Project Title: Patient Connected Imaging: Adapting a robotic C-arm Cone Beam CT system for clearer, safer and faster medical imaging	**Code: CCS5**

Host School / Institute: Central Clinical School	**Address:** ATP Biomedical Building (C81) Eveleigh NSW

Certificates & Clearances required: No

Primary Supervisor: Dr Tess Reynolds

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Co-Supervisor/team: This project will involve working directly with Dr Tess Reynolds (leader of the cardiac-based Patient Connected Imaging projects) and Associate Professor Ricky O'Brien (Deputy Director of the ACRF Image X Institute and pioneer of the Patient Connected Imaging Program), and Dr Owen Dillon (post-doctoral research associate specialising in cone beam CT reconstruction and image analysis).

Project Type: Data Analysis

Project Category: Imaging; Cardiovascular

Skills / Attributes of a successful student: This project would be suitable for a wide range of students with backgrounds in either engineering, science or medicine. Proficiency in computer-based analysis and MATLAB would be desirable. Training in the specific experimental and analytical techniques required will be provided on site.

Project Keywords: Cone Beam CT; Cardiac; Robotic C-Arm; Imaging; Hybrid Theater

Project Description: Aim:The aim of this project is to conduct a series of experimental phantom studies to characterise the performance of our newly developed Patient Connected Imaging protocols for reducing image distortion caused by cardiac motion on a state-of-the-art robotic C-arm Cone Beam CT system.

Background : Medical imaging procedures are negatively affected by patient's anatomical motion. Notably, there is an inherent disconnect between the imaging hardware and motion signals from the patient (i.e. cardiac and breathing rates), leading to significant image distortion (i.e. motion blur, streak artefacts). To overcome this limitation, we have developed Patient Connected Imaging protocols that adapt the imaging hardware to changes in the patient's physiological signals in real-time. Simulation studies have shown that Patient Connected Imaging can provide a revolutionary 80% reduction in image dose and 40% increase in image sharpness. Conducting phantom studies is the next step in the translational pathway to enable Patient Connected Imaging to be utilized clinically.
Project Scope: The student will assist in conducting the phantom experiments and be involved in analysing the Cone Beam CT images acquired. The ACRF Image X Institute is a world leader in adaptive medical imaging. The student will have the chance to work in a large research group focusing on technology innovation to improve current practise and have access to state-of-the-art medical imaging equipment. The outcome of this project can potentially lead to a Masters/PhD study, a conference presentation, and a high impact publication.