

An Indian-Australian research partnership

Project Title:

Project Number

Monash Supervisor(s) *Full names and titles*

Monash Primary Contact: *Email, phone*

IITB Supervisor(s) *Full names and titles*

IITB Primary Contact: *Email, phone*

Research Academy Themes:

Highlight which of the Academy's Theme(s) this project will address?

(Feel free to nominate more than one. For more information, see www.iitbmonash.org)

1. **Advanced computational engineering, simulation and manufacture**
2. Infrastructure Engineering
3. Clean Energy
4. Water
5. Nanotechnology
6. Biotechnology and Stem Cell Research

The research problem

Define the problem

Compressive sensing imaging and parallel imaging are two important techniques for accelerated MRI, and their combination, called compressive parallel imaging, is currently an active research area in MRI. The aim of this Doctoral work is to explore current research issues in compressive parallel MR imaging. In particular, one of the themes to be explored could be: the most effective use of modern and novel transform methods in compressive sensing of MR signals and image reconstruction - there shall be an effort to explore the effective use of wavelets and filter banks to advantage in these problems, for example. A broader view of the problem would be to develop effective methods for compressive sampling of MR signals and optimal image reconstruction in compressive parallel MRI, based on modern transform domain approaches.

Project aims

Define the aims of the project

1. Address the current imaging speed limitations in MRI through the use of compressive sensing and parallel imaging techniques.
2. Develop effective methods for compressive sampling of MR signals and optimal image reconstruction in compressive parallel MRI, based on modern transform domain approaches.

Expected outcomes

Highlight the expected outcomes of the project

1. Development of new and effective approaches towards accelerating MRI imaging scans
2. Demonstrate the effective use of wavelets and filter banks with compressive sensing and parallel imaging

How will the project address the Goals of the above Themes?

Describe how the project will address the goals of one or more of the 6 Themes listed above.

The aim of the project is to develop effective methods for compressive sampling of MR signals and optimal image reconstruction in compressive parallel MRI, based on modern transform domain approaches that will include the use of wavelets, filter banks etc. This approach will address the aims listed above

Capabilities and Degrees Required

List the ideal set of background and capabilities required in a student for this project noting that the more specific you make it, the less likely that you will get a candidate that matches the requirements exactly.

The student must ideally have a post graduate degree in electrical/bio-medical engineering. Alternatively, under graduate students with outstanding academic track records in the fields listed above can also be considered.