



CENTER FOR ADVANCED HUMAN BRAIN IMAGING RESEARCH (CAHBIR)

Offering Cutting-Edge Human Imaging Research Services




CAHBIR, part of the Rutgers Brain Health Institute (BHI), on the Piscataway campus in NJ, utilizes a research-dedicated **3 Tesla Siemens Magnetom scanner** with a range of coils to allow imaging of both the brain and other body regions of children and adults. Human neuroimaging is accomplished with a **state-of-the-art 64-channel head/neck coil**. Unlike clinical MRI scanners, CAHBIR's scanner supports the latest MRI sequences (parameters) well before they are available in clinical practice. CAHBIR's highly-skilled and experienced staff can help with study design, implementation and analysis.

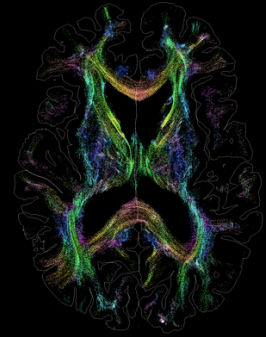
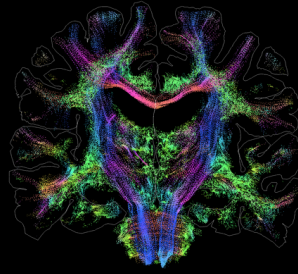
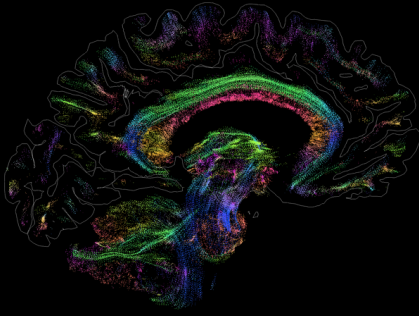
This brochure describes CAHBIR's one-stop neuroimaging and neuromodulation services to meet your research and clinical human imaging needs. Contact us at cahbir@rbhs.rutgers.edu to learn more.



Rutgers Brain Health Institute
Center for Advanced Human Brain Imaging Research



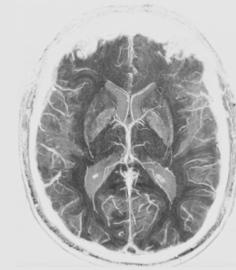
-  cahbir@rbhs.rutgers.edu
-  <https://brainhealthinstitute.rutgers.edu/our-centers/cahbir/>
-  119 Staged Research Building, 661
Hoes Lane West, Piscataway, NJ 08854



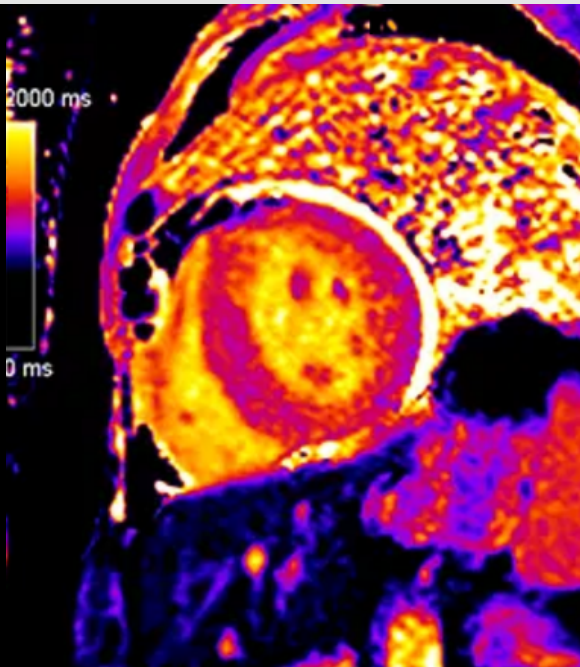
*Advanced diffusion imaging for white-matter microstructure

BRAIN IMAGING

- **Structural imaging** with submillimeter resolution
- **Advanced diffusion imaging** for white-matter microstructure
- **Functional MRI (fMRI)** with multiband-multiecho sequences to measure task-based activity and functional connectivity with subsecond sampling
- fMRI with **real-time neurofeedback**
- **Simultaneous eye-tracking and psychophysiological data collection**
- **Regional cerebral blood flow and blood-brain barrier characteristics**
- **Advanced Sequences** for neuropathology characterization, including high resolution susceptibility weighted imaging and quantitative susceptibility mapping
- **MR spectroscopy** for measuring neurotransmitters (GABA, glutamate), neuronal integrity, metabolism, glial activation, and neuroinflammation



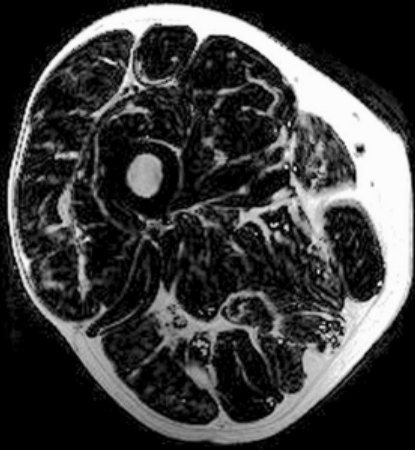
*Susceptibility weighted imaging revealing cerebrovasculature



* Myocardial tissue quantification

HEART IMAGING

- **Non-invasive, radiation-free high-resolution 3D imaging** of heart structure and tissue characterization
- **4D real-time cardiac imaging** for valve function and blood-flow dynamics
- **MR spectroscopy** of myocardial bioenergetics (PCr, total creatine, ATP)
- MR spectroscopy of **myocardial lipid (fat) accumulation**
- **Diffusion tensor imaging** to assess cardiac wall microstructure (cardiomyocyte arrangement, myocyte orientation and density)



*Fat imaging of the thigh

MUSCLE IMAGING

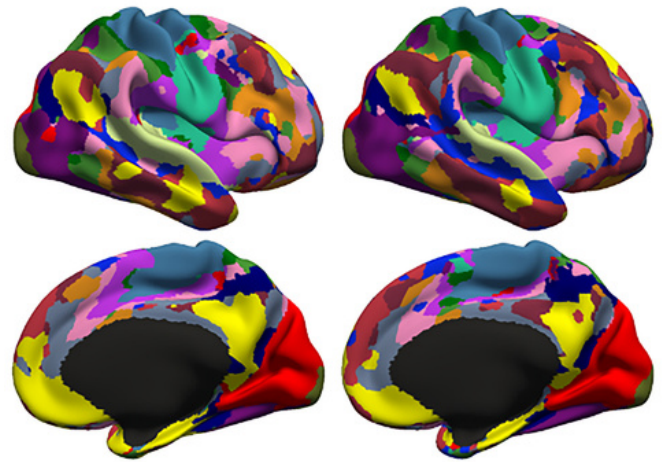
- Assessment of **muscle volume and quality** (fat infiltration)
- **MR spectroscopy** to measure mitochondrial function and muscle oxidative phosphorylation
- **Energy metabolism**

LIVER IMAGING

- MR spectroscopy to quantify **hepatic fat content (steatosis)**

DATA INFRASTRUCTURE

- **Large-scale computing infrastructure:** support automated analysis and emerging AI/ML pipelines for brain morphology, neuropathology identification and characterization, including "connectome fingerprinting" based on structural and functional networks



*Individual functional network maps ("connectome fingerprints")

ADDITIONAL SERVICES

- **EEG:** BrainVision system with 64-channel stimulus-locked electroencephalography
- **TMS:** MagVenture Transcranial magnetic stimulation with robotic arm and neuronavigation for targeted neuromodulation determined by subject-specific MRI anatomy and circuits





Clinical Trial Expertise

Extensive experience meeting clinical trials requirements, including:

- Protocol compliance
- Data standardization
- Regulatory requirements for imaging endpoints

Pediatric-Friendly Research

Pediatric-friendly protocols and environment designed for patient comfort and safety in younger populations, including a mock scanner to help habituate pediatric participants and patients.



Access to Large and Diverse Patient Population Database for Participant Recruitment

CAHBIR, in partnership with RWJBarnabas Health—New Jersey’s largest academic health system, which treats over 3 million patients annually, has unparalleled access to one of the most extensive and diverse patient populations in the region.

For enrollment, approved research and clinical trial investigators can screen nearly 5 million patients in the system’s electronic medical records, and find participants with various diagnoses. For example, the system includes:

- > 200,000 patients with Alzheimer’s disease and related dementias
- > 150,000 patients with epilepsy
- > 100,000 patients with Parkinson’s disease
- > 90,000 patients with cerebrovascular disease

For studies requiring psychiatric patient participants, the Rutgers Behavioral Health System serves more than 200,000 patients annually across the state of New Jersey.