This is a sample of some of the projects that were offered in 2019

This list is provided to give you an idea of the types of projects that can be conducted during the Foundations of Medical Research (MEDI7281) selective course in Semester 2, Year 2 of the MD.

These specific projects may not be available in 2020.

An updated list of projects offered in 2020 will be provided in April!

If you would like to suggest a supervisor, please contact Dr Megan Steele: med.yr2projects@uq.edu.au

---

Project ID: 2095057

Title of project: Investigating prognostic biomarkers in breast cancer

Supervisor/s: Dr Peter Simpson

Organisational unit / Institute / Centre: UQ Centre for Clinical Research

Location: UQ Centre for Clinical Research, Building 71/918, Royal Brisbane and Women's Hospital, Herston Qld 4029,

Field of research: breast cancer, pathology

Type of research: Laboratory research

Keywords: breast cancer

Project overview: This project will investigate the promise of several protein biomarkers in predicting the prognosis of breast cancer patients diagnosed with invasive lobular carcinoma. The proposed biomarkers were identified through a bioinformatic process using publicly available molecular data (gene expression and DNA copy number) and hence need to be validated in an independent cohort of cases. Validation will be done in tissue samples using immunohistochemistry. The students will gain experience in optimising experimental condition; in using microscopy and digital microscopy to visualise and score staining patterns; and in statistical analysis for data analysis to correlate expression of the biomarker(s) with clinical and pathological features (eg breast cancer specific survival).

Number of projects available: 2

Required training: biosafety training

Desirable skills:

Contact with supervisor prior to allocation: I have a strong desire to liaise with students before they are allocated to this project

Preferred mode of contact: Email

Email: ********************   **Phone:** ***********

Link: https://clinical-research.centre.uq.edu.au/profile/386/peter-simpson

Project ID: 2136467

Title of project: Mucosal Perforation in Hellers Myotomy versus POEM

Supervisor/s: Dr Andrew Maurice

Organisational unit / Institute / Centre: Department of General Surgery (Upper GI & Bariatric), Royal Brisbane and Women's Hospital

Location: RBWH

Field of research: Surgery

Type of research: Literature review

Keywords: Achalasia, myotomy, POEM, Per-oral endoscopic myotomy

Project overview: Achalasia is a disorder of the oesophagus that is treated by gastroenterologists and surgeons. It results in the irreversible spasm of the lower oesophageal sphincter and dysphagia and inability to swallow. The most effective and gold standard treatment is a "Heller myotomy": a key-hole (laparoscopic) abdominal operation where the surgeon cuts the sphincter to allow food to pass. It is a highly effective and safe procedure. This procedure has been challenged in recent years by "Per-Oral Endoscopic Myotomy" or POEM, which is a less invasive procedure where the sphincter can be divided endoscopically, without any abdominal incisions. A common complication in Heller myotomy surgery is that a hole can be made in the oesophagus (mucosal perforation). Unrecognized at surgery, this will usually lead to severe peritonitis and possible death. We performed a systematic review and discovered that almost always this is recognized at surgery and can usually be fixed very easily with laparoscopic suturing and never resulted in long term injury. This work was presented last year at an international conference, ISDE 2018: https://academic.oup.com/dote/article/31/13/57/5097108   Muocsal perforations occur during the POEM procedure but are much more difficult to fix. We aim to repeat our systematic review, except for the POEM procedure (i.e. document all reported cases of POEM and mucosal perforations from this procedure and long-term reported morbidity). Our hypothesis is that mucosal perforation in POEM are more catastrophic and difficult to fix.   We aim for this project to be completed and submitted for publication and presentation at ISDE 2020 in Toronto (https://www.isde.net/ISDE-2020-Toronto)

Number of projects available: 5

Required training: No. We would ideally require TWO students to perform a systematic review.

Desirable skills: An interest in surgery is ESSENTIAL. *************

Contact with supervisor prior to allocation: It is not necessary but I am willing to liaise with students before they are allocated to this project

Email: *******************   **Phone:** ***********

Project ID: 2085023

Title of project: Researching the History of Disease Diagnosis and Treatment

Supervisor/s: Ms Rebecca Lush

Organisational unit / Institute / Centre: School of Biomedical Sciences

Location: Integrated Pathology Learning Centre, Level 6 Health Sciences Building, Royal Brisbane and Women's Hospital, Herston

Field of research: Humanities

Type of research: Online research with potential exhibition development research

Keywords: History; Disease; Treatment; Diagnosis

Project overview: The Integrated Pathology Learning Centre (IPLC) is embarking on a new long-term project to document and display the history of disease diagnosis and treatment. This particular project will assist in launching phase 1, initial research and data collection. It will involve selecting diseases on display in the IPLC and researching their history in order to create a report and disease overview card. There is potential for this project to evolve into exhibition development with knowledge gained from the research being applied. This project provides an opportunity to study medicine from a different perspective and be introduced to the basics of historical research.

Number of projects available: 1

Required training: A full site induction will be completed on the first day of the project. There is no other specific training required.

Desirable skills: Good written and verbal skills, familiarity with UQ Library, can work independently, comfortable directing their own research and asking for assistance if required.

Contact with supervisor prior to allocation: I have a strong desire to liaise with students before they are allocated to this project

Preferred mode of contact: Email / Phone

Email: *******************   **Phone:** ***********

Supervisor bio:

Link:

Project ID: 2094685

Title of project: Remote assessment and monitoring of lymphoedema

Supervisor/s: Dr Anna Finnane

Organisational unit / Institute / Centre: School of Public Health

Location: Public Health Building, The University of Queensland, Herston QLD

Field of research: Public health

Type of research: Interventional study

Keywords: Lymphoedema, chronic disease, public health, telehealth

Project overview: One in two Australians has at least one chronic condition, and one in 50 has more than 4 chronic conditions. Many of these conditions require patients to largely self-monitor and self-manage their condition day to day, under the care of multiple health professionals. The increasing prevalence of chronic conditions is putting strain on our health care system, which is far better equipped to respond to acute conditions. Alternative models of care are urgently needed. Lymphoedema is an under recognised, chronic and incurable condition affecting thousands of Australians. People with lymphoedema experience significant swelling, reduced function of the affected regions, increased risk of skin infections and reduced quality of life. Without treatment, lymphoedema can progress, leading to significant increases in limb size and/or severe swelling of the genital area, trunk, head and neck, and worsening physical symptoms. Current recommended treatment is complex and expensive, involving combinations of compression therapy and manual lymphatic drainage. These treatments are commonly prescribed as an intensive treatment program for 2-4 weeks, after which patients are advised to self-manage the condition to maintain any improvements. The treatments are inaccessible to many patients, particularly those living in rural and remote areas, with limited mobility and/or low income. This research program is investigating whether a multidisciplinary telehealth service can support people with lymphoedema to be more actively involved in their care, enable health professionals to increase their scope of practice, and reduce the burden on the health care system. This project will enable an MD student to be actively involved in the research program. Depending on the background and skills of the student, there are opportunities for literature searching/data extraction, qualitative or quantitative data analysis, or a written communication piece for consumer organisations involved in the research. The details of the task will be negotiated with the supervisor prior to starting the project.

Number of projects available: 1

Required training: No

Desirable skills: Good communication skills, quant or qual data analysis skills (if seeking analysis project)

Contact with supervisor prior to allocation: I have a strong desire to liaise with students before they are allocated to this project

Preferred mode of contact: Email

Email: *******************   **Phone:** ***********

Supervisor bio: Dr Anna Finnane is a Senior Lecturer in Epidemiology in the School of Public Health. She has particular interests in study design and outcome measures in clinical research, and the impact of these on the success of translational research. Anna has training and experience in quantitative research methodologies and statistical methods, and has taught Epidemiology and Research Methods units across multiple health disciplines. Her current research interests are in consumer and patient perspectives in melanoma and lymphoedema research.

Project ID: 2094746

Title of project: Genetic risk prediction in neurological diseases

Supervisor/s: Dr Anna Vinkhuyzen & Professor Wray

Organisational unit / Institute / Centre: Institute for Molecular Bioscience, Program in Complex Traits Genomics

Location: IMB Building, The University of Queensland, St Lucia

Field of research: genetics, statistics

Type of research: Secondary data analysis, IT development project, Literature review, Knowledge translation (e.g. implementing evidence into practice)

Keywords: genetic risk prediction, translation, precision medicine

Project overview: We are currently developing a real-time genetic risk prediction and genetic screening pipeline to help improve health outcomes. For this project, we are collaborating with psychiatrists and neurologists to provide useful genetic information on individuals presenting to the clinic. In short: consenting patients' blood is collected in the clinic and transferred to our laboratory at the IMB for DNA extraction and genotyping. Using genotype data from existing datasets and controls we plan to develop genetic risk predictors for the patient with current and newly developed algorithms. These predictors will be presented in a report that will be shared with the patients' clinician. The clinician can then refer to the report during the decision-making process to support an individualised and precision medicine approach to treatment and diagnosis. This is a novel project, for which the outcomes are expected to improve and be refined over time with clinician feedback and longitudinal data. Students interested in taking part in this project can work on various sub-projects:

*technical development of the pipeline (using R, Python, drupal)
*literature research into pharmacogenomics
*literature research into clinical interventions using in genetic risk prediction
*genetic data analyses (using PLINK, GCTA and other genetic analyses software tools)
*software development

Number of projects available: 3

Required training: no

Desirable skills: Data analyses or coding experience is desirable (R, python) for some sub projects.

Contact with supervisor prior to allocation: I have a strong desire to liaise with students before they are allocated to this project

Preferred mode of contact: Email

Email: *******************   **Phone:** ***********

Supervisor bio:

Link: http://cnsgenomics.com/

Project ID: 2135050

Title of project: 4th Generation Cardiac CT - effects on radiation dose and image quality

Supervisor/s: Associate Professor Christian Hamilton-Craig

Organisational unit / Institute / Centre: Northside Clinical School - The Prince Charles Hospital

Location: The Prince Charles Hospital

Field of research: Cardiology, Cardiac Imaging

Type of research: Observational study (e.g. survey, chart review)

Keywords: Cardiology, Cardiac Imaging, Cardiac CT, imaging

Project overview: The Prince Charles Hospital was one of the very first sites in Australia to install a 4th Generation broad-detector volume CT Scanner (GE Revolution). We wish to retrospectively review the first 1000 cardiac CT Angiograms to asses improvement of radiation dose with this cutting edge infrastructure. The dates are already collected in an automatic Radimetrix database but we need help to collect additional information from charts and ECGs to complete the dataset. This is also linked to the CONVERGE registry which is a global consortium of GE-Revolution sites, lead by Prof Matt Budoff at Los Angeles BioMedical Institute. Data will be contributed to the CONVERGE-phase II project.

Number of projects available: 2-3

Required training: N/A

Desirable skills: This is a relatively simple project with no special skills required. Knowledge of SPSS or Prism is always appreciated for statistical analysis.

Contact with supervisor prior to allocation: I have a strong desire to liaise with students before they are allocated to this project

Preferred mode of contact: Email

Email: ********************   **Phone:** ***********

Supervisor bio: Eminent Staff Cardiologist and leading researcher in cardiac imaging.

Link:

Project ID: 2148422

Title of project: Towards biomarker for lung injury

Supervisor/s: Dr. Jacky Suen

Organisational unit / Institute / Centre: School of Clinical Medicine

Location: The Prince Charles Hospital

Field of research: respiratory, critical care medicine, biomarker, molecular biology

Type of research: Laboratory research

Keywords: Respiratory injury, biomarker

Project overview: Biomarkers are essential tool for modern medicine, especially in diagnosis and monitoring of medical conditions. Highly sensitive and specific biomarkers, such as troponin, and ANP/BNP have a huge international market due to its significant roles in the clinic. To date, there is an absence of respiratory injury biomarker. Biomarkers for lung are funational based (F/P ratio, SaO2) but not on its injury or biology. The students will be involved in the early stage to confirm if there is any commercially available ELISA/antibodies that is specific to our large animal models. This project will be based in laboratory only and students must be able to commit to an entire 8 hr block due to experimental requirement. The students will also learn to handle tissues and samples collected from previous studies.

Number of projects available: 2-3

Required training: Biosafety, workplace.

Desirable skills: Basic laboratory skills, ELISA and PCR experience preferred, good pipetting skill preferred.

Contact with supervisor prior to allocation: It is not necessary but I am willing to liaise with students before they are allocated to this project

Preferred mode of contact: Email

Email: *******************   **Phone:** ***********

Supervisor bio: I am the director of the Scientific and Translational Research Lab (STARLAB) of Critical Care Research Group at The Prince Charles Hospital. The lab is approximately 30 members with 50% scientists and 50% clinicians. Currently, we are focus on research related to heart, lung and ECMO. In particular, we have projects involved in heart transplant, lung transplant, heart failure, Acute Respiratory Distress Syndrome and ECMO. We specalise in large animal preclinical model, with nearly all of our reserach are designed for quick translation into clinical trials.

Link:

Project ID: 2149219

Title of project: Segmentation of kidney glomerular structures using high-resolution MRI and validation using histology

Supervisor/s: Prof David Reutens, Dr Nyoman Kurniawan

Organisational unit / Institute / Centre: Centre for Advanced Imaging

Location: Building 57, CAI, St Lucia

Field of research: medical imaging, radiology, kidney

Type of research: Secondary data analysis, Laboratory research

Keywords: Kidney, MRI, histology, microscopy, registrations, image analysis

Project overview: The ability to count the number of nephrons in the kidney is the holy grail for nephrologists as it is a key determinant of the trajectory of kidney function through life. The size of human nephron is ~300 micron, and they have not been visualised in vivo using conventional magnetic resonance imaging (MRI).   The aim of this project is to develop a high-resolution MRI protocol to perform kidney nephron counting. Specifically, we will test the feasibility of using super-resolution track density imaging (sTDI) applied to diffusion MRI data to do nephron counting. We will also use a gradient echo sequence to test if the glomerulus structures can be visualised using a conventional anatomical scan at ultra-high resolution. We will use fixed whole pig kidney samples obtained from a local commercial butcher/abattoir for imaging at 16.4T. Subsequently the sample will be processed for histology and the slices will be imaged using bright field microscopy. The histological slices will be reconstructed into 3D volumes and will be registered into the MR images for segmentation and validation of the glomeruli structures. The student will have the opportunity to develop skills in MRI, histology/microscopy, and image data analysis (image registration and segmentation)

Number of projects available: 1

Required training: CAI workplace induction; biosafety training; laboratory safety training; MRI induction; Vibratome and microscope training

Work location: A work station will be provided. Students are expected to work on-site.

Essential: Good communication skills **Desirable:** Basic commands in unix and programming; some knowledge in histology/microscopy and image analysis

Contact with supervisor prior to allocation: I have a strong desire to liaise with students before they are allocated to this project

Email: ********************   **Phone:** ***********

Supervisor bio: Professor Reutens is the director of the Centre for Advanced Imaging. He is also a clinical neurologist specialising in epilepsy and is a senior staff specialist at the Royal Brisbane and Women's Hospital. Research in the Reutens Lab focuses on neurological disorders, such as epilepsy, stroke and dementia, and the development of imaging methods to better understand, diagnose and manage them. https://cai.centre.uq.edu.au/profile/102/david-reutens Dr Nyoman Kurniawan is the Facility Manager for the 16.4T and 9.4T Small Animal MRI. His research interest is in diffusion MRI, especially in the spinal cord, and microstructure imaging using ultra-high field MRI. https://cai.centre.uq.edu.au/profile/110/nyoman-kurniawan

Link: https://cai.centre.uq.edu.au

Project ID: 2183097

Title of project: Integrating electronic medical records to case-base learning to support digital literacy of medical students

Supervisor/s: Prof Mark Braunstein, Dr Jim Steel, Dr Ben Barry, Dr Iulia Oancea, Dr Sharon Darlington

Organisational unit / Institute / Centre: CSIRO Australian E-Health Research Centre

Location: St Lucia Campus (Engineering Bld and St Lucia Clinical Unit) and CSIRO eHealth at the UQ Health Sciences Building, Herston

Field of research: e-health, medical education, information technology

Type of research: Digital health project, IT development project

Keywords: medical education, electronic medical records, digital literacy, teamwork, innovation

Project overview:

A team spanning CSIRO Australian E-Health Research Centre, the School of Information Technology and Electrical Engineering (Faculty of Engineering, Architecture and Information Technology) and the School of Clinical Medicine (Faculty of Medicine) have collaborated to develop an electronic medical record platform to support case-based learning (CBL). The intent of this platform is to enhance digital literacy of medical students and also to improve the scope for individualised learning within CBL. The platform was implemented and evaluated in 2018, with substantial input from a team of software engineering students mentored by Mark Braunstein and Jim Steel. The next development stage of the project presents the opportunity for medical students to work as part of the team to ensure that the platform development is suitable for the user group (i.e., students) and also staff (tutors and academics. In particular, existing CBL cases will be adapted to the platform, which will require the expertise of medical students contributing to this project. The skills and connections developed in this project may be very valuable to future careers involving increasing use of information technology in healthcare.

Number of projects available: 10

Required training: Nil

Desirable skills: Nil

Work location: Some on-site work is required but students can also work off-site

Contact with supervisor prior to allocation: It is not necessary but I am willing to liaise with students before they are allocated to this project

Email: ******************** **Phone:** ***********

Supervisor bio: Professor Mark Braunstein is Professor of the Health Informatics Practice from the School of Interactive Computing at Georgia Tech, USA. Prof Braunstein graduated from MIT prior to completing his medical degree and has since had a distinguished career working at the interface of information technology and health care. Mark completed a sabbatical at the CSIRO Australian E-Health Research Centre and UQ in 2018 during which he collaborated with David Hansen (CSIRO), Jim Steel (CSIRO and UQ), Ben Barry (UQ, SLCU), Iulia Oancea (UQ, SLCU) and Sharon Darlington (UQ, SLCU) to help lead a team of engineering students to develop an electronic medical record platform (EMR) to support case-based learning. He is returning in June 2019 to continue work on this project.

Link: https://www.cc.gatech.edu/people/mark-braunstein

Project ID: 2098418

Title of project: Supporting workers to stand up, sit less and move more

Supervisor/s: Associate Professor Genevieve Healy

Organisational unit / Institute / Centre: School of Public Health

Location: Public Health Building, The University of Queensland, Herston QLD

Field of research: Public health

Type of research: Secondary data analysis, IT development project, Interventional study, Literature review, Knowledge translation (e.g. implementing evidence into practice), Digital health project, Observational study (e.g. survey, chart review)

Keywords: translation, public health, activity

Project overview: We are seeking students to form part of our BeUpstanding team comprised of world-leading experts in workplace health promotion, sitting time and activity, translational research and implementation science. The BeUpstanding program (www.beupstanding.com.au) includes a NHMRC-funded national implementation trial of a free online toolkit designed to support workplaces, and workplace champions, to take up, deliver and evaluate an evidence-based program to reduce sitting and increase movement in the workplace. The toolkit went live in a "soft launch" in September, 2017 and we already have over 100 work teams (>4,500 employees) signed up to the toolkit. In March we will be starting our implementation trial to understand the uptake, implementation, effectiveness, and cost of the toolkit in work teams across Australia. This provides several opportunities to gain research experience, from descriptive analysis of the characteristics of who is in the trial, to qualitative interviews with organisations, through to knowledge translation of key findings. The actual details of the project will be discussed prior to commencement. This is a world-first trial and an exciting opportunity to see research being translated into action.

Number of projects available: 2

Required training: No

Desirable skills: Good communication skills

Contact with supervisor prior to allocation: I have a strong desire to liaise with students before they are allocated to this project

Preferred mode of contact: Email

Email: *******************   **Phone:** ***********

Supervisor bio: A/Prof Genevieve Healy is a NHMRC Career Development Fellow at the Cancer Prevention Research Centre in the School of Public Health at the University of Queensland, and an honorary research fellow at the Baker IDI Heart and Diabetes Institute, and Curtin University. Her PhD research reported some of the first evidence regarding the importance of regularly interrupting sedentary time for heart health. Her current research builds on this work to examine population-level variations in prolonged sedentary time as well as the feasibility and acceptability of reducing this behaviour in key settings, such as the workplace.

Link: http://www.beupstanding.com.au