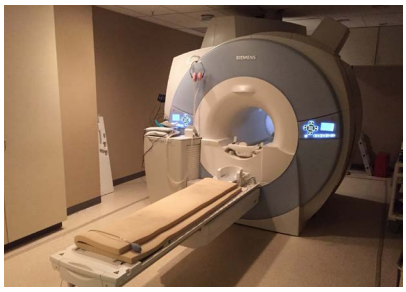
CORE FOR TRANSLATIONAL RESEARCH IN IMAGING @MARYLAND (C-TRIM)

MAGNETIC RESONANCE RESEARCH CENTER

CIBR: Center for Innovative Biomedical Resources

CORE EQUIPMENT

Siemens Tim Trio 3 Tesla whole body MRI System

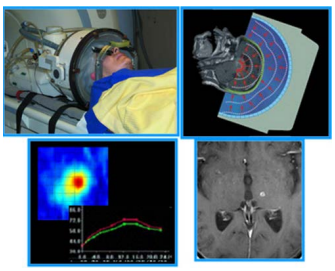


- Siemens whole body Tim-Trio 3.0 Tesla system with high-speed gradients
- 32 receiver channels with head and body array coils
- High-resolution anatomic imaging (~70-µm resolution) for CNS and body applications
- Tumor kinetics
- Metabolomic studies
- High-resolution Diffusion Tensor and Diffusion Kurtosis Imaging for detecting microstructural and cellular changes
- Cardiac Functional Analysis and Vascular studies
- Cerebral blood flow studies using endogenous contrast
- Functional MRI and Resting state brain networks
- Interventional Imaging

GE SpinLab Dynamic Nuclear Polarizer

- Hyperpolarization of C-13 substrates (pyruvate, fumarate, glutamine etc) for detection *in vivo*
- Four sterile sample sizes up to 100 mL of 250 mM C-13 substrates for human applications
- Detection of downstream metabolic products *in vivo* in real-time
- Ability to determine metabolic fluxes, for example to determine aggressiveness of tumor
- Metabolic response to therapeutic drugs

MR guided Focused Ultrasound (MRgFUS)



- Insightec Neuro ExAblate system for neuro-interventions
- 1024 element high-intensity focused ultrasound (HIFU) system
- Ability to focus ultrasound beam within 2 mm radius
- MR temperature mapping to facilitate brain interventions
- Neuromodulation Studies
- Blood brain barrier opening for delivery of nanoparticles
- Translational studies

MISSION

To provide full-fledged access to research using Magnetic Resonance Imaging for humans and large animals to discover new imaging markers, understand brain function, and to translate basic science to the clinic.

Objective: To provide a collaborative environment to imaging researchers, that leads to innovation that can be rapidly translated to the clinic.

CORE SERVICES

The staff of C-TRIM provides consultation on all imaging related research. Assistance is available for the design of experiments and to optimize imaging techniques. The staff also provides assistance in image processing and image analysis. Training is provided to users upon request. The core conducts an annual retreat where specific areas of imaging research are highlighted.

One aspect of the core is to develop new technologies with the goal of making available state-of-the-art techniques to investigators. Through this core, investigators have access to facilities at the Center for Metabolic Imaging & Therapeutics (CMIT).

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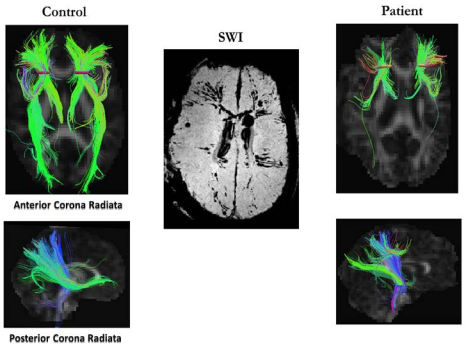
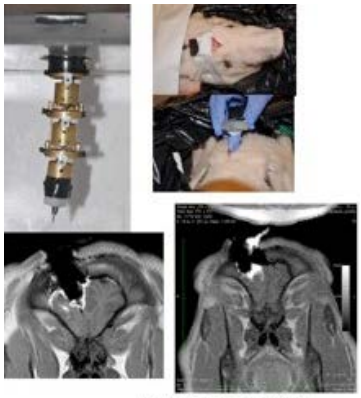
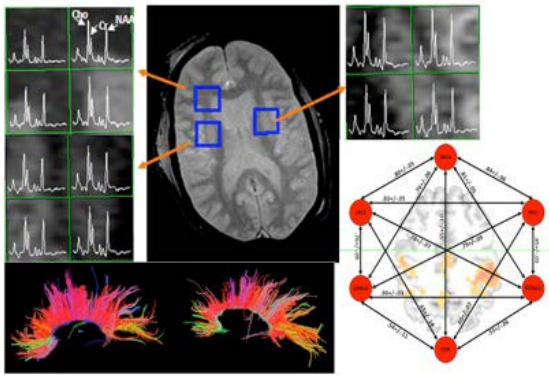


Significant disruption of anterior-posterior white matter tracts due to extensive micro-hemorrhage along the tracts



Ho et al., IEEE Trans Robot, 2011
Yang et al., Int J Rob Res, 2014

Minimally invasive neurosurgical intervention robot performing neurosurgery under image guidance



Anatomic, Biophysical, Biochemical & Functional Changes following TBI

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