Project Title: Design and Calibration of X-Ray CT Imaging	**Code: CCS2**
Host School / Institute: Central Clinical School	**Address:** Level 2, Biomedical Building (C81) 1 Central Ave, Australian Technology Park
Certificates & Clearances required: No	
Primary Supervisor: Dr Owen Dillon	
Phone: 0451 124 018	**Email:** owen.dillon@sydney.edu.au
Co-Supervisor/team: Research group at the ACRF Image-X institute, Dr Tess Reynolds and Professor Ricky O'Brien.	
Project Type: Design; Laboratory based; Data Analysis	
Project Category: Cancer; Imaging	
Skills / Attributes of a successful student: Basic proficiency in any of MATLAB, Python, C# or C++, and at least some background in linear algebra. This will be used as the basis for training in x-ray imaging, reconstruction and calibration.	
Project Keywords: Image Reconstruction; Inverse Problems; Parameter Estimation; System Design; Calibration	

Project Description: Aim: This project will involve conducting practical experiments with x-ray tomography systems as well as simulation studies on novel x-ray system designs and reconstruction algorithms. This work will be used to calibrate our existing systems and develop new x-ray imaging modalities.

Background: X-ray imaging is a vital tool for diagnosis and assessment of a wide range of conditions from cancer to heart disease to bone defects. When 3D knowledge is required, an x-ray CT scan is conducted, taking x-ray images at several angles to be mathematically combined into an estimate of the anatomy. The quality of these reconstructions depends on the number of x-ray projections used, the positions the projections were taken at, and the reconstruction algorithm used. All of these factors need to be assessed and compromises reached depending on the application.

Project Scope: The student will assist in constructing phantoms, designing imaging protocols, and performing experiments for calibration and assessment of x-ray imaging equipment at the ACRF Image X institute. The student will also perform simulation studies of potential new x-ray imaging systems designed for novel applications. This work will be used as the basis for a conference presentation and high impact publication, and can be extended into a Masters/PhD project.