Overview

Research at the Northwestern Cardiovascular Imaging Program aims to provide new insights into structure and function of neurovascular and cardiovascular diseases. The goal is to improve diagnosis and therapy planning by developing novel and innovative imaging techniques for the evaluation of morphology, blood flow, perfusion, function, and tissue mechanics. These techniques merge the functional aspects of each anatomical region into a comprehensive representation of local and global structure and function. Current research activities focus on heart muscle, valve systems, ventricular chambers, and vessels throughout the human body.

Infrastructure

The 10,500 sq.ft. Center for Translational Imaging (CTI) contains 5 MRI systems, animal preparation rooms and the Interventional Radiology Research Laboratory. Within CTI, the Northwestern Center for Cardiovascular Imaging Research has access to two 1.5T and 3T MRI systems fully dedicated to cardiovascular MR research. The recently installed 1.5T and 3T MR systems are state-of-the-art in clinical high field MRI.

CV-CTI operations are overseen by a dedicated research staff. We assist new investigators in getting started and add our imaging expertise to any project. Fully trained MR technologists can provide assistance with scanner operations, setup and troubleshooting.

Research Directions

Research interests are centered within cardiovascular MRI with a focus on the development of new MRI techniques, advanced data analysis tools, and biophysical modeling of disease processes. Clinical applications provide new insights into the specific links between pathology, therapy, intervention and functional changes within the cardiovascular system.

Collaborations between Radiology, Cardiology, Cardiac Surgery, Neurosurgery, Biomedical Engineering, Neurology, Vascular Surgery, and Preventive Medicine continue to be at the center of research activities. A strong relationship with the Siemens Medical Solutions MRI Division aids in the development of novel MRI applications.

The evaluation of new technical methods, translation into novel clinical applications, and the eventual integration into clinical workflow within Northwestern Medicine are at the core of past and ongoing scientific activities, including:

- **Development & progression of vascular pathologies**
  - Hemodynamics and 4D flow MRI
- **Vascular disease & interventions**
  - Blood flow, perfusion & morphology
- **Cardiovascular pathologies**
  - Coronary wall imaging, contrast & non-contrast MRA
- **Heart disease**
  - Cardiac structure, mechanics & perfusion

Research interests focus on diagnostic imaging with MRI but other modalities such as CT, PET, or molecular imaging are integrated into the research projects and have a high potential to provide enhanced information on cardiovascular disease.

For further details and contact information see: [http://www.cti.northwestern.edu](http://www.cti.northwestern.edu)