2019 THIRD YEAR RESEARCH PROJECT OPPORTUNITIES GUIDEBOOK
Faculty of Health and Medical Sciences

adelaide.edu.au
The purpose of the research placement course is to provide small group research experiences (in consecutive semesters, as parts one and two) for all third year Bachelor of Health and Medical Sciences, Bachelor of Health and Medical Sciences (Advanced) and Bachelor of Health Sciences (Advanced) students, supervised by academic and research staff. A cross-disciplinary research conference event held in part two will be a highlight of the course.

This research placement guidebook describes the projects that will be available for 2019.

**How to apply**

Students will be invited by email to nominate their project preferences online during a single week in February, from 9:00am 18th February to 5pm on the 22nd February, for students who are starting part one at the beginning of the year (semester one).

**Other information**

Students can only be placed in projects for which they are eligible, based on Major(s) and other criteria as listed in the project descriptions. Students who enrol after the preference round, who do not submit preferences, or whose preferences cannot be accommodated, will be assigned by course coordinators into projects that are appropriate to their majors.

Assignment into projects by course coordinators will be final, and not open to requests for reassignment.

Students are allowed to contact supervisors only after their placement with that supervisor has been confirmed.

To best fit the field of work, research activities may be spaced weekly, or packed into a shorter span of days, to achieve 20 hours of research contact time per semester, as determined by the supervisor in consultation with the students in the group.

**Special requirements**

Note that police clearances, immunisations, or other special requirements, if specified in the guidebook, must be organised by students in advance of the research project start date, at their own expense.

**Timeline**

- **December 2018**: research placement guidebook posted online.
- **18th to 22nd February 2019**: Project preference requests will be accepted from students (online poll website) from 9:00am Monday to 5pm on Friday.
- **Friday 1st March 2019**: Students are notified of their project group via email.
- **Week three of semester one**: Students attend introductory meetings with their supervisors, setting the planned schedule of contact meetings for the semester, discussing relevant reports or literature to be read, and completing orientation and induction requirements as required for the research project.

**Key for abbreviation of majors**

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CANCER BIOLOGY
AND CLINICAL ONCOLOGY
CANCER BIOLOGY AND
CLINICAL ONCOLOGY

Our cancer biology research seeks to understand the fundamental mechanisms by which cancers arise, progress and respond to treatment.

Clinical oncology consists of three primary disciplines: medical oncology (the treatment of cancer with medicine, including chemotherapy); surgical oncology (the surgical aspects of cancer, including biopsy, staging, and surgical resection of tumours); and radiation oncology (the treatment of cancer with therapeutic radiation).

Understanding the causes of cancer will enable the development of innovative approaches to treat both liquid cancers (leukaemia and myeloma) and solid cancers (breast, prostate, ovarian and gastrointestinal cancer).

Researchers across the faculty are focused on:

- identifying the molecular and cellular basis of cancer
- developing preclinical models that closely resemble human cancer
- understanding the mechanisms involved in cancer spread and resistance to chemotherapy
- identifying novel biomarkers for detection of cancer
- developing and evaluating new drugs to treat cancer.
Cancer Treatment Toxicities Group

Location
Adelaide Health and Medical Sciences (AHMS) building
North Terrace Campus
Helen Mayo Building

Supervisor
Associate Professor Joanne Bowen and Dr Janet Coller (equal share)

Supervisor email
janet.coller@adelaide.edu.au

Research placement project title
1.01 Cancer chemotherapy and toll-like receptors

Project description
The broad research interests of the Cancer Treatment Toxicities Group focus on the toxicity of cancer treatment, particularly of the gastrointestinal tract, and how it links to other toxicities such as pain and cognitive decline, and risk factors for poor treatment outcomes in patients. The research group is investigating chemotherapy, radiotherapy and targeted therapy-induced whole gut damage, and the efficacy of new agents in prevention and treatment.

In this project, students will investigate the effect of the chemotherapy drug, irinotecan, on the expression of innate immune receptors, TLR-2, -4 and -5, throughout the gastrointestinal tract and in tumours. The project techniques will include real-time PCR, histological analysis, and protein assays.

Major(s)
Medical sciences

Available in which semester
Semester 1

Minimum number of students: 1
Maximum number of students: 10

Category
Laboratory (wet lab)

Special requirements
Nil
Cancer Treatment Toxicities Group

Location
Adelaide Health and Medical Sciences (AHMS) building
North Terrace Campus
Helen Mayo Building

Supervisor
Associate Professor Joanne Bowen

Supervisor email
joanne.bowen@adelaide.edu.au

Research placement project title
1.02 Innate immune response in TLR4/MD2 deficient mice

Project description
The broad research interests of the Cancer Treatment Toxicities Group focus on the toxicity of cancer treatment, particularly of the gastrointestinal tract, and how it links to other toxicities such as pain and cognitive decline, and risk factors for poor treatment outcomes in patients. The research group is investigating chemotherapy, radiotherapy and targeted therapy-induced whole gut damage, and the efficacy of new agents in prevention and treatment. In this project, the focus is on the Tlr4/Md-2 receptor complex which is vital in regulating innate immune response to bacterial signals in the gastrointestinal tract. Disruption of this signal has been implicated in inflammatory disorders and responses to cancer therapy.

Students will investigate the ability of mucosal immune cells to generate a response to the chemotherapy drug, irinotecan, and the impact on mucosal inflammation.

Major(s)
Nutritional health

Available in which semester
Semester 1

Minimum number of students: 2
Maximum number of students: 4

Category
Laboratory (wet lab)

Special requirements
Bachelor of Health and Medical Sciences (Advanced) students only

Research areas
Cancer Biology and Clinical Oncology
Nutrition and Metabolic Health
Liver Cancer Recurrence Monitoring Group

Location
Lyell McEwin Hospital

Supervisor
Dr Mohamed Asif Chinnaratha

Supervisor email
asif.chinnaratha@adelaide.edu.au

Research placement project title
1.03 Hepatocellular carcinoma recurrence post hepatitis C therapy - A systematic review and meta-analysis

Project description
Background and Aim: Treatment of hepatitis C virus (HCV) infection has been revolutionised by the arrival of direct acting antiviral (DAA) agents. However, there has been concerns about the use of DAA’s and the early recurrence of hepatocellular carcinoma (HCC) in those who have had curative HCC therapies. The main aim of this meta-analysis is to compare the HCC recurrence rates post DAA and Interferon (IFN) based treatments. Methods and Analysis: Electronic searches of databases (MedLine, EMBASE and Cochrane central) will be performed from 1st January 2000 till 31st December 2017 using MeSH terms or free text.

Criteria for studies to be included in this meta-analysis:
- participants: Those who had curative treatments for HCC (i.e. Ablative therapies or surgical resection)
- clinical intervention: DAA therapy for underlying chronic HCV infection
- comparator: IFN based therapies for chronic HCV infection
- outcome measure: Overall HCC recurrence rates
- study designs: Both retrospective and prospective cohort studies.

A random-effects model will be used to compare the outcome. Metaregression analysis will be performed to adjust for the differences in follow-up period. Inter-study heterogeneity will be assessed and the outcome will be reported using pooled odds ratio (OR) with 95% confidence interval (CI).

Major(s)
Medical sciences

Available in which semester
Semester 1
Minimum number of students: 1
Maximum number of students: 2

Category
Systematic review / meta analysis

Special requirements
Nil

Research areas
Cancer Biology and Clinical Oncology
Molecular Oncology / Colorectal Cancer Research Group

Location
Basil Hetzel Institute for Translational Health Research, The Queen Elizabeth Hospital

Supervisor
Dr Jennifer Hardingham and Dr Eric Smith

Research placement project title
1.04 Screening novel aquaporin 1 inhibitors using 3D tumour spheroids in culture

Project description
Aquaporin 1 (AQP 1) is a water channel protein involved in cellular water and ion flux, and is implicated in growth, migration, angiogenesis and invasion in cancer. The drug discovery program in Professor Yool’s lab has identified several drugs that modulate aquaporin channel activity. The aim is to investigate the efficacy of these drugs in inhibiting tumour growth and invasion in vitro using 3D spheroid cultures of human colon and breast cancer cells in assays of proliferation, apoptosis, migration and invasion. Angiogenesis (new blood vessel formation) is also a critical process for the continued growth and progression of tumours. We will use co-culture of tumour cells with endothelial cells to investigate the effect of the inhibitors on the process of angiogenesis. The outcome of this project will be to identify new therapeutic agents needed to augment therapy options for patients who have developed resistance to currently used chemotherapy.

Major(s)
Medical sciences

Research areas
Cancer Biology and Clinical Oncology
Innovative Therapeutics

Available in which semester
Semester 1

Minimum number of students: 2
Maximum number of students: 4

Category
Laboratory (wet lab)

Special requirements
Nil
Leukaemia Research Group, Cancer Theme North

Location
South Australian Health and Medical Research Institute (SAHMRI)

Supervisor
Dr Sue Heatley

Supervisor email
sue.heatley@sahmri.com

Research placement project title
1.05 Investigating downstream signalling and drug sensitivity in high risk B-ALL

Project description
Acute lymphoblastic leukemia (ALL) remains a leading cause of cancer-related death in children and young adults. The peak disease incidence is between 2 and 5 years of age. Philadelphia-like acute lymphoblastic leukaemia (Ph-like ALL) is characterised by a range of genomic alterations, the majority of which activate cytokine receptor or kinase signalling, providing potential for therapeutic targeting. Furthermore, Ph-like ALL has been demonstrated to have a poor prognostic outcome with an increased incidence of relapse. The aim of this project is to investigate the downstream consequences of these genomic alterations and potential drug sensitivity. This project will use cell lines as a model of Ph-like ALL and techniques to be used include flow cytometry, western blotting and molecular biology.

Major(s)
Medical sciences

Available in which semester
Semester 1

Minimum number of students: 2
Maximum number of students: 2

Category
Laboratory (wet lab)

Special requirements
National police check

Research areas
Cancer Biology and Clinical Oncology
Leukaemia Research Group, Cancer Theme North

Location
South Australian Health and Medical Research Institute (SAHMRI)

Supervisor
Dr Ilaria Pagani

Supervisor email
ilaria.pagani@sahmri.com

Research placement project title
1.06 Investigation of the mechanism and biology of high risk chronic myeloid leukaemia

Project description
The Philadelphia chromosome which results from a translocation between chromosome 9 and 22; t(9;22) is the causative lesion in Chronic myeloid leukaemia (CML). Drugs that target the Bcr-Abl protein, which is encoded by this translocation, are known as tyrosine kinase inhibitors (TKIs). TKIs have transformed this disease from a fatal neoplasm, to a chronic disease in the majority of patients. However, not all patients respond well, and in a significant minority drug resistance is a major concern. The research project will be focusing on understanding the biology of high risk CML and optimising treatment and outcomes for patients with this blood cancer. The key areas of research include: identifying biomarkers to predict patient responses to TKIs and identifying novel TKI resistant mechanisms in leukaemic cells by in vitro models. Students will undertake hands-on experience in western blot, flow cytometry, PCR, cell culture and data analysis.

Major(s)
Medical sciences

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 1
Maximum number of students: 2

Category
Laboratory (wet lab)
Leukaemia Research Group, Cancer Theme North

Location
South Australian Health and Medical Research Institute (SAHMRI)

Supervisor
Dr Barbara McClure

Supervisor email
barbara.mcclure@sahmri.com

Research placement project title
1.07 Cloning acute lymphoblastic leukaemia fusion genes, functional characterisation and therapeutic responses

Project description
Recent advances in genomic profiling have defined Acute Lymphoblastic Leukaemia (ALL) as a heterogeneous disease with multiple subgroups characterised by distinct genetic alterations. The presence of chromosomal rearrangements of epigenetic regulatory genes in ALL blasts is associated with extremely poor prognosis. Using transcriptomic analysis, we have identified a number of poorly characterised fusion genes in patients with ALL. This project aims to clone full-length fusion-genes from patient material into mammalian expression plasmids. This will allow in vitro characterisation in cell line models and assess therapeutic responses. This project will involve a range of molecular biology and cloning techniques including primer design, PCR Sanger sequencing, bacterial work and tissue culture.

Major(s)
Medical sciences

Special requirements
Nil

Available in which semester
Semester 1

Research areas
Cancer Biology and Clinical Oncology

Minimum number of students: 1
Maximum number of students: 1

Category
Laboratory (wet lab)
Aquaporin Physiology and Drug Discovery Group

Location
North Terrace Campus

Supervisor
Dr Jinxin (Victor) Pei and Professor Andrea Yool

Supervisor email
jinxin.pei@adelaide.edu.au

Research placement project title
1.08 Discovery of new drugs targeting aquaporin-1 to slow cancer metastasis

Project description
This project is aimed at the discovery of new drugs to slow cancer metastasis. Metastasis involves movement of cancer cells away from a primary tumour site and invasion into other organs and tissues, and is the predominant cause of cancer-related deaths. A membrane water channel, aquaporin-1 (AQP1), has been found to serve as a key mechanism that enables the rapid movement of some classes of aggressive colon and brain cancers. Imaging techniques including light microscopy and live-cell imaging are used to track the trajectories of moving cells, to measure migration rates in AQP1-expressing and non-expressing cancer cell lines, and to assess the inhibitory effects of candidate AQP1 modulators. Students can explore natural medicinal plants (such as those from traditional Chinese and Indian alternative medicines) as sources of novel pharmacological agents that could block AQP1 channel activity and slow cancer cell migration. New AQP drugs that restrain metastasis hold promise for cancer therapy.

Major(s)
Medical sciences; Neurosciences

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 1
Maximum number of students: 4

Category
Laboratory (wet lab)

Special requirements
Nil

Research areas
Cancer Biology and Clinical Oncology
Neuroscience, Behaviour and Brain Health
Innovative Therapeutics
Dame Roma Mitchell Cancer Research Laboratories (Prostate Cancer Research Group)

Location
Adelaide Health and Medical Sciences (AHMS) building

Supervisor
Dr Luke Selth

Supervisor email
luke.selth@adelaide.edu.au

Research placement project title
1.09 Regulation of receptor tyrosine-protein kinase ERBB-3 (HER3) by the androgen receptor in prostate cancer

Project description
The androgen receptor (AR), a ligand-activated transcription factor, is the mediator of androgen action and plays a key role in defining the male phenotype. AR is required for the growth of both the normal prostate and prostate cancer. Indeed, AR is the primary target of drugs that are used to treat metastatic prostate cancer. The selection pressure associated with AR-targeted therapies leads to alteration of the AR signalling axis in prostate tumours. One type of alteration observed in advanced prostate cancer is increased activity of AR accessory proteins, termed co-activators, which enhance AR activity. Another type of alteration to the AR signalling axis observed in prostate cancer is the regulation of novel gene targets by AR that drive the growth of lethal disease. The Cancer Research Laboratories group has recently identified a novel AR co-activator, GRHL2, which enables AR to regulate a distinct set of gene targets. One such gene, receptor tyrosine-protein kinase ERBB-3 (HER3), is known to be an important driver of various cancer types, and their preliminary evidence suggests that it becomes regulated by AR and GRHL2 during prostate cancer progression. In this project, the student(s) will validate HER3 as a novel AR- and GRHL2-regulated target gene in prostate cancer.

Major(s)
Medical sciences

Available in which semester
Semester 1

Minimum number of students: 1
Maximum number of students: 2

Category
Human research

Special requirements
Access to AHMS building level 8 office area and laboratories

Research areas
Cancer Biology and Clinical Oncology
Men's Health
Myeloma Research Group

Location
South Australian Health and Medical Research Institute (SAHMRI)

Supervisor
Professor Andrew Zannettino and Dr Stephen Fitter

Supervisor email
andrew.zannettino@adelaide.edu.au

Research placement project title
1.10 Hepatocellular Carcinoma (HCC) - a novel method of detecting malignant disease

Project description
Hepatocellular carcinoma (HCC) is a malignancy of the liver and occurs predominantly in patients with underlying chronic liver disease and cirrhosis. Hepatitis B and hepatitis C strongly predisposes to the development of chronic liver disease and subsequent development of HCC. We have recently identified an antibody that binds to the surface of cell lines derived from patients with HCC. Most notably, the antibody binds almost exclusively to cell lines that are permissive to Hepatitis C virus infection. Participants will screen a human HCC tissue array that includes tissues graded into stages, based on prognostic indications, to determine the binding specificity of the antibody and to evaluate any prognostic significance.

Major(s)
Medical sciences

Available in which semester
Semester 1

Minimum number of students: 1
Maximum number of students: 2

Category
Laboratory (wet lab)

Special requirements
Nil

Research areas
Cancer Biology and Clinical Oncology
Myeloma Research Laboratory

Location
South Australian Health and Medical Research Institute (SAHMRI)

Supervisor
Professor Andrew Zannettino and Dr Duncan Hewett

Research placement project title
1.11 Ribonucleic acid (RNA) editing targets in multiple myeloma

Project description
The Myeloma Research Laboratory studies the molecular and cellular basis for the development of the bone marrow cancer, multiple myeloma. Myeloma is the second most common blood cancer, with over 100,000 people diagnosed worldwide each year. Multiple myeloma (MM) is a cancer caused by the outgrowth of plasma cells (PCs). Patients with MM have a diverse range of mutations in their cancerous PCs, including premature termination codon (PTC) mutations of the gene encoding the nuclear antigen protein Sp140. We have recently discovered that a mouse myeloma PC line, derived from a myeloma-prone strain of mice, also has a PTC in 50% of its Sp140 mRNA transcripts. This PTC mutation is not observed at the DNA level and we believe that it is caused by aberrant RNA-editing mediated by an Apobec cytidine deaminase enzymes. Cell culture, nucleic acid extraction, PCR, sequencing and proliferation assays will be used to identify the Apobec responsible for this aberrant RNA editing.

Major(s)
Medical sciences

Research areas
Cancer Biology and Clinical Oncology

Available in which semester
Semester 1

Minimum number of students: 1
Maximum number of students: 2

Category
Laboratory (wet lab)

Special requirements
Nil
Mesenchymal Stem Cell Group

**Location**
South Australian Health and Medical Research Institute (SAHMRI)

**Supervisor**
Professor Stan Gronthos

**Supervisor email**
stan.gronthos@adelaide.edu.au

**Research placement project title**
1.12 Investigating the role of ephrinB1 is osteoblast maturation function and communication

**Project description**
Bone homeostasis is the maintenance of a healthy skeleton, which is achieved by retaining the balance between bone forming and bone removing cells. These cells (bone forming osteoblasts and osteocytes, and bone removing osteoclasts) communicate with each other to remove damaged bone and replace it with newly synthesised bone. We and others have demonstrated that ephrinB1 is important for correct skeletal formation and maturation when expressed by osteoprogenitors. However, what is unknown is how ephrinB1 influences osteoblast maturation into osteocytes. Furthermore, we are yet to elucidate the importance of EphB/ephrinB signalling via the cells responsible for maintaining bone homeostasis. This project will investigate the cellular communication between osteoblasts, osteocytes and osteoclasts using cell culture experiments and via histological analysis.

**Major(s)**
Medical sciences

**Research areas**
Cancer Biology and Clinical Oncology

**Available in which semester**
Semester 1 or Semester 2

**Minimum number of students:** 1
**Maximum number of students:** 2

**Category**
Laboratory (wet lab)

**Special requirements**
Nil
Aquaporin Physiology and Drug Discovery

Location
Adelaide Health and Medical Sciences (AHMS) Building
Helen Mayo Building

Supervisor
Jeffrey Chow and Professor Andrea Yool

Supervisor email
pakhin.chow@adelaide.edu.au

Research placement project title
1.13 Characterisation of a novel cancer cell inhibitor

Project description
Cancer metastasis is one of the leading causes of death in Australia. This project is aimed at the discovery of new drugs to slow cancer metastasis. Cell lines derived from tumours are the most frequently utilized models in cancer research and they are fundamental for drug discovery. In this project, different colorectal cancer cell lines will be used to test the effects of a new medicinal plant compound. Imaging techniques including light microscopy and live-cell imaging are used to track the trajectories of moving cells, to measure migration rates of cell lines. By comparing the effects of the new plant compound in different cell lines, this project will provide pilot data for future development of possible therapeutic agents.

Major(s)
Medical sciences; Neurosciences

Available in which semester
Semester 1

Minimum number of students: 1
Maximum number of students: 4

Category
Laboratory (wet lab)

Special requirements
Nil

Research areas
Cancer Biology and Clinical Oncology
Reproductive Cancer Research Group

Location
Adelaide Health and Medical Sciences (AHMS) Building

Supervisor
Dr Carmela Ricciardelli and Dr Noor Lokman

Supervisor email
carmela.ricciardelli@adelaide.edu.au and noor.lokman@adelaide.edu.au

Research placement project title
1.14 Evaluating annexin A2 epitopes as novel prognostic markers and therapeutic targets against ovarian cancer

Project description
Despite improvements in surgery and new developments in chemotherapy, ovarian cancer mortality rates have not improved substantially over the last two decades. An important approach to improve survival is the identification of more effective molecularly targeted therapies for advanced stage disease. We have identified a protein called annexin A2 which has promise as a therapeutic target. Annexin A2 forms a complex with S100A10 and together they play a critical role in the plasminogen activator system to mediate the conversion of plasminogen to plasmin, a key enzyme which facilitates critical cellular processes involved in cancer invasion. We have shown that annexin A2 is highly expressed in 90% of serous ovarian cancers (most common subtype) and is actively involved in the process of ovarian cancer metastasis. This study will evaluate the expression of novel annexin A2 epitopes in ovarian cancer tissues and their ability to inhibit pro-metastatic ovarian cancer cell behaviour.

Major(s)
Reproductive and childhood health

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 2
Maximum number of students: 2

Research areas
Cancer Biology and Clinical Oncology
Innovative Therapeutics

Special requirements
Nil
CARDIAC, RESPIRATORY AND VASCULAR HEALTH
Our researchers conduct interdisciplinary research to understand the mechanisms which underlie the development of coronary heart disease, peripheral arterial disease, and vascular and heart rhythm disorders. Utilising the skills of physicians, bioengineers, research scientists and computational modelers, research is focused on translating biomedical discoveries to clinical practice.

Furthermore, researchers undertake clinical trials and epidemiological studies into cardiovascular disorders with the objective of improving health outcomes for patients.

Researchers across the faculty are focused on:

- understanding the molecular and cellular mechanisms underlying cardiac and vascular disorders including peripheral arterial disease, atherosclerosis and cardiac arrhythmias
- exploring the relationship between atrial fibrillation, blood clotting and stroke
- developing improved cardiovascular imaging and disease detection methods
- understanding the relationship between high density lipoproteins (HDL) and cardiovascular risk
- developing strategies to modify cardiovascular risk through the control of obesity and obesity-related conditions
- applying evidence-based medicine, recommendations and guidelines to target education and improve health outcomes for at risk cardiac patients
- developing new approaches to treat airway inflammation in asthma and chronic obstructive pulmonary disease (COPD)
- developing cell and gene therapy approaches for diseases affecting lung blood vessels (pulmonary hypertension) and lung transplant.
Centre for Heart Rhythm Disorders

Location
South Australian Health and Medical Research Institute (SAHMRI)
The Cardiovascular Centre, Norwood

Supervisor
Dr Adrian Elliott and Dr Dominik Linz

Supervisor email
adrian.elliott@adelaide.edu.au

Research placement project title
2.01 Physiological regulation during atrial fibrillation

Project description
The Centre for Heart Rhythm Disorders involves a multidisciplinary team of physicians, bioengineers, research scientists and computational modelers, allowing an integrated approach to research at the molecular, cellular, whole heart and patient level. Atrial fibrillation (AF) is the most common clinical cardiac arrhythmia, resulting in a wide range of symptoms as well as increased risk of heart failure and stroke. However, the impact of AF on physiological control at rest and during exercise is still poorly understood. This project will evaluate changes in autonomic function, and cardiovascular control mechanisms in patients with AF.

Students will employ techniques such as muscle sympathetic nerve recordings, continuous cardiac monitoring and measurements of pulmonary gas exchange at rest and during exercise. In most cases, these measures will be obtained during persistent AF and then following restoration of normal sinus rhythm with electrical cardioversion. The project may also compare the effects of various concomitant risk factors, such as hypertension and obstructive sleep apnea.

Major(s)
Clinical trials; Medical sciences

Special requirements
Nil

Available in which semester
Semester 1

Research areas
Cardiac, Respiratory and Vascular Health

Minimum number of students: 1
Maximum number of students: 2

Category
Human research
Primary Care and Health Services Research Group

**Location**
North Terrace Campus

**Supervisor**
Dr David Gonzalez

**Supervisor email**
david.gonzalez@adelaide.edu.au

**Research placement project title**
2.02 Prevalence and management of chronic conditions, preventive care and quality of life among Australian adults

**Project description**
The Primary Care and Health Services Research Group has experience in developing and conducting clinical trials, cross-sectional and longitudinal studies, analysing large data sets and informing health policy. It regularly recruits patients for long-term studies and collaborates with interstate and international Universities. This project involves the analysis of a population-based representative sample of around 3,500 adults in SA investigated in 2017, who answered face-to-face survey questions on medical diagnoses of approximately 30 chronic conditions (including cardiovascular, respiratory, mental, musculoskeletal, sleep problems), use of medications, the frequency of contacts with the health service, medical assessments performed by the GP (if the GP checked weight, blood pressure, laboratory tests, etc.), lifestyle variables (alcohol intake, fruit/vegetable consumption, smoking status, physical activity), sociodemographic characteristics, and quality of life (using the SF-12 questionnaire).

The project has different aims, as the data allow exploring topics in medicine, nutrition, psychology, public health, and health economics. These analyses may include descriptive statistics or complex analyses, depending on the interest (and skills) of the students involved. Although activities will be supervised and supported by academics experienced in the data analysis, some background in statistics and epidemiology is required from the students interested in this project.

**Major(s)**
Medical sciences; Nutritional health; Addiction and mental health

**Available in which semester**
Semester 1

**Minimum number of students:** 1  
**Maximum number of students:** 4
**Category**
Human research

**Special requirements**
Background in statistics and epidemiology (using Excel, Stata or some other statistical tool)

**Research areas**
Cardiac, Respiratory and Vascular Health
Nutrition and Metabolic Health
Early Origins of Health
Heart Rate Variability (HRV) Validation Study

Location
North Terrace Campus

Supervisor
Professor David Saint

Supervisor email
david.saint@adelaide.edu.au

Research placement project title
2.03 Validation of heart rate variability as a predictive tool for cardiovascular morbidity and mortality

Project description
The project will have two parts- a systematic review of the literature to assess the prognostic value of heart rate variability as a predictive tool in various cardiovascular diseases. Concurrently, the students will perform a longitudinal study on their own electrocardiograms (ECGs) during the year, to assess intra-subject variability over time. There is very little data in the literature on this aspect of HRV, but this sort of data is needed to validate predictive HRV as a tool. This latter part will involve the students recording their ECG each week and amassing a data set of variability over both semesters.

Major(s)
Medical sciences; Neurosciences

Available in which semester
Semester 1

Minimum number of students: 2
Maximum number of students: 4

Category
Human research

Special requirements
Best if students are non smokers; no cardiovascular disease

Research areas
Cardiac, Respiratory and Vascular Health
AHMS Respiratory Research Group

Location
Adelaide Health and Medical Sciences (AHMS) Building
Helen Mayo Building

Supervisor
Dr Eugene Roscioli

Supervisor email
eugene.roscioli@adelaide.edu.au

Research placement project title
2.04 Assessing autophagy in human airway epithelial cells

Project description
Autophagy is a fundamental cellular process that has many implications for health and disease. This cellular process is responsible for recycling cytosolic contents for the cell. It is dysregulated in diseases such as chronic obstructive pulmonary disease (COPD) where the airway epithelium is damaged. This project will compare human primary and secondary epithelial cells for their response to cigarette smoke and a range of other stimuli that effect autophagy. Analyses of cellular apoptosis and viability will be performed to assess the aims.

Major(s)
Medical sciences

Available in which semester
Semester 1

Minimum number of students: 1
Maximum number of students: 2

Category
Laboratory (wet lab)

Special requirements
TBA

Research areas
Cardiac, Respiratory and Vascular Health
Innovative Therapeutics
Translational Health Outcomes
CEPSA, Adelaide Nursing School

Location
Adelaide Health and Medical Sciences (AHMS) Building
South Australian Health and Medical Research Institute (SAHMRI)

Supervisor
Dr Jeroen Hendriks

Supervisor email
jeroen.hendriks@adelaide.edu.au

Research placement project title
2.06 A systematic review on nurse-led clinics as an effective service for people with cardiovascular disease

Project description
To perform a systematic review and meta-analysis, reviewing the evidence for nurse-led clinics for patients with chronic cardiac disease. This review will build on a systematic review published in 2011, which reviewed the evidence for nurse-led clinics in patients with coronary heart disease. This will be a collaborative project between researchers at the Centre for Evidence Based Practice South Australia (CEPSA, Adelaide Nursing School, University of Adelaide), the Centre for Heart Rhythm Disorders (South Australian Health and Medical Research Centre), and the Australian Catholic University. Supervision across the whole project will be provided by a team of 4 researchers (Dr Tim Schultz, Dr Rick Wiechula, Mr Paul McLiesh and Dr Jeroen Hendriks).

Students on this project will undertake an abridged training program in how to conduct a systematic review, focusing on the skills of searching for literature and screening relevant studies. Students will develop these important research skills, while gaining content knowledge about health systems, cardiovascular disease, and research methods in health services. It is expected that students’ work will contribute to the publication of an updated systematic review, a significant contribution that will be appropriately acknowledged.

Major(s)
Medical sciences

Category
Systematic review / meta analysis

Available in which semester
Semester 1

Special requirements
Nil

Minimum number of students: 2

Maximum number of students: 4

Research areas
Cardiac, Respiratory and Vascular Health
Chronic Inflammatory Lung Disease Laboratory

Location
Adelaide Health and Medical Sciences (AHMS) Building

Supervisor
Dr Miranda Ween

Supervisor email
miranda.ween@adelaide.edu.au

Research placement project title
2.07 Assessing the effects of sphingosine-1-phosphate (S1P) and its analogue FTY720 on cigarette smoke-exposed macrophages

Project description
The Chronic Inflammatory Lung Disease group has shown that cigarette smoke causes a wide range of negative effects on lung macrophages, including altering their cytokine release and ability to phagocytose apoptotic cells and bacteria. Sphingolipids e.g., ceramides, sphingosine, and sphingosine-1-phosphate (S1P) are regulators of virtually every vital cell function. These small bioactive molecules are readily degraded, de-novo synthesised or enzymatically interconvertible (‘sphingolipid rheostat’) with often diametrically opposing cell-specific effects. Their work has shown that treatment with the final step in the rheostat, S1P, as well as its agonistic analogue, FTY720, which is an FDA-approved treatment for MS, can reverse the negative effects of cigarette smoke on macrophages. Further goals are to investigate via a dose response the mechanisms by which this occurs, with a particular focus on cytoskeletal rearrangement and cell surface phagocytic recognition receptors. In this project, students will learn cell culture and differentiation, total protein harvesting and quantitation, and cutting edge western blotting techniques to assess several hypothesised mechanisms of action.

Major(s)
Medical sciences; Addiction and mental health

Special requirements
Nil

Available in which semester
Semester 1

Research areas
Cardiac, Respiratory and Vascular Health

Minimum number of students: 1
Maximum number of students: 3

Category
Laboratory (wet lab)
CEPSA, Adelaide Nursing School; CHRD, South Australian Health and Medical Research Centre

Location
Adelaide Health and Medical Sciences (AHMS) Building
South Australian Health and Medical Research Institute (SAHMRI)

Supervisor
Dr Rick Wiechula

Supervisor email
rick.wiechula@adelaide.edu.au

Research placement project title
2.11 A systematic review on nurse-led clinics as an effective service for people with cardiovascular disease

Project description
This project involves performing a systematic review and metaanalysis, reviewing the evidence for nurse-led clinics for patients with chronic cardiac disease. This review will build on a systematic review published in 2011, which reviewed the evidence for nurse-led clinics in patients with coronary heart disease. This will be a collaborative project between researchers at the Centre for Evidence Based Practice South Australia (CEPSA, Adelaide Nursing School, University of Adelaide), the Centre for Heart Rhythm Disorders (South Australian Health and Medical Research Centre), and the Australian Catholic University.

Supervision across the whole project will be provided by a team of 4 researchers (Dr Tim Schultz, Dr Rick Wiechula, Mr Paul McLiesh and Dr Jeroen Hendriks). Students on this project will undertake an abridged training program in how to conduct a systematic review, focussing on the skills of searching for literature and screening relevant studies. Students will develop these important research skills, while gaining content knowledge about health systems, cardiovascular disease, and research methods in health services.

Major(s)
Medical sciences

Category
Systematic review / meta analysis

Available in which semester
Semester 1

Special requirements
Nil

Minimum number of students: 2

Research areas
Cardiac, Respiratory and Vascular Health

Maximum number of students: 3
Chronic Inflammatory Lung Disease Research Lab

Location
Adelaide Health and Medical Sciences (AHMS) Building

Supervisor
Professor Sandra Hodge

Supervisor email
sandra.hodge@adelaide.edu.au

Research placement project title
2.17 Dysregulated sphingolipid signaling and inflammation in cystic fibrosis

Project description
Cystic Fibrosis (CF) affects multiple organs, primarily the lung. CF is caused by mutations to the CFTR gene leading to abnormal chloride channels in mucus and sweat-producing cells, and is characterised by chronic inflammation and increased susceptibility to infections. Sphingolipids such as ceramides, sphingosine, and sphingosine-1-phosphate (S1P) are regulators of most vital cell functions. These small bioactive molecules are readily degraded, de-novo synthesised or enzymatically interconverted (sphingolipid rheostat) with often diametrically opposing cell-specific effects. A role for increased ceramides and S1P signalling in inflammation and susceptibility to infections in CF patients and CFTR mutant mice has been shown. Regulation of the sphingolipid signalling system could offer novel pharmacologic targets for CF. A large gap in this field, however, remains whether and how individual components of the sphingolipid system are involved.

This project tests the hypothesis that inflammation in CF is associated with altered expression/localisation of sphingolipid signalling system components. A mouse model of beta-epithelial Na+ channel overexpression which reproduces a number of pathologic features of CF will be employed and analysed for parameters such as sphingosine-S1P converting enzymes, S1P receptors, and the S1P exporter, in parallel with inflammatory markers IL-1beta, IFNgamma, and NFkB.

Major(s)
Medical sciences

Available in which semester
Semester 1

Minimum number of students: 2
Maximum number of students: 4
**Category**
Human research

**Special requirements**
Standard AHMS requirements

**Research areas**
Cardiac, Respiratory and Vascular Health
Innovative Therapeutics
Immunology and Infection
Stroke Research Program

**Location**
South Australian Health and Medical Research Institute (SAHMRI)

**Supervisor**
Professor Simon Koblar, Associate Professor Anne Hamilton-Bruce and Dr Karlea Kremer

**Supervisor email**
srp@adelaide.edu.au

**Research placement project title**
2.2 Systematic review: Animal assisted therapy

**Project description**
The literature on Animal assisted therapy (AAT) is growing, yet AAT research findings are not consistent. Benefits are reported, but many questions remain unanswered. This project will review the literature systematically to identify current gaps that we could explore in the clinical setting in order to assess AAT objectively, taking the welfare of both human and non-human animals into consideration.

**Major(s)**
Medical sciences; Neurosciences

**Available in which semester**
Semester 1 or Semester 2

**Minimum number of students:** 2
**Maximum number of students:** 3

**Category**
Laboratory (wet lab)

**Special requirements**
Nil

**Research areas**
Cardiac, Respiratory and Vascular Health
CEPSA (Centre for Evidence Based Practice South Australia)

Location
Adelaide Health and Medical Sciences (AHMS) Building
South Australian Health and Medical Research Institute (SAHMRI)

Supervisor
Dr Tim Schultz

Supervisor email
tim.schultz@adelaide.edu.au

Research placement project title
2.22 A systematic review on nurse-led clinics as an effective service for people with cardiovascular disease

Project description
The project goal is to perform a systematic review and meta-analysis, reviewing the evidence for nurse-led clinics for patients with chronic cardiac disease. This review will build on a systematic review published in 2011, which reviewed the evidence for nurse-led clinics in patients with coronary heart disease. This will be a collaborative project between researchers at the Centre for Evidence Based Practice South Australia (CEPSA, Adelaide Nursing School, University of Adelaide), the Centre for Heart Rhythm Disorders (South Australian Health and Medical Research Institute), and the Australian Catholic University.

Supervision across the whole project will be provided by a team of four researchers (Dr Tim Schultz, Dr Rick Wiechula, Mr Paul McLiesh and Dr Jeroen Hendriks). Students on this project will undertake an abridged training program in how to conduct a systematic review, focussing on the skills of searching for literature and screening relevant studies. Students will develop these important research skills, while gaining content knowledge about health systems, cardiovascular disease, and research methods in health services.

Major(s)
Medical sciences

Available in which semester
Semester 1

Minimum number of students: 2
Maximum number of students: 4
**Category**  
Systematic review / meta analysis

**Special requirements**  
Nil

**Research areas**  
Cardiac, Respiratory and Vascular Health  
Translational Health Outcomes  
Ageing, Frailty and Mobility  
Nutrition and Metabolic Health
Paediatric Sleep Disorders Team

Location
Women's and Children's Hospital

Supervisor
Professor Declan Kennedy and Dr Anna Kontos

Supervisor email
anna.kontos@adelaide.edu.au

Research placement project title
2.23 This project looks at the effects of sleep disordered breathing in childhood on cardiovascular health and development

Project description
Sleep disordered breathing (SDB) in children is common, with as many as 10% of children reported to snore on a regular basis. The severity of sleep disordered breathing ranges from primary snoring, to the more severe obstructive sleep apnea and a reduction in blood oxygen levels and increase in carbon dioxide profile. Even relatively mild condition has significant daytime effects on neurocognitive domains and behaviour. Our focus is on assessing the effects SDB has on the physiology of the developing child, including evaluation of cardiovascular, autonomic nervous system and inflammatory response and changes in oral microbiota and dento/facial morphology; post-operative neurocognitive evaluation of children who had previously been assessed and treated with adenotonsillectomy.

Depending on the student’s area of interest this project will investigate one of the topics (e.g. neurocognition, microbiology, cardiovascular health) in relation to paediatric sleep disordered breathing.

Major(s)
Medical sciences; Neurosciences; Reproductive and childhood health

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 1
Maximum number of students: 2

Category
Human research

Special requirements
DCSI clearance (children), immunisation, out-of-hours work

Research areas
Cardiac, Respiratory and Vascular Health
Early Origins of Health
Neuroscience, Behaviour and Brain Health
Child and Adolescent Health
FERTILITY AND CONCEPTION
Our research in this area is led by the Robinson Research Institute, which is internationally recognised for its work in fertility and conception. A more in-depth explanation of this research area is available on the Robinson Research Institute’s website.
Ovarian Cell Biology and Reproductive Cancer Biology Laboratory

Location
Adelaide Health and Medical Sciences (AHMS) building

Supervisor
Professor Darryl Russell

Supervisor email
darryl.russell@adelaide.edu.au

Research placement project title
3.01 Screening large drug libraries using phenotypic endpoints to identify new therapies

Project description
Recent developments in high throughput microscopy technology has enabled the design of systematic screening of large drug libraries against morphological and phenotypic endpoints to discover new drugs with valuable therapeutic properties. This basic molecular cell biology research will apply a drug discovery screen of a mid-sized compound library investigating effects on growth and survival of ovarian or breast cancer cells. Analytical tools will be developed to allow streamlined assessment of cell proliferation or death as well as morphological assessments that can be interpreted to identify new drug compounds with therapeutic potential. Specific skills learned include mammalian cell culture, high content microscopy, and cell morphometric analysis.

Major(s)
Reproductive and childhood health

Available in which semester
Semester 2

Minimum number of students: 3
Maximum number of students: 3

Special requirements
Nil

Research areas
Fertility and Conception
Ovarian Cell Biology

**Location**
Adelaide Health and Medical Sciences (AHMS) building

**Supervisor**
Professor Rebecca Robker and Dr Macarena Gonzalez

**Supervisor email**
rebecca.robker@adelaide.edu.au

**Research placement project title**
3.02 Analysis of embryo developmental morphokinetics using real time imaging

**Project description**
The project will utilise the PrimoVision time-lapse monitoring system which is used for embryo diagnostics in IVF clinics. This project will assess preimplantation mouse embryos, from fertilisation to the blastocyst stage, in order to determine egg quality and embryonic developmental potential. Mouse oocytes and sperm will be used for in vitro fertilisation.

Next, using non-invasive video imaging and analytical software, specific developmental events and morphological markers during embryogenesis will be identified and measured. This project would suit students who wish to gain skills in: embryo morphokinetics, gamete manipulation and developmental biology and IVF methodology.

**Major(s)**
Reproductive and childhood health

**Available in which semester**
Semester 1

**Minimum number of students:** 3
**Maximum number of students:** 4

**Special requirements**
Nil

**Research areas**
Fertility and Conception
PREGNANCY AND BIRTH
PREGNANCY AND BIRTH

The most common conditions affecting Australian pregnancies are preeclampsia, preterm birth, foetal growth restriction and gestational diabetes. Their cost for individuals, families and communities is enormous, and can last a lifetime.

The Robinson Research Institute leads our research in pregnancy and birth and has an outstanding record of success in the area. This success relates to the cross-disciplinary capability and bench-to-bedside approach, which has led to major improvements in the health outcomes of mothers and babies. A more in-depth explanation of this research area is available on the Robinson Research Institute’s website.
BetterStart Child Health and Development Research

Location
Adelaide Health and Medical Sciences (AHMS) Building

Supervisor
Professor John Lynch

Research placement project title
4.01 Data analytics internship with BetterStart Child Health and Development Research Group

Project description
The BetterStart Research Group is led by Professor John Lynch, an internationally recognised scholar in epidemiology and public health. An internship with the BetterStart Research Group will build skills in epidemiology, hands-on data management, analysis using statistical software, and interpretation and communication of evidence.

There are two possible research streams:

1. Data Analytics projects use data sources such as the Longitudinal Study of Australian Children, Australian Bureau of Statistics, food advertising databases, or SA Early Childhood Data Project 1999 to 2013, with perinatal and birth records, hospital admissions and educational data that are relevant to other research question. For confidentiality reasons, data used may be synthetic and anonymised but will maintain distributions and correlations of the original database, without representing real individuals.

2. Evidence Quality Assessment projects will train students to interpret and synthesise the quality of evidence from randomised control trials (RCTs) and observational studies on interventions to improve child health and wellbeing.

Examples of research questions that could form the focus of the internship include:

- Did a RCT involving carers of Aboriginal children alter what children eat and drink?
- Does child health (hospitalisations) influence school achievement?

Students are also expected to attend regular research group meetings.

Major(s)
Public health

Available in which semester
Semester 1 or Semester 2
Minimum number of students: 1
Maximum number of students: 3

Category
Laboratory (wet lab)

Special requirements
Nil

Research areas
Pregnancy and Birth
Child and Adolescent Health
Indigenous and Disadvantaged Health
Placental Development and Equity and Healthy Futures

**Location**
Adelaide Health and Medical Sciences (AHMS) building

**Supervisor**
Dr Prabha Andraweera and Dr Zohra Lassi

**Supervisor email**
prabha.andraweera@adelaide.edu.au and zohra.lassi@adelaide.edu.au

**Research placement project title**
4.02 Pregnancy complications and cardiovascular disease risk

**Project description**
Emerging research demonstrates a strong link between the major pregnancy complications (gestational hypertension, preeclampsia, small for gestational age pregnancy, spontaneous preterm birth, gestational diabetes) and cardiovascular disease. Women who develop these complications are shown to be at twice the risk of developing CVD compared to women who have uncomplicated pregnancies. However the timeline for manifestation of risk factors for CVD is not known. Therefore, a systematic synthesis of evidence focusing on CVD risk factors at different stages postpartum would provide valuable information. We will conduct a few systematic reviews related to this topic. The students will be trained on how to conduct systematic reviews with meta-analyses and have the opportunity to contribute to manuscripts.

**Major(s)**
Reproductive and childhood health

**Available in which semester**
Semester 1 or Semester 2

**Minimum number of students:** 3
**Maximum number of students:** 12

**Special requirements**
Nil

**Research areas**
Pregnancy and Birth
EARLY ORIGINS OF HEALTH
EARLY ORIGINS OF HEALTH

The Robinson Research Institute leads our research in the early origins of health and is well placed to tackle this challenge, having conducted some of the largest trials in the world investigating interventions in pregnant women and newborn infants to improve outcomes for the mother and child.

A more in-depth explanation of this research area is available on the Robinson Research Institute’s website.
Placental Development Group

**Location**
Adelaide Health and Medical Sciences (AHMS) Building

**Supervisor**
Dr Prabha Andraweera

**Supervisor email**
prabha.andraweera@adelaide.edu.au

**Research placement project title**
5.02 Cardiovascular risk factors in children and young adults born preterm or born small for gestational age - systematic review and meta analyses

**Project description**
Cardiovascular disease (CVD) remains the number one killer in Western societies. Exposure to an adverse intrauterine environment is thought to predispose the offspring to adult life CVD. Based on early epidemiological findings, Barker and colleagues initially proposed the ‘fetal origins of disease hypothesis’ which suggested that being born small could be a risk factor for cardiovascular disease in adult life. This theory has since then been confirmed by many others with evidence for increased CVD risk following intrauterine growth restriction as well as other pregnancy complications, mainly preeclampsia. Systematic review and meta-analyses of data from long term follow-up studies demonstrate that children and young adults born to pregnancies complicated by preeclampsia demonstrate cardiovascular risk factors which are evident from early life.

The research goals are to perform the following two systematic reviews and meta-analyses:
- cardiovascular risk factors in children and young adults born preterm
- cardiovascular risk factors in children and young adults born small for gestational age.

Two students can work on one project. The students will gain experience in developing systematic review protocols, registering systematic review protocols, systematic search of articles, selection of articles and performing meta-analyses.

**Major(s)**
Clinical trials; Medical sciences; Reproductive and childhood health

**Available in which semester**
Semester 1

**Minimum number of students:** 2
**Maximum number of students:** 4
**Category**
Systematic review / meta analysis

**Special requirements**
Nil

**Research areas**
Early Origins of Health
Pregnancy and Birth
Child and Adolescent Health
Early Origins of Health and Disease Group

**Location**
North Terrace Campus
Adelaide Health and Medical Sciences (AHMS) Building

**Supervisor**
Dr Kathy Gatford

**Supervisor email**
kathy.gatford@adelaide.edu.au

**Research placement project title**
5.05 Nutrient transport in the IUGR placenta

**Project description**
The Early Origins of Health and Disease Group seeks to optimise the life-long health of the next generation by understanding how early life exposures cause long-term changes in health. The goal is to develop interventions during pregnancy or in early postnatal life to improve health and reduce risks of non-communicable disease in the next generation. We are also interested in defining the developmental stages at which such intervention strategies are most effective. Poor growth before birth increases the risks of death and disease not only around birth, but also long-term. The early environment influences an individual’s risk of developing major diseases including diabetes, cardiovascular disease, impaired neurological function and allergy. We are developing a new model of IUGR in mice to allow testing of dietary interventions to improve placental function and fetal growth, to prevent IUGR. Before we can measure effects of our interventions, we first need to understand how the placenta functions in our IUGR model. As part of our model characterisation, students in this project will assess the effects of the IUGR model on placental nutrient transport and its determinants.

**Major(s)**
Medical sciences; Reproductive and childhood health

**Category**
Laboratory (wet lab)

**Available in which semester**
Semester 1

**Special requirements**
Nil

**Research areas**
Early Origins of Health
Pregnancy and Birth
Nutrition and Metabolic Health

**Minimum number of students:** 1
**Maximum number of students:** 3
NEUROSCIENCE, BEHAVIOUR AND BRAIN HEALTH
NEUROSCIENCE, BEHAVIOUR AND BRAIN HEALTH

Neuroscience is an interdisciplinary science that focuses on the study of neurochemistry and experimental psychology. It deals with the structure and normal function of the nervous system and brain that impact on behaviour, cognitive function and neurological dysfunction.

Our researchers investigate these areas with the aim of developing therapies and informing improved health service provision for individuals.

Researchers across the faculty are focused on:

- understanding the function of genes that cause neurodevelopmental disorders, such as intellectual disability and epilepsy
- investigating the causes of diseases of the brain, spine or nervous system (including Parkinson's disease and Alzheimer's disease) to inform diagnosis, prevention and treatment
- understanding the cellular and molecular basis of cognition, perception and neuropsychology
- developing therapies, and translating results into the treatment and prevention of neurological diseases
- understanding the health psychology, healthy development across the lifespan, and disability to inform and assess rehabilitation and health service delivery
- developing innovative biological computation technologies to enable large-scale epidemiological studies that can inform health care policy and service provision.
Neuropharmacology of Drug Abuse Group

**Location**
North Terrace Campus

**Supervisor**
Dr Abdallah Salem

**Supervisor email**
abdallah.salem@adelaide.edu.au

**Research placement project title**
7.01 Amphetamines-induced brain hyperthermia - methodological measurement aspects at different ambient temperatures

**Project description**
Understanding how drugs of abuse interact with the cells in our body to cause their effects is fundamental to the development of strategies to deal with many of the social and health problems associated with these drugs. The Neuropharmacology of Drug Abuse group is currently conducting a number of projects to better understand how amphetamines alter the brain and immune system and cause neuro-inflammatory processes responsible for severe and prolonged hyperthermia. Both human and animal studies indicate that amphetamines can cause hyperthermia by disrupting physiological and behavioural thermoregulation. However, the temperature probes and recording equipment commonly available are limited in their ability to provide real-time accurate brain temperature measurements. This project will investigate the use of a novel optic fibre-based temperature probe versus a thermocouple probe as tools for providing repeated and accurate temperature measurements at different ambient temperatures.

**Major(s)**
Addiction and mental health

**Research areas**
Neuroscience, Behaviour and Brain Health

**Available in which semester**
Semester 1

**Minimum number of students:** 2
**Maximum number of students:** 4

**Category**
Laboratory (wet lab)

**Special requirements**
Nil
Vagal Afferent Research Group

Location
South Australian Health and Medical Research Institute (SAHMRI)

Supervisor
Professor Amanda Page

Supervisor email
amanda.page@adelaide.edu.au

Research placement project title
7.02 Gastrointestinal hormone levels during pregnancy

Project description
Dysregulation of glycemic control in women with gestational diabetes mellitus is associated with adverse maternal and neonatal outcomes. The gut-hormone, glucagon-like peptide-1 (GLP-1) is a hormone produced in specialised L-cells in the proximal small intestine. It is a hormone that influences insulin and glucagon secretion in pancreatic islets. During pregnancy there is hypertrophy of the intestinal mucosa to maximise absorption of nutrients. However, there is no information available on gut-hormone levels in the intestinal mucosa during pregnancy. This project will use immunohistochemistry and quantitative polymerase chain reaction (PCR) to establish the expression and cellular distribution of GLP-1 in the duodenum and jejunum of pregnant and un pregnant mice. The project will establish if there are changes in GLP-1 levels in the gut that could contribute to glycemic control during pregnancy.

Major(s)
Medical sciences; Nutritional health; Reproductive and childhood health

Research areas
Neuroscience, Behaviour and Brain Health; Nutrition and Metabolic Health

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 1
Maximum number of students: 2

Category
Laboratory (wet lab)

Special requirements
Possible out of hours work
Neuromotor Plasticity and Development Research Group

**Location**
Robinson Research Institute

**Supervisor**
Dr Carolyn Berryman and Dr Mitchell Goldsworthy

**Supervisor email**
carolyn.berryman@adelaide.edu.au

**Research placement project title**
7.03 Neural mechanisms of altered body awareness in fibromyalgia

**Project description**
Fibromyalgia (FM) is a chronic disease characterised by widespread pain and fatigue. In addition, individuals with FM frequently report an altered perception of body size, reporting that it feels larger and unfamiliar. A higher frequency of falls and a loss of balance is also associated with this altered perception, which suggests a more global sensorimotor disruption may underpin FM. Body awareness involves perception of our external self in relation to space (exteroception), and our internal self in relation to internal state (interoception). Both are key elements of the mind-body relationship and aspects of each have been shown to be altered in FM. To date, however, the neurophysiological mechanisms that underpin these changes have not been investigated.

This project uses transcranial magnetic stimulation (TMS) and body illusion tasks to investigate the association between changes in cortical excitability and body awareness in FM. Participants will be asked to report body awareness changes and the impact of FM including pain, changes to mood and traits such as anxiety using standard questionnaires. They will then be administered several computer-based tasks that assess exteroception and interoception, and motor cortical excitability will be measured using TMS. The hypothesis is that deficits in body awareness will be associated.

**Major(s)**
Addiction and mental health; Medical sciences; Neurosciences

**Available in which semester**
Semester 1

**Minimum number of students:** 1
**Maximum number of students:** 4

**Category**
Human research

**Special requirements**
Nil

**Research areas**
Neuroscience, Behaviour and Brain Health
Musculoskeletal Health
Translational Neuropathology Laboratory

Location
North Terrace Campus

Supervisor
Associate Professor Corinna Van Den Heuvel and Stephanie Plummer

Supervisor email
corinna.vandenheuvel@adelaide.edu.au

Research placement project title
7.04 Evaluation of axonal injury following the administration of amyloid precursor protein derivatives after traumatic brain injury

Project description
Traumatic brain injury (TBI) is a life-threatening condition, for which there are currently no accepted pharmacological treatments. Recently, the Translational Neuropathology research team have shown that the amyloid precursor protein (APP) derivatives APP96-110 and mAPP96-110 have shown encouraging neuroprotective activity following experimental TBI in rats. The aim of this project is to assess the effects of these APP derivatives on the extent of axonal injury in rat brain tissues (already obtained) at survival times of 24 hours and 1 month post TBI. Specifically key cytoskeletal elements such as neurofilaments, namely neurofilament-light (NF-L) and neurofilament-heavy (NF-H) will be analysed by Western blot.

Major(s)
Neurosciences

Available in which semester
Semester 1

Minimum number of students: 1
Maximum number of students: 4

Category
Laboratory (wet lab)

Special requirements
Nil

Research areas
Neuroscience, Behaviour and Brain Health
SA Pathology

**Location**
North Terrace Campus
SA Pathology

**Supervisor**
Associate Professor John Finnie

**Supervisor email**
john.finnie@sa.gov.au

**Research placement project title**
7.08 Pathological changes in tunicamycin-induced liver injury

**Project description**
While tunicamycin is an antibiotic, it is also an endoplasmic reticulum stressor and produces severe disease in domestic livestock that is characterised by brain and liver damage. In this project, students will study the histopathological changes in the liver produced by tunicamycin and, as a result of this examination, gain a better understanding of:

- different modes of liver cell death (necrosis, apoptosis, necroptosis) and types of hepatocyte degeneration
- patterns of hepatocellular injury, particularly as they relate to the acinar/lobular organisation of the liver
- pathological consequences of endoplasmic reticulum stress.
- These basic principles of liver pathology can then be extrapolated to other hepatic disorders.

**Major(s)**
Medical sciences

**Research areas**
Neuroscience, Behaviour and Brain Health

**Available in which semester**
Semester 1 or Semester 2

**Minimum number of students:** 1  
**Maximum number of students:** 4

**Category**
Laboratory (wet lab)

**Special requirements**
Nil
Neurophysiology of Human Movement

Location
Adelaide Health and Medical Sciences (AHMS) Building
University of Adelaide North Terrace Campus
Helen Mayo Building

Supervisor
Associate Professor John Semmler and Dr George Opie

Supervisor email
john.semmler@adelaide.edu.au

Research placement project title
7.09 Impact of fatigue on motor skill learning

Project description
The Neurophysiology of Human Movement program focuses on neural mechanisms responsible for human movement throughout the lifespan. Transcranial magnetic stimulation is used as a painless and non-invasive tool to investigate the cortical control of skeletal muscles, with interventions including ageing, exercise, training and fatigue. The goal is to understand how the healthy nervous system controls movements following a variety of interventions and how it adapts in situations involving neuromuscular injury or disease. Neuromuscular fatigue results in a reduction in force-producing capacity of muscle. Processes within the motor areas of the brain partly contribute to this fatigue. These same brain areas are also important in learning new motor skills, which involves reorganisation of connections to optimise muscle activation in time and space and improve motor performance.

This study will examine whether changes in the central nervous system that accompany fatigue influence the ability to learn new motor skills. This aim will be addressed in human subjects by quantifying their ability to learn a sequential visual isometric pinch task in the presence and absence of fatigue. A greater understanding of the interaction between fatigue and motor skill learning will help to refine interventions for successful rehabilitation following injury to the central nervous system.

Major(s)
Medical sciences; Neurosciences

Available in which semester
Semester 1

Minimum number of students: 3
Maximum number of students: 4

Category
Human research

Special requirements
Nil

Research areas
Neuroscience, Behaviour and Brain Health
Ageing, Frailty and Mobility
Integrative Human Neurophysiology Laboratory

**Location**
Adelaide Health and Medical Sciences (AHMS) Building
University of Adelaide North Terrace Campus
Helen Mayo Building

**Supervisor**
Dr Simran Sidhu

**Supervisor email**
simran.sidhu@adelaide.edu.au

**Research placement project title**
7.10 Exercise and the brain

**Project description**
The focus of this project will be to determine how the central nervous system responds to movement of the body and how it is reorganised as a consequence of exercise. The research involves the application of electro-physiological techniques such as transcranial magnetic stimulation, peripheral nerve stimulation, neuromodulation (i.e. transcranial direct current stimulation) and electromyography in experiments involving human subjects.

**Major(s)**
Medical sciences; Neurosciences

**Available in which semester**
Semester 1 or Semester 2

**Minimum number of students:** 1
**Maximum number of students:** 4

**Category**
Human research

**Special requirements**
Nil

**Research areas**
Neuroscience, Behaviour and Brain Health
Visual Physiology and Neurobotics Laboratory

**Location**
North Terrace Campus

**Supervisor**
[Dr Steven Wiederman](mailto:steven.wiederman@adelaide.edu.au) and [Ben Lancer](mailto:)

**Supervisor email**
steven.wiederman@adelaide.edu.au

**Research placement project title**
7.11 Electrophysiological recordings from insect photoreceptors

**Project description**
Flying insects perform impressive visual tasks. The Visual Physiology and Neurobotics Laboratory studies how the insect brain processes visual information. Recent work suggests that insects use sophisticated mechanisms of attention that are similar to those in primates, to aid in the selection of one feature of interest in a complex environment. Visual processing is investigated from behavioural, computational and physiological levels, by a multidisciplinary team covering the fields of neuroethology, neurobiology, psychology, computer vision and engineering. The project involves intracellular recordings from insect photoreceptors, using sharp electrodes that are 1500 times thinner than the width of a human hair (~30 nm). A new LED display panel (on loan from the US Air Force) will be used to test photoreceptor responses to visual stimuli of varying wavelengths. Outcomes of this research will assist in the understanding of sensory neuroscience and are anticipated to have potential applications in the development of artificial vision systems.

**Major(s)**
Neurosciences

**Available in which semester**
Semester 1 or Semester 2

**Minimum number of students:** 2  
**Maximum number of students:** 4

**Category**
Laboratory (wet lab)

**Research areas**
Neuroscience, Behaviour and Brain Health  
Ageing, Frailty and Mobility

**Special requirements**
Nil
Integrative Human Neurophysiology

Location
North Terrace Campus

Supervisor
Dr Simran Sidhu

Supervisor email
simran.sidhu@adelaide.edu.au

Research placement project title
7.12 Can cycling exercise rewire your central nervous system?

Project description
You will conceive and design a project that will directly investigate the influence of cycling exercise on spinal and brain pathways in human participants using non-invasive stimulation techniques including electrical nerve stimulation and transcranial magnetic stimulation.

Major(s)
Medical sciences; Neurosciences

Available in which semester
Semester 1

Minimum number of students: 2
Maximum number of students: 4

Category
Human research

Special requirements
Nil

Research areas
Neuroscience, Behaviour and Brain Health
Critical and Ethical Mental Health Group (CEMH)

Location
Women's and Children's Hospital

Supervisor
Professor Jon Jureidini

Supervisor email
jon.jureidini@adelaide.edu.au

Research placement project title
7.13 Psychotropic medication database project

Project description
The Critical and Ethical Mental Health group (CEMH) is actively involved in researching the safety, efficacy, and public health impact of psychotropic medications (psychiatric drugs), and analysing factors that influence prescribing. CEMH is developing a psychotropic database, including historical and current information on regulatory approvals of drugs and the conditions for which they have been approved (in Australia, the US and Europe); reports of adverse events; clinical guidelines; continuing medical education; significant clinical trials; and pharmaceutical company advertising and marketing activities and regulation (including court cases). This database will be useful for multiple research projects.

Project tasks include:
- Searching for and downloading documentation from the Australian Register of Therapeutic Goods (ARTG) and the Pharmaceutical Benefits Scheme (PBS) websites, detailing indications, inclusions, changes, and prescribing conditions for psychotropic medications
- Searching the US Food and Drug Administration (FDA) and the European Medicines Agency (EMA) websites for information on psychotropic drug indications, approvals, adverse events and drug monitoring activities
- Online searching for information relating to court cases and media reports relevant to psychotropic drugs
- Inputting data and report summaries into an Excel database
- Preparation of a presentation (e.g. summarising findings for different categories of psychotropic drugs)

Major(s)
Addiction and mental health

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 1
Maximum number of students: 4

Category
Laboratory (wet lab)

Special requirements
Nil

Research areas
Neuroscience, Behaviour and Brain Health
Child and Adolescent Health
Health Economics Research Group

Location
North Terrace Campus

Supervisor
Dr Benjamin Geisler

Supervisor email
ben.geisler@adelaide.edu.au

Research placement project title
7.14 Repurposing anti-convulsants/mood stabilizers for alcohol use disorder

Project description
Risky alcohol use and alcohol disorder are both a very common and its consequences are devastating: Heavy alcohol use leads to irreversible damage to liver, affects other organ systems, and can result in premature death. It is also associated with a decreased quality of life, and it often impacts the immediate family of the patient as well. The economic burden of unhealthy alcohol use is substantial. Most alcohol use disorder patients are not able to quit despite serious attempts. Older members of the group of medications that was first used as anticonvulsants (anti-seizure medications, e.g., gabapentin, valproic acid, carbamazepine, topiramate, or lamotrigine) have been used as mood stabilizers in other settings, for example in disorders in which a diminished impulse control is paramount. Retrospective analysis and small trials of various of these medications have been conducted with promising results. However, their efficacy has not been finally proven, both to limitations in their study design (i.e., the observational nature of the study with possible unmeasured confounding, non-randomized trials, inadequate blinding, or otherwise flawed characteristics) and/or their sample size. Moreover, the different substances (whose safety profiles are generally well known but differ somewhat) have not been compared in terms of their effectiveness. Given this lack of knowledge, a systematic review with a meta-analysis would be helpful. Students will learn fundamentals of systematic reviews and/or metaanalysis as well as their practical application in PubMed/Medline and Embase, a bibliographic software +/- Covidence, and/or Review Manager or Stata. In addition, they will gain content knowledge in addiction medicine/psychiatry and learn how to judge the quality of clinical trials and other study types. The project is expected to lead to a peer-reviewed contribution to the literature with the student as a co-author.

Major(s)
Addiction and mental health; Clinical trials; Medical sciences; Neuroscience

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 2
Maximum number of students: 4

Category
Systematic review / meta analysis

Special requirements
Nil

Research areas
Neuroscience, Behaviour and Brain Health
Health Economics Research Group

Location
North Terrace Campus

Supervisor
Dr Benjamin Geisler

Supervisor email
ben.geisler@adelaide.edu.au

Research placement project title
7.15 Inflammation and possible interventions to prevent various cardiovascular, neurological, infectious, and oncologic conditions

Project description
Inflammation plays a potentially outsized (compared to our current understanding) role in influencing long-term mortality and the incidence and severity of such diverse diseases as sepsis, atherosclerotic disease and cancer. In previous projects, we have examined the association of statins with the level of organ dysfunction in sepsis, the role of the Mediterranean diet in preventing major cardio- and cerebrovascular events and the degree to which statins of varying potencies influence inflammatory parameters. Depending on the background, major and interest of the student(s) and existing skill sets, a research project will be designed that studies an intervention/exposure such as aspirin dose/formulation/frequency, statin potency, Mediterranean diet, or exercise/lifestyle. Possible outcomes are mortality, sepsis incidence/severity, stroke incidence/severity, dementia incidence, depression incidence, myocardial infarction/coronary artery disease incidence, (colon) cancer incidence, health-related quality of life and costs. If appropriate, projections to the population level as well as budget impact/cost-effectiveness can be envisioned. In addition to content knowledge in the relevant field, the student(s) will gain an understanding in how to approach either primary data analysis (with causal inference techniques, as necessary), systematic reviews/meta-analysis, or decision analysis. Depending on the appropriateness of the data as a contribution to the literature, the student(s) would be expected to be a co-author of a peer-reviewed paper.

Major(s)
Medical sciences; Nutritional health; Addiction and mental health; Clinical trials

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 2
Maximum number of students: 4

Category
Human research

Special requirements
Nil

Research areas
Neuroscience, Behaviour and Brain Health
Translational Health Outcomes
Stroke Research Program

Location
South Australian Health and Medical Research Institute (SAHMRI)

Supervisor
Professor Simon Koblar, Dr Karlea Kremer and Associate Professor Anne Hamilton-Bruce

Supervisor email
simon.koblar@adelaide.edu.au

Research placement project title
7.16 Investigating stem cells injected into the rodent brain

Project description
This project aims to investigate dental pulp stem cells (DPSC) after implantation over time in the rodent brain. This is an important research question as we begin to translate our pre-clinical research to the clinic. As there are currently no drugs or biological agents proven to improve neurological recovery in combination with rehabilitation, stem cell therapy is actively investigated. We have previously published the first formal evidence of functional recovery in a rodent stroke model following DPSC implantation. We now aim to look at the implanted DPSC over time - their growth, migration and differentiation in non-stroke rodent brains, where the normal rodent brain will simulate a chronic stroke situation (no active inflammation present). This represents a likely target for future human clinical trials. This study will provide information as to possible mechanisms of action that DPSC may be facilitating within the brain to provide the positive functional effects we have previously seen. We will implant DPSC via an intracerebral injection into brain parenchyma, and at various points to 3 months, we will analyse the brains for cell numbers, proliferation, migration and differentiation via immunohistochemistry. The information gained from this study is important for understanding stem cell actions in a biological environment for future use in clinical trials.

Major(s)
Neurosciences

Available in which semester
Semester 2

Minimum number of students: 1
Maximum number of students: 2

Category
Laboratory (wet lab)
Neuroimmunopharmacology Research Lab

Location
North Terrace Campus

Supervisor
Dr Alex Whittaker and Prof Mark Hutchinson

Supervisor email
alexandra.whittaker@adelaide.edu.au

Research placement project title
7.17 Validation of the five-choice serial-reaction time task as an indicator of cognitive impairment in a rat model of chemotherapy-induced cognitive impairment

Project description
Chemotherapy-induced cognitive impairment (CICI) affects a third of all cancer survivors. The condition impairs attention, memory and processing speed for survivors. This profoundly impacts on survivor’s work and social performance, and quality of life. Current treatment strategies focus on remediation through cognitive rehabilitation or pharmacological treatment. However, a superior approach would prevent the insult to the brain at the time of cancer treatment. Our work is investigating the role of innate immune receptors (TLR-4) on CICI development. The results will facilitate development of molecular-targeted therapies for prevention of CICI. In this particular project we will utilise the five-choice serial-reaction time task, in conjunction with traditional rodent cognitive tests, in a rat model of CICI. We aim to determine whether this test is a reliable method of assessing subtle cognitive change in this animal model. Techniques will include rodent behavioural testing and data analysis.

Major(s)
Neurosciences

Available in which semester
Semester 1

Minimum number of students: 1
Maximum number of students: 3

Special requirements
Nil

Research areas
Neuroscience, Behaviour and Brain Health
Spinal Cord Injury Group

**Location**
Helen Mayo Building

**Supervisor**
Dr Anna Leonard

**Supervisor email**
anna.leonard@adelaide.edu.au

**Research placement project title**
7.18 Characterising acute neuroinflammation following a large animal model of spinal cord injury

**Project description**
Neuroinflammation has been well documented to contribute to further tissue damage within the spinal cord after a traumatic spinal cord injury. However, this has not yet been characterised in our newly established large animal model of SCI. We have recently developed a large animal model of SCI to meet a required need for improved clinical translation. This project will involve learning histological techniques such as processing and cutting tissue, staining methods such as H&E and immunohistochemistry, as well as analysis of these histological methods. We would also strongly encourage our students to visit our large animal to observe and learn about the development of this model.

**Major(s)**
Medical sciences; neurosciences

**Available in which semester**
Semester 1

**Minimum number of students:** 1  
**Maximum number of students:** 3

**Special requirements**
Nil

**Research areas**
Neuroscience, Behaviour and Brain Health
Translational Neuropathology Laboratory

Location
Helen Mayo Building

Supervisor
Associate Professor Renee Turner

Supervisor email
renee.turner@adelaide.edu.au

Research placement project title
7.19 Beyond the brain: characterising systemic injury and inflammation following traumatic brain injury and stroke

Project description
The overarching research goals of the Translational Neuropathology Laboratory are to identify and screen novel therapeutic agents for the treatment of CNS injuries and disorders. Traumatic brain injury and stroke lead to significant neuronal injury which results in disability and poor outcomes for patients. However, recently it has been demonstrated that the effects of these injuries extend well beyond the brain. Specifically, peripheral inflammation and injury to the gastrointestinal tract can occur, both of which can exacerbate brain injury and poor patient outcomes. On this project, students will work alongside PhD students to examine peripheral inflammatory markers and gastrointestinal tract injury/permeability changes following traumatic brain injury and stroke in clinically-relevant models. Techniques may include: western blot, ELISA, immunohistochemistry.

Major(s)
Medical sciences; neurosciences

Available in which semester
Semester 1

Minimum number of students: 1
Maximum number of students: 4

Special requirements
Nil

Research areas
Neuroscience, Behaviour and Brain Health
Translational Neuropathology Laboratory

Location
Helen Mayo Building

Supervisor
Associate Professor Renee Turner

Supervisor email
renee.turner@adelaide.edu.au

Research placement project title
7.20 The blood-brain barrier – the key to neurodegeneration following traumatic brain injury and stroke?

Project description
The overarching research goals of the Translational Neuropathology Laboratory are to identify and screen novel therapeutic agents for the treatment of CNS injuries and disorders. Blood-brain barrier dysfunction and increased permeability are early features of traumatic brain injury and stroke. However, the involvement of the BBB long-term and how this may contribute to the development of later neurodegeneration is poorly understood. On this project, students will work alongside PhD students to examine the composition (e.g.: tight junctions) and permeability changes to the blood-brain barrier that occur beyond the acute phase following traumatic brain injury and stroke in pre-clinical models. Techniques may include: western blot, ELISA, immunohistochemistry.

Major(s)
Medical sciences; neurosciences

Available in which semester
Semester 1

Minimum number of students: 1
Maximum number of students: 4

Special requirements
Nil

Research areas
Neuroscience, Behaviour and Brain Health
SURGICAL AND
HEALTH SYSTEMS INNOVATION
SURGICAL AND HEALTH SYSTEMS INNOVATION

Our researchers are working to enhance the quality, effectiveness and sustainability of surgical and health systems innovation at all levels. Our research addresses the many challenges of bringing health innovations into practice, including validating the innovation, justifying the economics, influencing the policies and spreading the knowledge to implement these new approaches.

Using evidence-based assessment, researchers test the efficacy and safety of the innovation, model the costs of implementation, and finally garner the support of the health industry, health service providers, policymakers and the community to implement the innovation. This exciting and challenging field can yield highly rewarding results that benefit society for years to come.

Researchers across the faculty are focused on:

- developing and evaluating the efficacy of new therapeutics
- evaluating new, less invasive diagnostic technologies to lower patient risk, improve the patient experience and reduce health service costs
- performing large-scale, multi-centre clinical trials to rigorously assess treatments and predictive diagnostic tests
- performing longitudinal studies to monitor patient health status and quality of care to identify problems in the health system’s delivery of services
- performing long-term analysis of total-joint-replacement patients to analyse prosthetic failure, assessing the device, the biomaterials and methodology
- assessing the impacts of health policies and implementation of preventative health interventions.
Treatment of Unruptured Intracranial Aneurysms

Location
Royal Adelaide Hospital

Supervisor
Dr Amal Abou-Hamden

Supervisor email
amal.abou-hamden@adelaide.edu.au

Research placement project title
8.01 Management of patients with unruptured intracranial aneurysms in South Australia

Project description
This is a prospective observational study of patients with unruptured intracranial aneurysms. The aim of the study is to characterise the factors used in decision making and selection of patients for surgical, endovascular or conservative management and to report the treatment outcomes in each arm. Students will gain skills in completing an ethics application for the clinical project, setting up of a clinical database, collecting relevant clinical data, including quality of life and data analysis.

Major(s)
Neurosciences

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 3
Maximum number of students: 5

Category
Human research

Special requirements
Nil

Research areas
Surgical and Health Systems Innovation
Neuroscience, Behaviour and Brain Health
Translational Health Outcomes
Royal Adelaide Hospital Medical Emergency Response Service

Location
Royal Adelaide Hospital

Supervisor
Associate Professor Arthas Flabouris

Supervisor email
arthas.flabouris@sa.gov.au

Research placement project title
8.02 Consumer knowledge and confidence to recognise acute deterioration and utilise rapid response systems

Project description
Early recognition and response to acute clinical deterioration improves hospital patient outcomes. Successful management of deteriorating patients is dependent upon rapid identification and triggering of an escalation response. This typically involves a Rapid Response Team, consisting of clinicians, skilled and resourced, to manage acute deterioration. A key feature of Rapid Response Systems is the empowerment to summon help without deferring to traditional hierarchical hospital systems. This ability is now being extended to patients’ carers, as their familiarity with their relatives places them at an advantage in recognising early subtle changes that might suggest acute deterioration. Doing so may also enhance partnerships with health professionals and empower health care consumers.

The aims of this study, through a structured interview of patients’ careers, are to identify their knowledge and perceptions of rapid response systems, confidence to identify clinical deterioration and trigger an escalation response. Carers of patients who have had a recent Rapid Response Team call, and of similar patients who have not, will be approached to participate. The output of this study will have the potential to influence future policy, both locally and nationally with respect to consumer initiated escalation.

Major(s)
Medical sciences

Category
Human research

Available in which semester
Semester 1 or Semester 2

Special requirements
Nil

Minimum number of students: 1

Research areas
Surgical and Health Systems Innovation

Maximum number of students: 4
Royal Adelaide Hospital Intensive Care Research

Location
Royal Adelaide Hospital
Adelaide Health and Medical Sciences (AHMS) Building

Supervisor
Associate Professor Arthas Flabouris

Supervisor email
arthas.flabouris@sa.gov.au

Research placement project title
8.03 Association of trends in age and chronic illness in the population and amongst patients admitted to intensive care

Project description
The proportion of the population aged 65 and over in Australia has increased from 12% (2.1 million people) in 1996 to around 15% (or 3.7 million people) in 2016. In addition, one in four Australians (5.3 million people) had two or more chronic diseases in 2014-15, whilst more than 11 million Australians reported having at least one chronic disease, in particularly amongst those aged over 65 years of age. An ageing population and increased incidence of chronic disease contributes to health services utilisation including demand for critical care services and admissions to intensive care (ICU). Thus there is a need to understand the implications of these changing population demographics upon ICU resource utilisation.

The aims of this study are to examine the population trend in age and prevalence of certain chronic conditions (Chronic obstructive pulmonary disease (COPD), heart failure, mental health, cancer, chronic renal and chronic liver disease) with the trend in age and recorded prevalence of similar conditions amongst patients admitted to the ICU over a 10 year period. Data will be sourced from SA Government Data Directory (SA Health datasets) and Royal Adelaide Hospital ICU patient admission database. Analysis will explore for association in trends.

Major(s)
Medical sciences

Category
Human research

Available in which semester
Semester 1

Special requirements
Nil

Minimum number of students: 1

Research areas
Surgical and Health Systems Innovation

Maximum number of students: 4
Royal Adelaide Hospital ICU Research Department

Location
Royal Adelaide Hospital
Adelaide Health and Medical Sciences (AHMS) Building

Supervisor
Dr Samuel Gluck

Supervisor email
samuel.gluck@adelaide.edu.au

Research placement project title
8.04 A comparison of location outcomes derived from smartphones - the CLOUDS study

Project description
Patient function is reflected in their ability to get ‘out and about’. With the smartphone market expansion, almost everyone has a global positioning system (GPS) transponder in their pocket. Google Maps and Frequent Locations (iOS) hold location data that describes a patient’s pre-morbid function (we have shown this data to be present on 50% of ICU patients smartphones). The location data can be used to describe how far patients travel, how much time they spend at home, how many locations they visit and what surface area they interact with. These data could be used to provide novel, objective, patient and clinician centred outcomes. However, the relationship between raw GPS data, smartphone GPS data (from an app we have built) and location data from Google Maps and Frequent Locations is unknown. The goal is to investigate the relationship between these data sources. In this project, students will assist with recruiting healthy individuals, installing the app on their phone, instructing them how to use a GPS transponder, and extracting data from the transponder, Google Maps and Frequent Locations. The final application of this research could be far reaching with relevance to almost any medical speciality.

Major(s)
Medical sciences

Available in which semester
Semester 1

Minimum number of students: 1
Maximum number of students: 10

Category
Human research

Special requirements
Nil

Research areas
Surgical and Health Systems Innovation
Ageing, Frailty and Mobility
Translational Health Outcomes
ENT Research Team

**Location**
Basil Hetzel Institute for Translational Health Research, The Queen Elizabeth Hospital

**Supervisor**
Associate Professor Sarah Vreugde

**Supervisor email**
sarah.vreugde@adelaide.edu.au

**Research placement project title**
8.05 A phase 1 clinical trial testing the safety and efficacy of a new antimicrobial compound to improve outcomes after sinus surgery

**Project description**
The ENT Research team has found a new treatment combination to have potent anti-microbial effects that are stronger than currently used antibiotics. The treatment combination has the added advantage that it improves wound healing after surgery. The aim is to do a phase 1 human clinical trial, testing the safety and efficacy of this new treatment to improve wound healing after sinus surgery.

**Major(s)**
Clinical trials

**Available in which semester**
Semester 1 or Semester 2

**Minimum number of students:** 1
**Maximum number of students:** 10

**Category**
Human research

**Special requirements**
Nil

**Research areas**
Surgical and Health Systems Innovation
Immunology and Infection
Translational Health Outcomes
Innovative Therapeutics
Colorectal Unit, Department of Surgery

**Location**
Royal Adelaide Hospital

**Supervisor**
Associate Professor Tarik Sammour

**Supervisor email**
tarik.sammour@gmail.com

**Research placement project title**
8.06 Dissection of lateral lymph nodes after neoadjuvant chemoradiotherapy for rectal cancer - a systematic review

**Project description**
Curative surgical treatment of colorectal cancer includes mesenteric lymph node dissection. The lymphatic drainage of the mid and lower rectum includes lateral pelvic sidewall nodes. However, while there is evidence that resection of these nodes in the absence of chemoradiation improves local cancer recurrence rates, the role of dissection after chemo-radiotherapy is unclear and thus generally not performed in Australia and New Zealand. The aim of this project is to undertake a systematic review of the evidence for lateral node dissection in this setting. The research will be supported by a senior research fellow actively working on the project with the medical students.

**Major(s)**
Clinical trials

**Available in which semester**
Semester 1

**Minimum number of students:** 1
**Maximum number of students:** 2

**Category**
Systematic review / meta analysis

**Special requirements**
Nil

**Research areas**
Surgical and Health Systems Innovation
Cancer Biology and Clinical Oncology
**Ophthalmic Research Laboratories; Royal Adelaide Hospital Ophthalmology**

**Location**
Royal Adelaide Hospital  
Adelaide Health and Medical Sciences (AHMS) Building

**Supervisor**
Dr Michelle Sun, Dr John Wood and Professor Dinesh Selva

**Supervisor email**
michelle.sun@adelaide.edu.au

**Research placement project title**
8.07 Bioengineering for the eye

**Project description**
Our research investigates the use of bioengineering and cell culture techniques for application in various ophthalmic conditions. Our projects incorporate clinical ophthalmology with lab-based research and we have a strong focus on translating our work from the lab to the patient. Currently we are looking at various ways to bioengineer eyelid tissue and the lacrimal gland. Students will have the opportunity to be involved in all facets of our research in a variety of setting, both lab and clinical.

**Major(s)**
Medical sciences; Neurosciences

**Available in which semester**
Semester 1 or Semester 2

**Minimum number of students:** 1  
**Maximum number of students:** 2

**Category**
Laboratory (wet lab)

**Special requirements**
Will require police clearance for clinical experience

**Research areas**
Surgical and Health Systems Innovation  
Translational Health Outcomes
NUTRITION AND METABOLIC HEALTH
NUTRITION AND METABOLIC HEALTH

The links between nutrition, metabolism and human health are complex, and our researchers—from basic scientists, human physiologists, clinicians and population health specialists—are working to enhance our understanding of these links.

Our researchers are investigating the associations between diet and sleep, pregnancy, foetal growth and mortality, and serious illnesses such as coronary heart disease, stroke, hypertension, atherosclerosis, obesity, cancer, type 2 diabetes, osteoporosis, dental caries, gall bladder disease, dementia and nutritional anaemias.

Our overarching goal is to develop and validate innovative diets to promote health and wellbeing, and deliver improved health outcomes to the community in a range of areas.

Researchers across the faculty are focused on:

- determining the effects of modifying diet on metabolic health
- developing strategies to prevent and manage obesity and type 2 diabetes
- studying the molecular and cellular basis of appetite regulation
- understanding immune function and pain-sensing in the gut
- exploring how nutrition interacts with sleep patterns and metabolic disorders
- investigating metabolism in liver, muscle, fat tissue and bone tissue
- understanding nutrition in vulnerable populations such as the elderly, and determining the association between nutritional intake and chronic disease
- conducting longitudinal, large cohort studies to assess associations between diet and chronic diseases.
Gastrointestinal Function in Diabetes Mellitus

**Location**
North Terrace Campus  
Royal Adelaide Hospital  
Adelaide Health and Medical Sciences building (AHMS)

**Supervisor**
Mr Chinmay Marathe

**Supervisor email**
chinmay.marathe@adelaide.edu.au

**Research placement project title**
10.01 Hypoglycaemia and gastric emptying in diabetes

**Project description**
Hypoglycaemia, or low blood glucose, is a frequent and important complication of type 1 and insulin-treated type 2 diabetes. Hypoglycaemia can, generally, be self-treated (i.e. by eating or drinking carbohydrate) if symptoms are recognised promptly. However, a substantial number of people, particularly those who have had frequent episodes of hypoglycaemia, do not experience adequate warning symptoms. This state is known as ‘impaired awareness of hypoglycaemia’ or IAH. Severe hypoglycaemia (defined as an event requiring the assistance of another person to actively treat hypoglycaemia) is particularly dangerous and may be fatal. The risk of severe hypoglycaemia is increased 3-6 fold in IAH. The gut is the largest endocrine organ in the body and plays a major role in blood glucose homeostasis. It is known that gastric emptying (the rate at which stomach empties food into the small intestine) exhibits a wide inter-individual variation that impacts on post-meal blood glucose. Upper gastrointestinal symptoms and delayed gastric emptying are common in longstanding diabetes. The proposed study will determine whether an increased frequency of, and/or impaired awareness of, hypoglycaemia are associated with delayed gastric emptying in diabetes. If this proves to be the case, it would have major implications for the management of hypoglycaemia.

**Major(s)**
Medical sciences; Nutritional health

**Category**
Human research

**Available in which semester**
Semester 1 or Semester 2

**Special requirements**
Nil

**Minimum number of students:** 1  
**Maximum number of students:** 2

**Research areas**
Nutrition and Metabolic Health
Nutrition and Metabolic Physiology Laboratory

Location
North Terrace Campus

Supervisor
Dr Mark Gibson and Dr Nichola Thompson

Supervisor email
mark.gibson@adelaide.edu.au

Research placement project title
10.04 Are Health Science students getting healthier? Trends in body and dietary health markers 2011-2018

Project description
In Australia over the last 30 years there has been an alarming trend in increasing childhood and adult obesity with currently over 30% of adults being obese and around 30% being overweight but not in the obese category. These trends have massive implications for increasing the incidence of major preventable diseases and overburdening the Australian health budget in the coming years. The Australian Dietary Guidelines and other health initiatives have promoted guidance to improve diet and healthy body weight over the last 10 years or so. Have these messages had any effect on student health? In this project we will determine changes in de-identified data from Health Sciences Nutrition diet analyses, and body composition practicals over the period 2011 to 2018. We will study changes in average student body composition, and healthy and unhealthy nutritional intake markers over this period, and compare our results to population data obtained from sources such as The Australian Bureau of Statistics and the World Health Organisation.

Major(s)
Medical sciences; Nutritional health

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 2
Maximum number of students: 4

Category
Laboratory (wet lab)

Research areas
Nutrition and Metabolic Health
Cardiac, Respiratory and Vascular Health
Men's Health

Special requirements
Nil
Intestinal Nutrient Sensing Group

Location
South Australian Health and Medical Research Institute (SAHMRI)

Supervisor
Associate Professor Richard Young

Supervisor email
richard.young@adelaide.edu.au

Research placement project title
10.05 Friend or foe: How does the human gut respond to low-calorie sweeteners?

Project description
In contrast to the view that low-calorie sweeteners are “nutritionally inert” we now known that they are detected in the gut by the same pathway that recognises sugars as sweet, and can trigger adverse changes in the control of blood glucose. Low-calorie sweeteners may also alter blood glucose by changing the way gut bacteria work, and how they communicate to the gut/host. This project will contribute to understanding how the human gut detects and signal the presence of low-calorie sweeteners, and ways that sweeteners may change bacterial communities in the gut. This will involve research on gut function using human tissues and measurement of hormones released by low-calorie sweeteners, as well as experiments examining gut bacteria in SAHMRI.

Major(s)
Clinical trials; Nutritional health

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 1
Maximum number of students: 2

Category
Human research

Special requirements
Nil

Research areas
Nutrition and Metabolic Health
Translational Health Outcomes
Innovative Therapeutics
ORAL HEALTH
ORAL HEALTH

Oral health research seeks to understand population and individual dental health to prevent or manage oral disease and to educate our community to maintain optimal oral health throughout their lives.

Our research spans a broad range of fields including: dental education; endodontics and pulp biology (stem cell research); periodontics; orthodontics; craniofacial biology; oral and maxillofacial surgery; forensic odontology; population oral health; and cancer treatment.

Our research activity also includes epidemiological studies focusing on the efficacy of population oral health interventions, oral health services and oral health policy analysis in relation to oral disease prevention and provision of optimal dental health services.

Researchers across the faculty are focused on:

- assessing intergenerational change in oral health in Australia
- monitoring of Indigenous oral health and the use of dental services
- performing population-based studies focusing on socioeconomic and psychosocial factors related to the use of dental services
- investigating patient-reported outcomes of dental care, such as oral health impact, health utility and quality of life.
Quality of Life Post Cancer Treatment

Location
North Terrace Campus
Adelaide Health and Medical Sciences (AHMS) Building
Helen Mayo Building
South Australian Health and Medical Research Institute (SAHMRI)

Supervisor
Dr Sue Gardner

Supervisor email
sue.gardner@adelaide.edu.au

Research placement project title
11.01 The quality of life impact after head and neck cancer treatment

Project description
Head and neck cancers are the seventh most diagnosed cancers in Australia and treatment regimes often require surgery, chemotherapy and radiotherapy. Treatments vary, depending on the stage of the cancer at the point of diagnosis, and patients experience a range of side effects; some of which are permanent. The purpose of the project is to explore the literature on the quality of life post treatment and how this may impact a health professional in providing nutritional advice and oral health care for example.

Major(s)
Medical sciences; Nutritional health

Research areas
Oral Health
Indigenous and Disadvantaged Health

Available in which semester
Semester 2

Minimum number of students: 3
Maximum number of students: 5

Category
Human research

Special requirements
Nil
Musculoskeletal health is a multidisciplinary area of research involving connective tissue biology (including bone, cartilage and muscle), diseases of connective tissue (including arthritis and osteoporosis), biomechanics and surgical/clinical interventions to treat traumatic bone injury and other conditions.

Researchers across the faculty are focused on:

- understating the cellular and molecular basis of normal and pathological bone turnover
- how to best repair fractures after traumatic injury with novel surgical approaches and post-operative management
- how to optimise the outcomes of joint replacement surgery in order to provide better and longer lasting outcomes for patients
- performing gait analysis and activity monitoring to evaluate the success of interventions across all musculoskeletal conditions
- developing better ways to manage spinal cord injury patients to improve their outcomes
- identifying links between bone cells and the molecules they produce and bone health.
Bone and Joint Research Laboratory (Centre for Orthopaedic and Trauma Research)

Location
Adelaide Health and Medical Sciences (AHMS) Building
University of Adelaide North Terrace Campus
Helen Mayo Building

Supervisor
Dr Julia Kuliwaba

Supervisor email
julia.kuliwaba@adelaide.edu.au

Research placement project title
12.02 Compositional mapping of the cartilage-bone unit in human knee osteoarthritis: insight into disease pathobiology

Project description
Osteoarthritis (OA) is a common painful degenerative disease of the joints, which constitutes a major and growing health problem for the ageing Australian population, and for which there are no effective therapies. Our recent research in human OA has shown the involvement of the bone under the cartilage, i.e. subchondral bone, in the development of OA. There is limited quantitative understanding of the tissue matrix composition of the cartilage-bone unit in human OA. This project will utilise Fourier Transform InfraRed (FTIR) spectroscopic imaging to map region-specific changes in bone and cartilage matrix composition, e.g. collagen organisation, proteoglycan and mineral distribution, for human knee OA and non-OA cases. This project will use an available cohort of human OA and non-OA tibial plateau specimens that has been characterised by MRI-imaging for the presence/absence of bone marrow lesions in the subchondral bone. Bone marrow lesions are of clinical importance as they are associated with pain, predict disease progression, and may be useful as outcome measures for intervention strategies. This project will deliver new knowledge of the cartilage-bone matrix composition for human knee OA patients with and without subchondral bone marrow lesions, and provide insight into the pathobiology of OA disease progression.

Major(s)
Clinical trials; Medical sciences; Nutritional health

Available in which semester
Semester 1

Minimum number of students: 2
Maximum number of students: 6

Category
Laboratory (wet lab)

Special requirements
Nil

Research areas
Musculoskeletal Health
Ageing, Frailty and Mobility
Nutrition and Metabolic Health
Acetabular Fracture Research Project

**Location**
Royal Adelaide Hospital

**Supervisor**
Associate Professor Mark Rickman

**Supervisor email**
mark.rickman@sa.gov.au

**Research placement project title**
12.03 What are the reasons for re-operation after surgical management of an acetabular fracture? A systematic literature review

**Project description**
Acetabular fractures are commonly managed operatively, and within the literature there are multiple published series regarding outcomes. Almost all papers use re-operation as a surrogate endpoint (either re-fixation or total hip replacement). However, the reasons for reoperation are rarely investigated but are simply reported. In reality, if we are to plan the future of this surgery, then the reasons for reoperation should guide us in determining future areas for research and development. There are currently no papers in the literature specifically aimed at identifying the main causes of re-operation, and how they can be addressed. The main categories of failure are likely to be infection, malreduction, fixation failure, non-union, avascular necrosis or development of osteo-arthritis. The relevant frequencies of these failure modes however is unknown to date. A systematic review of the published literature will aim to define the common modes of failure and their relevant frequency, and thus provide essential information for planning future research directions.

**Major(s)**
Clinical trials; Medical sciences

**Special requirements**
Nil

**Available in which semester**
Semester 1 or Semester 2

**Research areas**
Musculoskeletal Health

**Minimum number of students:** 2
**Maximum number of students:** 4

**Category**
Systematic review / meta analysis
Mesenchymal Stem Cell Laboratory

**Location**
South Australian Health and Medical Research Institute (SAHMRI)

**Supervisor**
Professor Stan Gronthos

**Supervisor email**
stan.gronthos@adelaide.edu.au

**Research placement project title**
12.04 Molecular regulation of mesenchymal stem cell growth and differentiation

**Project description**
The focus of the Mesenchymal Stem Cell Laboratory is to investigate the origin and biological properties of different postnatal mesenchymal stem cell (MSC) populations that give rise to supportive connective tissues such as myelosupportive stroma, adipose tissue, smooth muscle, cardiac muscle, bone, cartilage, ligament, cementum and dentin. The work seeks to identify critical genes and epigenetic factors that regulate MSC self-renewal, proliferation and differentiation. In addition, research efforts have focused on identifying the factors central to MSC mediated regulation of haematopoesis, angiogenesis and immune cell modulation. Importantly, many of these molecular processes are considered underlying causes of chronic diseases and tumour cell development. Postnatal mesenchymal stem cells (MSC) derived from connective tissues are capable of developing into multiple cell lineages (myelosupportive stroma, adipocytes, smooth muscle cells, myoblasts, ligament cells, chondrocytes and osteoblasts). This project will examine an aspect of the transcriptional, epigenetic and signalling factors that regulate MSC self-renewal, proliferation, multi-differentiation and immune cell modulation. These molecular processes are being investigated as underlying mechanisms mediating tissue repair, inflammation, tumour cell development and aged related diseases.

**Major(s)**
Medical sciences

**Available in which semester**
Semester 1 or Semester 2

**Minimum number of students:** 2
**Maximum number of students:** 4

**Category**
Laboratory (wet lab)

**Special requirements**
Nil

**Research areas**
Musculoskeletal Health
Musculoskeletal Epidemiology Research Group

Location
South Australian Health and Medical Research Institute (SAHMRI)

Supervisor
Dr Tiffany Gill

Supervisor email
tiffany.gill@adelaide.edu.au

Research placement project title
12.05 Musculoskeletal epidemiology

Project description
This project utilises data from the North West Adelaide Health Study, a cohort study in the North West suburbs of Adelaide. Data have been collected over a 15 year period, with data relating to back pain available over the past 10 years. Also available are covariates such as other chronic diseases, risk factors, quality of life, Medical Benefits Scheme, Pharmaceutical Benefits Scheme, biomedical and linkages to hospital admissions/ emergency and outpatient data. Originally, over 4000 participants were recruited to the study and in 2015, over 1500 took part in a postal survey. Back pain is a significant problem in the Australian population which impacts on quality of life, ability to undertake work and leisure activities. The cost to the health system is significant and is predict to increase over the coming years. Understanding the problem and then the implementation of strategies to address the issue are of paramount importance. By using these data and examining those who: have back pain, develop back pain over the period of the study and doesn’t develop back pain, we can understand the condition more fully and develop strategies to reduce the problem in the community.

Major(s)
Nutritional health; Medical sciences

Special requirements
Nil

Available in which semester
Semester 2

Research areas
Musculoskeletal Health

Minimum number of students: 3
Maximum number of students: 4

Category
Human research
WCH Paediatric Orthopaedic Clinical Research Team

**Location**
Women's and Children's Hospital

**Supervisor**
Associate Professor Nicole Williams

**Supervisor email**
nicole.williams01@adelaide.edu.au

**Research placement project title**
12.06 Improving early detection and management of developmental dysplasia of the hip: international collaborative and local research projects

**Project description**
The orthopaedic department at WCH conducts ongoing research into developmental dysplasia of the hip (DDH), with an international collaborative study, international registry and multiple local projects. The research team comprises orthopaedic surgeons, nursing and allied health staff and a dedicated paediatric orthopaedic research scientist. Students can develop skills in database management, registry research, statistical analyses, presentation skills, literature review and preparation of scientific papers.

**Major(s)**
Medical sciences; Reproductive and childhood health

**Research areas**
Musculoskeletal Health
Child and Adolescent Health
Surgical and Health Systems Innovation

**Available in which semester**
Semester 1 or Semester 2

**Minimum number of students:** 1
**Maximum number of students:** 4

**Category**
Human research

**Special requirements**
DCSI child-related employment screening
North West Adelaide Health Study

Location
South Australian Health and Medical Research Institute (SAHMRI)

Supervisor
Dr Tiffany Gill

Supervisor email
tiffany.gill@adelaide.edu.au

Research placement project title
12.07 The epidemiology of back pain

Project description
This project utilises data from the North West Adelaide Health Study, a cohort study in the North West suburbs of Adelaide. Data have been collected over a 15 year period, with data relating to back pain available over the past 10 years. Also available are covariates such as other chronic diseases, risk factors, quality of life, Medical Benefits Scheme, Pharmaceutical Benefits Scheme, biomedical and linkages to hospital admissions/ emergency and outpatient data. Originally, over 4000 participants were recruited to the study and in 2015, over 1500 took part in a postal survey. Back pain is a significant problem in the Australian population which impacts on quality of life, ability to undertake work and leisure activities. The cost to the health system is significant and is predict to increase over the coming years. Understanding the problem and then the implementation of strategies to address the issue are of paramount importance. By using these data and examining those who: have back pain, develop back pain over the period of the study and doesn’t develop back pain, we can understand the condition more fully and develop strategies to reduce the problem in the community.

Major(s)
Medical sciences; Public health

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 1
Maximum number of students: 3

Category
Human research

Special requirements
DCSI child-related employment screening

Research areas
Musculoskeletal Health
Translational Health Outcomes
IMMUNOLOGY AND INFECTION
IMMUNOLOGY AND INFECTION

Our research is focused on understanding how our body’s elaborate, innate and adaptive immune systems can distinguish foreign pathogens from self-tissue. Malfunction of the immune system can result in the development of autoimmune disorders including type 1 diabetes, inflammatory bowel disease, multiple sclerosis, psoriasis and rheumatoid arthritis.

Furthermore, inappropriate immune responses are also implicated in central nervous system diseases such as anxiety, depression, epilepsy and stroke and have been proposed to play a role in addictions and pain. Understanding immune responses, and how to control and modulate them is crucial to the successful treatment of patients requiring life-saving transplantation therapies. It is also critical for the development of safe and effective vaccines, which enable significant improvements worldwide in the health status of many communities.

Researchers across the faculty are focused on:

- developing new vaccines
- identifying novel targets in autoimmune diseases such as rheumatoid arthritis
- understanding the role of immune cells in neural tissue (glial cells) in normal healthy brains to elucidate their role in chronic pain, drug addiction and epilepsy and identifying new targets to treat these conditions
- developing immune interventions to prevent or modulate pathologies of pregnancy and graft rejection (in transplantation settings)
- conducting clinical trials to evaluate tolerability, safety and effectiveness of new agents to control infections in patients suffering chronic infections.
Gastrointestinal Neuro-Immune Interactions

Location
South Australian Health and Medical Research Institute (SAHMRI)

Supervisor
Dr Patrick Hughes

Supervisor email
patrick.hughes@adelaide.edu.au

Research placement project title
13.01 Microbial activation of the immune system in inflammatory bowel disease

Project description
Inflammatory Bowel Disease (IBD) is a chronic debilitating disease of the lower gastrointestinal tract. The causes of IBD remain unknown but involve both environmental and genetic factors. In this project, immune function will be assessed in tissue taken from human subjects and from animal model(s) of Inflammatory Bowel Disease, with the aim of determining how altered microbiota contribute to an over-active immune system. Dr. Hughes is interested in communication between the nervous and immune system, and particularly how this is relevant for gastrointestinal diseases. He collaborates with clinical gastroenterologists, immunologists and neuroscientists to investigate the effects immune mediators have on sensations from the gut, and also the effects neurotransmitters have on the immune system.

Major(s)
Medical sciences

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 2
Maximum number of students: 4

Category
Laboratory (wet lab)

Research areas
Immunology and Infection
Nutrition and Metabolic Health
Neuroscience, Behaviour and Brain Health

Special requirements
Nil
TRANSLATIONAL

HEALTH OUTCOMES
TRANSLATIONAL HEALTH OUTCOMES

High quality preclinical, clinical and epidemiological research is the foundation stone of optimised health care provision that serves to improve the quality of life of patients who are managed in the health system. Effective translational research is crucial to the continued improvement and sustainability of the Australian health system, and requires significant engagement with industry and service sectors within government.

Our researchers are developing new and innovative ways to transfer new knowledge to health service professionals, to: change practice; improve skills; and influence policy and procedures system-wide.

Researchers across the faculty are focused on:

• undertaking population surveys to develop and test new interventions to improve the mental health of children and adolescents
• undertaking evidence-based practice development to manage at-risk populations for trauma and mental disorders across the lifespan
• elucidating genetic factors that may serve as new targets for therapy, or are predictive of responses to pharmaceutical treatments
• performing longitudinal studies of patients undergoing invasive procedures to review and improve standard practice in the health care system
• developing evidence-based assessments of novel surgical techniques and postoperative care to enhance skills and promote knowledge transfer to health service professionals.
Personalised Medicine Research Consortium

**Location**
Adelaide Health and Medical Sciences (AHMS) Building
University of Adelaide North Terrace Campus
Helen Mayo Building

**Supervisor**
Professor Andrew Somogyi

Supervisor email
andrew.somogyi@adelaide.edu.au

**Research placement project title**
14.01 Optimisation of tuberculosis drug therapy in Papua New Guinea

**Project description**
Tuberculosis is a major infectious disease in Papua New Guinea. Significant treatment failure is leading to major health problems and death. In western countries the principle of giving the same dose of tuberculosis medicines to all sufferers is being increasingly rejected in favour of personalised therapy based on the sufferer’s genetic profile. Papua New Guineans have a very different genetic profile compared to Caucasians, which affects how medicines work and their side effects. Pharmacogenomics is the study of variations in the genome that alter responses to medicines and contribute to adverse drug reactions, and also how genetic variations can be used to provide a ‘precision medicine’ approach to better target a drug, or its dose. This research project will investigate the genetic profile of the two major drugs for the disease and compare how genes affect outcomes in Caucasians and Papua New Guineans. It will also consider how treatment of the disease through a dosage-optimisation approach (called Therapeutic Drug Monitoring) can be used in Papua New Guinea to reduce the frequency of treatment failures and side effects which often cause tuberculosis sufferers to not take the medicine. The result will be a research proposal as a hypothetical research grant application.

**Major(s)**
Medical sciences

**Category**
Laboratory (wet lab)

**Available in which semester**
Semester 2

**Special requirements**
Nil

**Minimum number of students:** 2
**Maximum number of students:** 4

**Research areas**
Translational Health Outcomes
Immunology and Infection
Neuroscience, Behaviour and Brain Health
Indigenous and Disadvantaged Health
Workforce Planning Group

Location
Adelaide Health and Medical Sciences (AHMS) Building

Supervisor
Professor Caroline Laurence

Supervisor email
caroline.laurence@adelaide.edu.au

Research placement project title
14.02 Analysis of general practice services

Project description
There are a number of data sets held by various organisations in South Australia that record GP activity: for example, descriptive analyses of existing immunisation data bases would allow us to identify immunisation rates by region, which would be useful in planning targeted immunisation campaigns. This research project will involve two students identifying four research questions that can be answered by the existing databases and undertaking a background literature review for each project and then analysing them and providing a report outlining the descriptive statistics and results.

Major(s)
Public health

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 1
Maximum number of students: 2

Category
Laboratory (wet lab)

Special requirements
Nil

Research areas
Translational Health Outcomes
Health Economics Research Group

Location
Adelaide Health and Medical Sciences (AHMS) Building

Supervisor
Professor Jon Karnon, Dr Laura Edney, Ms Jodi Gray and Dr Elizabeth Hoon

Supervisor email
jonathan.karnon@adelaide.edu.au

Research placement project title
14.05 Primary Health Network group research portfolio

Project description
This research portfolio provides students with research experience in a university setting and practical experience working with local government health service providers and their key stakeholders. In 2015, the Commonwealth established 31 geographically defined Primary Health Networks (PHNs) across Australia to increase the efficiency and effectiveness of medical services for patients and to improve coordination of care. To achieve these aims, PHNs design services, commission these services to external partners and work with these partners to monitor and evaluate services for continued improvement. As part of this research portfolio, students will be working with the two South Australian PHNs-- Adelaide PHN and County SA PHN to document and contribute to their current processes from needs assessment through to monitoring and evaluation.

Documenting their current processes might include:
- Compiling existing online resources
- Qualitative and qualitative research processes
- Contributing to their current processes might include:
- Accessing updated secondary quantitative and qualitative data to inform the next iteration of their needs assessment
- Conducting a literature review
- Developing a standardised method for PHNs to design service interventions and guide monitoring and evaluation activities
- Qualitative and/or quantitative assessment of the practical utility of the standardised methods developed.
Major(s)
Public health

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 1
Maximum number of students: 3

Category
Human research

Special requirements
This position may require police checks; travel may be required to PHN sites.

Research areas
Translational Health Outcomes
Environment and Health Research Group

**Location**
Adelaide Health and Medical Sciences (AHMS) Building

**Supervisor**
Professor Peng Bi, Dr Scott Hanson-Easey and Dr Alana Hansen

**Supervisor email**
peng.bi@adelaide.edu.au

**Research placement project title**
14.09 Environmental and occupational exposures and human health and behaviours

**Project description**
The Environment and Health Research Group, led by Professor Peng Bi, conducts research that identifies and delineates environmental and climatic hazards and their impact on public health and explores how risk, adaptation and preparedness messages and practices can build health resilience within communities. Students will undertake a project which will involve data collection, management and analyses from a diverse range of sources and settings related to environmental or occupational factors which may pose a risk to health. e.g.

- Air quality and extreme weather events. Air pollution has adverse effects on respiratory and cardiovascular health and this study will gather data from the Bureau of Meteorology and the SA Environment Protection Authority to examine seasonal trends in three major air pollutants and variations in concentrations during extreme weather events.
- How do different news media (TV, social media, newspapers, news blogs), using different modalities (e.g. written and audible language, film), work to represent public health issues? The media are key to how public health information is presented and made sense of in society. You will choose a public health issue and compare how this topic is represented across different news and social media platforms.

**Major(s)**
Public health

**Available in which semester**
Semester 1 or Semester 2

**Minimum number of students:** 1
**Maximum number of students:** 3

**Category**
Laboratory (wet lab)

**Special requirements**
Nil

**Research areas**
Translational Health Outcomes
Indigenous Oral Health Unit, Australian Research Centre for Population Oral Health

Location
Adelaide Health and Medical Sciences (AHMS) Building

Supervisor
Professor Lisa Jamieson and Dr Kostas Kapellas

Supervisor email
lisa.jamieson@adelaide.edu.au and kostas.kapellas@adelaide.edu.au

Research placement project title
14.15 Public health internship

Project description
The Baby Tooth Talk randomised trial recruited 446 mothers during pregnancy between 2010-2011 and provided motivational interviewing and anticipatory guidance over a two year period in an effort to prevent early childhood caries. As of 2018, these children are now aged 6 or 7 years. This trial has maintained contact with the study participants and their children as a prospective cohort. A public health internship using this dataset would suit those interested in childhood development and/or oral health.

Major(s)
Public health

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 1
Maximum number of students: 5

Category
Human research

Special requirements
Knowledge and general understanding of statistics and data analysis methods and use of software such as SPSS and/or SAS encouraged, but not essential.

Research areas
Translational Health Outcomes
Adelaide Exposure Science and Health

Location
Adelaide Health and Medical Sciences (AHMS) Building

Supervisor
Dr Paul Rothmore

Supervisor email
paul.rothmore@adelaide.edu.au

Research placement project title
14.16 Reviewing SA Health policy directive for slips, trips and falls

Project description
Students will undertake a literature review of contributing factors and effective interventions for healthcare workers. There are different groups of contributing factors which are associated with slips, trips and falls for SA Health workers which would be included in the literature review:
- environmental (e.g. wet floors, trip hazards, slippery tiles, uneven footpaths, etc.)
- intrinsic worker factors (e.g. balance, age, medications, vision, osteoporosis, etc.)
- footwear
- human factors (e.g. inattention, rushing, fatigue, carrying loads that obscure vision of foot, looking at phones, 3 points of contact on stairs, etc.)

Students may also undertake a review of SA Health slips, trips, and falls data (incidents and claims).

Major(s)
Public health

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 1
Maximum number of students: 3

Category
Human research

Special requirements
All students working at SA Health will be required to present evidence of a current police check. Adelaide work experience and community placement guide.

Research areas
Translational Health Outcomes
Adelaide Exposure Science and Health

Supervisor
Dr Leigh Thredgold, Dr Sharyn Gaskin and Professor Dino Pisaniello

Supervisor email
leigh.thredgold@adelaide.edu.au, sharyn.gaskin@adelaide.edu.au, and
dino.pisaniello@adelaide.edu.au

Research placement project title
14.17 Are there reproductive health effects from toxic chemical exposure through the skin? A review of the evidence for the flower industry

Project description
Students will participate in a number of practical activities relevant to occupational and environmental skin absorption of toxic chemicals. Lab work will involve hands on scenario-based scientific measurements of a range of industry relevant chemical exposures. Research papers and current research projects will be used to frame the learning. Scenarios and topics will be drawn from research in healthcare, defence, mining, agriculture and manufacturing industries. Students may have the opportunity to participate in field work or visits to relevant government agencies.

Major(s)
Public health

Available in which semester
Semester 1

Minimum number of students: 1
Maximum number of students: 3

Category
Laboratory (wet lab)

Special requirements
Laboratory induction

Research areas
Translational Health Outcomes
Social and Behavioural Sciences Unit: End of Life Care

Location
Adelaide Health and Medical Sciences (AHMS) Building

Supervisor
Dr Teresa Burgess, Associate Professor Jaklin Eliott and Dr Katherine Hodgetts

Supervisor email
teresa.burgess@adelaide.edu.au, jaklin.eliot@adelaide.edu.au and katherine.hodgetts@adelaide.edu.au

Research placement project title
14.18 Advance care planning in vulnerable communities

Project description
This project offers students the opportunity to experience research in a university setting and practical experience in the day to day activities required of a research project. The student will be part of a team working on an NHMRC funded project entitled: Investigating the inclusion of vulnerable populations in ACP: Developing complex and sensitive public policy. Various policies and practices have been developed to help Australians document their end-of-life preferences through advance care planning and written Advance Care Directives. However, healthcare policies and practices are typically designed to suit the majority population, and may not meet the needs of vulnerable Australians — those with lower levels of health literacy, with chronic diseases who may be too unwell to discuss their wishes, or within cultural groups that value family or community decisions over individual autonomous decision-making. In this project, we are examining what should be done to ensure that advance care planning and end-of-life care within these communities are best supported. Students will assist with a variety of activities including literature searching and reviewing, data organisation, planning and implementation of research activities such as focus groups and interviews, attending research team meetings, stakeholder liaison, simple data analysis etc.

Major(s)
Public health

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 1
Maximum number of students: 2

Category
Human research

Special requirements
Nil

Research areas
Translational Health Outcomes
DASSA-WHO Collaborating Centre for Research in the Treatment of Drug and Alcohol Problems

Location
North Terrace Campus

Supervisor
Associate Professor Linda Gowing

Supervisor email
linda.gowing@adelaide.edu.au

Research placement project title
14.19 Analysis of data on treatment services provided by DASSA

Project description
Drug and Alcohol Services South Australia (DASSA) provide a range of treatment services for people with substance use disorders. Routine data collected on treatment episodes is the basis of monitoring activities at DASSA. The topic for this project will depend on DASSA priorities for monitoring at the time of commencement. Previous analyses have involved examination of assessments for admission to residential rehabilitation, and the effect of the medications modafinil and mirtazapine on the outcomes of inpatient management of amphetamine withdrawal. Analyses are usually based on de-identified data from DASSA computerised records, but additional information from individual clinical records may be necessary. A police check will be required if access to clinical records is to be undertaken. The project will be supervised by Associate Professor Linda Gowing, with input from DASSA staff to provide orientation to the particular questions to be addressed. The purpose of the project will be to provide a report to the Clinical Executive Committee of DASSA. There is also potential for a journal article to be derived from the work, in which case the students involved will at least be acknowledged as contributors.

Major(s)
Addiction and mental health

Category
Human research

Available in which semester
Semester 1

Special requirements
Nil

Minimum number of students: 1
Maximum number of students: 2

Research areas
Translational Health Outcomes
DASSA-WHO Collaborating Centre for Research in the Treatment of Drug and Alcohol Problems

Location
North Terrace Campus

Supervisor
Associate Professor Linda Gowing

Supervisor email
linda.gowing@adelaide.edu.au

Research placement project title
14.20 Overview of current evidence of the effectiveness of naltrexone for treatment of alcohol dependence

Project description
There are existing systematic reviews on the effectiveness of naltrexone (oral and depot preparations) for relapse prevention treatment of alcohol dependence. However, systematic reviews are complex documents, and typically focus on specific questions of efficacy. This project will draw on existing systematic reviews, and other publications, to prepare a concise overview of the evidence, covering effectiveness, likely adverse effects, and factors that might predict response to the medication. The overview will become the basis for clinical information that is published on the website of Drug and Alcohol Services South Australia (DASSA). The project will involve literature searching to locate articles, and critical appraisal of all relevant articles. The project will be supervised by Associate Professor Linda Gowing.

Major(s)
Addiction and mental health

Research areas
Translational Health Outcomes

Available in which semester
Semester 1

Minimum number of students: 2
Maximum number of students: 4

Category
Human research

Special requirements
Nil
INNOVATIVE THERAPEUTICS
INNOVATIVE THERAPEUTICS

From 2001 to 2014, health care expenditure in Australia doubled to $140 billion (9.5% GDP), and has since been increasing at a rate of 7.7% per annum. The various tiers of government fund 68% of these costs, 11.5% of which can be attributed to pharmaceuticals alone.

The development of new and cost-effective therapeutics is critical for sustaining and advancing the delivery of health care to the Australian community. Our research aims to produce novel therapeutic approaches to enhance efficacy and specificity; lower the side effects; provide greater safety; and reduced need for hospitalisation or other health services.

Researchers across the faculty are focused on:

- identifying novel targets for therapy to prevent metastasis and modulate the progression of cancers
- identifying new biomarkers to identify disease, predict disease trajectories and monitor response to treatment
- developing tissue regeneration technologies to address tissue injuries and disease
- developing cost-effective in vitro models to replace animal models for testing therapeutic efficacy
- developing rigorous clinical evaluation approaches of novel combinations of existing therapeutic agents, including development of novel modes of delivery.
ENT Surgery

Location
Basil Hetzel Institute for Translational Health Research, The Queen Elizabeth Hospital

Supervisor
Dr Katharina Richter

Supervisor email
katharina.richter@adelaide.edu.au

Research placement project title
15.01 Boosting antibiotics

Project description
The looming threat of antibiotic resistance has large economic and medical implications. While resistance is rocketing leaving conventional antibiotics less and less effective, there are no breakthroughs in the pharmaceutical development pipeline. This project aims to identify compounds that boost the activity of antibiotics against resistant bacteria. After discussing which compounds theoretically improve the antibiotic activity, 1-2 compounds will be selected for microbiology assays (e.g. checkerboard assay, resazurin assay, crystal violet assay) to determine synergistic antimicrobial effects in a wet lab. There is potential to employ confocal laser scanning microscopy for the visualisation of bacteria.

Major(s)
Medical sciences

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 2
Maximum number of students: 4

Category
Laboratory (wet lab)

Special requirements
Meetings can be organised on city campus; wet labs are in Woodville
MEN’S HEALTH
MEN’S HEALTH

The research area of men’s health focuses on the common and interrelated conditions that constitute the bulk of the disease burden in men, and have the most significant effects on wellbeing and quality of life, families and workforce participation. These include:

- prostate cancer
- diabetes and heart disease
- anxiety and depression
- urological disease
- sexual health
- reproductive health
- sleep health.

Our researchers are using an interdisciplinary approach to narrow the gap between male and female health. This comprises a network of basic scientists, public health, clinical, behavioural and social science researchers, health practitioners, educators, economists, consumers and expert advisors working together to share expertise and knowledge to advance men’s health.

Our research emphasises the biopsychosocial determinants of health across all our men’s health research and training programs. Our programs have a strong focus on:

- healthy male ageing
- clinical consequences of obesity
- health literacy
- preventative health and e-health measures
- vulnerable populations of men at greater risk
- innovation in screening, diagnostic and prognostic tools and therapies
- health economics
- healthy paternity.
Digital Health and Cancer Control

Location
South Australian Health and Medical Research Institute (SAHMRI)

Supervisor
Dr Camille Short

Supervisor email
camille.short@adelaide.edu.au

Research placement project title
17.01 Delivering tailored exercise advice to men with metastatic prostate cancer using the internet: useful or useless?

Project description
We are developing an interactive web-based platform to support men with metastatic prostate cancer to participate in health-enhancing physical activity. The tool is being designed to:

- Provide automatically tailored exercise prescriptions to individual users that are considered safe and likely to lead to physiological and/or psychological benefits if followed.
- Demonstrate appropriate exercises to individual survivors in a clear and easy to understand way via tailored text and videos.
- Ensure all users have adequate levels of exercise knowledge, confidence and skills to participate in exercise at recommended levels.

To evaluate the efficacy of the website for enhancing physical activity and thereby improving quality of life we are conducting a RCT in 2019. Students working on this project will have the opportunity to learn about and be involved in intervention optimisation and evaluation.

Major(s)
Medical sciences

Available in which semester
Semester 1 or Semester 2

Minimum number of students: 1
Maximum number of students: 2

Category
Human research

Special requirements
Nil

Research areas
Men's Health
Nutrition and Metabolic Health
Cardiac, Respiratory and Vascular Health