

The University of Queensland - IIT Delhi Academy of Research Joint PhD Project

PROJECT TITLE	ADVANCING CARDIAC MAGNETIC RESONANCE IMAGING USING MACHINE LEARNING
PROJECT CODE	UQIDAR 00157
PROJECT DESCRIPTION	Cardiovascular diseases represent a severe socio-economic burden to an aging society. En route to healthy aging, enabling technologies in diagnosis/guidance of therapy demands non-invasive imaging. This is the forte of cardiac magnetic resonance (CMR). Today's CMR has limited resolution and capability for myocardial tissue characterization. MR imaging using high (3 Tesla) and ultra-high (7 Tesla) MR scanners, installed at the University of Queensland, aim to address these challenges. Prof Barth (UQ) offers supervision in MR sequence programming, reconstruction and analysis "including in the field of CMR making it a great topic to translate these innovations into clinical value. Prof Singh (IIT) offers supervision in the applications of machine learning in healthcare based multiparametric MRI features to evaluate its potential for early disease diagnosis, grading and monitoring of follow-up/treatment responses. This PhD project combines the outstanding MRI expertise and unique MR facilities at UQ and the expertise in machine learning at IIT to enable high fidelity imaging of the beating heart. These efforts will afford non-invasive mapping of myocardial tissue with high spatial resolution and will change the landscape of cardiac imaging.
PROJECT OUTCOMES	This project will advance current state-of-the-art CMR by developing and implementing: - New MRI sequences to make use of novel tissue contrast at the most advanced human MRI scanners - Combining the power of machine learning algorithms to improve the accuracy and speed of the imaging and reconstruction process - Use machine learning to analyse and process the images to provide a better decision support for the clinician
ADVISORY TEAM	<p>Professor Markus Barth https://researchers.uq.edu.au/researcher/9564 m.barth@uq.edu.au School of Information Technology and Electrical Engineering The University of Queensland</p> <p>Professor Anrup Singh http://web.iitd.ac.in/~anupsm/ Anup.Singh@cbme.iitd.ac.in Department of Biomedical Engineering Indian Institute of Technology Delhi</p>
TYPE OF STUDENT	Applications are open to i/a students who meet eligibility criteria . note: i-students must have own scholarship to apply (CSIR, UCG-NET, etc)
DISCIPLINE BACKGROUND OF STUDENT	Ideally, this project requires students with a background in biomedical engineering, computer science, physics and related, electrical engineering.
IDEAL CANDIDATE	Essential capabilities: <ul style="list-style-type: none"> • Computer modelling and Machine learning IT Experience, e.g. MATLAB, Python or similar

APPLICATION
PROCESS

Desirable capabilities:

- Strong communication skills
- Experience in image data processing

Expected qualifications (Courses, degrees, etc.):

- MSc. in Biomedical Engineering, MSc. in Electronic Engineering, MSc. in Computer Science and Physics.

Apply online by the due date: <https://www.uqidar.org/students/how-to-apply/>