -	\$ 11,070	4.24%
50304 Office Supplies	\$ 312	\$ 81	\$ -	\$ 393	0.15%
50306 Med/Sci/Lab Supplies	\$ 145	\$ 2,252	\$ 557	\$ 2,954	1.13%
50201, 50312 Postage	\$ -	\$ 82	\$ 20	\$ 101	0.04%
50349 Additional Software Licenses	\$ 180	\$ 227	\$ -	\$ 407	0.16%
50349 Calpendo License	\$ -	\$ 5,840	\$ -	\$ 5,840	2.24%
50401 30 Bee Street Lease	\$ -	\$ 29,354	\$ -	\$ 29,354	11.24%
50409 Insurance (Commercial, Hazard/Flood)	\$ -	\$ 6,959	\$ -	\$ 6,959	2.66%
50629 Equipment	\$ -	\$ -	\$ -	\$ -	0.00%
<b>TOTAL COSTS</b>	<b>\$ 56,590</b>	<b>\$ 203,201</b>	<b>\$ 1,436</b>	<b>\$ 261,227</b>	<b>100.00%</b>
<b>Total Expenses</b>	<b>\$ 98,289</b>	<b>\$ 611,454</b>	<b>\$ 104,574</b>	<b>\$ 814,317</b>	
<b>% of Total Expenses</b>	<b>12%</b>	<b>75%</b>	<b>13%</b>	<b>88%</b>	
<b>Total Revenue less Total Expenses</b>	<b>\$ (98,289)</b>	<b>\$ 25,321</b>	<b>\$ (83,324)</b>	<b>\$ (156,292)</b>	
<b>Institutional Support</b>				<b>\$ 150,000</b>	
<b>FY21 TOTAL</b>	<b>\$ (98,289)</b>	<b>\$ 25,321</b>	<b>\$ (83,324)</b>	<b>\$ (6,292)</b>	

# Appendix II: COVID-19 Mitigation Policy

## Safety Guidelines and Procedures During the COVID-19 Pandemic for the CBI 3T MRI Facility at 30 Bee Street

To mitigate the spread of COVID-19, the following safety guidelines and procedures are in effect until further notice for the CBI 3T MRI Facility at 30 Bee Street.

- 1) **Compliance with MUSC Research Guidelines:** All studies utilizing CBI resources must comply with the relevant MUSC research guidelines including [specific directives related to COVID-19](#).
- 2) **In-Person Study Plan Approval:** An [In-person Study Visit Plan](#) must be approved by MUSC research leadership prior to scheduling subjects on Calpendo. This should be certified by completing an additional brief [CBI REDCap form](#). Failure to complete this certification may result in bookings being cancelled.
- 3) **Screening for COVID-19:** All subjects must be verbally screened in advance to assess their risk of COVID-19 infection. Under no circumstances should a subject or researcher with [COVID-19 symptoms](#) enter the CBI MRI Facility (e.g., cough or temperature > 99.5 °F).
- 4) **Face Masks Required:** All subjects and researchers must follow MUSC social distancing guidelines. Given the difficulty of maintaining a 6-foot distance inside the CBI MRI Facility, face masks must be worn by all subjects and researchers while in this space. The research teams are responsible for providing face masks for their subjects. If needed, the MR Technologist will supply MRI-compatible face masks at the time of the scan.
- 5) **Researchers Expected to Use Screening Rooms:** All researchers should use Calpendo to book in advance a screening room for their scan. This will be used as both a waiting area and a place to conduct interviews. To limit contact with other occupants, researchers and subjects are expected to wait in their screening room until their scheduled scan time, unless directed otherwise by the MR technologist. Each room will have a cleaning log book that must be signed by the researcher at the beginning and end of each session.

*Note: If you're new to scheduling a screening room on the [Calpendo website](#) go to the "Resources" dropdown on left side, highlight "Select bookmark" and select the "Default" option. You should then be able to select different screening rooms from the "Resources" panel. A refresh of the browser website page might be necessary for these settings to take effect.*

- 6) **Checking Screening Rooms Prior to Use:** Prior to escorting subjects into the CBI MRI Facility, researchers are responsible for checking the cleaning log to confirm that their reserved screening room has been disinfected. If not, researchers should disinfect the room before allowing subjects to enter. Promptly notify the CBI staff if a screening room was not disinfected after the previous use.

*Note: Environmental Services will clean the CBI MRI Facility each night.*

- 7) **Arrival of Subject to CBI MRI Facility:** Since the front door to the CBI MRI Facility at 30 Bee Street will remain locked at all times, subjects must be met outside the building by a member of the research team and accompanied inside. It is recommended that subjects be instructed to wait in

their car, if possible, until the researcher meets them. The researcher should be on-site well in advance of the scheduled time for the subject's appointment to properly conduct the procedures described in this document.

- 8) **Social Distancing in CBI Lobby:** Subjects should be brought directly to the screening room after entering the CBI MRI Facility. If necessary, companions may wait in the lobby, but to support social distancing, the number of people in the lobby should always be kept to an absolute minimum. Only those essential for the study should be allowed into the CBI MRI Facility. If the lobby is utilized by a study, the research team will also be responsible for disinfecting this area at the end of their visit.
- 9) **Subject Belongings and Lockers:** Subjects should put their belongings into a disposable plastic bag that will be provided. They may then put this bag into a locker. Do not put anything in the lockers that are not in a personal belonging bag. Do NOT use the CBI break room which is for MUSC staff ONLY. The CBI break room will no longer be used as a staging area; this creates a bottleneck and increases the chance of contamination. Please wait in the screening room until your scheduled start time or until called by the MR technologist.
- 10) **Researcher Belongings:** Researchers using the CBI MRI Facility must be always mindful of minimizing potential contamination. Researchers may put their belongings into the provided plastic bags and store them in designated areas. Researcher belongings should NEVER be placed on CBI staff desks and work areas.
- 11) **Researchers Required to Disinfect:** After each use, researchers must disinfect any areas they have touched using approved disinfectant materials, which will be provided. All surfaces in the control room and your screening room (including tabletops, doorknobs, chairs, keyboard, and mouse) potentially contaminated by the researcher and subject must be cleaned. This must be documented in the cleaning log on the door of each screening room. Failure to properly clean control room/screening rooms may result in suspension of scanning privileges.  
  
*Note: Researchers will also be responsible for disinfecting other rooms or equipment (lobby chairs, mock scanner equipment, wet lab, etc.) if used by researchers, subjects, or subjects' companions while at the CBI MRI Facility. The MR technologist will disinfect the MRI scanner room.*
- 12) **Extra Scheduling Time for Disinfection:** There will be at least a 15-minute gap between the scheduled times for all scans so that the scanner, console, and locker areas can be properly disinfected. Do not bring your subject into these areas prior to the scheduled start time unless directed to by the MR technologist.

## Appendix III: Grants Supported by CBI for FY21

PI	Funding Source	Grant Title
Sudie Back	NIAAA	Oxytocin to Enhance Integrated Exposure-Based Treatment of Co-occurring Alcohol Use Disorder and PTSD
Sudie Back	NIAAA	Clinical trial for alcohol use disorder and post-traumatic stress disorder (PTSD)
Bashar Badran	NIH COBRE	Optimization of Closed-loop Transcutaneous Auricular Vagus Nerve Stimulation (taVNS) as a Neurorehabilitation Tool
Andreana Benitez	MN4R	High-dose Accelerated rTMS to Cognitive Control Neurocircuitry in MCI: A Safety and Feasibility study
Andreana Benitez/Joseph Helpern	NIA	Quantitative Neuroimaging Assessment of White Matter Integrity in the Context of Aging and AD
Leonardo Bonilha	NIDCD	Optimized Intracranial EEG Targeting in Focal Epilepsy based upon Neuroimaging Connectomics
Jeffrey Borckardt	NIDA	RCT of TDCS-Augmented CBT for Veterans with Pain and Opioid Misuse
Olga Brawman-Mintzer	AgeneBio, Inc.	AGB101 on MCI and Alzheimer's subjects
Truman Brown	NIMH	EEG/fMRI Controlled TMS Real-Time Neural Feedback in Anti-Depressive Treatment
Christopher Cowan	NCBI	Mef2c het corpus callosum
Carla Kmett Danielson	NIMH	Threat-related negative valence systems, child victimization, and anxiety
Carla Kmett Danielson	NIH	Impact of Race-related violence exposure
Mark Eckert	NIDCD	Experimental and clinical Studies of resbyacusis
Adviye Ergul	VA	Cerebral arteriole structure and function in diabetic ischemic stroke
Maria de Fatima Falangola	NIA	Assessing Brain Microstructure in Alzheimer's Disease with Advanced Diffusion MRI
Julianne Flanagan	NIAAA	Oxytocin to enhance alcohol behavioral couple therapy

<b>Colleen Hanlon</b>	<b>NIAAA</b>	Charleston ARC Clinical Project 4- Cortical rTMS as a tool to change craving and brain reactivity to alcohol cues
<b>Colleen Hanlon</b>	<b>NIDA</b>	Developing brain stimulation as a treatment for chronic pain in opiate dependent individuals
<b>Kelly Harris</b>	<b>NIDCD</b>	Neural determinants of sound encoding in the aging ear and brain
<b>Kelly Harris</b>	<b>NIDCD</b>	Experimental and Clinical Studies of Presbycusis
<b>Amber Jarnecke</b>	<b>NIAAA</b>	Identifying the neurobehavioral signature of individuals with AUD and comorbid PTSD
<b>Jens Jensen</b>	<b>NIDA</b>	Establishing the Neurostructural and Clinical Impact of Brain Iron Dysregulation in Cocaine Use Disorder
<b>Jane Joseph</b>	<b>NIA</b>	Using connectomics to characterize risk for Alzheimer's Disease
<b>Jane Joseph</b>	<b>DOD</b>	Connectome biomarkers for predicting Alzheimer's risk in traumatic brain injury
<b>Jane Joseph</b>	<b>Center on Aging Grant</b>	Alcohol use disorder and connections to Alzheimer's disease
<b>John Kindred</b>	<b>VA</b>	Fatigue and mobility in stroke: a Biomechanical and Neurophysiological Investigation
<b>Hesheng Liu</b>	<b>NIDA</b>	Neurocircuit Strategy to Decrease Cocaine Cue Reactivity
<b>Aimee McRae-Clark</b>	<b>NIDA</b>	Neural substrates of emotion: Impact of cocaine dependence
<b>Lisa McTeague</b>	<b>National Center for Neuromodulation for Rehabilitation</b>	Probing Cognitive Control Neurocircuitry Towards Optimizing rTMS-based Neurocognitive Rehabilitation
<b>William Mellick</b>	<b>NIAAA</b>	Imaging Framework for Testing GABAergic/glutamatergic Drugs in Bipolar Alcoholics
<b>Nicholas Milano</b>	<b>Biogen</b>	Multicenter, Safety Study of BIB037 (aducanumab) in Subjects with Alzheimer's disease Who Had Previously Participated in the Aducanumab Studies 221AD103, 221AD301, 221AD302 and 221AD205
<b>Jacobo Mintzer</b>	<b>NIA</b>	Memory Improvement Through Nicotine Dosing (MIND) Study (MIND)
<b>Jacobo Mintzer</b>	<b>NIA</b>	Anti-amyloid treatment in asymptomatic Alzheimer's Disease (A4)
<b>Jacobo Mintzer</b>	<b>NIA</b>	Alzheimer's Disease Neuroimaging Initiative 3 (ADNI 3)

<b>Besim Ogretmen</b>	<b>SmartState Endowment</b>	Effects of sphingolipid alterations in glioblastoma growth in mice models
<b>James Prisciandaro</b>	<b>NIAAA</b>	Imaging Framework for Testing GABAergic/glutamatergic Drugs in Bipolar Alcoholics
<b>Gonzalo Revuelta</b>	<b>Other</b>	Gait Task in Parkinson's Disease (TMS/FOG)
<b>Donna Roberts</b>	<b>Translational Research Institute for Space Health</b>	Safety and Efficacy of an Accelerated Protocol of Intermittent Theta Burst Transcranial Magnetic Stimulation (TMS) to Enhance Performance and Promote Resilience in Astronauts
<b>Michael Saladin</b>	<b>NIDA</b>	Behavioral & Integrative treatment development program
<b>Joseph Schacht</b>	<b>NIAAA</b>	Effects of cortical dopamine regulation on drinking, craving, and cognitive control
<b>Na Jin Seo</b>	<b>NICHD</b>	Concomitant sensory stimulation during therapy to enhance hand functional recovery post stroke
<b>Lindsay Squeglia</b>	<b>NIAAA</b>	Neuroscience-informed treatment development for adolescent alcohol use
<b>Lindsay Squeglia</b>	<b>NIDA</b>	The Adolescent Brain Cognitive Development (ABCD) Study
<b>Stephan Tomlinson</b>	<b>NINDS</b>	Role of complement in TBI
<b>Kenneth Vaden</b>	<b>NIDCD</b>	Understanding cognitive and neurobiological factors of age-related speech recognition declines
<b>Yongren Wu</b>	<b>NIDCR (sub award)</b>	Improvement of animal models for stem cell-based TMJ regeneration



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