2022 School of EECMS Summer Internship Application Form

Main Supervisor	Dr. Ritu Gupta
Is the main supervisor an ECR/MCR?	NO
Other supervisors (if applicable)	Prof. Ryan Loxton
Project Title	Saving Hearts, Saving People - Power of Artificial Intelligence
Duration of project (select between 4 and eight weeks)	8 weeks
Project Description	Heart disease is one of the major killers in Australia. According to the Australian Institute of Health and Welfare (AIHW) National Mortality Database, cardio vascular disease was linked to over 100,000 deaths in Australia in 2018. A vast majority of these deaths can be prevented by monitoring plaque build up in the heart and taking timely preventative actions. The cardiac computed tomography (CT) is used by clinicians to assess condition of the heart. Risk measures like calcium score per vessel, plaque composition, vulnerable plaque and total plaque burden can be computed by analysing CT images. The manual processing of images is very complex and may take hours to get results, and this is where Artificial Intelligence (AI) can provide huge benefits. AI can generate the result in few minutes, saving time of clinicians and making it possible for them to use such measures in everyday patient management. Most commercial AI models are known to be very restrictive due to the homogeneity of the population groups used for training the models. It is known that different populations have anatomical differences in the heart. This, combined with genetical disposition and epi-genetical factors, may result in variations in the tendency to develop plaque and the location of that plaque. Hence AI models trained for one population group may not perform well for other populations. In this project you will validate the performance of AI algorithms across various ethnic populations and develop methods for generating population specific risk measures. The results will be of great significance to assist treatment of the ethnically diverse Australian population. This project will not only result in advances in patient outcomes, but open a door for research in medical imaging in other areas like brain and spine.