UQ Summer Research Scholarship Projects in the Faculty of Medicine 2020-21

Read about the summer program on the https://employability.uq.edu.au/summer-winter-research page, and apply online from 24 August 2020 - 27 September 2020 via https://employability.uq.edu.au/summer-winter-research/apply

Please take note of where each project is located. Projects are listed under the unit names on the application page (StudentHub). Additional projects may be uploaded over the coming weeks up until 11 September so please check which version you download (version noted in the footer).

Scholars can select from one of the following to see the associated projects:

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SoCM - Northside Clinical Unit

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34	Prof Ian Yang	Mobile Health for COPD
35	Dr Jacky Suen	Advancing knowledge in cardiac surgery-associated Organ Complications: Confronting/Understanding the daRk side of cell-free mitochondrial DNA (OCCUR)
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SoCM - PAH-Southside-Clinical Unit

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SoCM - Royal Brisbane Clinical Unit

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School of Public Health

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59	Dr Katherine Cullerton	Examination of letters to the editor regarding nutrition policy in Australia
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UQ Centre for Clinical Research

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Child Health Research Centre

Project title: 1	**Can an E-Health tool improve satisfaction after childhood concussion?**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 30 hours
Description:	"Paediatric concussion is a common presentation to emergency departments, can have long-term adverse outcomes, and is a significant public health burden. Clinical evidence and parental reports indicate the benefits of clear and consistent discharge information, and routine follow-up to facilitate recovery from concussion. Clinical pathways (CP) are tools that enable healthcare professionals to deliver optimal care using the best available evidence. They provide step-by-step processes of care. Effective implementation and design of intervention strategy requires evidence-based, theory-driven approaches, both to systematically assess barriers and facilitators that may affect uptake of CPs, and to devise appropriate solutions. This can be done using the Theoretical Domain Framework approach (TDF) to optimize integration into daily practice (similar to the approach of the Victorian Neurotrauma Institute Evidence Translation group and Canadian MNCY groups). A particular facilitator is the availability and use of online, web-based interactive technologies that can be used to guide the recovery process. We hypothesize that by using both the TDF, and mobile and web based technologies we can improve knowledge translation, adherence to concussion-recovery clinical pathways, and clinician and family satisfaction. In collaboration with a similar Canadian initiative, this project has adapted a CP for the management of paediatric concussion in Australia. Phases A – C have been completed and the study is in its final phase (D) which will run until Dec 2020. The project has produced discharge information sheets

	('Fact Sheets'), infographics, videos and a new eHealth application App to help guide families through the first 4 weeks of recovery.
Location:	Centre for Children's Health Research, South Brisbane
Expected outcomes and deliverables:	The successful student will be involved in the analysis (working with A/Prof Barlow) of a pre- and post- intervention design to evaluate the implementation of these eHealth interventions. He/she will work with app designers, concussion specialists, GPs, researchers, physiotherapists and families. This work will be essential, and the student will help produce a working draft of a research paper by the end of the summer studentship. He/she will be able to be intimately involved in the subsequent processes necessary to get this paper to publication. The student will be expected to present the results of their work firstly at an informal lab meeting and then at a research centre presentation in February 2021.
Suitable for:	Students interested in data analysis, health care, and traumatic brain injury. Students interested in MD-HDR pathway are encouraged to apply.
Primary Supervisor:	A/Prof Karen Barlow k.barlow@uq.edu.au
Primary contact, if not supervisor	Hema Moench h.moench@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 2	**Health care utilization after concussion and traumatic brain injury in children**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 30 hours
Description:	Concussion is a common diagnosis in childhood and can lead to long-term problems that impede returning to school and sport participation. Over the last decade, researchers and healthcare providers have increasingly realized the significant morbidity associated with concussion. Once thought to be a "trivial" injury, the healthcare needs are increasingly recognized as well as the potential short-falls in healthcare systems. Although some rehabilitation interventions are time- and resource-intensive, there are also cheaper intervention strategies that can help the majority of children. As part of our program to improve the outcome of childhood concussion and traumatic brain injury throughout Queensland, the aim of this summer research project is to investigate its healthcare needs and associated costs in Queensland children. This project follows on from a summer student research project last year. We hypothesize that there will be considerable heterogeneity in the services children receive and that there will be considerable sociodemographic variability with children in poorer and more remote areas being at risk of not receiving both low cost (education) and intervention (high cost) strategies they need. Approach: The successful candidate will be part of a healthcare utilization team (neurologist, physiatrist, economist, and allied health professionals), investigating needs and costs associated with Traumatic Brain Injury in Children. A funded cross-sectional study is already underway and data has been collected

	from over 115 participants. The student project will be vital to the program and will focus on mild TBI and concussion. During this 8-week project the student will help collate and analyze health service utilization and outcome data on children with TBI focusing on mild injuries. This topical project has the potential to inform local and national governing bodies.
Expected outcomes and deliverables:	The successful applicant can expect multiple useful outcomes that will help them plan their future career. Firstly, the student will be quickly integrated into the ABiC research team (A/Prof Barlow, research nurse Bec, health economist Kim Nguyen, neuropsychologist Owen Lloyd and Allied Health coordinator and researcher Penny Ireland). He/she will gain unique experience in methodologies to assess health service utilization and associated economic costs. We expect the student to be able to analyze data (with supervision and help) to produce a report summarizing the main outcomes from the project by the end of the summer studentship. He/she will be able to be intimately involved in the subsequent processes necessary to publish the final outcome paper for this project. The student will be expected to present the results of their work firstly at an informal lab meeting and then at a centre research presentation in February 2021.
Location:	Centre for Children's Health Research, South Brisbane
Suitable for:	A student who is interested in health care as a future career or health service research.
Primary Supervisor:	A/Prof Karen Barlow k.barlow@uq.edu.au
Primary contact, if not supervisor	Hema Moench h.moench@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 3	**Impact of maternal cannabis around conception on fetal and placental development**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 24 hours
Description:	There is now overwhelming evidence that the health and lifestyle habits of women and men around the time of conception can impact pregnancy, the development of the baby and long-term health of the child. This early window of development is particularly vulnerable to 'risky' behaviours, particularly by women who are not planning a pregnancy. For women in high-income countries, this commonly includes the consumption of alcohol and the use of recreational drugs. Despite cannabis not being legalised for recreational use at present in Australia, ~10% of pregnant women report using cannabis in the previous year. Although we know that alcohol in this period can have harmful consequences, we know much less about cannabis use during this sensitive developmental window. This study will use a rat model to test the impact of periconceptional exposure to Δ9-tetrahydrocannabinol (THC), the psychoactive cannabinoid in cannabis, on fetal and placental development. Female Sprague Dawley rats will be injected with THC daily from one estrous cycle prior to mating until day 5 of pregnancy, which is prior to implantation of the early embryo. This is typically the time in an unplanned human pregnancy when

	the woman will realise she is pregnant and cease using drugs and/or alcohol for the remainder of pregnancy. Fetal and placental tissues will then be collected for detailed morphometric, histological and molecular analysis. For this specific project, tissues will have already been collected for analysis. Depending on the student's interest, either fetal or placental tissues will be analysed using 1) detailed stereological analysis of placental structure and vasculature or 2) molecular markers of growth and development. There will also be potential for in vitro experiments using placental trophoblast cells to examine the direct effects of THC on cell differentiation. We hypothesise that periconceptional THC exposure will alter placental morphogenesis and vascularization, resulting in fetal growth restriction.
Expected outcomes and deliverables:	Scholars will gain experience of being part of an active research lab, allowing them to learn some key laboratory skills and techniques. This may include RNA extraction, RT-PCR, Western Blot, immunohistochemistry, tissue culture, histology and stereology. Although all the animal work for this project will have been completed, the student will have the opportunity to participate in other similar animal work being conducted by our lab. They will also be taught how to critically read scientific papers, conduct statistical analysis and presentation of data and present their results at regular lab meetings. Students will be expected to complete a short report at the end of the project.
Location:	Level 5, Sir William Macgregor Building, St Lucia Campus
Suitable for:	This project would suit students with a biomedical or straight science background and/or pre-medical students interested in an MD-HDR pathway.
Primary Supervisor:	Prof Karen Moritz k.moritz@uq.edu.au
Primary contact, if not supervisor	Dr Lisa Akison l.akison@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Centre for Health Service Research

Project title: 4	**Detection of Malaria in vectors and human samples using deep learning**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	**Background:** Infectious diseases typically produce proteins or compounds not normally found in the blood stream. For example, hemozoin is produced by Plasmodium spp. which causes malaria. Spectroscopy techniques can identify the presence of compounds by shining a bright light on a blood spot and identifying the spectral pattern reflected from the sample. Using partial least squares regression, the primary supervisor has generated predictive algorithms to detect the presence and quantity of malaria parasites in blood samples from mice. However, these models have low specificity when considering blood samples with low levels of

	infection. Deep neural networks have shown to out-perform many other machine learning algorithms in classification problems. However, to date the optimal network structure has yet to be identified. **Aim:** To apply various neural network models to the existing dataset to improve the accuracy of these diagnostic algorithms, especially in the case of low level infections. **Approach:** Using existing datasets and prior analysis as a baseline the student will apply multiple deep neural network architectures in an effort to identify the best structure for identifying samples infected with Plasmodium spp. using data obtained through near infra-red spectroscopy.
Expected outcomes and deliverables:	A comparative analysis of multiple machine learning algorithms including different styles of deep neural networks will be generated. This will be contrasted against the most commonly used method (partial least squares). These results are expected to form the basis of a publication.
Location:	Centre for Health Services Research, Oral Health Centre, Herston
Suitable for:	Students with a background in programming (python), preferably with an understanding of machine learning.
Primary Supervisor:	Dr Anton Lord a.lord@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 5	**Smoking cessation programs for inpatients in Queensland hospitals: time-series analysis**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 32 hours
Description:	The background to this dataset is that in QLD hospitals admitted patients cannot smoke cigarettes in or on the hospital campus. In response to this the Smoking Cessation Clinical Pathway (SCCP, attached) was developed to be completed for all patients admitted to Queensland Health facilities. The dataset we have captures the responses to this form over a two year period, meaning it is highly likely that patients have re-admitted during this time and appear in the dataset more than once. In addition to responses to the SCCP questions (which indicate current smoking habits, preferences for quitting, current NRT use and NRT acceptance during admission) I have also managed to acquire data regarding NRT products prescribed to this cohort on discharge. **Aims** 1. To use existing data sets to explore the demographic and diagnostic characteristics of patients who identify as smokers on admission to hospital. 2. To determine admitted smokers intention to quit, acceptance of NRT, and change in smoking behaviours over time.
Expected outcomes and deliverables:	We expect that this research will lead to further project, and may result in work that could be turned into a publication.

Location:	PAH Campus, Woolloongabba
Suitable for:	A post-graduate student with advanced statistical or data analysis skills. Skills or experience with time-series analysis is desirable.
Primary Supervisor:	Dr Centaine Snoswell c.snoswell@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 6	**Global Drug Survey: Analysis of the world's largest survey of people who use drugs (2013-2020)**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 24-36 hours
Description:	The Global Drug Survey is the world's largest survey of drug use. We have annual data spanning 2013-2020 (with more than 500,000 records). Over 100,000 people from around the world (30+ countries) complete the survey each year. We have data on over 100 different types of drugs: on the less typical drugs for example GHB, ketamine, and many Novel Psychoactive Substances (NPS) and the more common drugs for example cocaine, methamphetamines, cannabis and synthetic cannabis, and alcohol. If you are interested in drug and alcohol research, this project is for you. We are looking for a highly motivated scholar to assist with the preparation of a paper using GDS data. If you want to know more see http://www.globaldrugsurvey.com
Expected outcomes and deliverables:	The exact project topic will be determined by the studentâ€™s interests and available data. The student will be required to complete a short literature review, create an Endnote library, may conduct data cleaning and preparation, and will complete descriptive data analysis.
Location:	Building 33, PAH Campus/ Public Health Building, Herston campus
Suitable for:	We are looking for a student with the following skills: - Excellent academic writing skills - Advanced quantitative analysis skills - Interest in alcohol and illicit drug policy/interventions
Primary Supervisor:	Dr Cheneal Puljevic c.puljevic@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 7	**Using Big Data to Tackle Alcohol-Fuelled Violence**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 24-36 hours
Description:	Strong evidence exists of an association between alcohol consumption and violence. In 2016 the Queensland Government released the “Tackling Alcohol-Fuelled Violence” Policy, with the purpose of reducing alcohol-related violence in key entertainment precincts across Queensland, including Fortitude Valley.

	This project will draw any of the many administrative datasets that we hold from our evaluation of the TAFV Policy, consisting of millions of records, to explore hidden gems in the data. This research will provide policy makers and other key stakeholders with valuable information about ways of reducing alcohol-fuelled violence in Queensland.
Expected outcomes and deliverables:	The exact project topic will be determined by the student's interests and available data. The student will be required to complete a short literature review, create an Endnote library, may conduct data cleaning and preparation, and will complete descriptive data analysis. Depending on the project outcomes, there is an opportunity for the student to be a named author on the resulting publication.
Location:	Building 33, PAH Campus/ Oral Health Centre, Herston campus
Suitable for:	We are looking for a student with the following skills: - Excellent academic writing skills - Advanced quantitative analysis skills - Interest in alcohol and illicit drug policy/interventions - Interested in big data analytics and data science approaches
Primary Supervisor:	A/Prof Jason Ferris j.ferris@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 8	**The association between quality of life and comorbidities**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 35 hours
Description:	This project aims to understand the association between morbidity and co-morbidities and the changes in quality of life measured by two instruments, EQ-5D-5L and AD-5D-4L in an Australian general population sample. A secondary aims of this project is to understand the pattern of correlations between two quality of life instruments. Data is drawn from a general population sample obtained by online survey for a valuation study. Participants were selected to broadly represent similar age and gender profile of the Australian population. Additional data sources might be available to enrich the analysis if needed. Standard statistical methods will be used to analyse the data, including appropriate statistical tests and regression analyses.
Expected outcomes and deliverables:	Expected gains for the student: (1) in-depth understanding about quality of life measurement, (2) quantitative skill applicable to analyse cross-sectional data (with relatively large sample size) - statistical package is stata, (3) skill in presenting results and writing up quantitative analysis report, prerequisite for HDR. Expected outcomes: (1) a oral presentation in CHSR seminar, (2) a statistical analysis report (format to be advised)

	There is an option of turning the report into a publication, pending the student's commitment and his/her level of quantitative and writing skill.
Location:	Centre for Health Services Research, Oral Health Centre, Herston
Suitable for:	Students interested in HDR pathway who are interested in the topic of patient outcomes and have appetite for statistical analysis.
Primary Supervisor:	Dr Kim-Huong Nguyen kim.h.nguyen@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 9	**Feasibility and effectiveness of peer-led well-being interventions for older adults: a systematic review**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 25-30 hours
Description:	Interventions to improve physical and mental health in older adults have been shown to be feasible and effective. Peer-led interventions have also shown promise. However, interventions and programs tend to focus on a single area, be it physical activity or nutrition. Rarely do interventions include multicomponent strategies, and focus on a range of physical and psychosocial quality of life outcomes. Therefore, the aim of this project is to undertake a systematic review of peer-led interventions in older adults that focus on general well-being and quality of life outcomes.
Expected outcomes and deliverables:	The successful applicant will gain skills in the conduct and assessment of systematic reviews, including how to develop search terms, search databases, use endnote to a high skill level, and synthesise evidence. The deliverable for this project will be a draft manuscript for publication in a peer-reviewed journal.
Location:	Herston or PAH Campus
Suitable for:	This project would best be suited to students interested in or studying public health, epidemiology, geriatrics and gerontology, or health services research
Primary Supervisor:	Dr Natasha Reid n.reid@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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QIMR Berghofer Medical Research Institute

Project title: 10	**Studies in Transplantation Immunology**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	**Project 1:** Understanding the immunological mechanisms that regulate increased susceptibility to respiratory syncytial viral infection after stem cell transplantation.

	Background: Allogeneic stem cell transplantation (alloSCT) is considered the gold standard procedure for the treatment of blood cancers. Globally, over 9000 patients per year undergo this high-risk, life-saving therapy. However, major complications limit the therapeutic potential of this treatment which include graft-versus-host disease (GVHD) and infections due to the severe immunosuppression in these patients. Respiratory syncytial viral (RSV) infection is frequent in these patients, is often fatal and clearly a significant clinical problem. Thus, there is a pressing need for new treatment approaches to improve transplant outcome for these patients. We have established a novel, robust, preclinical model of RSV infection after alloSCT using Pneumonia Virus of Mice (PVM), the murine relative of RSV, to enable mechanistic pathways to be investigated. **Aim:** To determine the immune cells and cytokines that are dysregulated after alloSCT in the context of a PVM infection. **Approach:** This project will involve multi-parameter flow cytometry, RT-qPCR and immunoassays of samples collected from PVM infected mice after alloSCT. **Project 2:** Delineating immune response similarities between autoimmunity and chronic graft-versus-host disease. **Background:** Chronic graft-versus-host disease (GVHD) occurs in approximately 60-80% of long-term survivors of allogeneic stem cell transplantation (allo-SCT). This immunological complication is a major cause of morbidity and accounts for approximately one-quarter of the deaths in long-term transplant survivors. Clinical manifestations of chronic GVHD such as dry eyes, dry mouth and connective tissue disease closely resemble those of autoimmune disorders such as Sjogren's syndrome. Focal lymphocytic infiltrates of exocrine tissues (eg salivary glands), a characteristic feature of the disease, leads to tissue pathology and gland dysfunction. Cytokines are known mediators in this process and are important in regulating the disease sequela. Given current cytokine-targeted therapeutic approaches are ineffective, a better understanding of the pathophysiology of disease is needed for new therapies to be developed. **Aim:** Using preclinical models of chronic GVHD, this project aims to define the role of novel cytokine and cellular interactions within salivary gland tissues. **Approach:** This project will develop staining protocols for the detection of novel molecules in salivary gland tissues during chronic GVHD using confocal microscopy. Additionally, analysis of the expression of these critical molecules using multi-parameter flow cytometry will also be undertaken. **Project 3:** Spatial localization of immunoglobulin A in the gastrointestinal tract. **Background:** Blood cancers, which include leukaemia, lymphoma and myeloma account for 10% of all cancers and 9.4% of cancer deaths. Stem cell transplantation (SCT) is the predominant curative therapy for these diseases. However, a major complication is graft-versus-host disease (GVHD) in which the gastrointestinal (GI) tract, skin, lung and liver are preferentially damaged by the transplanted donor immune system,

	limiting the therapeutic potential of this treatment. Thus, there is a pressing need for new treatment approaches to improve transplant outcome for these patients. Immunoglobulin A (IgA) is the predominant antibody isotype found at the mucosal surface in the gastrointestinal tract. Importantly, in stem cell transplant recipients, serum IgA levels have been noted to be deficient in patients during the first 6 months after SCT, with those who develop acute or chronic GVHD remaining chronically IgA-deficient. A detailed understanding of the role of IgA in GVHD, particularly in the context of the gut microbiome, is lacking yet of critical importance. **Aim:** To establish an immunofluorescence staining protocol for the detection and spatial localization of IgA production in the GI tract at steady-state and during GVHD. **Approach:** Building on existing immunofluorescence approaches for the detection of mucin production and bacteria (FISH) in tissues, this project will develop a staining protocol for the detection and spatial localization of IgA in tissue sections of the GI tract using confocal microscopy. Additionally, production of IgA by immune cells using multi-parameter flow cytometry will also be undertaken.
Expected outcomes and deliverables:	The student will gain practical laboratory experience and further his/her knowledge in this research field. This project will involve histological techniques, confocal microscopy and flow cytometry. He/she will have the opportunity to observe and learn other techniques/skills, in addition to those required for this project. The student will work in a stimulating and supportive environment. He/she will be expected to display good laboratory practice, maintain a detailed and accurate laboratory notebook and write a brief report upon completion.
Location:	QIMR Berghofer Medical Research Institute, Herston
Suitable for:	This project is open to applications from students with a background in immunology/microbiology, particularly undergraduate students interested in a Honours/PhD pathway or pre-medical provisional students interested in MD-HDR pathway.
Primary Supervisor:	A/Prof Antiopi Varelias antiopi.varelias@qimrberghofer.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 11	**Mosquito determinants of arbovirus transmission**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	Dengue and dengue haemorrhagic fever (DHF) is a worsening global pandemic resulting from infection with the dengue viruses. The dengue viruses are transmitted through the bite of a mosquito, primarily the highly urbanised and anthropophilic species Aedes aegypti. We have current projects evaluating the vector competence of mosquitoes (capability of virus transmission), a novel anti-viral therapy using dengue Defective Interfering Particles, mosquito immunity and metabolism.

Expected outcomes and deliverables:	The student will participate in one or more of the above projects by engaging in PC2 laboratory activities; including the processing of fixed specimens, bioinformatics, microscopy and image analysis of histological sections. The student will be involved in data collection and the preparation of data for publication.
Location:	QIMR Berghofer Medical Research Institute, Herston
Suitable for:	Experience with molecular biology, bioinformatics or microscopy beneficial
Primary Supervisor:	Dr Greg Devine
Primary contact, if not supervisor	Dr Leon Hugo Leon.Hugo@qimrberghofer.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 12	**The effect of genetic predisposition to traits on recruitment bias**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	Population based research projects only recruit those willing to take part in a study, therefore potentially introducing a recruitment bias. As part of the PISA study (Prospective Imaging Study of Aging: Genes, Brain, and Behaviour) we are leveraging our extensive in-house cohorts drawn from genetic studies of approximately 16,000 individuals. All participants have been invited to complete an online survey on cognition and behaviour, lifestyle and family history. The fact that we already have genetic data for all participants before recruitment, presents a unique opportunity to investigate how a person's genetic predisposition to certain traits or psychiatric disease risk affects their propensity to take part. During this project we aim to investigate the association of genetic variants which affect education attainment (a proxy for IQ) and risk of psychiatric disease with the recruitment status. Results will highlight important biases which could affect findings from population based studies.
Expected outcomes and deliverables:	Scholars will gain skills in participant recruitment and data analysis. They will be expected to complete a literature review for the study and may also be asked to produce a report or oral presentation at the end of their project. There may be opportunity to generate a publication from their research.
Location:	QIMR Berghofer Medical Research Institute, Herston
Suitable for:	This project would suit an applicant with an interest in genetic epidemiology and biostatistics, and with experience in statistical analysis.
Primary Supervisor:	Dr Michelle Lupton Michelle.Lupton@QIMRBerghofer.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 13	**Understanding general practitioners attitudes towards skin cancer, sun, exposure, and vitamin D**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours

Description:	Skin cancer is Australia's national cancer, but exposure to sunlight also has benefits for health. This means that finding the right amount of sun exposure for optimal health is challenging. As part of developing new guidelines, we are doing a mixed methods study to understand how general practitioners currently advise their patients. The first phase of this study involves semi-structured interviews; the second phase is a quantitative survey. This is the opportunity for a summer scholar to assist with coding the semi-structured interviews. This involves using NVivo software, and extracting themes and subthemes from the interviews, using standard qualitative methods. The student will have the opportunity to contribute to the manuscript describing this work.
Expected outcomes and deliverables:	Students will gain skills in qualitative research methods, along with an understanding of the science, policy, and practice around balancing the risks and benefits of sun exposure. We plan to submit this work to a peer-reviewed journal, and the student will have the opportunity to contribute to this. This project will also inform a Sun Exposure Summit that is planned for March 2021, and the student will be invited to attend the Summit.
Location:	QIMR Berghofer Medical Research Institute, Herston
Suitable for:	This work is ideally suited to a student studying medicine. It does not require any specific pre-existing skills or knowledge.
Primary Supervisor:	A/Prof Rachel Neale Rachel.neale@qimrberghofer.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 14	**Chimeric Antigen Receptor (CAR) T cells for the treatment of cancer**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	Chimeric Antigen Receptor (CAR) T cells are genetically modified immune cells that can recognise and kill cancer cells. They are a type of cancer immunotherapy that can be very effective against certain types of blood cancers and are now approved for use in patients. However, CAR T cells can only benefit a very small proportion of cancer patients at present. The aim of this project is to develop new types of CAR T cells that are more effective and can target other types of cancer. The project involves using molecular biology techniques to clone new types of CAR T cells and using immunology assays to test the function of these new CAR T cells. It will provide exposure to the fields of cancer immunotherapy, genetic engineering and biotechnology, with a focus on clinical translation.
Expected outcomes and deliverables:	Scholars will gain exposure to molecular cloning, gene modification with retroviral vectors, cell culture and immunological assays, such as flow cytometry. Scholars are expected to learn at least one or two techniques and be proficient in basic laboratory procedures at the end of their project. Scholars will also participate in lab meetings and seminars.
Location:	QIMR Berghofer Medical Research Institute, Herston
Suitable for:	Students who are interested in cancer immunotherapy, biotechnology and clinical translation. Students who are interested in pursuing Honours or research higher degree are particularly encouraged to apply.

Primary Supervisor:	Dr Siok Tey siok.tey@qimrberghofer.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 15	**Microsatellite Instability as a determinant of chemotherapy sensitivity**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	Colorectal cancer is a major cause of mortality in Australia. Late stage colorectal cancers usually treated with a battery of cytotoxic chemotherapeutics, including a drug called TAS-102. The efficacy of chemotherapy varies dramatically between patients due to reasons that are not entirely clear. We have evidence that microsatellite instability may influence how patients respond to TAS-102, and in this project, we will combine genome engineering using the CRISPR-Cas9 system with traditional cell culture techniques to explore this relationship further.
Expected outcomes and deliverables:	Students will gain skills in cell and molecular biology. Students will have the opportunity to attend lab meetings and be involved in the general day-to-day activities of the laboratory. Students will be expected to present a summary of their results at the end of their project.
Location:	QIMR Berghofer Medical Research Institute, Herston
Suitable for:	Students will have a background in molecular and cell biology. Students are expected to have basic laboratory skills although training will be provided on site for all techniques.
Primary Supervisor:	A/Prof Vicki Whitehall vicki.whitehall@qimrberghofer.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 16	**Exploring and targeting MLK4 in drug resistance**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	Breast cancer (BC) remains the leading cause of cancer-related deaths in women. Despite recent advances in precision radiotherapy technologies, tumour recurrence remains a significant clinical hurdle. It is imperative to determine the causes of, and find novel strategies to treat, recurrent disease. Precursor metastatic cells, referred to as 'cancer stem cells' (CSCs), play a pivotal role in BC metastasis and relapse. There is a compelling need to understand the unique properties of CSCs to identify novel therapeutic targets. We propose to address this translational gap by building on our recent breakthrough discovery that MLK4, a serine/threonine kinase, is a critical mediator of CSC radioresistance. MLK4 depletion abrogates the increase in CSC populations seen after exposure of cells to ionizing radiation (IR). Importantly, we have shown that MLK4 is an IR-induced kinase in CSCs, predominantly expressed in the aggressive/poor prognosis basal BC subtype. MLK4 depletion reduces cancer cell proliferation and mammosphere-forming capacity in basal BC lines. MLK4 has yet to be studied in more detail, its signalling networks and upstream regulators remain unknown. Our compelling preliminary data indicate that

	MLK4 involved in DNA damage response signalling. Here we propose to study MLK4 in the context of DNA damage response signalling. We also identify small molecule inhibitors that can target MLK4 mediated signalling. **Hypothesis** Based on our discovery that MLK4 is a critical molecular regulator of radioresistance in CSCs, we hypothesise that MLK4 plays a pivotal role to regulate cell responses to IR and is a key determinant of refractory and recurrent disease. **Aims** Aim1: Consolidate the collaborative contributions of MLK4 loss and IR/chemotherapy to BC development using xenograft models Aim 2: Provide a mechanistic understanding of how MLK4 regulates CSC radioresistance Aim 3: Establish the clinicopathological importance of MLK4 in tumour cells.
Expected outcomes and deliverables:	Approaches Cell Culture and animal models Immunoblotting, Immunoprecipitation and Immunodetection Flow Cytometry Immunofluorescence Time Lapse Microscopy Molecular biology techniques such as plasmid overexpression and mutagenesis. Outcome: Student will learn a wide array of techniques that underpin the role of MLK4 in drug resistance.
Location:	QIMR Berghofer Medical Research Institute, Herston
Suitable for:	Honours and Masters
Primary Supervisor:	Prof KumKum Khanna KumKum.Khanna@qimrberghofer.edu.au
Primary contact, if not supervisor:	Murugan Kalimutho murugan.kalimutho@qimrberghofer.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 17	**Investigating hepcidin regulation in hereditary haemochromatosis.**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	**Background** Iron is an essential nutrient, but is also toxic when in excess, so the amount of iron in the body must be tightly controlled. As mammals don't actively excrete iron, body iron levels are regulated at the point of absorption in the small intestine. This process is controlled by the hormone hepcidin which is secreted by the liver in response to iron requirements. Circulating hepcidin binds to the iron export protein ferroportin on intestinal cells, causing the protein complex to be internalised and degraded, reducing iron absorption from the diet.

	Inappropriate regulation of hepcidin production causes a number of human diseases. The most common of these is hereditary haemochromatosis, which results from mutations in the HFE gene. This leads to a reduction in hepcidin production, increasing dietary iron absorption and causing tissue iron loading. Currently, the only treatment for hereditary haemochromatosis is regular phlebotomy to remove the excess iron. This project will examine the molecular processes regulating hepcidin production and will establish tools for examining novel treatments for hereditary haemochromatosis. **Aims** Aim 1: To utilise cultured cells to examine the factors regulating hepcidin production. Aim 2: To establish a high throughput assay to screen for novel iron removing compounds. **Experimental Plan** In Aim 1, liver cells in culture will be treated with a range of compounds to determine their effect on hepcidin production. In Aim 2, cells stably expressing yellow fluorescent protein (YFP) under the control of an iron responsive element will be created, allowing YFP to be regulated by cellular iron levels. In future studies, this cell line will be used as part of a high throughput assay to screen compound libraries for novel molecules able to remove iron from cells. **Outcomes** This study should provide more information about the molecular processes regulating hepcidin expression, which could potentially assist in the development of agents to treat disorders of iron homeostasis, such as hereditary haemochromatosis.
Expected outcomes and deliverables:	The student can expect to gain a range of skills in molecular biology, tissue culture and protein analysis, as well as data analysis and presentation skills.
Location:	QIMR Berghofer Medical Research Institute, Herston
Suitable for:	This project is suitable for a student with a basic knowledge of molecular biology.
Primary Supervisor:	Dr David Frazer David.frazer@qimrberghofer.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Rural Clinical School

Project title: 18	**Clinical registries to study bariatric surgery outcomes: A review**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 30 hours
Description:	This literature review will focus on core components required to set up a formal registry to study the outcome of patients undergoing bariatric surgery. This will involve identifying and reviewing documents and policies from registries established worldwide.

Expected outcomes and deliverables:	The summer scholar is expected to summarise their findings in the form of a manuscript or a report.
Location:	Rural Clinical School, Toowoomba
Suitable for:	Medical students in Years 1 or 2.
Primary Supervisor:	A/Prof Srinivas Kondalsamy-Chennakesavan uqskonda@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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School of Biomedical Sciences

Project title: 19	**Cleaning up cells: Understanding how proteins are tagged for destruction**
Project duration & delivery	Length of project: 8-10 weeks Hours expected per week: 36 hours
Description:	The cellular proteasome breaks down proteins and helps to keep a balance between protein synthesis and degradation. This system can be harnessed to specifically degrade harmful proteins that cause disease, as has been demonstrated by recent interest in proteolysis-targeting chimeras (PROTACs) in the pharmaceutical industry. However, we know little about the specific signals that send specific proteins down the destruction pathway. Understanding how these signals work will help in the design of new PROTACs that can target specific disease-related proteins. In this project, we will synthesise several protein degradation motifs (degrons) and analyse their effects on protein structure and degradation.
Expected outcomes and deliverables:	Techniques you will learn in our group may include: \Protein expression and isotope labelling Protein ligation and modification â€“ native chemical ligation, protein conjugation Solid phase peptide synthesis Protein structural biology â€“ peptide and protein NMR spectroscopy Protein purification â€“ affinity purification, HPLC Protein characterisation â€“ mass spectrometry, stability, binding interactions Searching and reading current research literature Analysing and presenting data Planning and carrying out laboratory experiments safely and reproducibly Students will present a brief presentation of their research project in the lab meeting at the end of the project. Work from the project might contribute to a larger project for publication.
Location:	Skerman Building 63, St Lucia campus
Suitable for:	Students should be highly motivated and organised. The project is best suited to students with a background in chemistry/biochemistry/molecular biology and with a keen interest in understanding biological and disease processes at a molecular level. Critical thinking abilities and good oral and written communication in English are essential.
Primary Supervisor:	Dr Anne Conibear a.conibear@uq.edu.au

Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 20	**Calcium handling by the mitochondria of skeletal muscle**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 20-36 hours
Description:	The mitochondria is the powerhouse of the cell, producing ATP for energy. The ATP production rate is controlled by the calcium within the organelle. However, we know little about how calcium is regulated within the mitochondria. This project will use confocal microscopy to image Ca2+-sensitive dyes inside the mitochondria of skeletal muscle fibre preparations to track changes in Ca2+ levels inside mitochondria with the aim of understand Ca2+ regulation and buffering inside mitochondria.
Expected outcomes and deliverables:	The project will introduce the student to muscle fibre microdissection, Ca2+-imaging, confocal microscopy and cell physiology.
Location:	MacGregor Building, St Lucia campus
Suitable for:	Suitable for students with background in cell physiology or biology or medicine.
Primary Supervisor:	A/Prof Bradley Launikonis b.launikonis@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 21	**Glycogen in epilepsy**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 30-40 hours
Description:	Glycogen occurs in soluble and insoluble forms. Her we will investigate which type of glycogen is found in epilepsy models.
Expected outcomes and deliverables:	The applicant will learn how to handle tissue samples and use biochemical measurements to quantify glycogen and other metabolites. Depending on results obtained co-authorship on a publication is possible.
Location:	Skerman Building 63, St Lucia campus
Suitable for:	Students who have taken BIOM2402.
Primary Supervisor:	A/Prof Karin Borges k.borges@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 22	**The role of NFIX in choroid plexus biology**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 25 hours
Description:	NFIX is a transcription factor that regulates a myriad of events during development. We have previously shown that NFIX is expressed in the developing brain, and that mice lacking this gene exhibit deficits in brain formation. One key phenotype these mice exhibit is hydrocephalus (enlarged cerebral ventricles). Hydrocephalus emerges when there is too

	much cerebrospinal fluid in the ventricular cavity. The choroid plexus is the site for the production of cerebrospinal fluid. We have previously shown that NFIX is expressed by cells of the developing and mature choroid plexus. Here, we would like to analyse the choroid plexus phenotype of mice lacking NFIX. **Hypothesis:** NFIX plays a central role in the formation of the choroid plexus. **Approach:** We will analyse the development of the choroid plexus in a variety of embryonic and postnatal aged mice lacking NFIX (or age-matched controls). This will be done via immunohistochemistry followed by confocal microscopy.
Expected outcomes and deliverables:	Applicants will learn a variety of lab techniques, including sectioning immunohistochemistry and confocal microscopy, as well as elements of data analysis and interpretation. A key deliverable will be dressing the key project hypothesis
Location:	St Lucia campus
Suitable for:	A background in biology is critical
Primary Supervisor:	A/Prof Michael Piper m.piper@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 23	**Sleep in Experimental Parkinson's Disease**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	Mounting evidence suggests that people suffering from neurodegenerative diseases (ND) have accumulating disruption of sleep and circadian (24-hourly) rhythms which are thought to worsen other symptoms associated with ND. This project aims to characterize sleep and circadian function in a novel experimental model for Parkinson's disease.
Expected outcomes and deliverables:	The successful candidate will gain skills in data collection, and analysis and have an opportunity to generate publications from their research. The Student will be asked to produce a report and oral presentation at the end of their project.
Location:	Otto Hirschfeld Bldg. 81, School of Biomedical Sciences, St Lucia campus
Suitable for:	This project is open to applications from students with a background in science, engineering and pre-medical provisional students interested in MD-HDR pathway.
Primary Supervisor:	Dr. Oliver Rawashdeh o.rawashdeh@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 24	**How does retrograde protein trafficking dysfunction cause Parkinson's Disease?**

Project duration & delivery	Length of project: 8 weeks Hours expected per week: 20-30 hours
Description:	The molecular changes which initiate Parkinson's Disease (PD) remain unknown. Endosomes and their associated cellular processes have emerged to have a significant role in the pathophysiology associated with PD. Our unpublished observations have revealed defects in a specific protein trafficking pathway associated with the retrograde trafficking of cargo from endosomes to the trans-Golgi Network (TGN) in familial PD. Specifically, we found that cells expressing familial PD associated retromer variants have a reduced capacity to generate a single type of endosome transport carrier (ETC). Our central hypothesis is that dysfunction in this retrograde protein trafficking underpins the majority of the pathobiology associated with the initiation of PD. Specific aims within this project will be to determine if specific cargo proteins utilise these specific types of ETC and if their function is altered under various experimental conditions. This project will involve mammalian tissue culture, protein localisation and advanced fluorescent microscopy techniques.
Expected outcomes and deliverables:	Training in mammalian tissue culture, protein localisation and advanced fluorescent microscopy techniques. Experience performing cell biology based research.
Location:	St Lucia Campus
Suitable for:	Biomedical Science Student interested in research
Primary Supervisor:	A/Prof Rohan Teasdale r.teasdale@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application.

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Project title: 25	**Overcoming immune suppression in ovarian cancer**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	We are interested in developing novel nano-therapeutic methods to overcome immune suppression in ovarian cancer. Ovarian cancer is the most deadly type of gynaecologic disease with more than 1500 new cases being diagnosed each year in Australia. The high recurrence rate is a major challenge in the clinical management of high grade serous ovarian cancer. While stimulating our own immune system to recognize and attack tumour cells represents an attractive means to facilitate complete elimination of tumours, emerging data suggest that many of the immunotherapy tools, such as immune checkpoint inhibitors, are minimally active in ovarian cancer. We aim to develop effective strategies to enhance the infiltration and function of cytotoxic T lymphocytes in ovarian tumours and to develop clinically feasible means to monitor T-lymphocytes activity in tumours following therapy. Ultimately, strategies developed in this project could harness the power of the immune system to eliminate tumours and significantly increase the survival of patients with ovarian cancer.

Expected outcomes and deliverables:	The student will learn critical laboratory skills and knowledge needed to develop new strategies to enhance the infiltration and function of cytotoxic T lymphocytes in ovarian tumours. In addition, the student will gain experience in developing novel nanoparticle platforms for tumour-targeted delivery. He/She will gain experience in working in a multidisciplinary environment, obtain hands-on training from the lab head and a postdoctoral fellow, and contribute to an exciting project in the area of cancer nanomedicine and immunology.
Location:	St Lucia Campus
Suitable for:	We are seeking a motivated undergraduate student who is interested in contributing to a large project involving nanotechnology and cancer biology, and who is eager to learn how to develop effective strategies to enhance anti-tumour immunity.
Primary Supervisor:	Dr Sherry Wu sherry.wu@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 26	**Wearable Assistive Devices to augment human movement**
Project duration & delivery	Length of project: 10 weeks Hours expected per week: 26-36 hours
Description:	The promise of successfully augmenting human locomotion in healthy and pathological populations with wearable assistive technologies is getting closer to reality. Lower-limb exoskeletons represent a class of wearable technology that apply assistance in parallel with muscle-tendon units. These devices aim to optimize or improve physical performance via reducing the metabolic cost and lowering musculoskeletal loads, but hurdles still remain. To date, the majority of exoskeleton research has focused on using powered devices that deliver energy to lower-limb joints. However, the potential metabolic benefits of these devices are significantly reduced by the added cost of carrying the motors and batteries needed to power them. In addition, powered devices are bulky, expensive and require careful maintenance—all practical issues that continue to limit their routine use. An alternative to powered assistive technology is bio-inspired passive elastic ankle exoskeletons. This highlights that we have a limited understanding of how to apply bio-enhancement technologies such that users obtain maximal benefit. This is a key barrier in their adoption and routine use outside the research laboratory. Devices may be fit for comfort, but are predominantly implemented as a 'one-size-fits-all' approach, without consideration to the behaviour or mechanical properties of the muscle-tendons which the device is affecting. Preliminary data from our team, exploring the relationship between ankle exoskeletons, metabolic cost, and muscle-tendon dynamics, highlights that some 'exo-tendon' stiffness's shift muscles to unfavourable contractile conditions and lead to suboptimal benefits for the user. As part of this project, we will determine how wearable assistive devices interact with the underlying musculotendinous structures during locomotor tasks.

Expected outcomes and deliverables:	It is expected that the successful candidate will work together with HDR students to gain skills in data acquisition and/or analysis of ultrasound, electromyography, kinematics, and kinetics. The student may also play a role in the design process of the assistive ankle devices, together will engineering collaborators.
Location:	Building 81, St Lucia Campus
Primary Supervisor:	Dr Taylor Dick t.dick@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 27	**Quantifying spinal motor neurones in GH-deficient mice with motor neuron disease**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 20 hours
Description:	Growth hormone (GH) deficiency in MND patients could play a pathogenic role in disease. Our studies in SOD1G93A mice show increased GH release at symptom onset, with GH levels correlating with the number of innervated neuromuscular junctions (NMJs). Muscle specific IGF-1 is also increased in SOD1G93A mice. GH and IGF-1 have strong anabolic actions, and muscle IGF-1 promotes axonal sprouting. An increase in GH/IGF-1 in SOD1G93A mice at disease onset could represent an endogenous response to counteract muscle loss. As disease progresses, GH release declines, culminating in GH deficiency. Thus, interventions to maintain or enhance early increases in GH/IGF-1 in MND could improve or sustain muscle re-innervation and function. Upregulation of endogenous IGF-1 may offer additional benefits. As a neurotrophic factor, IGF-I supports sensory and motor nerve regeneration, and is protective in motor neurons and muscle. IGF-1 directed interventions prolong survival in MND mice, whereas human studies show mixed results. Positive outcomes in SOD mice generally involve early and targeted delivery of IGF-1 to the spinal cord or the upregulation of IGF-1 across muscle in general. By contrast, treatment in humans is generally restricted to focal administration of IGF-1 well after the onset of symptoms. To overcome limitations in IGF-1 delivery in humans, treatment strategies must promote a systemic upregulation in IGF-1. However, before we invest in these strategies, it is critical that we first confirm that loss of GH/IGF-1 will impact the survival of Motor Neurones, especially in the context of MND. This project will investigate the impact of loss of GH/IGF-1 signalling on motor neurones in spinal cords of MND mice with GH/IGF-1 deficiency. Candidates will complete experiments aimed at the immunohistochemical identification and quantification of motor neurones located of within the anterior horn of the spinal cord.
Expected outcomes and deliverables:	Applicants will gain histology and stereology research skills. They will also gain an appreciation of the complexities of Motor Neurone Disease, and be part of an ongoing research project that seeks to develop strategies to treat MND. As part of this placement, students will have an opportunity to join the clinical research team that is embedded in the wider MND

	research group, and so will also be given an opportunity gain an understanding on how this research might benefit patients.
Location:	School of Biomedical Sciences, St Lucia Campus
Suitable for:	This project is open to all candidates with an interest in neuroscience
Primary Supervisor:	Dr Frederik Steyn f.steyn@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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School of Clinical Medicine – Northside Clinical Unit

Project title: 28	**Sequencing of PET scan in Lung cancer Diagnosis and staging**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	The aim of this retrospective study is to determine whether FDG PET scan prior to bronchoscopy or any biopsy is likely to conserve resources , reduce patient risk , and time to definitive management of lung cancer. PET is an important cancer imaging tool as it not only distinguishes benign from malignant solitary pulmonary nodules but also offers nodal and extrathoracic staging information crucila to lung cancer management , FDG-PET is mostly done as a staging assessment after a lung cancer diagnosis, a prerequisite for the Medicare rebate in non-small cell lung cancer. Therefore patients will undergo a diagnostic bronchoscopy, then FDG- PET scan which may indicate possible node involvement requiring a second bronchoscopy to sample nodes that were not implicated by pre - diagnostic CT alone
Expected outcomes and deliverables:	General research skills.
Location:	Clinical Sciences Building, The Prince Charles Hospital, Rode Road, Chermside
Suitable for:	Bio-Medical Students , Pre-Medical Provisional students interested in MD-HDR pathway
Primary Supervisor:	Prof Kwun Fong
Primary contact, if not supervisor	Barbara Page Barbara.Page@health.qld.gov.au 07 31396194
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 29	**Importance of Staging and Diagnosis in Lung Cancer research**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	Accurate diagnosis and staging is important to ensure the most appropriate treatment and determines treatment intent. If patients have

	nodal metastases they can benefit from post operative adjuvant chemotherapy or radiotherapy. However, the quality of pathologic nodal staging varies significantly, with major survival implications in large populations of patients This project aims to identify the concordance of staging and pathological diagnosis by undertaking a concordance study of lung cancer cases in the TPCH Lung Bank. We want to determine if small biopsies reflect the final surgical pathological diagnosis and what is the concordance between clinical and pathological TNM stages in a research Lung Bank.
Expected outcomes and deliverables:	General Research Skills
Location:	Clinical Sciences Building, The Prince Charles Hospital, Rode Road, Chermside
Suitable for:	Bio-Medical Students , Pre-Medical provisional students interested in MD-HDR pathway
Primary Supervisor:	Prof Kwun Fong
Primary contact, if not supervisor	Barbara Page Barbara.Page@health.qld.gov.au 07 31396194
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 30	**How does stress affect memories?**
Project duration & delivery	Length of project: 6 weeks Hours expected per week: 36 hours
Description:	Memory disorders impact Australian society with devastating consequences. These disorders constitute a major economic and social burden. Memory dysfunction features prominently in neuropsychiatric disorders including post-traumatic stress disorder (PTSD) and phobias. One of the major challenges in PTSD treatments is the ability to re-activate and then moderate emotional aspects of trauma related memories. Our ability to treat memory-related disorders is dependent upon a full understanding of the molecular, cellular and neural networks responsible for memory formation, modulation and pathology. Central to memory acquisition and consolidation is the N-methyl-D-aspartate receptor (NMDAR), a post synaptic ionotropic glutamate receptor, sensitive to both glutamate binding and membrane voltage. In addition, NMDAR is also sensitive to mechanical force mediated by its lipid environment. Here we propose that mechanosensitivity (mechanical force) also contributes to memory. Although several studies suggest possible mechanisms that may underlie mechanosensitivity of NMDAR, the role of mechanosensitivity of the NMDAR in memory is currently unknown. In this project, using patch clamp electrophysiology, we will investigate how stress signalling hormones (and other compounds) induce mechanical force in the cell membrane and thus modulate NMDAR activity and therefore memory formation.

Expected outcomes and deliverables:	There are significant gaps in our understanding of NMDAR mechanosensitivity, including whether the modes of NMDAR channel activation (i.e. ligand, voltage, mechanical) interact cooperatively, synergistically or competitively to regulate its function. Studying the modulatory effect on NMDAR mechanosensitivity by stress signalling hormones in artificial membrane systems will provide an opportunity to understand whether this property (in addition to NMDAR's voltage and ligand gating) plays a role in memory formation.
Location:	Clinical Sciences Building, The Prince Charles Hospital, Rode Road, Chermside
Suitable for:	Students with a background in chemistry, biochemistry or biophysics are encouraged to apply.
Primary Supervisor:	Dr Andrew Battle a.battle1@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 31	**Health Related Quality in Life in Lung Cancer Screening**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	This Project looks at Health Related Quality of Life in participants undergoing screening in the International Lung Screen Trial. The student will be involved in data collection, quality assurance and analysis of the TPCH cohort of 595 participants
Expected outcomes and deliverables:	General Research Skills , Data collection, Quality Assurance and Analysis. Students may be asked to present at the UQTRC meetings
Location:	Clinical Sciences Building, The Prince Charles Hospital, Rode Road, Chermside
Suitable for:	Bio-Medical Science Students , Pre-Medical Provisional Students interested in MD-HDR pathway
Primary Supervisor:	Dr Henry Marshall Henry.Marshall@health.qld.gov.au 07 31396805
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 32	**Comorbidities in lung cancer screening**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	This project looks at comorbidity in participants undergoing screening in the International Lung Screen Trial specifically COPD, coronary artery calcification and osteoporosis. The student will gain experience in radiological software to help analyse CT Scans, data collection , quality assurance and analysis

Expected outcomes and deliverables:	The Student will gain experience in radiological software to help analyse CT Scans. General Research Skills
Location:	Clinical Sciences Building, The Prince Charles Hospital, Rode Road, Chermside
Suitable for:	Bio-Medical Students, Pre-Medical provisional students interested in MD-HDR pathway
Primary Supervisor:	Dr Henry Marshall Henry.Marshall@health.qld.gov.au 07 31396805
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 33	**Screening for lung cancer, the International Lung Screen Trial(ILST)**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	The International Lung Screen Trial is multicentre NHMRC funded International Lung Cancer Screening Trial, led by Prof Kwun Fong at The University of Queensland Thoracic Research Centre at The Prince Charles Hospital. Study participants undergo CT screening at baseline and 2 years to look for early lung cancer. Substudies address osteoporosis prevalence , smoking cessation and nodule measurement. Students will gain skills in data collection, extraction, cleaning, storage, research methodology and analyses and have opportunity to help generate data for presentation and publications
Expected outcomes and deliverables:	Student will gain skills in data collection , extraction, cleaning storage, research methodology and analyses
Location:	Clinical Sciences Building, The Prince Charles Hospital, Rode Road, Chermside 4032
Suitable for:	Bio-Medical Students and Pre-Medical provisional students interested in MD-HDR pathway
Primary Supervisor:	Dr Henry Marshall Henry.Marshall@health.qld.gov.au 07 31396805
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 34	**Mobile Health for COPD**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	Chronic Obstructive Pulmonary disease (COPD) is a chronic lung disease that requires complex management . Educational resources for patients with COPD are widely available in hard copy and online;however patients do not always access these appropriately in a timely manner. This randomised controlled trial will address these gaps by using mobile technologies to deliver self- management tools to patients, for enhanced

	management of COPD. This mobile phone intervention will be compared to usual care, which will consist of standard hard copy resources
Expected outcomes and deliverables:	General Research Skills
Location:	Clinical Sciences Building, The Prince Charles Hospital, Rode Road, Chermside 4032
Suitable for:	Science Student , Pre-Medical provisional Students interested in MD-HDR pathway
Primary Supervisor:	Prof Ian Yang Ian.Yang@health.qld.gov.au 07 3139 5050
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 35	**Advancing knowledge in cardiac surgery-associated Organ Complications: Confronting/Understanding the daRk side of cell-free mitochondrial DNA (OCCUR)**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	Heart valve disease is a form of cardiovascular disease that becomes even more common with age, affecting millions worldwide. In Australia, the prevalence is expected to double in the next 10-20 years as the 5.5 million baby boomers age. Aortic valve disease is the most prevalent and serious type. Aortic valve replacement (AVR) surgery is the gold standard treatment, but regularly has unintended side-effects. Up to 30-50% of patients develop post-AVR organ dysfunction (irregular heartbeats/kidney injury). This can lead to a 4-fold increase in postoperative complications, worsening heart health, and patient recovery. Emerging evidence suggests there is less organ dysfunction associated with transcatheter AVR (TAVR), an alternative to surgical AVR, however the topic remains debated. To date, our capacity to find clinical solutions to effectively reduce/prevent these unwanted complications is limited due to the lack of mechanistic understanding of their causes. Thus, in this time of increasing aortic valve disease, urgent mechanistic research is required to improve patient outcomes. We propose to investigate one mechanism potentially underpinning post-AVR systemic inflammatory response syndrome (SIRS), known to provoke organ dysfunction - a potent inflammatory, organ damage-associated molecule called cell-free mitochondrial DNA (cf-mtDNA). Overall aims: i) To profile the influence of AVR and TAVR on cf-mtDNA release; and ii) evaluate its correlation with the early immune and inflammatory response, and post-AVR patient outcomes. Outcomes: The study is expected to validate cf-mtDNA as a useful predictor or risk stratifier to help identify high-risk patients. This could provide clinicians with the ability to intercept and reduce the risks of postoperative organ dysfunction. Our findings are anticipated to help

	reduce complications, associated hospital stay and long-term side-effects of heart surgery, leading to better patient heart health and quality-of-life.
Expected outcomes and deliverables:	The Critical Care Research Group (CCRG) is recognised as frontier for basic and clinical mechanical assist device and organ support research involving a broad range of disciplines. The scholar will therefore have the opportunity to work alongside experts in different fields (e.g. scientists, clinicians, nurses and engineers). Within the project, the scholar will gain exposure to the processes associated with setting the clinical study, as well as practical experience in the laboratory - acquiring skills in blood sample processing, red blood cell, leukocyte preservation for storage and potentially more. The scholar will also provide assistance in sample pick up from within the hospital (no contact with patients).
Location:	Based at Critical Care Research Group/UQ lab within The Prince Charles Hospital campus, Chermside West
Suitable for:	Science interested in research or pre-medical provisional students interested in MD-HDR pathway
Primary Supervisor:	Dr Jacky Suen
Primary contact, if not supervisor	Dr Katrina Ki k.ki@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 36	**Biomarkers for Lung Cancer Risk**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	Planning and undertaking a gene environment lung cancer risk case control study to identify novel lung cancer biomarkers
Expected outcomes and deliverables:	General Research Skills,May have to do presentation for the team at UQTRC meetings
Location:	Clinical Sciences Building, The Prince Charles Hospital, Rode Road, Chermside
Suitable for:	Bio-Medical , Science and Pre-Medical provisional students interested in MD-HDR pathway
Primary Supervisor:	Prof Kwun Fong Kwun.Fong@health.qld.gov.au 07 31394314
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 37	**Biomarkers for Lung Cancer prognosis and therapeutics**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	Evaluating public datasets to test emerging lung cancer biomarkers
Expected outcomes and deliverables:	General Research Skills

Location:	Clinical Sciences Building, The Prince Charles Hospital, Rode Road, Chermside
Suitable for:	Bio-Medical and Pre-Medical Provisional Students interested in MD-HDR pathway
Primary Supervisor:	Prof Kwun Fong Kwun.Fong@health.qld.gov.au 07 31394314
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 38	**Computer aided detection of nodules**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	This Project will analyse the role of CAD for the identification of lung nodules that are present on CT chest CT scans, in the screening, early detection and clinical settings . Knowledge learnt will include epidemiology and etiology of lung nodules and cancer, manual and CAD characterization of nodules, technical and clinical aspects of CT imaging for lung nodules , longitudinal follow -up of suspicious nodules.
Expected outcomes and deliverables:	General Research Skills
Location:	Clinical Sciences Building, The Prince Charles Hospital, Rode Road, Chermside
Suitable for:	Bio-Medical Students and Pre-Medical Provisional students interested in MD-HDR pathway
Primary Supervisor:	Prof Kwun Fong Kwun.Fong@health.qld.gov.au 07 31394314
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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School of Clinical Medicine – Primary Care Clinical Unit

Project title: 39	**General Practice services adapting to COVID-19 policies**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 20 hours
Description:	General Practice care in the community is remunerated through a fee for service model. Medicare is the national Australian universal health insurance scheme that covers reimbursements to general practices. Until 2020, only face to face patient contact was eligible for a Medicare rebate. An exception was telehealth consultation with a remote specialist provider. However, the COVID pandemic has fast-tracked availability of non-face-to-face rebate item numbers, a policy that had been championed by the general practice community for many years. Making consultations available to patients online and on the phone enabled general practice care to continue during a time when visits to a clinic posed a health risk to patients and staff. These telehealth options have been adopted widely

	across the nation. Originally intended to be a temporary measure until 30 September 2020, the telehealth item numbers have now been made a permanent feature of GP with a number of restrictions applied. As the pandemic has eased in many states, telehealth has remained a strong option in GP. It is however unclear how this adoption has happened and how the changes in the requirements have impacted on uptake. This study will use publicly available Medicare data to map the most commonly used medicare rebated services in Australia in 2020 compared to 2019 and assess the impact of telehealth and the COVID-19 pandemic. We will explore regional and provider related factors and do a time series analysis to assess the impact of policies.
Expected outcomes and deliverables:	Students will acquire quantitative research skills, and specifically learn about pharmaco-epidemiological research. They will gain experience in designing and conducting a study and contribute to the dissemination of findings. It is expected that they participate in and are co-authors of a journal publication of the study findings. Students will work with experienced researchers who have a strong track record of successful student projects and publications.
Location:	Herston
Suitable for:	This project is suitable for a student with an interest in quantitative research, who is interested in understanding how to work with large databases and apply data to inform day to day practice and policy. Supervisors are Professor Mieke van Driel (UQ Faculty of Medicine) and Dr Sam Hollingworth (UQ School of Pharmacy)
Primary Supervisor:	Professor Mieke van Driel m.vandriel@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 40	**Access of people experiencing homelessness to telehealth, mHealth and eHealth resources**
Project duration & delivery	Length of project: 6-8 weeks Hours expected per week: 20 hours
Description:	Vulnerable populations may experience challenges migrating from face-to-face healthcare to telehealth, and using mHealth and eHealth resources. However they may also benefit from these adjustments and innovations in healthcare delivery, particularly during pandemics. The aim of this project is to understand the barriers and enablers for people experiencing homelessness in terms of accessing these options effectively, in order to identify strategies for improving access. The successful student will conduct a focused, systematic literature review, and identify validated surveys of eHealth/telehealth/mHealth literacy and accessibility. The survey will be administered to people consulting general practitioners who specialise in providing primary healthcare to this client group.
Expected outcomes and deliverables:	Skills in survey design, data collection from a vulnerable population, and preliminary analysis. Exposure to health and social care for homeless people. Oral presentation at end of project.
Location:	Herston and inner city Brisbane
Suitable for:	Motivated student with ability to work independently, interest in social disadvantage and good people skills.

Primary Supervisor:	A/Professor Nancy Sturman n.sturman1@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 41	**What do pre-clinical year 2 medical students want to learn in a placement in General Practice in the time of the COVID19 pandemic?**
Project duration & delivery	Length of project: 6 weeks Hours expected per week: 24 hours
Description:	Primary Care is where most Australians receive most of their health care, and as the Royal College of General Practice has proclaimed, "No one knows you like your GP". The Urban LInCC program provides an opportunity for second year MD students to apply to spend half a day a week for 14 weeks (a Semester) in a community General Practice. Since the commencement of this program, many students have generously consented to researcher access to their de-identified survey responses and learning task and assessment material. This project will aim to identify the key themes in student learning activity submissions during Semester 2, 2020. The learning activity submissions record the student's learning goals at regular intervals during the placement. Semester 2, 2020 is a particularly fascinating time in the history of Urban LInCC, as students were in community practice at the time of the COVID19 pandemic, and this was the first clinical exposure for students, after some months of the withdrawal of hospital-based clinical coaching. The project will include, in consultation with Faculty library colleagues, a literature review on what students expect to learn during General Practice placements. Student learning activity qualitative data from Semester 2, 2020 will be analysed and themes identified. The findings of this project will be of interest to medical educators and GP teachers and academics, and may assist in refinement of course and curriculum design for longitudinal placements in MD2023.
Expected outcomes and deliverables:	Applicants are expected to have the following opportunities: • Learn and put into practice core skills in searching the relevant literature and constructing a narrative literature review. • Learn and put into practice core skills in qualitative research, including the concepts of coding and identifying themes, reflexivity, and active avoidance of bias. • The opportunity to co-author a publication and/or conference presentation, sharing this important and unique data. Deliverables which applicants are expected to deliver as an outcome of the project: • In consultation and with the advice of Faculty library colleagues, construct a search to find recent relevant literature which examines what medical students wish to learn on General Practice placements. • Complete, or make substantial progress towards completion, a narrative literature review which summarises the key relevant literature for this topic.

	• Read, analyse, discuss and reach agreement on key themes in the qualitative data described. • Contribute to the written discussion reporting the key themes and implications of these.
Location:	Level 8 Health Sciences Building, Royal Brisbane and Women's Hospital, Herston campus
Suitable for:	This project is most suitable for students who are interested in developing skills in qualitative research, and who have strong written communication skills. The project may be undertaken by an MD student at any level and would likely be of particular interest to a year 2 student who is about to enter his or her clinical years.
Primary Supervisor:	Dr Margaret Henderson m.henderson5@uq.edu.au
Primary contact, if not supervisor:	Dr Alison Green a.green1@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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School of Clinical Medicine – PAH Southside Clinical Unit

Project title: 42	**The predictors of weight gain with clozapine in people with treatment-resistant schizophrenia**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 20-36 hours
Description:	Schizophrenia is a psychiatric disorder that currently affects 1 in 100 Australians. Of this cohort, about one in three are treatment-resistant; classified as those with moderate-severe impaired functioning and a lack of response to at least two antipsychotics agents other than clozapine. Clozapine, an atypical antipsychotic, is first line therapy for treatment-resistant schizophrenia (TRS) due to its superior ability to reduce positive symptoms of schizophrenia compared to other antipsychotics. For some consumers, however, the risks of clozapine outweigh the benefits. Clozapine has a low propensity to induce extrapyramidal side effects, unlike 1st generation (so called typical) antipsychotics such as haloperidol. However clozapine commonly causes serious adverse effects such as weight gain and metabolic syndrome. People with schizophrenia live 15-20 years less than the general population. Two-thirds of this reduced life expectancy is attributable to metabolic syndrome from atypical antipsychotics. Clozapine was withdrawn from the Australian market in the 1970s due to reports of eight deaths in Finland in 1975 as a result of agranulocytosis. Clozapine's unique efficacy and the lack of a suitable alternative for TRS led to the Therapeutic Goods Administration allowing its return to use in Australia in 1993, albeit with mandatory regular monitoring for neutropenia. Metabolic monitoring however was not mandated by the TGA, even though this is estimated to have led to many more deaths than blood dyscrasias. Whilst metabolic monitoring may be undertaken for some or even most consumers at each clinic visit, it is not mandatory, unlike monitoring of neutrophil count.

	Weight gain is common and of a large magnitude in consumers taking clozapine but there is a lack of evidence about what factors predict weight gain in this cohort. Weight gain can be partially prevented by therapeutic interventions such as metformin; however, indiscriminate universal use of these therapeutic interventions has their own risks associated with them. Targeting these interventions to people most at risk of clozapine induced weight gain seems prudent. The aim of this review is to compile the evidence of predictors of clozapine-induced weight gain in consumers with TRS. We envisage that such information will provide some clarity about weight gain in these consumers to inform clinical decision-making
Expected outcomes and deliverables:	Students will be involved in Cochrane-style systematic review and meta-analysis. Students will be involved in the systematic literature search, article selection, data extraction and compilation of PRISMA diagrams. Motivated students will be involved in data-analysis, interpretation, and manuscript preparation and submission. It is the expectation that this research project will lead to a publication. The student's authorship position on the manuscript will be dependant on their level of contribution to the overall project.
Location:	Princess Alexandra Hospital, Woolloongabba
Suitable for:	Students in the health and medical sciences would be most suitable for this project.
Primary Supervisor:	A/Prof Dan Siskind d.siskind@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 43	**Incidentalomas in ED: Added Value or VOMIT (victim of medical imaging technology)?**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 30 hours
Description:	CTs and X rays are done in ED for multiple reasons. It is reasonably common to have incidental findings reported on CT and sometimes on X ray which do not relate to the presenting complaint in ED. Although most incidental findings are not serious, a proportion are likely to represent incidental recognition of a significant problem. It is therefore essential that all such findings are divulged to the patient and to their GP or admitting team, depending on disposition. This study will determine how many incidences of non-urgent findings are discussed with patients, and the need for follow up investigation explained and documented. It will also determine for how many of the patients who do have these discussions is their GP or admitting team alerted.
Expected outcomes and deliverables:	The PAH ED places a strong emphasis on learning about the entire research process. Activities will include a) literature review, b) development of a research proposal, c) knowledge of ethics application, d) collection and analysis of data, and e) reporting and dissemination of findings. Minimum expected outcomes are a project report and a presentation to the ED Research Group. All previous summer scholars have also made at least one conference presentation. Several past summer scholars have been co-

	authors on peer reviewed publications. Similar outcomes are expected in 2020.
Location:	Princess Alexandra Hospital, Woolloongabba
Suitable for:	Medical student
Primary Supervisor:	Dr Georgia Livesay
Primary contact, if not supervisor:	Dr Robert Eley r.eley@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 44	**Dosage of short-acting insulin in management of hyperkalaemia in End-Stage Renal Failure Patients**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 30 hours
Description:	Patients with end-stage renal failure (ESRF) who require dialysis, either peritoneal or haemodialysis, frequently present to hospital with hyperkalaemia. The standard management plan for hyperkalaemia includes use of short-acting insulin given with dextrose to protect against hypoglycaemia. The standard dose regimen is 10 units of insulin with 50mls of 50% dextrose. There is some suggestion in the literature that 5 units of insulin is as effective as 10 units in lowering potassium levels, with decreased risk of hypoglycaemia. This study aims to review the literature on this topic, and perform an audit through chart review of ESRF patients treated with insulin-dextrose for hyperkalaemia in the Emergency Department to clarify how many later developed hypoglycaemia requiring intervention (oral or IV glucose, or diet).
Expected outcomes and deliverables:	The PAH ED places a strong emphasis on learning about the entire research process. Activities will include a) literature review, b) development of a research proposal, c) knowledge of ethics application, d) collection and analysis of data, and e) reporting and dissemination of findings. Minimum expected outcomes are a project report and a presentation to the ED Research Group. All previous summer scholars have also made at least one conference presentation. Several past summer scholars have been co-authors on peer reviewed publications. Similar outcomes are expected in 2020
Location:	Princess Alexandra Hospital, Woolloongabba
Suitable for:	Any medical student
Primary Supervisor:	Dr Georgia Livesay
Primary contact, if not supervisor:	Dr Robert Eley r.eley@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 45	Use of ROTEM in the PAH ED: an audit
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 30 hours
Description:	Rotational Thromboelastometry (ROTEM) allows for â€œreal-timeâ€ identification of coagulopathy that may be contributing to exsanguination. ROTEM has been in use in the PAH ED for over 2 years primarily for our sickest trauma patients but also patients with non-traumatic haemorrhage requiring / at high risk of requiring massive transfusion. It was originally introduced during a research project investigating coagulopathy in trauma. ROTEM continues to be most commonly used in cases of severe trauma requiring massive transfusion. However, there are other causes of bleeding seen through ED and it is sometimes used for cases other than trauma. This study will audit the use of ROTEM including indication compared against a departmental guideline and changes in management based on results as well as our response to abnormal ROTEM (e.g use of fibrinogen concentrate / cryoprecipitate)
Expected outcomes and deliverables:	The PAH ED places a strong emphasis on learning about the entire research process. Activities will include a) literature review, b) development of a research proposal, c) knowledge of ethics application, d) collection and analysis of data, and e) reporting and dissemination of findings. Minimum expected outcomes are a project report and a presentation to the ED Research Group. All previous summer scholars have also made at least one conference presentation. Several past summer scholars have been co-authors on peer reviewed publications. Similar outcomes are expected in 2020
Location:	Princess Alexandra Hospital, Woolloongabba
Suitable for:	Medical Student
Primary Supervisor:	Dr Glenn Ryan
Primary contact, if not supervisor:	Dr Robert Eley r.eley@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 46	Use of the Queensland Emergency Airways Registry (QEAR)
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 30 hours
Description:	Endotracheal intubation (EI) in the Emergency Department (ED) is a high-risk procedure in a high-risk environment that can be associated with significant morbidity and mortality. An on-line form integrated into the electronic medical record (iEMR) is used across the state and is the basis of the Queensland Emergency Airway Registry (QEAR). The goal of this form is to improve documentation, decrease unwarranted variation in practice, and contribute to current best evidence-based practice data and current literature pool. A study undertaken by a summer scholar in 2019 reviewed how the form had been used at the PAH-ED. This current project will expand on that project, assist in data analysis and utilise those data to draft a publication.

Expected outcomes and deliverables:	Minimum expected outcomes are a draft paper report and a presentation to the ED Research Group. All previous summer scholars have also made at least one conference presentation. Several past summer scholars have been co-authors on peer reviewed publications. Similar outcomes are expected in 2020
Location:	Princess Alexandra Hospital, Woolloongabba
Suitable for:	This project is will be suitable for an MD student who has experience in analysis, interpretation and reporting.
Primary Supervisor:	Dr Iain McNeill
Primary contact, if not supervisor:	Dr Robert Eley r.eley@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 47	**Deliberate self-poisonings by patients with Borderline Personality Disorder presenting to a Clinical Toxicology Unit: A retrospective case series.**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 30 hours
Description:	Patients with Borderline Personality Disorder often present to hospital following overdose. Agents ingested include pharmaceuticals that are regularly prescribed. There is limited research focusing on the clinical aspect of overdose in these patients. Anecdotally many are on medications that are prescribed for off-label indications which can cause significant harm in overdose. Patients for this project will be identified through the Princess Alexandra Hospital Clinical Toxicology Unit's relational database. The focus of the study will be to compare regular medications and their indications with what is taken in overdose and the clinical sequelae of the same. It is hoped the study will identify specific culprit agents which could guide changes to prescribing practice with a view to risk mitigation.
Expected outcomes and deliverables:	The PAH ED places a strong emphasis on learning about the entire research process. Activities will include a) literature review, b) development of a research proposal, c) knowledge of ethics application, d) collection and analysis of data, and e) reporting and dissemination of findings. Minimum expected outcomes are a project report and a presentation to the ED Research Group. All previous summer scholars have also made at least one conference presentation. All previous summer scholars in the Toxicology Unit have been co-authors on peer reviewed publications. Similar outcomes are expected in 2020
Location:	Princess Alexandra Hospital, Woolloongabba
Suitable for:	Medical student with interest in toxicology
Primary Supervisor:	Dr Katherine Isoardi
Primary contact, if not supervisor:	Dr Robert Eley r.eley@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 48	**A systematic review and meta-analysis of the effect severe mental illness on colorectal cancer treatment and survival**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 25 hours
Description:	Aims: A systematic review and meta-analysis on whether people with severe mental illness (SMI) have equitable access to guideline appropriate care for colorectal cancer. **Background Review:** Colorectal cancer (CRC) is second only to lung cancer as a cause of cancer death in Australia and this cancer site is a clear example of a cancer that has poorer outcomes in those with SMI. As with all cancer sites, people with mental illness have a greater risk of dying from CRC than those without mental illness although incidence rates are very similar to the general population. This systematic review will investigate the role of equitable access to services post-diagnosis such as the receipt of surgery, chemo- or radiotherapy **Methods:** This will be a Cochrane-like review comparing access for people with SMI to that of the general population. The primary outcomes will be the receipt of receipt of guideline appropriate care such as surgery, chemo- or radiotherapy.
Expected outcomes and deliverables:	Meta-analyses will be done in Cochrane's software program, RevMan, for which training would be provided, and be supervised by Steve Kisely who is an experienced Cochrane reviewer, being 1st author on two & co-author on another four. The nature of the project means that the work is flexible and so could fit round other commitments. It will give practical experience of doing a Cochrane-type review and meta-analysis, as well as the possibility of publication in a peer-reviewed journal with a reasonable impact factor. Importantly, the project is not susceptible to disruption by the COVID19 pandemic
Location:	Supervisor is @ PAH but work can be done anywhere w/ an Internet connection
Suitable for:	Students in medicine or health sciences. Applications from students with experience of undertaking Medline, EMBASE or PsycInfo searches are especially welcome.
Primary Supervisor:	Prof Steve Kisely s.kisely@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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School of Clinical Medicine – Royal Brisbane Clinical Unit

Project title: 49	**Knowledge, attitudes and practice of pregnant Australian women regarding antibiotic use**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 30 hours
Description:	There are many indications for antibiotic use in pregnancy. Many women do not know if they have received antibiotics. We aim to undertake a

	survey of inpatient pregnant women to evaluate their knowledge attitudes and practice related to antibiotic use around the time of delivery.
Expected outcomes and deliverables:	Student will be supervised in distribution and collection of surveys, data entry and basic data analysis. We aim to present this survey locally (abstract RBWH) and contribute the data to a multisite project. Student will be considered for authorship depending on the level of contribution.
Location:	Ned Hanlon Building, RBWH, Herston
Suitable for:	Hard worker, sensitive to needs of post-partum inpatient women, good communication skills, team worker.
Primary Supervisor:	A/Prof Victoria Eley v.eley@uq.edu.au 0438127616
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 50	**Accurate Thermometry in Operating Theatres**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 20 hours
Description:	Accurate thermometry is vital during anaesthesia and postoperative recovery of patients undergoing surgery. Predominantly, thermometry methods (peripheral/central/rectal) used in a hospital to detect both hypothermia and hyperthermia require contact. Recently, methods of thermometry utilised in non-hospital environments, such as airports and checkpoints, have become a topic of attention with the ongoing COVID-19 coronavirus outbreak. New methods have been introduced which measure body temperature from a distance (no-contact; infrared method) in an attempt to reduce transmission of any infection. The previously available non-contact devices utilised in hospital settings have known issues with accuracy, but updated evidence is emerging in regards to the accuracy of new non-contact devices in non-hospital settings. We want to evaluate existing thermometers (both contact, and previously utilised non-contact devices) and compare accuracy and utility with new non-contact devices, to evaluate whether their accuracy for estimating core body temperature in adults is potentially suitable for temperature monitoring in operating theatres. We therefore propose first an extensive systematic literature review of physical characteristics (similarities and differences) of existing thermometers (digital; electronic ear; forehead; plastic strip, glass; mercury; infrared thermometers). This foundational work to understand will lead to the development of proposed work to investigate the accuracy and utility of these devices in the clinical setting.
Expected outcomes and deliverables:	Scholars may gain extensive experience with: * the technique of thermometry is all its aspects in theatres and hospital wards and outside the hospital. * gain skills in how to do obtain literature about a scientific problem in medicine * gain skills in how to write a review article. It is our intention to have the medical student as a co-author on our articles.

	Students may be asked to present an oral presentation.
Location:	Department of Anaesthesia & Perioperative Medicine, RBWH, Herston
Suitable for:	All medical students with an interest in thermometers
Primary Supervisor:	Prof Andre Van Zundert vanzundertandre@gmail.com 041 7654348
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 51	**Intraoperative cell salvage as an alternative to allogeneic (donated) blood transfusion: An evaluation of immune related adverse outcomes.**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 20 hours
Description:	1.2. Background: Allogeneic blood transfusion (ABT) is associated with an increased risk of infection and tumour recurrence secondary to TRIM (Transfusion Related Immune Modulation). TRIM-related adverse outcomes and ABT requirements (volume of blood products) can be reduced by using autologous transfusion (Intraoperative cell salvage/ICS). Transfusion related adverse outcomes disadvantage patients and are expensive to manage and can be identified and predicted through immunological laboratory investigation (flow cytometry and RNA sequencing techniques). The primary research questions are: • Is there a difference between the incidence of TRIM-related adverse outcomes when comparing ABT and ICS transfusion? And if so, what is the cost relevant to these adverse outcomes? • What are the differences in immune profiles (in vitro assays) when comparing ICS and ABT? Do these differences explain the mechanism of action of TRIM? • What is the immunological influence of other external factors (patient comorbidities, surgery and anaesthetic drugs, ABT and ICS) on associated adverse outcomes? • Can lymphocyte-monocyte ratio (LMR) and neutrophil-monocyte ratio (NMR) predict adverse outcomes during ICS and ABT? So far we have collected most data and published the first paper, posters and book chapter. Ongoing data analysis and publication is planned.
Expected outcomes and deliverables:	The applicant can expect to be involved in the data analysis, cleaning and manuscript writing as well as the design of follow-up projects from findings. Depending on progress participant would be supported to present published findings at appropriate forum.
Location:	Department of Anaesthesia & Perioperative Medicine, RBWH, Herston
Suitable for:	This project is suitable for medical students with a keen interest in research. A background in laboratory research or blood transfusion would be of value.

Primary Supervisor:	Dr Michelle Roets m.roets@uq.edu.au 0400 305 854
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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School of Public Health

Project title: 52	**Mapping Australia's mental health services**
Project duration & delivery	Length of project: weeks Hours expected per week: hours
Description:	Service maps are important sources of information that can be used to inform mental health policy and service planning. Currently, there is no standardised, comprehensive methodology for mapping the capacity (e.g., available beds, workforce full-time equivalent (FTE) staff) of, and activity (e.g., occasions of services, number of consumers seen) occurring within, Australia's mental health services. A team from The University of Queensland has therefore been contracted by the National Mental Health Commission to develop such a methodology, using the National Mental Health Service Planning Framework-Planning Support Tool (NMHSPF-PST) as a guiding framework. The NMHSPF-PST provides benchmarks for optimal service delivery (i.e., service activity and capacity) across the spectrum of mental health services required to meet Australia's population needs. These benchmarks can be used by service planners to improve the design of mental health services within their region. The aim of this project is to therefore: • develop a standardised methodology for mapping regional level mental health services capacity and activity data, using the NMHSPF-PST as a guiding framework; and • using the developed methodology, transform regional level mental health services data, sourced from national administrative data collections, into a standardised format. The transformed data, when compared to NMHSPF-PST outputs, will provide insights into: the existence of gaps or duplication in the current provision of mental health services in Australia; and the presence of population subgroups that may be at risk of receiving insufficient levels of care.
Expected outcomes and deliverables:	The successful applicant can expect to gain an understanding of Australia's mental health system and the different sectors and services that it comprises. Largely, they will assist with literature searches and the writing of publications. They may also be involved in the collating of data tables to inform project deliverables and/or publications. The successful applicant will gain exposure to a busy research environment at the intersection of academia and policy.
Location:	The Park Centre for Mental Health, Wacol

Suitable for:	This project is open to applications from students with backgrounds in psychology, health sciences, or public health. It is particularly suitable for applicants with an interest in understanding Australia's mental health system and approaches to mental health service planning.
Primary Supervisor:	Ms Claudia Sparti claudia.sparti@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 53	**The potential for tobacco product regulation to achieve a tobacco endgame**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 20-36 hours
Description:	This literature review will summarise the evidence base for using product regulation strategies to reduce cigarette use or to remove cigarettes from the market. Examples include maximum emissions limits, manufacturing standards such as banning filter-venting or filters, nicotine limits.
Expected outcomes and deliverables:	The expected outcome is a rapid review (evidence synthesis) of the literature on the topic.
Location:	School of Public Health Building, Herston
Suitable for:	This project is suitable for students from a wide range of backgrounds, including public health, medicine, nursing, law, science, etc.
Primary Supervisor:	A/Prof Coral Gartner c.gartner@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 54	**Approaches to control the commercial sale of tobacco and nicotine products**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 20-36 hours
Description:	This literature review will summarise the evidence base for approaches to restrict and reduce the commercial sale of tobacco and other nicotine products. This ranges from retailer licensing, to consumer licensing, regulated market models, and product bans.
Expected outcomes and deliverables:	The expected outcome is a rapid review (evidence synthesis) of the literature on the topic.
Location:	School of Public Health Building, Herston
Suitable for:	This project is suitable for students from a wide range of backgrounds, including public health, medicine, nursing, law, etc.
Primary Supervisor:	A/Prof Coral Gartner c.gartner@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 55	**Systematic literature search on environmental exposure and health outcomes**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	In this summer research project, the scholar will perform a systematic literature search on research articles published in environmental exposure and health outcomes. The quality of epidemiological, toxicological and clinical studies that assess the relationships between environmental exposures and health outcomes varies. This is a systematic literature search of the topic as guided by the supervisor. In this project, the scholar will learn to apply different search strategies across different databases, eliminate duplicates, and categorise the journal articles as per inclusion-exclusion criteria he or she will develop by collaborating with the supervisor. The scholar will need to use a reference management software program such as EndNote.
Expected outcomes and deliverables:	Students will gain skills in data base search strategies, EndNote software program, inclusion-exclusion criteria development, and data extraction from published articles.
Location:	School of Public Health Building, Herston
Suitable for:	Students with a background in public health, epidemiology, and or biostatistics.
Primary Supervisor:	Dr Darsy Darssan d.darssan@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 56	**National Adolescent Mental Health Surveys (NAMHS)**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 24 hours
Description:	While the majority of adolescents live in low- and middle-income countries (LMICs), little to no data exists on the prevalence of mental disorders among adolescents living in these regions. The project, titled National Adolescent Mental Health Surveys (NAMHS), was funded to address this lack of data. NAMHS involves conducting nationally-representative household surveys of adolescent mental disorders in Kenya, Indonesia, and Vietnam. Risk and protective factors will also be measured, as well as service use. NAMHS is led by Dr Holly Erskine and her team, who are based at the Queensland Centre for Mental Health Research. Johns Hopkins University (JHU) is a collaborating partner and the surveys within each country are led by the African Population and Health Research Center (Kenya), Universitas Gadjah Mada (Indonesia), and the Institute of Sociology (Vietnam). The data generated by NAMHS will provide vital information for service planning, prevention and early intervention strategies, and advocacy. The project will also generate data able to be included in the Global Burden of

	Disease Study (GBD), which is used by governments and global health agencies to inform policy and priority setting. Pilot studies have been completed in all sites (Kenya, Indonesia, and Vietnam). Based on the pilot study findings, revisions to the content and methodology for the national surveys are currently underway with data collection due to begin in 2021. The successful Scholar will contribute to various tasks within NAMHS, and will gain exposure to the running of an international, multisite research project. This project is 8 weeks in duration (excluding the Christmas/New Year closure).
Expected outcomes and deliverables:	This Summer Research Scholarship Project provides a unique opportunity to participate in a high profile, international, multisite research project. Under the guidance of Dr Erskine and her team, the successful Scholar will complete a range of tasks, including (but not limited to): testing the NAMHS instrument, creating templates for reports/data tables, contributing to publications (with any contribution being recognised accordingly), joining meetings with international collaborators, and other tasks dependent on the timeline of the project. The Scholar will learn about and gain skills in survey development, research project management, and primary research processes.
Location:	The Park Centre for Mental Health, Wacol
Suitable for:	This project is open to applications from students with a background in public health, psychology, mental health, health science, or other suitably related fields. This project would best suit a Scholar with an interest in mental health and/or child and adolescent health.
Primary Supervisor:	Dr Holly Erskine h.erskine@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 57	**Systematic review of indicators of mental health service needs**
Project duration & delivery	Length of project: 8-10 weeks Hours expected per week: 20-25 hours
Description:	Mental health is an integral component of overall health and wellbeing, and the impacts of poor mental health affect not only the individual, but their families, networks and society as a whole.1 To reduce the burden associated with mental illness effective mental health service planning is needed. Planning for mental health services requires an understanding of both (1) the population who needs services, and (2) the service response required. This project is about determining the population who need services. Epidemiological data from national surveys give us a starting point by capturing the 12 month prevalence of mental disorders. However diagnosis alone is not a good indicator of need for services, as having a mental disorder diagnosis does not automatically mean that a person has specific treatment needs. For instance, one person diagnosed with an anxiety disorder may be high functioning, with a good support network and therefore only need low intensity treatment from the mental health system, such as internet based cognitive behaviour therapy. Another

	person with the same diagnosis may have very low functioning, and the impact of their disorder may have flow on affects to other facets of their life, resulting in them needing a much more intensive service response.2 We are seeking to identify key indicators which can be used to determine the mental health service needs of adults with a 12 months mental disorder. To do this we are undertaking a systematic review of peer-reviewed and grey literature. This project is 8 weeks with the possibility of extension to 10 weeks. References 1. Productivity Commission. Mental Health draft report. 2019. Canberra. 2. Andrews G, Bell C, Boyce P, et al. Royal Australian and New Zealand College of Psychiatrists clinical practice guidelines for the treatment of panic disorder, social anxiety disorder and generalised anxiety disorder. Australian & New Zealand Journal of Psychiatry 2018; 52: 1109-1172. DOI: 10.1177/0004867418799453.
Expected outcomes and deliverables:	Students will learn how to design and execute a systematic review, including design of a search strategy, academic database searching, search result screening, data extraction and analysis of included publications. There will be opportunities to contribute to peer reviewed publications as a result of the project. Additionally, students will gain exposure to a busy research environment at the intersection of academia and policy.
Location:	The Park Centre for Mental Health - Wacol
Suitable for:	Psychology or Public Health background (or similar).
Primary Supervisor:	Miss Imogen Page i.page@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 58	**Examination of food and beverage industry political donations in Australia**
Project duration & delivery	Length of project: 6-8 weeks Hours expected per week: 36 hours
Description:	When corporations give money to politicians, what return can they expect on their investment? Political donations have become synonymous in the Australian mind with privileged access to politicians and potentially backroom deals regarding policy. However, very little is know about this interaction particularly around public health policy outcomes. This project will involve a literature review examining the relationship between political donations from corporations and their relationship to policy outcomes, in particular nutrition policy. It will also include an analysis of a publicly available disclosure database that documents political donations at the federal level in Australia. This analysis will identify whether the companies/individuals who have made donations have vested interests in public health policy outcomes. Particular attention will be paid to food and beverage companies.

Expected outcomes and deliverables:	Students will gain skills in conducting a literature review and secondary data analysis. After summarising the data a manuscript will be written for possible publication in a peer-reviewed journal.
Location:	School of Public Health Building, Herston
Suitable for:	The project requires good analytical skills and attention to detail.
Primary Supervisor:	Dr Katherine Cullerton k.cullerton@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 59	**Examination of letters to the editor regarding nutrition policy in Australia**
Project duration & delivery	Length of project: 6-8 weeks Hours expected per week: 30 hours
Description:	This study will examine opinion towards different nutrition policies using letters to the editor from Australian newspapers over a 20 year period. As many types of evidence influences policy makers, this information is likely to help contribute to development of a rounded picture of responses to different nutrition polices and health behaviours in general. The data for this study has already been extracted and the summer project will focus on the analysis of the data and writing up of the results into a peer-reviewed manuscript.
Expected outcomes and deliverables:	data analysis and synthesis. draft manuscript
Location:	School of Public Health Building, Herston
Suitable for:	Students with attention to detail and high level writing skills.
Primary Supervisor:	Dr Katherine Cullerton k.cullerton@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 60	**Systematic review of mental health service planning models and tools**
Project duration & delivery	Length of project: 8- weeks Hours expected per week: hours
Description:	Mental disorders are the second largest cause of years lived with disability in Australia, which contributes to a significant amount of the total disease burden [1]. In order to effectively address the needs of those suffering from mental disorders, it is necessary to quantify who needs services, where the services are needed and what the services look like. Systems modelling techniques and tools can be used to produce estimates of expected need for services and service requirements to meet this need (e.g. number of beds, staffing profiles, funding etc.). For the most part, these models are static in nature and therefore lack the ability to be used in real-time. More recently in mental health, there has been a push for more dynamic modelling techniques as a way to forecast service needs and resourcing. For example, modelling from the University of Sydneyâ€™s Brain and Mind

	Centre have used simulation and systems dynamic modelling to predict the effects of the COVID-19 pandemic on rates of suicide in the Australian population [2]. While there is a lot of activity in this area of research, to date there has been no effort to systematically review all mental health service planning methods, tools, and models. In order to determine the scope of available mental health service planning models and tools for future collaboration and coordination, we are undertaking a systematic review of peer-reviewed and grey literature. This project is 8 weeks with the possibility of extension up to 10 weeks. References 1. Australian Institute of Health and Welfare 2019. Australian Burden of Disease Study: impact and causes of illness and death in Australia 2015. Australian Burden of Disease series no. 19. Cat. no. BOD 22. Canberra: AIHW. 2. Brain and Mind Centre. Sydney: University of Sydney; 2020.
Expected outcomes and deliverables:	Students will learn how to design and execute a systematic review on the topic of mental health service planning, including design of a search strategy, academic database searching, search result screening, data extraction and analysis of included publications. There will be opportunities to contribute to peer reviewed publications as a result of the project. Additionally, students will gain exposure to a busy research environment at the intersection of academia and policy.
Location:	The Park Centre for Mental Health - Wacol
Suitable for:	Psychology or Public Health background. Understanding of mental health services is desirable.
Primary Supervisor:	Ms Madeleine Gardner; Dr Sandra Diminic (co-supervisor) m.gardner2@uq.edu.au 07 3271 8667
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 61	**Making healthy food affordable in remote communities**
Project duration & delivery	Length of project: 6 weeks Hours expected per week: 20 hours
Description:	**Background:** The School of Public Health has been funded to conduct a food security project in remote Aboriginal and Torres Strait Islander communities. Phase 1 of the project will apply a discount to a range of healthy foods with the aim of making a healthy diet affordable (i.e. <30% disposable household income). This discount will be made available to pregnant and breastfeeding women, and carers of children 6 months to 5 years of age, via a loyalty card in the local community store/s. It is planned that the scholar will develop the method for implementing the discount in this project. This scholar project may be modified according to project need and scholar interests at the time.

	Aim: To develop a process for determining the list of healthy foods to be discounted and the value of the discount to be applied to each healthy food. **Approach:** The scholar will work the Chief Investigator and the Project Working Group which has been established to oversee this project component. The project will be informed by community engagement methods and price discount and price monitoring literature. The scholar project will result in a method and ideally, training materials for Project Managers facilitating the project with Research Assistants in remote communities.
Expected outcomes and deliverables:	The successful scholar will learn to manage a component of research project design through working with research collaborators from the Aboriginal Community Controlled Health sector, UQ and the Australian and international university sector. They will develop skills in literature searching, tool development and training module development. There may be the potential to contribute to a peer-reviewed publication on development of the tool.
Location:	School of Public Health Building, Herston
Suitable for:	Master of Dietetic Studies, Master of Public Health
Primary Supervisor:	Dr Megan Ferguson megan.ferguson@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 62	**Understanding and explaining the heterogeneity of COVID-19 epidemics around the world**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 30 hours
Description:	On 31 December 2019, the World Health Organization (WHO) was alerted to a cluster of pneumonia patients in Wuhan City, Hubei Province of China.1 One week later, on 7 January 2020, Chinese authorities confirmed that they had identified a novel (new) coronavirus as the cause of the pneumonia. The outbreak was declared a Public Health Emergency of International Concern on 30 January 2020. On 11 February 2020, WHO announced a name for the new coronavirus disease: COVID-19. The disease has spread quickly to all corners of the world, and its capacity for explosive spread has overwhelmed even the most resilient health systems. As of July 27, 2020, there were more than 15 million cases and more than 640,000 deaths reported around the world. The burden of COVID-19 is heterogeneous across the regions of the world: The American region is the most affected followed by European region while the Western pacific is the least affected followed by Eastern Mediterranean region. It is also variable across countries around the world.

	The objective of this project is to understand and explain the variability of the epidemics in different regions and countries around the world. We hypothesise that a number of factors, including economic, demographic, epidemiologic and environmental and public health system will explain these variabilities across regions and countries around the world. We will be using a mixed-methods approach to understand and explain the epidemics across the world.
Expected outcomes and deliverables:	The project will have outcomes and deliverables including: understanding the pandemic towards an effective and sustainable response; designing an epidemic and pandemic preparedness plan for emerging and re-emerging epidemics and pandemics; publications in academic journals; and teaching and learning global health security.
Location:	School of Public Health Building, Herston
Suitable for:	MD or MPH students
Primary Supervisor:	Dr Yibeltal Alemu y.alemu@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 63	**Understanding and explaining the heterogeneity of the COVID-19 epidemics across states and territories in Australia**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	On 31 December 2019, the World Health Organization (WHO) was alerted to a cluster of pneumonia patients in Wuhan City, Hubei Province of China.1 One week later, on 7 January 2020, Chinese authorities confirmed that they had identified a novel (new) coronavirus as the cause of the pneumonia. The outbreak was declared a Public Health Emergency of International Concern on 30 January 2020. On 11 February 2020, WHO announced a name for the new coronavirus disease: COVID-19. The disease has spread quickly to all corners of the world, and its capacity for explosive spread has overwhelmed even the most resilient health systems. As of July 27, 2020, there were more than 15 million cases and more than 640,000 deaths reported around the world. The burden of COVID-19 is heterogeneous across the regions of the world: The American region is the most affected followed by European region while the Western pacific is the least affected followed by Eastern Mediterranean region. It is also variable across countries around the world. Australia is one of the first countries affected by the COVID-19 pandemic. The first cases of COVID-19 in Australia were identified in January. The number of new cases rapidly increased and peaked in March. A relatively low number of cases were reported daily between mid-April and early-June 2020. Cases have increased since mid-June. There were 14935 confirmed COVID-19 cases and 161 deaths reported in each state and territory between 22 January and By July 27, 2020. There is a huge variability in number of cases and deaths across states and territories. The majority of confirmed cases are from Victoria while the majority of deaths are from New South Wales.

	The objective of this project is to understand and explain the variability of the epidemics across states and territories in Australia. We will be using a mixed-methods approach to understand and explain the epidemics across states and territories in Australia.
Expected outcomes and deliverables:	The project will have several outcomes and deliverables, including: understanding the epidemics in different states and territories in Australia to improve the response; designing appropriate preparedness systems for emerging and re-emerging epidemics; publications in academic journals; teaching and learning public health emergency management and global health security.
Location:	School of Public Health Building, Herston
Suitable for:	MD or MPH students
Primary Supervisor:	Dr Yibeltal Alemu y.alemu@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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UQ Centre for Clinical Research

Project title: 64	**Genetics of sex development**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 30 hours
Description:	Disorders of sex development (DSD) are conditions in which development of chromosomal, gonadal, or anatomical sex is atypical. DSD are surprisingly common, and include complete XX or XY sex reversal (XX males or XY females), genital anomalies, and gonadal dysgenesis. DSD represent a significant healthcare burden due to their challenging clinical management and association with gonadal cancer and infertility. To date, the pathways regulating sex development remain poorly understood, resulting in the lack of definitive diagnosis for the majority of DSD. Using CRISPR genome editing, we have developed novel mouse models of several DSD, and this project aims to study the molecular and cellular mechanisms regulating their sex development. The successful candidate will perform immunohistochemistry and gene expression analyses to understand how specific gene ablations affect gonadal development and lead to DSD.
Expected outcomes and deliverables:	The student will learn techniques including microtome sectioning, immunohistochemistry, and real-time PCR. They will contribute to the research of the lab, and will have the opportunity to generate publications.
Location:	UQ Centre for Clinical Research (UQCCR), Herston campus
Suitable for:	Students interested in genetics, molecular biology, or the development of the reproductive system.
Primary Supervisor:	Dr Emanuele Pelosi p.pelosi@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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UQ Diamantina Institute

Project title: 65	**Influence of the gut microbiota on type 1 diabetes**
Project duration & delivery	Length of project: 10 weeks Hours expected per week: 35 hours
Description:	Our lab is interested in the role of the gut microbiota in triggering type 1 diabetes. We have performed a clinical trial investigating using a specialised dietary supplement for the treatment of type 1 diabetes. This project will use samples collected during this trial to investigate the functional effects of the altered microbiota on the immune system. The project will utilise germ-free mouse models colonised with human microbiota and/or bioinformatics approaches to integrate microbiome, dietary and clinical datasets.
Expected outcomes and deliverables:	The student will gain experience in a dynamic lab environment working with both wet and dry lab researchers. They will gain knowledge of autoimmunity, gut microbiota and data analysis approaches.
Location:	UQ Diamantina Institute, Translational Research Institute (TRI), Woolloongabba
Suitable for:	Students with a background in immunology or microbiology or bioinformatics, students interested in honours or PhD studies.
Primary Supervisor:	Dr Bree Tillbert
Primary contact, if not supervisor	A/Prof Emma Hamilton-Williams e.hamiltonwilliams@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 66	**Developing prediction models of COVID-19 research**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 35 hours
Description:	The novel coronavirus disease-2019 (COVID-19) is a recently emerged human pathogenic disease and announced as a pandemic by the WHO. Recent clinical observations suggest that patient's agxe, gender, details of chronic medical conditions could predict the risk of the infection1-2. Additionally, a number of genomic, proteomics and cellular markers have been uncovered that correlate with disease onset 3-4. The COVID-19 symptoms can vary from modest, mild to severe respiratory distress syndrome. The factors that trigger COVID-19 patients to get severe disease are largely unknown, but are believed to be a combination of prior health conditions and some immune system markers. Our vision is that a better understanding of COVID-19 progression mechanisms can be established by integrating the huge resource of the heterogeneous data that is currently being generated in COVID-19 research. Such an approach will predict severe COVID-19 onset and uncover therapeutic strategies that could prevent or suppress severe disease responses in the subjects at highest risk for disease interception.

Expected outcomes and deliverables:	The project will provide a computer program that could be used to predict COVID19 disease severity and will be available to broader community
Location:	UQ Diamantina Institute, Translational Research Institute (TRI), Woolloongabba
Suitable for:	- Immunology - Computational Immunology - Bioinformatics - Biostatistics - Students with programming experience - Public Health
Primary Supervisor:	Prof Ranjeny Thomas
Primary contact, if not supervisor	Dr Ahmed Mehdi a.mehdi@uq.edu.au 0488 686 072
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 67	**T cell pre-leukaemia and cell competition**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 30 hours
Description:	T cell pre-leukaemia is generally asymptomatic, but is a distinct disease state defined in animal models by the abnormal self-renewal of a subset of thymocytes. In our model, the NHD13 transgenic mouse, the thymocytes also block the entry of new progenitors into the thymus, leading to an undersized thymus with deficient cell competition. Normally, cell competition enforces regular turnover among thymic progenitors, and its deficiency is sufficient to induce T-cell leukaemia. We have identified a cell surface receptor involved in this cell competition and demonstrated that when it is deleted, cell competition is restored. We now aim to characterise the different cell populations in these mouse model thymuses by single cell RNAseq profiling, to segregate winner and loser populations and by doing so identify candidate molecular pathways which define these populations. This project may also include work on a proof-of-principle assay designed to identify T cell pre-leukaemia in humans, which is an important translational step to allow patients to benefit from the progress made in the animal models. Techniques involved will be animal dissection and tissue harvest, flow cytometry, single cell RNAseq preparation, bioinformatics analysis, DNA preparation, PCR and other basic molecular biology techniques.
Expected outcomes and deliverables:	This project will produce and conduct at least preliminary analysis or a large high-value dataset of gene expression in our animal models. It will likely lead to publication and contributing students will be included as authors.

	Students should maintain detailed records of experimental work performed during their stay, and at the end of their project will deliver either a written or oral report on their findings.
Location:	Level 5, UQ Diamantina Institute, Translational Research Institute (TRI), Woolloongabba
Suitable for:	Students interested in haematology and leukaemia, with basic molecular biology background and interest in bioinformatics analysis.
Primary Supervisor:	Dr Chris Slape c.slape@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 68	**The causal effect of maternal coffee consumption on birthweight â€“ A Mendelian Randomization Study**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 20 hours
Description:	High caffeine intake has been associated with adverse pregnancy outcomes, such as low birthweight. However, observational studies are prone to confounding and conclusions regarding causality cannot easily be drawn. Mendelian randomization (MR) is a method that uses genetic data to provide information on causality in observational studies. We will use MR to explore if the previously observed relationship between maternal caffeine intake and low birthweight is causal. If the student is interested, other maternal exposures could be added to the project.
Expected outcomes and deliverables:	Scholars will have an opportunity to work in a research group, gain skills in data analysis and generate publications from their research.
Location:	UQ Diamantina Institute, Translational Research Institute (TRI), Woolloongabba
Suitable for:	The student should be familiar with the software R. It would also be preferred if the student have some background or interest in bioinformatics, genetics or epidemiology.
Primary Supervisor:	Dr Gunn-Helen Moen g.moen@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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Project title: 69	**Which tumour immunosuppressive pathways prevent natural killer cell activation?**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 20-36 hours
Description:	Background: Despite advances in treatment and earlier detection, cancer is still a main cause of cancer death worldwide. Natural killer (NK) cells are circulating innate lymphocytes that naturally protect against tumor spread (metastasis), and recently showed by our group as dysfunctional in the tumour microenvironment (TME) established by cancers at distant organs for future metastatic spread. Yet, despite knowing that NK cells do control

	cancer metastasis, our knowledge of how cancer cells evade NK cell control is still very poor. This project aims to examine several immune suppressive pathways that cancers likely manipulate to avoid NK cells and spread. These include factors the transforming growth factor (TGF)-Î² superfamily that are elevated in the tumor environment. These molecules have great potential to suppress the normally high killing and anti-metastatic activity mediated by NK cells, but to date we still need to elucidate how relatively important each pathway might be. Proposed research program: The intrinsic NK cell function under suppressive factors stimulation will be assessed with NK cells purified from mouse spleen (wild type) by cell sorter, and in vitro challenge with activating cytokines and suppressive factors. Aim-1: Which suppressive factor is a major inhibitor of NK cell killing activity? This aim will be screened by killing activity of NK cells versus target tumour cells in co-culture systems. Aim-2: Which suppressive factor is a major inhibitor of NK cell cytokine secretion? This aim will assess NK cell cytokine production by intracellular cytokine (e.g. IFN-gamma) staining (flow cytometry) and secreted IFN-gamma, among others, from culture supernatants (ELISA); Aim-3: What is the cellular signalling status under suppressive conditions? The identification of altered cellular signalling will be screened by intracellular staining of phosphorylated signalling molecules (phosphor(p)-AKT, p-ERK1/2, p-p38, p-phospholipase C-gamma2, p-phosphotyrosine, p-SMAD2,3, p-STAT4, p-STAT5 and p-ZAP70 (PhosphoFlow).
Expected outcomes and deliverables:	Scholars will gain skills in data collection and analysis, lab-based experiments in cellular biology and immunology, writing/presentation skills and opportunity to participate in publications generated by the lab. Students will be asked to produce a report and give oral presentations in our lab meetings.
Location:	Level 5, UQ Diamantina Institute, Translational Research Institute (TRI), Woolloongabba
Suitable for:	This project is open to applications from students with a background in biomedical sciences.
Primary Supervisor:	Dr Fernando Guimaraes f.guimaraes@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 70	**Targeting hepatic stellate cells to improve hepatocellular carcinoma chemosensitivity**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 25-30 hours
Description:	Hepatocellular carcinoma (HCC) is the most common type of primary tumor in the liver and is a leading cause of cancer-related death worldwide. Activated hepatic stellate cells (HSCs) are key components of the HCC microenvironment and play an important role in the onset and progression of HCC. Current HCC treatment, including chemotherapy, radiotherapy and ablation, can activate HSCs and remodel the tumor microenvironment. Growing evidence has demonstrated that the complex interaction between activated HSCs and tumor cells can facilitate cancer

	chemoresistance and metastasis. Therefore, therapeutic targeting of activated HSCs has emerged as a promising strategy to improve treatment outcomes for HCC. In this project, we will first analyse collected clinical data to reveal the role of HSCs in hepatocellular carcinoma chemosensitivity. Then cellular experiments will be performed to investigate the molecular mechanisms. We will also assess novel and combination treatments against HCC in preclinical models.
Expected outcomes and deliverables:	Students will gain a deep understanding of liver pathology, as well as skills in clinical data assessment, preclinical cancer models and cellular biology. Students may have an opportunity to generate co-authored publications from their research.
Location:	UQ Diamantina Institute, Translational Research Institute (TRI), Woolloongabba
Suitable for:	Students interested in HDR, MD, MD-HDR pathways
Primary Supervisor:	Dr Haolu Wang h.wang21@uq.edu.au
Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 71	**Identification and characterisation of tumour self-seeded cells in liver cancer**
Project duration & delivery	Length of project: 8-10 weeks Hours expected per week: 30 hours
Description:	Tumour self-seeding is a process whereby cancer cells leave a primary tumour, circulate and return to colonise their own tumour of origin. This phenomenon provides new insights into the dynamics of tumour progression. Therapeutic targeting of tumour self-seeded cells (TSCs), a newly defined cell population within the primary tumour, will offer critical perspectives for cancer treatment. However, the process of tumour self-seeding has not been well described and TSCs are still ill-defined due to the lack of suitable animal models. We have developed in vivo model that can fully recapitulate the process of tumour self-seeding within â€œexactlyâ€ the same tumour. This project aims to identify and characterise the molecular profiles and functional attributes of TSCs in liver cancer, which would provide a new strategy to improve the response to current treatments and prevent the relapse of liver cancer.
Expected outcomes and deliverables:	Students can learn the relevant knowledge in cancer biology and experimental skills in this project such as cell culture, cell isolation, and microscopy imaging. Students have an opportunity to generate publications from their research output and this project has capacity to be an PhD project.
Location:	UQ Diamantina Institute, Translational Research Institute (TRI), Woolloongabba
Suitable for:	Student with a background in Biomedicine and Biological Science.
Primary Supervisor:	Dr Xiaowen Liang x.liang@uq.edu.au

Further info:	The supervisor MUST be contacted by students prior to submission of an application

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Project title: 72	**Enhancing bacterial uptake of antibiotics as a strategy for improving treatment of tuberculosis**
Project duration & delivery	Length of project: 8 weeks Hours expected per week: 36 hours
Description:	Tuberculosis is the leading global cause of death due to infection with a bacterial pathogen. Treatment of tuberculosis represents a therapeutic challenge not only because of the naturally high resistance of Mycobacterium tuberculosis to antibiotics, but also because of poor penetrance of TB antibiotics across the Mycobacterium tuberculosis cell wall. This project will characterise contributions and molecular functions of bacterial transport proteins in the mycobacterial uptake of current TB antibiotics and promising new antimicrobial leads. Outcomes of this project will deliver new insights into how antibiotics are transported across the mycobacterial cell wall, which may be exploited for enhancing the potency of available or new TB antibiotics to address the urgent need for improved treatment of drug-susceptible and drug-resistant tuberculosis.
Expected outcomes and deliverables:	- Detailed knowledge of bacterial transporters and their role in Mycobacterium tupberculosis pathogenesis and drug susceptibility - Hands-on laboratory expertise in molecular microbiology - Introduction into computer-based visualization of protein structures - Experimental design - Introduction into data collection, analysis, interpretation
Location:	UQ Diamantina Institute, Translational Research Institute (TRI), Woolloongabba
Suitable for:	Students with basic lab skills and a keen interest in acquiring microbiology expertise pertinent to a significant human pathogen.
Primary Supervisor:	Dr Giorgia Mori, A./Prof. Antje Blumenthal g.mori@uq.edu.au
Further info:	The supervisor CAN be contacted by students prior to submission of an application

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