2024 Summer Research Project

Project title:	**Machine learning based prediction of seizure onset zone in focal epilepsy**
Project duration, hours of engagement & delivery mode	Duration of the project: 16 weeks Hours of engagement: 36 hrs per week Applicant will be required on-site for the project.
Description:	Localisation of the seizure onset zone in the brain is essential for diagnosis and treatment planning in focal epilepsy. Medical imaging plays a key role, as it provides images from which abnormal brain regions can be identified. In this project human brain SPECT (Single Photon Emission Computed Tomography) images will be synthesised from MRI (Magnetic Resonance Imaging) and PET (Positron Emission Tomography) scans for the purpose of improving workflow and patient experience. Ideally, a machine learning framework will be implemented which takes medical images as input directly and produces a new image of high diagnostic quality, instead of manually analysing images using a labour-intensive pipeline.
Expected outcomes and deliverables:	The primary expected outcome of this project is the machine learning automation of the SISCOM (Subtraction Ictal SPECT Co-registered to MRI) pipeline used in the assessment of focal epilepsy. Findings from the research may eventually be presented at a conference, and/or published as part of a manuscript. The student will be expected to implement methods, analyse their data, and present their work as a written report and oral presentation.
Suitable for:	This project is open to applications from students with a background in machine learning and computer vision or pattern recognition. Experience in programming is essential for this project. Participants should be familiar with Python syntax, data structures, and common libraries used for data preparation, such as Pandas and NumPy. Prior exposure to popular deep learning frameworks (TensorFlow or Pytorch) would be helpful.
Primary Supervisor:	Associate Prof Viktor Vegh
Further info:	Please contact Azin Fard (a.shokraeifard@uq.net.au) from the Centre for Advanced Imaging (AIBN, UQ) if you would like to discuss this project in detail and whether you meet project requirements.