DIVISION OF HEALTH SCIENCES

LIST OF VACATION SCHOLARSHIP PROJECTS 2017-18

Aboriginal Health

Allied Health Evidence (Please also see 'Nutrition and Exercise' for related projects)

Biomaterials and Nanomedicine

Cancer Biology

Neuroscience

Nursing and Midwifery

Nutrition and Exercise (Please also see 'Allied Health Evidence' for related projects)

Pharmacy and Medical Sciences

Population Health

Rural Health

ABORIGINAL HEALTH

School	Health Sciences
Centre/Institute	Sansom Institute/Wardliparingga Aboriginal Research Unit
Project keyword(s)	Diabetes, cardiovascular disease, preclinical research
Project title	***Characterisation of cardiometabolic state in an animal model***
Project summary	Diabetes is recognised as one of the fastest growing global epidemics. There is a well-established link between cardiovascular disease and diabetes, with patients at increased risk of developing atherosclerosis, nephropathy, neuropathy, and retinopathy. Extensive research has been conducted on each condition to elucidate disease development and progression mechanisms, at cellular, tissue, organ and organism levels. The fat sand rat (Psammomys obesus) is an animal model that closely resembles the development of type 2 diabetes and complications in human. A collaboration between the Sansom Institute for Health Research, UniSA, and Heart Health, Vascular Research Centre, South Australian Health and Medical Research Institute (SAHMRI), is seeking to explore the link between cardiovascular disease and diabetes. This summer vacation scholarship will contribute to the characterisation of the cardiometabolic state in a diabetes animal model. This project will provide the opportunity to gain exposure to work that is conducted in a vascular research environment, and learn a broad range of laboratory techniques, including RNA and protein extraction methods, tissue sectioning and histochemistry, and scientific write-up of results.
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ALLIED HEALTH EVIDENCE

School	Health Sciences
Centre/Institute	Sansom Institute for Health Research
Project keyword(s)	Diabetic Neuropathy, Altered body schema, Altered Awareness
Project title	***Evaluating the prospect of altered perception of the foot in people with diabetes neuropathy*.**
Project summary	It is now well-recognised that we have an internal representation of ourselves, a body-schema, which may be modulated by somatic and proprioceptive input (Moseley 2008). We know that these body images/maps, together with tactile acuity may be altered in pain disorders such as CRPS, in chronic back pain and with phantom limb pain (Moseley 2008). Conversely, we also know that when someone has a body part amputated, this may also result in cortical changes, and altered perception. However, we do not know is how these systems alter in someone who has a decreased pain awareness. An example of this is someone who suffers from Diabetic Neuropathy. DN occurs when the peripheral nerves are damaged (usually damage to the myelin sheath) affecting the transmission of nerve impulses after long-term exposure to metabolic by-products of raised blood glucose levels. Thus, the aim of this study is to investigate and compare, via a cross-sectional means, measures of body awareness and perception in people with DN and normal.
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School	Health Sciences
Centre/Institute	International Centre for Allied Health Evidence
Project keyword(s)	Student learning styles
Project title	***Analysis of student perceptions of optimal teaching and learning strategies during clinical education***
Project summary	The project involves analysis of a longitudinal study of undergraduate physiotherapy student's perceptions of optimal teaching and learning activities in clinical education and their self-reported Learning style. Currently the data is stored in Questionnaire hard copy format and the student will be expected to enter the data, undertake a scoping review of the literature in the area of optimal clinical education strategies for undergraduate physiotherapy students. I would like the student to co-author a paper comparing this dataset to datasets from students collected in India, Malaysia and South Africa
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School	Health Sciences
Centre/Institute	International Centre for Allied Health Evidence
Project keyword(s)	Flatfeet, surface electromyography
Project title	***The use of surface electromyography to determine tibialis posterior tendon dysfunction.***
Project summary	The tibialis posterior muscle primarily serves as a dynamic stabiliser of the foot's medial longitudinal arch, working as an antagonist to the tibialis anterior muscle (Blasimann et al. 2015). Dysfunction of the tibialis posterior tendon affects up to 10% of older people and often results in adult acquired flatfoot deformity (AAFD),(Kohls-Gatzoulis et al. 2004). People with AAFD often seek podiatry and physiotherapy services. Delayed identification and treatment of AAFD can result in rigid, painful deformities which may require surgical ankle fusions (Park 2012). Previous research has identified that AAFD results in changes in activation and timing for both tibialis posterior and tibialis anterior muscles. The gold standard for determining the activation and timing of tibialis posterior is intra-muscular electromyography (EMG); however, this is often limited in application due to the pain and risk involved with its use. Concurrently, surface EMG (sEMG) technology is becoming more affordable and more likely to be employed within physiotherapy and podiatry practices. This study aims to explore whether sEMG investigations of tibialis posterior and tibialis anterior muscles are a suitable alternative to intra-muscular EMG, when compared to ultrasound scans, for the purposes of identifying tibialis posterior tendon dysfunction.
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School	Health Sciences
Centre/Institute	International Centre for Allied Health Evidence
Project keyword(s)	Posterior Tibial Tendon Dysfunction, Management,
Project title	***Scoping the diagnosis and management of Posterior Tibial Tendon Dysfunction***
Project summary	Posterior Tibial Tendon Dysfunction (PTTD) is a progressive condition and the most common cause of adult acquired flatfoot deformity, with a prevalence as high as 10% in an elderly population (Kohls-Gatzoulis et al. (2004b). In addition to being the cause of significant pain, dysfunction can severely impact on both gait and balance (Kohls-Gatzoulis et al. 2004a), and therefore the confidence, mobility and independence of sufferers (Durrant et al. 2016; Edwards et al. 2008). PTTD is diagnosis is often missed or late, contributing to its progression. Furthermore, sufferers often present to a wide array of health professionals, including general practitioners, orthopaedic specialists, physiotherapists and podiatrists, who may utilise a variety of different observations, clinical tests and approaches to management. This has led to a rather disjointed approach to the diagnosis and management of the condition, particularly during the early stages. Consequently, in this project we aim to scope the broad array of management techniques utilised by the various health professions via a scoping review and then identify the clinical indicators, and reasoning processes regarding management choices undertaken by each of the professions via an online survey.
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School	Health Sciences
Centre/Institute	Sansom Institute/ Body in Mind Research Group (BIM)
Project keyword(s)	Pain, Education, Paediatrics
Project title	***Making pain education fun for kids***
Project summary	This project involves reviewing publicly available multimedia resources for educating kids about pain and identifying key features of effective health educational material for kids, with a view to participating in an interdisciplinary workshop with this aim in mind. As such, the successful student will require an unusual skill set. Specifically, the student must have some evidence of creative endeavours, some health training already (e.g. evidence of health-related educational or clinical experience) and a clearance to work with kids.
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School	Health Sciences
Centre/Institute	Sansom Institute, Medical Radiation
Project keyword(s)	proton radiation therapy; paediatric cancers
Project title	***Review of proton therapy clinical trials for paediatric cancers of the central nervous system.***
Project summary	Proton therapy is the use of high energy proton beams to kill tumours. Protons exhibit a unique dose distribution as compared to other types of ionising radiation, for example x-rays. The dose is low at shallow depths and remains so until a sudden rise, the Bragg Peak, where up to 80% of the dose is delivered. As dose minimisation to healthy tissue is optimal, protons may be used to deliver optimal geometric dose distribution. In the last decade, we have seen rapid expansion of radiotherapy centres offering proton radiation therapy for cancer. As of 2014, there were over 50 protons and heavy ion therapy centres around the world in operation. There are as many as 40 new facilities under construction or proposed. In some of these new centres it is proposed to combine both proton and heavy ion therapy facilities. At the end of 2013, over 120,000 patients world-wide were treated with protons and other heavy ions. There are unique applications of proton beams that give reduced adverse events, especially for paediatric cancers. Because of their physical and radiobiological properties, protons are beneficial for treatment of complex anatomical structures and radioresistant tumours as well as of tumours located in close proximity to radiosensitive organs such as the brain, spinal cord or pelvis, making application of photon therapy difficult or impossible. For example, in base of skull chordomas, protons appear to provide superior results to photon therapy. This project aims to conduct critical literature review of all published clinical trials and studies (internationally) in the last decade to evaluate the efficacy of proton radiotherapy for treatment of paediatric cancers of the central nervous system, in terms of tumour control, survival and normal tissue complications. Data will be tabulated and analysed to identify treatment schedules leading to higher therapeutic ratio. The results will be summarised in a report with the aim to publish.
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School	Health Sciences
Centre/Institute	Sansom Institute, Medical Radiation
Project keyword(s)	point of care ultrasound, antenatal, rural, remote
Project title	***Review of studies in remote antenatal point of care ultrasound (POCUS) and their impact on babies' outcomes***
Project summary	There are significant disparities in the infant mortality and low birthweight between babies of women from metropolitan vs remote/rural areas. These disparities are even larger for aboriginal and non-aboriginal women (infant mortality rates are 2 times higher for Aboriginal and Torres Strait Islander babies and fewer women receive antenatal care in first trimester). The key risk factors associated with infant and child mortality and morbidity include low birthweight and pre-term births, maternal health and behaviours (smoking, alcohol, nutrition during pregnancy), socio-economic status, and access to health services (AIHW 2014ad). Timely ultrasound imaging is of immense help in early diagnosis of low birthweight and other morbidities, leading to timely intervention and reduction of mortality and morbidity rates among mothers and their babies. Australian government reports show that in rural and remote Australia proportionately far fewer pregnant women have access to timely US service as compared to women in metropolitan or regional areas. This project aims to conduct critical literature review of all published studies (internationally) on the following: • Review of studies examining the impact of antenatal ultrasound on babies' outcomes in remote and rural areas in Australia and overseas. • Review of training methods in point of care ultrasound for remote health staff and their impact on babies' outcomes. This literature review will explore what is known globally in relation to availability, access, utilisation and clinical impact of POCUS services. It will compare global perspectives to the Australian context. This data will be helpful in developing a Needs Analysis Survey, which will be conducted of all rural, remote Health services, and Aboriginal Community Controlled Health Organisations (ACCHO) to examine access, availability, utilisation and impact of POCUS in rural, remote and Aboriginal communities of Australia.
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School	Health Sciences
Centre/Institute	Podiatry
Project keyword(s)	Onychomycosis
Project title	***Efficacy and safety of urea in the treatment of onychomycosis***
Project summary	This project involves undertaking a systematic literature review to determine the efficacy and safety of using urea for treating onychomycosis. The project may lend itself to a meta-analysis and possible publication of study findings
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School	Health Sciences
Centre/Institute	Alliance for Research in Exercise, Nutrition and Activity (ARENA)
Project keyword(s)	Sleep
Project title	***Examining objectively-measured sleep characteristics***
Project summary	The aim of this study is to examine objectively-measured sleep characteristics in a nationally representative Australian sample. Data for this study has already been collected. There are several projects that may be available for a student/s to work on, including examining the different methods of operationalising sleep characteristics as well as their association with health outcomes. This project will provide training to use SPSS, as well as an opportunity to understand more about sleep and the possibility to contribute to writing a manuscript for publication
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BIOMATERIALS AND NANOMEDICINE

School	Pharmacy and Medical Sciences
Centre/Institute	Sansom Institute for Health Research/Blencowe Group
Project keyword(s)	Peptides, organic synthesis, amino acids
Project title	***Revolutionizing peptide synthesis***
Project summary	The global market for peptide therapeutics is worth over US$ 21 billion, and is expected to double over the next 5 years. The most widely applied method for manufacturing peptides involves the use of a technique known as solid phase peptide synthesis, which involves the repetitive coupling of protected amino acids. The major disadvantages with this method are the poor atom efficiency, generation of large amounts of waste by-products and high cost. Therefore, the aim of this project is to develop an alternative approach that is less wasteful, more environmentally friendly, quicker and cheaper.
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School	Pharmacy and Medical Sciences
Centre/Institute	Sansom Institute for Health Research/Blencowe Group
Project keyword(s)	3D bioprinting, bioinks, assays, cell culture
Project title	***Development of bioinks for 3D bioprinting of cells***
Project summary	3D printing has emerged as an advanced manufacturing technique that has revolutionized numerous industrial sectors. In the medical and pharmaceuticals sectors, 3D printing offers the potential to rapidly generate complex tissue constructs and organs from single cells that will pave the way for advances in regenerative medicine and drug development, tackling current health care challenges. However, 3D bioprinting for biomedical applications requires specific biocompatible materials – bioinks – that are suited for the manufacturing process. These bioinks must have a number of important characteristics, including printability, mechanical integrity, biocompatibility, and promote cell growth and function. Therefore, the goal of this project is to develop new bioinks and methods for the 3D printing of biological tissues and organs.
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School	Pharmacy and Medical Sciences
Centre/Institute	Sansom Institute for Health Research/Blencowe Group
Project keyword(s)	oxygen delivery, microparticles, oxygen deficiency
Project title	***Oxygen delivery technologies for treatment of medical conditions***
Project summary	Oxygen is central to all life on earth. Humans and human tissues in particular require very specific levels of oxygen to function normally, without which the results can be devastating. Thus, it comes as no surprise that there are numerous medical conditions, diseases and emergencies related to oxygen deficiencies and starvation, many of which are life threatening. However, there are currently no therapeutic products on the market that provide rapid treatment of medical situations related to oxygen deficiency. Therefore, the aim of this project is to develop a microparticle technology that can deliver oxygen over a sustained period. The potential outcome of the project is a novel treatment for oxygen deficiency, which has implications for heart failure or stroke victims, the treatment of anemic disorders and emergencies (e.g., blood loss), organ transplantation, and in situ tissue regeneration.
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School	Pharmacy and Medical Sciences
Centre/Institute	Sansom Institute for Health Research/Blencowe Group
Project keyword(s)	native animals, wildlife conservation, feral cats
Project title	***Saving Australia's native wildlife from introduced predators***
Project summary	Introduced and invasive species, such as feral cats and foxes, pose a tremendous threat to native Australian species and animal reintroduction programs. Various methods to eliminate feral cats before reintroduction of native species have been trailed with limited success, due to the cats' preference for living prey rather than baits. When native species, such as quolls and bettongs, are reintroduced they are naive to their surrounds and are an easy target for cats. Generally, it only takes a few feral cats to rapidly wipe out the reintroduced population before they have a chance to breed and establish a colony in the area. Therefore, the aim of this project is to develop innovative new solutions and technologies that can be used to save native wildlife
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School	Pharmacy and Medical Sciences
Centre/Institute	Sansom Institute for Health Research/Blencowe Group
Project keyword(s)	biosurfactants, renewable resources, environmental sustainability
Project title	***Biosurfactants from waste resources***
Project summary	Many industrial biotechnology and food technology processes produce waste streams that are either sent for disposal (waste dumps) or are incorporated into other low value food (animal) and agriculture (fertilizers) products. Therefore, a number of food companies are actively looking to make more use of their waste streams by producing higher value products. As a results with have partnered with CSIRO to develop new value-added materials from waste streams, and in particular, the development of new biosurfactants for the pharmaceutical, cosmetics and household product industries. Surfactants are used in a wide range of industries, and are predominantly manufactured from non-renewable resources and are non-degradable, leading to their accumulation in the environment. Therefore, this project will involve the development of a green chemistry approach for the conversion of waste streams to biodegradable and environmentally friendly biosurfactants.
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School	Pharmacy and Medical Sciences
Centre/Institute	Sansom Institute/Biofilm Test Facility
Project keyword(s)	Antibiotic resistance, re-formulation, re-purposing, biofilm, nanomedicine
Project title	***Re-formulation of drugs to overcome antibiotic resistance***
Project summary	This project seeks to design and evaluate novel formulations against antibiotic resistant bacteria and biofilms. The student will join an established, interdisciplinary research group working on one of the most threatening global issues- antibiotic resistance. The student will have the opportunity to conduct state of the art research at SA's only Biofilm Test Facility. This project requires affinity to both formulation science and microbiology, hence is of interdisciplinary nature.
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CANCER BIOLOGY

School	Pharmacy and Medical Sciences
Centre/Institute	Centre for Cancer Biology/Vascular Biology & Cell Trafficking Laboratory
Project keyword(s)	Cancer, Diabetes, Blood vessels
Summary:	Our laboratory studies the intricate network of blood vessels that carry white blood cells throughout our body and contribute to normal and disease states. With a focus on translating our findings into outcomes for better human health, our work aims to provide new opportunities to (i) prevent tumours from growing and metastasising in cancer patients and (ii) promote blood vessel function in patients with diabetes.
Project title	***New discoveries in cancer***
Project summary	The growth and spread of cancer is dependent on an ability to access the blood supply. To do this, cancer cells not only promote blood vessel sprouting (angiogenesis) but also form vessel-like structures themselves (vasculogenic mimicry (VM)). Our recent work has identified new VM targets in breast cancer and melanoma (Tan et al, Oncotarget, 2016; Tan et al Clin Trans Immunol, 2017). A better understanding of how blood vessels promote tumour growth will provide new treatment options for patients with cancer. Techniques: Cutting edge technology will be used alongside cell culture, surface antigen expression by flow cytometry, protein detection by Western blot, in vitro blood vessel forming assays, gene expression by real time PCR, immunohistochemistry of human biopsies and high end microscopy (including confocal and multiphoton).
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School	Pharmacy and Medical Sciences
Centre/Institute	Centre for Cancer Biology/Vascular Biology & Cell Trafficking Laboratory
Project keyword(s)	Cancer, Diabetes, Blood vessels
Summary:	Our laboratory studies the intricate network of blood vessels that carry white blood cells throughout our body and contribute to normal and disease states. With a focus on translating our findings into outcomes for better human health, our work aims to provide new opportunities to (i) prevent tumours from growing and metastasising in cancer patients and (ii) promote blood vessel function in patients with diabetes.
Project title	***Curing diabetes***
Project summary	Pancreatic islet transplantation is an emerging cure for Type 1 Diabetes but success is limited by death of insulin producing beta cells post-transplantation. Endothelial progenitor cells (EPCs) have the potential to improve islet engraftment and function as they increase the blood supply to provide the much needed oxygen and nutrients. As recently published by us, a better understanding of how the insulin-producing beta cells in the pancreas interact with the local blood vasculature will significantly advance the cure for diabetes (Penko et al, Cell Transplantation 2015; Peiris et al, Diabetes 2014). Techniques: Cutting edge technology will be used alongside cell culture, surface antigen expression by flow cytometry, protein detection by Western blot, gene expression by real time PCR, small animal models of diabetes, immunohistochemistry of human tissue samples, functionalised biomaterials and high end microscopy (including confocal and multiphoton).
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School	Pharmacy and Medical Sciences
Centre/Institute	Centre for Cancer Biology/ Alternative Splicing in Human Pathologies Laboratory.
Project keyword(s)	Circular RNAs, brain cancer, leukaemia
Summary:	Our laboratory is pioneering how alternative gene products drive human diseases and act as novel targets for therapy. Recent years have witnessed a profound expansion of the variety and complexity of eukaryotic RNA species, particularly the enigmatic non-coding RNA families. The vast amounts of RNA sequencing data have illuminated these non-coding RNA species as unequivocally more abundant than the canonical mRNA species. Furthermore, insight into the diverse mechanisms and functional roles of these RNA Trojan Horses are emerging which point to their role in maintaining cellular homeostasis, gene regulation and/or directing various pathologies, including cancer. As the "New Kids on the Block" in the non-coding RNA family, the circular RNAs are a large family of uniquely alternatively-spliced RNA molecules ubiquitous among eukaryotes and are proving functional in plethora contexts. We are the leading laboratory in Australia investigating these transcripts, generating seminal publications in *Cell*, *Nature Plants* and *Genome Biology*. We propose two projects below:
Project title	1. ***The fundamental roles of circular RNAs in brain cancer*** 2. ***Circular RNAs as biomarkers for leukaemia***
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School	Pharmacy and Medical Sciences
Centre/Institute	Centre for Cancer Biology/ Translational Oncology Laboratory
Project keyword(s)	Brain tumours, glioblastoma, immunotherapy, T cells, translational cancer research
Project title	***Advancing T cell therapy for glioblastoma***
Project summary	Glioblastoma (GBM) is the most common and lethal form of malignant brain tumour. Even with current best-practise approaches to treatment, survival time from diagnosis is only ~15 months. Hence, there is an urgent need for more effective therapies. Our team aims to develop a novel approach to GBM treatment which harnesses the power and specificity of the immune system to specifically target cancer cells, using Chimeric Antigen Receptor (CAR) T cell technology. This approach is already showing enormous promise in the treatment of some forms of leukaemia but has not yet been widely adopted for the treatment of solid tumours such as GBM. The CAR-T cell technique uses killer T cells from the patient's own blood, which are re-directed' using genetic engineering techniques to specifically recognise molecules on the surface of tumour cells (tumour antigens). This allows the killer T cells to unleash their armoury of toxic molecules onto tumour cells, while leaving healthy cells alone. Our team aims to develop a new CAR-T cell therapy for GBM, and the student project will contribute to this aim by performing techniques such as: • analysis of patient tumour cells and tissues by immunofluorescence microscopy and flow cytometry • functional studies to test the ability of the CAR-T cells to kill tumour cells
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School	Pharmacy and Medical Sciences
Centre/Institute	Centre for Cancer Biology/Lymphatic Development Laboratory
Project keyword(s)	Vascular development, lymphatic vascular development, haemopoiesis, leukaemia, transcription factors, transcriptional regulation
Project title	***Understanding how cell identity is programmed during development and disease.***
Project summary	We are interested in how cell identity is programmed during development and in particular, how the identity of the cells that make up our blood vessels, lymphatic vessels and blood cells is programmed by molecular switches called transcription factors. Defects in the transcriptional programming of endothelial cell and haematopoietic cell identity underlie human disorders including vascular anomalies, lymphoedema and leukaemia. We have projects available to investigate the roles of key vascular transcription factors and how they go wrong in human disease.
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School	Pharmacy and Medical Sciences
Centre/Institute	Centre for Cancer Biology/Tumour Microenvironment Laboratory
Project keyword(s)	Breast Cancer, tumour microenvironment, cell signalling
Project title	***Determining how signalling from tumour cells expressing Rho-kinase can influence breast cancer progression***
Project summary	Breast cancer is the most frequently diagnosed cancer in women worldwide, and despite significant advances in treatment, mortality rates are still high. Therefore, novel treatments are urgently needed. We have found that when we activate the Rho-kinase (ROCK) signalling pathway in mammary cancer cells in a mouse model of breast cancer, tumours grow much larger and quicker compared to when we do not activate the ROCK pathway. We also see that in ROCK tumours there are many more stromal cells, called fibroblasts. Some types of fibroblasts are known to promote tumour growth. We believe that ROCK is causing breast cancer cells to secrete factors that make these fibroblasts migrate to the tumour, give them pro-tumour characteristics, and therefore causing rapid cancer growth. When we block secretion from the tumour cells using a drug called DMA, tumours grow less quickly and are much smaller than control tumours. This project will analyse the effect of DMA treatment on tumours or tumour cells from ROCK or control mice, and may address one or more of the following aims: • Use immunofluorescent microscopy and quantification techniques to look at fibroblast recruitment to mammary tumours – Does blocking secretion change how many fibroblasts are present? • Use immunofluorescent microscopy and quantification techniques to look at a variety of extracellular matrix proteins that are known to be regulated by fibroblasts, as well as collagen – Does blocking secretion change the composition of the ECM? • Treat cancer cells with DMA and analyse the effect on cultured fibroblasts – Do the fibroblasts acquire pro-tumour characteristics?
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NEUROSCIENCE

School	Health Sciences
Centre/Institute	Alliance for Research in Exercise, Nutrition and Activity (ARENA)
Project keyword(s)	Neuroscience, virtual reality, exercise
Project title	***What is the influence of virtual reality exercise on episodic memory retention in young and older adults***
Project summary	Dementia is now the second leading cause of death in Australia. With no known cure, research attention is being focussed on non-pharmacological interventions such as physical activity and cognitive stimulation. One new strategy to slow decline is to simultaneously immerse individuals in both physical activity and cognitively stimulating tasks using computer based exergaming and virtual-reality enhanced exercise. We are currently prototyping a virtual exercise environment and would like to assess the influence of active v's passive navigation of a virtual environment on episodic memory retention in healthy young adults. This project will involve hands on data collection (under supervision) and would be suited to a student who has a research and clinical interest in active video gaming for health, neuroscience and cognition.
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School	Health Sciences
Centre/Institute	Sansom Institute/Body in Mind Research Group (BiM)
Project keyword(s)	Neuroscience, Brain Stimulation, Neuroplasticity
Project title	***Establishing a threshold for transcranial direct current stimulation***
Project summary	Transcranial direct current stimulation (tDCS) is a non-invasive brain stimulation technique that is being used extensively to modify brain function and influence behavior. Evidence suggests that tDCS modifies the excitability of neurons and in turn results in changes in the strength of connections (synapses) between neurons via plasticity mechanisms. However, at present the response to tDCS is extremely variable both between and within individuals. One of the factors contributing to this variability may be differences in brain anatomy and the subsequent stimulus reaching the brain. In this project we will investigate whether it is possible to identify a threshold for tDCS effects at an individual level. Identification of such a threshold would then allow tDCS intensities to be individualised, resulting in a much more reliable neuroplastic response. This project is suitable for students who have an interest in neuroscience and neuroplasticity.
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School	Health Sciences
Centre/Institute	Alliance for Research in Exercise, Nutrition and Activity (ARENA)
Project keyword(s)	human performance; motor learning; skill acquisition; brain; cognition
Project title	***Modulating attention and working memory processes for efficient human sequence learning.***
Project summary	Humans rely on sequence learning for a range of activities related to work (e.g., typing, operating machinery), performing sport related skills (e.g., tennis serve, kicking a penalty goal in football/soccer), the arts (e.g., playing a musical instrument, sculpting), and personal-care (e.g., brushing teeth, dressing, cooking). While there is agreement that attention and working memory are important processes for sequence learning, we don't yet understand if and how attention and working memory processes can be enhanced in order to improve sequence learning and performance outcomes. This project is aligned with the aim of identifying neurocognitive mechanisms by which humans control attention and working memory when acquiring sequential action. As part of this project the student will get hands-on experience in employing sequence learning paradigms and measuring brain cortical activity in regions associated with attention, working memory and action production.
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School	Health Sciences
Centre/Institute	Sansom Institute/Body in Mind Research Group (BiM)
Project keyword(s)	Pain, osteoarthritis, neuroscience
Project title	***Assessing hidden bias against movement in osteoarthritis***
Project summary	This project will involve developing an online assessment measure to assess bias towards/against movement in people with osteoarthritis. There is an opportunity to be on the authorship team for this project depending on the student.
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School	Health Sciences
Centre/Institute	Sansom Institute/Body in Mind Research Group (BiM)
Project keyword(s)	Pain, amputees, neuroscience
Project title	***Normalising body perception in amputees with telescoped limbs***
Project summary	This project will work with mediated reality to create a visual illusion that normalises body perception in people who have an amputated limb that feels telescoped (a feeling that the phantom limb has retracted into the stump). There is an opportunity to be on the authorship team for this project depending on the student.
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NURSING AND MIDWIFERY

School	School of Nursing and Midwifery
Centre/Institute	Sansom Institute/Rosemary Bryant AO Research Centre
Project keyword(s)	Nursing, cancer care, patient-centred care, evidence-based practice, evidence synthesis, survivorship care, literature review
Project title	***Identifying and synthesising evidence based cancer care in nursing survivorship: a review to determine opportunities to implement evidence based care***
Project summary	Cancer care involves multiple health practitioners and complex treatment with often little support following treatment completion. National optimal cancer care pathways have recently been introduced in Australia with the aim of improving patient outcomes by facilitating consistent and best practice care. These pathways identify the importance of continuity of care into the post treatment period (survivorship). Critical components in survivorship care have been proposed in Australia, which involve multidisciplinary collaborative care in which nurses play a key role. The role of nurses in delivering evidence based care in cancer survivorship however is not well defined. In particular the effectiveness and feasibility of nurses delivering recommended components of survivorship care is not well understood. A number of organisations produce and promote evidence based care in nursing (e.g., The JBI clinical fellows program, the RNAO BPSO program). The first phase of all these activities however, is a comprehensive review of the literature with a key focus on identifying recommended evidence best practice. The purpose of this project is to review contemporary evidence in survivorship cancer care delivered by nursing staff and also looking examining the organisational supports required in order to do so. These practices and supports may be unique or at increased demand in oncology nursing, or be common among similar, many or all aspects of nursing. The student will work with the Chair in Cancer Care, Professor Marion Eckert, and a team of highly skilled cancer care researchers, to produce a comprehensive literature review, with the intention of subsequent publication and utilisation of the research to form evidence based practice in cancer nursing survivorship
Contact person and details (Name/Phone/Email)	Professor Marion Eckert Tel: +618 8302 2129 marion.eckert@unisa.edu.au

School	School of Nursing and Midwifery
Centre/Institute	Mental Health and Substance Research Group
Project keyword(s)	Consumer Engagement, Mental Health, Communication
Project title	***Engaging consumers and carers in service improvement and planning: Preferred use of communications and information systems***
Project summary	Working closely with staff from SA Health's Office of the Chief Psychiatrist, this project will focus on the growing area of consumer engagement in health and mental health care. Under the Australian Safety and Quality Health Care Standards, health services are developing more sophisticated ways to engage consumers and families in discussions about service quality, their experience, and possibilities for improvement. Consumers and carers can also engage in a variety of co-production and planning activities. Social media and web based platforms are also becoming means for engagement. A key to large scale engagement is the quality of Information systems and communications within the health service. This project will centre on the evaluation and development of communication/ information strategies used by mental health services in South Australia. The research will feature collaboration with research partners, review of literature and evidence, survey design and development of consultation processes with consumers, carers, clinicians and policy makers in mental health care. The aim will be to develop best practice strategies for communication and engagement which are based on evidence and consumer, carer and partner preferences. There are possibilities for the scholarship holder to engage in analysis and publications stemming from the study. Students with lived experience in mental health are encouraged to apply for this scholarship and study opportunity.
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NUTRITION AND EXERCISE

School	School of Health Sciences
Centre/Institute	Alliance for Research in Exercise, Nutrition and Activity (ARENA)
Project keyword(s)	Nutrition, functional food, sport, performance
Project title	***Role of functional foods in elite sporting performance: A meta-analysis***
Project summary	This project seeks to review research in the use and role of functional foods to assist in athletic performance.
Contact person and details (Name/Phone/Email)	Dr Robert Crowther Tel: +618 8302 1540 Robert.Crowther@unisa.edu.au

School	School of Health Sciences
Centre/Institute	Alliance for Research in Exercise, Nutrition and Activity (ARENA)
Project keyword(s)	Video, augmented feedback, sport
Project title	***Role of video recordings as augmented feedback in elite sport: A meta-analysis***
Project summary	This project seeks to review research in the use and role of video recordings as an augmented feedback tool to assist in athletic performance.
Contact person and details (Name/Phone/Email)	Dr Robert Crowther Tel: +618 8302 1540 Robert.Crowther@unisa.edu.au

School	School of Health Sciences
Centre/Institute	Alliance for Research in Exercise, Nutrition and Activity (ARENA)
Project keyword(s)	Basketball, talent development
Project title	***Pathway for junior basketball development in Australia***
Project summary	This project seek to review current strategies in junior high performance pathways in Australia Basketball
Contact person and details (Name/Phone/Email)	Dr Robert Crowther Tel: +618 8302 1540 Robert.Crowther@unisa.edu.au

School	School of Pharmacy and Medical Sciences
Centre/Institute	Sansom Institute for Health Research
Project keyword(s)	Type 2 diabetes, dietary intervention, intermittent energy restriction
Project title	***Dietary compliance to the Australian Guide to Healthy Eating and to intermittent energy restriction***.
Project summary	Weight loss improves glycaemic control in people with type 2 diabetes (T2D). The most common form of weight loss is daily dieting or continuous energy restriction (CER). Recently however, intermittent energy restriction (IER) has gained popularity. IER is an alternative weight loss method involving partial dieting (e.g. 2 days/week) followed by habitual eating (e.g. 5 days/week) and may prove useful for individuals who find CER difficult to maintain. The results from our recently published pilot trial suggest that a 2-day IER is as effective as CER for both glycaemic control and weight loss in people with T2D. Our pilot trial provides the foundation for further IER diabetes research and as such has expanded into a large clinical research trial. The student involved in this project will assist in food diary analysis of a small subgroup of volunteers, to further understand how closely people with T2D follow both the Australia Guide to Healthy Eating as well as our 2-day IER diet protocol. This food data will provide valuable insight into how blood glucose levels behave in response to food intake and in turn help establish clear medication management protocol to reduce potentially dangerous low blood glucose levels (hypoglycaemia) during diet change.
Contact person and details (Name/Phone/Email)	Associate Professor Jennifer Keogh Tel: +618 8302 2579 Jennifer.keogh@unisa.edu.au PhD candidate, Sharayah Carter sharayah.carter@mymail.unisa.edu.au

School	School of Health Sciences
Centre/Institute	Alliance for Research in Exercise, Nutrition and Activity (ARENA)
Project keyword(s)	Social norms, health communication, physical activity
Project title	***Using social norms messaging to impact physical activity levels: exploring the role of deviance-regulation.***
Project summary	Social norms messaging has shown to positively impact physical activity, such that messages which emphasised physical activity as *typical* and *desirable* has led to increases in physical activity among participants (Crozier & Spink, 2017; Priebe & Spink, 2015). These initial studies have provided evidence that social norm information motivates individuals to align their behaviour with what is typical and valued. However, research examining other health behaviours (i.e., vaccinations) also have found that individuals tend to self-regulate their behavior more on the basis of the perceived social consequences of *deviating* from what is typical versus the social consequences of *conforming* to what is typical (Deviation Regulation Theory; Blanton, Stuart, & VandenEijnden, 2001). In particular, people were more likely to engage in healthy behaviours when messages described the undesirable personality attributes of people who made unhealthy decisions, rather than desirable personality traits of people who made healthy decisions. In contrast, when they believed their peers made unhealthy decisions, they were most influenced by messages that emphasized the desirable attributes of people who made healthy decisions. This project will extend the research described above into the health behaviour of physical activity. In particular, it is expected that over the 8-week vacation scholarship, the student will gain experience with experimental research methods, social psychology theories and applying them to physical activity, crafting social norms messages, writing ethics applications, developing online surveys, recruiting participants, and interpreting results.
Contact person and details (Name/Phone/Email)	Dr. Alyson Crozier Alyson.crozier@unisa.edu.au

School	School of Pharmacy and Medical Sciences
Centre/Institute	Sansom Institute for Health Research Community and Public Health Nutrition research group
Project keyword(s)	Nutrition, children, unhealthy foods, obesity, health, psychology, marketing
Project title	***Understanding the role of social occasions in children's food intake***
Project summary	Young children's intake of unhealthy foods is excessive, currently contributing 36% of total energy intake (ABS 2014). These excessive intakes can have detrimental effects on children's current and future health. One possible factor contributing to children's intake of unhealthy foods is the frequency of social occasions (e.g. play dates, coffee shop catch ups) in modern lifestyles. This project aims to provide an understanding of young children's exposure to unhealthy food in context of social occasions. Specifically this project will: 1) Define 'social occasions' in the context of young children; 2) Describe the frequency (i.e. how often) and nature (i.e. types of occasions) of social occasions across early childhood; and 3) Identify the types of unhealthy foods associated with different social occasions. This project will explore the available published and grey literature. It will also involve simple analysis of parent reported data on social occasions collected from parents of 3-7 year olds across Australia. An abstract and short communication will be prepared at the completion of the project. Background knowledge in a nutrition-, health-, psychology- or marketing program would be an advantage.
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School	Pharmacy and Medical Sciences
Centre/Institute	Sansom Institute for Health Research
Project keyword(s)	Gestational diabetes, diabetes prevention, diet, weight loss, intermittent energy restriction
Project title	***How can we help mothers who have had gestational diabetes lose weight and prevent the development of type 2 diabetes?***
Project summary	In 2015 at least 10.9% of pregnant women in Australia were diagnosed with gestational diabetes (GDM). GDM is the highest risk factor for future development of type 2 diabetes (T2DM) and currently one in two women who have GDM will develop T2DM later in life. Lifestyle interventions that result in weight loss can reduce the risk of developing T2DM after GDM. However, weight loss can be difficult for mothers with young children given the demands of their infant, lifestyle adjustments, time constraints and inadequate sleep. Our research aims to address issues that women with young children identify as barriers to weight loss and aims to provide less burden and interruption to their daily routines. The successful student will be involved in an online survey project that looks at women's knowledge and beliefs regarding their risk of developing diabetes after gestational diabetes, perceptions on weight loss, barriers to lifestyle adjustments and will ask women what they think would work for them to lose weight. The student will gain experience in various aspects of the project which may include data collection, recording and analysis of online surveys and abstract preparation. The student will also have the opportunity to observe and work on other projects within the research team to gain a broad understanding of research work.
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School	Pharmacy and Medical Sciences
Centre/Institute	Sansom Institute for Health Research
Project keyword(s)	Diet Quality, Intake, Nutrients, Obesity, Weight Loss
Project title	***Dietary intake of 'usual diet' of participants following a 5:2 dietary protocol***
Project summary	Overweight and obesity are major health problems increasing the risk of lifestyle diseases including type2 diabetes and cardiovascular disease as well as increasing the overall burden on the healthcare system. Effective weight loss strategies are therefore important. In this project students will analyse the dietary intake of participants who are enrolled in a weight loss study following a 5:2 protocol. Students will be assessing the intake of participants during their 'usual' intake days looking at the overall intake of energy and nutrient content of the participant's diets as well as compliance to the Australian Dietary Guidelines.
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School	Pharmacy and Medical Sciences
Centre/Institute	Sansom Institute for Health Research
Project keyword(s)	Fatty Acids
Project title	***Determining Sources of LA in the contemporary Australian Diet***
Project summary	***Aims and/or objectives*** The ***aim*** of this project is to determine the sources of dietary linoleic acid (LA) in the contemporary Australian diet. ***Background/potential health benefits of the project*** The health benefits of omega-3 fatty acids (n-3 PUFA), particularly in relation to cardiovascular and inflammatory diseases, are now well-established, and this has led to recommendations from health agencies to increase the intake of these healthy fats (*NHF Position Statement on Fats and Oils, 2009)*. However, despite these recommendations being in place for many years and an increased overall awareness of the importance of the n-3 PUFA, the n-3 fatty acid status of the population has remained low. It has been suggested that a large part of the reason for this is the high content of another family of polyunsaturated fatty acids, the omega-6 fatty acids (n-6 PUFA) in the typical diet of modern Australians *(Meyer et al, 2003; Simopoulos et al, 2009)*. This shift has been driven in part by the replacement of traditional animal-based products used in cooking and baking, which were high in saturates and low in PUFA, with vegetable-based oils and spreads, which are lower in saturates but contain high levels of n-6, and the typical Australian diet now contains between 10 and 20 fold more n-6 PUFA than n-3 PUFA. Recently, there has been growing concern about the potential health implications of the increasing dominance of n-6 PUFA over n-3 PUFA in the modern diet. The n-6 PUFA give rise to pro-inflammatory eicosanoids and promote adipose tissue deposition and consuming a high n-6 PUFA diet over a period of time has been associated with negative effects on cardiovascular and metabolic health in experimental animals. The imbalance between n-3 and n-6 PUFA also has implications for PUFA metabolism, since the n-6 and n-3 PUFA compete with one another for conversion to their long-chain derivatives and incorporation into tissues *(Lands et al, 1999)*. In 2011, our group designed a low n-6 PUFA diet which complied with the Australian Guide to Healthy Eating *(Wood et al, 2013)*, in which the n-6 PUFA content was reduced from 7-8% energy to less than 2% energy whilst maintaining a saturated fatty intake of well below 10% energy. This was then then trialled in a clinical study in 2012 in which dietary intakes were assessed as well as tissue fatty acid levels. From this study we have a comprehensive collection of dietary information reflecting people's usual intake. In this project we would like to assess what the sources of dietary LA are in the contemporary Australian diet. This will guide future dietary advice for patients that are required to optimise n-3 tissue status.
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PHARMACY AND MEDICAL SCIENCES

School	Pharmacy and Medical Sciences
Centre/Institute	Sansom Institute/Experimental Therapeutics Laboratory
Project keyword(s)	Vaccines, Immunology, infectious disease, allergy
Project title	***Development and application of a viral vaccine platform for the prevention or treatment of infectious disease, allergy and cancer.***
Project summary	The Experimental Therapeutics Laboratory uses a multidisciplinary approach that aims to develop and implement novel immuno-therapeutics that exploit the power and specificity of the immune system. Our laboratory currently has a number of vaccines under development for the prevention of infectious diseases caused by Zika, Chikungunya, Ebola, Hepatitis A and B viruses and also for the treatment of various allergies and cancer. The immunogenicity of candidate vaccines is tested using various co-developed assays and animal models to determine their efficacy and mode of action using a range of skills and techniques from immunology, virology, molecular and cellular biology. Our team includes honours and PhD students, technical staff and post-doctoral scientists able to provide you with a diverse range of expertise and experience to develop skills in these disciplines.
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School	School of Pharmacy and Medical Science
Centre/Institute	Centre for Pharmaceutical Innovation and Development (CPID)
Project keyword(s)	Taste masking
Project title	***Taste masking of anthelmintic drug by polymer carrier system***
Project summary	The purpose of this research is to mask the intensely bitter taste of anthelmintic drug. Taste masking will be optimized by complexing drug with the different polymers by the precipitation method. Drug-polymer complexes will be characterized for drug content, in vitro release in simulated salivary fluid (SSF) of pH 6.2 etc. The Complex that would not release the drug in SSF will be considered for further study.
Contact person and details (Name/Phone/Email)	Prof Sanjay Garg Tel: +618 8302 1575 Sanjay.Garg@unisa.edu.au

School	School of Pharmacy and Medical Science
Centre/Institute	Centre for Pharmaceutical Innovation and Development (CPID)
Project keyword(s)	Nanotechnology, Antibacterial drug
Project title	***Development and evaluation of nanoparticle-based targeted delivery system for an antibacterial drug.***
Project summary	The bacterial infections are recurrent, persistent and are difficult to treat because of poor penetration and limited availability of antibiotics within macrophages and epithelial cells. Direct and targeted drug delivery within the intracellular compartment could facilitate the concentration of the drug within the foci of infection and therefore may act as a better therapeutic. The developed systems will be characterized by size, shape, zeta potential, entrapment efficiency and in vitro release. In addition, the *in-vitro* antibacterial assay will be used to assess the efficacy of antibacterial drug.
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School	School of Pharmacy and Medical Science
Centre/Institute	Centre for Pharmaceutical Innovation and Development (CPID)
Project keyword(s)	Coating, Microencapsulation, Fluidized Bed Dryers, Extrusion–spheronization
Project title	***Optimization of coating technique using microencapsulation, Fluidized Bed Dryers, and extrusion–spheronization.***
Project Summary	Taste masking, protection against degradation and site-specific delivery of a therapeutic agent can be readily accomplished by the application of the coating on a drug or solid dosage form. The critical parameters will be identified for the selection of appropriate coating method. The process parameters will be also identified and optimized based on drug loading and release study.
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School	School of Pharmacy and Medical Science
Centre/Institute	Centre for Pharmaceutical Innovation and Development (CPID)
Project keyword(s)	Targeted drug delivery
Project title	***Drug Targeting to Immune Cells Using Modified Inulin Particles***
Project Summary	The student will be involved in optimising attachment of a drug to the inulin particles, determining drug loading and then analysing the drug release.
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School	School of Pharmacy and Medical Science
Centre/Institute	Centre for Pharmaceutical Innovation and Development (CPID)
Project keyword(s)	A controlled release formulation development; analytical method establishment
Project title	***Formulation Development and Evaluation of a controlled release pellet***
Project Summary	A controlled release formulation will be developed and evaluated. The student involved in this project will get hands-on experience on a range of equipment eg: extruder, spheronizer, fluid bed dryer, dissolution tester and HPLC. In this study, the student will learn how to design a formulation and characterize, in an industrial fashion.
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School	School of Pharmacy and Medical Science
Centre/Institute	Sansom Institute for Medical Research
Project keyword(s)	Adults with autism, Anticholinergic medication, psychotropic medication, medicine use
Project title	***Medication Use in Adults with Autism Spectrum Disorder***
Project summary	Currently, very little is known about medicine use in adults with Autism Spectrum Disorder (ASD). This pilot project will use de-identified mental health care plan records of a large number of adults with ASD to begin to describe medicine use in this population. Of particular interest are anti-cholinergic medicines, psychotropic medicines, and the use of medicines currently used to treat dementia. It is anticipated that this project will lay the foundations for further work that will explore the impact of psychotropic and anticholinergic medicines on cognition in adults with ASD.
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School	Pharmacy and Medical Sciences (in collaboration with the School of Health Sciences)
Centre/Institute	Quality Use of Medicines and Pharmacy Research Centre
Project keyword(s)	Medicines, adverse drug event, physical activity
Project title	***Medicines and movement: assessing the association between medicines and reduced physical activity in older people***
Project summary	In this research project, the student will identify medicine induced changes in the physical activity of nursing home residents. The project involves collaboration with Assoc. Prof. Gaynor Parfitt (an Exercise and Sport Psychologist) and researchers in the School of Health Sciences, who are conducting a large project at Helping Hand Aged Care centres to assess the benefits of exercise physiology for aged care residents. In this project, activity trackers (similar to 'Fitbit') are being used to monitor the activity of nursing home residents, e.g. how often they are moving around during the day and how often they are sitting still for prolonged periods of time. Many medicines, e.g. benzodiazepines and tricyclic antidepressants, cause side effects like sedation that can reduce physical activity in older people. Often this is not recognised as a side effect of the medicine, and is misinterpreted as just a normal part of ageing. In this project, the student will be involved in analysing medicines and activity tracker data collected as part of the larger project, to see if there is an association between medicines and the side effect of reduced physical activity. The student will have the opportunity to be involved in the following activities: • reviewing and interpreting drug charts for nursing home residents; • entering data from drug charts into computer software; • running analyses to determine if medicines are associated with reduced physical activity (as measured by the activity trackers); • running analyses to determine if changes in medicine use are associated with changes in physical activity.
Contact person and details (Name/Phone/Email)	Dr Lisa Kalisch Ellett Tel: +618 8302 1121 lisa.kalisch@unisa.edu.au

School	School of Pharmacy and Medical Science
Centre/Institute	Sansom Institute/Early Origins of Adult Health Research Group
Project keyword(s)	Intrauterine growth restriction, cardiac health, heart
Project title	***Implications for cardiac health in adulthood: does maternal undernutrition cause fibrosis in the fetal heart?***
Project summary	Low birth weight (LBW) predisposes adult offspring to an increased risk of death from cardiovascular disease. LBW is caused most commonly by either by maternal undernutrition or placental insufficiency. The molecular mechanisms behind this predisposition to cardiovascular disease in those of us who were born small, is yet to be fully elucidated. We hypothesize that decreased maternal global nutrient restriction will result in overt cardiac remodelling and fibrosis. This project will make use of techniques such as qRT-RT PCR, western blotting and immunohistochemistry.
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School	School of Pharmacy and Medical Science
Centre/Institute	Sansom Institute/Early Origins of Adult Health Research Group
Project keyword(s)	Pregnancy, drug, metabolism, fetal
Project title	***Fetal and maternal drug metabolism in complicated pregnancies***
Project summary	During pregnancy, drugs are often required to treat illness in order to obtain the best outcomes for both mother and fetus. However, a large proportion of drugs used in pregnancies have limited information on the short- and long-term adverse effects on the fetus. However, due to ethical and safety reasons, pregnant women are often excluded from clinical trials. Hence, animal studies are a vital source of information and can provide preliminary data regarding the safety of a drug during pregnancy. There is a large amount of human and animal evidence showing hormonal and metabolic changes that occur in both the mother and the fetus as a result of maternal illness, and reduced or accelerated fetal growth. These changes in the mother could affect maternal, placental and fetal expression of drug metabolising enzymes and drug transporters and hence alter fetal drug exposure. By using various animal models of high substrate supply and low substrate supply, this project aims to study if there are changes to drug metabolism in the fetal and maternal liver due to complications in pregnancies. This project will be available between November 2017 to February.
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School	School of Pharmacy and Medical Science
Centre/Institute	Sansom Institute/Early Origins of Adult Health Research Group
Project keyword(s)	Resveratrol, pregnancy, insulin
Project title	***Does maternal supplementation with resveratrol in late gestation alter insulin signalling in the mother or the fetus?***
Project summary	Resveratrol a polyphenol (found in the skins of red grapes) is often used as a dietary supplement to help weight loss and correct blood sugar levels. It is a potent antioxidant and has the ability to act upon many cell signalling pathways, both directly and indirectly. Although the dietary supplementation of resveratrol has many positive health consequences, the implications of exposure during pregnancy on both mother and fetus are not completely understood. We hypothesize that maternal exposure to resveratrol in late gestation will alter both maternal and fetal insulin signalling pathways. This project will use techniques such as Western blot to determine the protein abundance of molecules within key insulin signalling pathways.
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School	School of Pharmacy and Medical Science
Centre/Institute	Sansom Institute for Health Research
Project keyword(s)	cardiac, regeneration, fetal, heart development, lipids
Project title	***Investigating changes in fetal lipid profiles in response to changes in maternal nutrient supply***
Project summary	Lipid metabolic and biosynthetic pathways are implicated in a wide range of chronic diseases. Maternal diet can have a significant impact on how lipids are metabolised by offspring, and subsequently their health in later life. However, the exact mechanisms behind this are yet unknown. Methods for measuring and localising lipids in tissue can provide insight into how factors, such as maternal overnutrition, result in changes to lipid profile in the fetus. This project explores methods for analysing lipids in sheep tissue, for example epifluorescence and confocal microscopy, and high-performance liquid chromatography (HPLC), and will expose students to various laboratory techniques and analytical methods. Students will have the opportunity to gain skills in histology and tissue sample preparation, image acquisition and data analysis.
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School	School of Pharmacy and Medical Science
Centre/Institute	Sansom Institute/Early Origins of Adult Health Research Group
Project keyword(s)	cardiac, regeneration, fetal, heart development
Project title	***The role of microRNA in cardiac proliferation***
Project summary	When adults have a heart attack, there is very limited capacity for cardiac repair because cardiomyocytes (heart muscle cells) cannot proliferate after birth, they can only grow via increasing their volume (hypertrophy).The number of cardiomyocytes that an individual will have for life is set at birth. This number is influenced by the amount of proliferation, apoptosis and autophagy that occurs in the heart during late gestation. After birth, there is very limited proliferation and as a result there is limited cardiac repair after injury. Recent studies have demonstrated that cardiomyocyte cell cycle withdrawal and multinucleation may be regulated by microRNAs. Understanding how microRNA orchestrates this process will therefore allow us to increase proliferation and thus cardiomyocyte endowment. This will allow us to develop an intervention to improve cardiac health after injury and provide insight into ways to promote proliferation in the adult heart. To address this question we will use immunohistochemistry and histological analyses to determine how the fetal response to cardiac damage differs to the adult response by looking at specific markers in heart tissue after a myocardial infarction. This project In collaboration with Dr Enzo Porrello, University of Queensland, Dr Rob Bischoff, Monash University, Dr Ross Tellam, CSIRO and Dr Lynne Nield, Sick Kids Hospital, Canada.
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School	School of Pharmacy and Medical Science
Centre/Institute	Sansom Institute for Health Research
Project keyword(s)	AGE formation, protein glycation, seafood peptides
Project title	***Effect of seafood peptides on protein glycation and oxidation biomarkers***
Project summary	Diabetes Mellitus, a chronic disease characterised by hyperglycaemia or high blood glucose levels, is a major health problem worldwide. The prevalence of this disease is increasing annually and projected to rise above 300 million before 2025. In Australia, currently 3.2 million people live with diabetes and it is known to be the 6th leading cause of death. The early stages of type II diabetes are characterised by non-insulin dependent hyperglycaemia due to the increased breakdown of starch by α-amylase and absorption of glucose by α-glucosidase. Hyperglycaemia can increase the production of free radicals that can modify the process of glycation, promoting the formation of advanced glycation end products (AGEs). With the steady increase in diabetes and side effects of synthetic drugs, there has been an increasing search for alternatives, which are affordable with minimal side effects. In recent years efforts have been devoted to isolating numerous biologically active novel compounds from marine sources. Many of such naturally occurring compounds are of great interest for potential drug development as well as an ingredient of new leads and commercially successful products for various industrial applications, especially, pharmaceuticals, agrochemicals, functional foods and nutraceuticals. Sea cucumbers are one of the potential marine animals with high food and medicinal value. The medicinal properties of these animals are ascribed to the presence of functional components with promising multiple biological activities. Previous work has established levels of phytochemicals and antioxidant activities in sea cucumber processed through different techniques. In this project we will investigate ability of cucumber peptides to inhibit AGE formation and protein oxidation. The project is in collaboration with researchers from James Cook University, Townsville.
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School	School of Pharmacy and Medical Science
Centre/Institute	Sansom Institute for Health Research
Project keyword(s)	prebiotic, oligosaccharide, honey
Project title	***Potential Prebiotic Activity of South Australian honey***
Project summary	Honey is primarily composed of the monosaccharides (such as glucose and fructose between 55-75%) and mixture of minor carbohydrates (disaccharides and trisaccharides, 10-25%). Many attempts have been made to determine the composition of honey; however the identity of some of these minor carbohydrates remain unknown. The value of Australian honey could be increased by evidence of beneficial properties beyond its basic nutritional qualities (including its important glycaemic index properties), and its already described therapeutic and antibacterial activities. It has been predicted that the complex saccharides in honey could be used by beneficial bacteria in the large intestine, which in turn would be likely to promote good gastrointestinal health and general bodily function. It is known that improvement in the composition of intestinal microbial flora can assist immune modulation in other parts of the body, thus suggesting that consumption of honey could have potential to improve and promote overall human health and well-being. Since the composition of honey varies with the floral species of origin, local climate, and procedures used for harvesting and storage, Australian honeys can be expected to be unique. It was therefore of interest to investigate the potential of south Australian honeys for use as natural functional foods. The objective of this project will be to investigate the prebiotic characteristics of local honeys and their potential for improving human gastrointestinal health using an in vitro fermentation system. The project is in collaboration with local honey producers.
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School	School of Pharmacy and Medical Science
Centre/Institute	Sansom Institute for Health Research
Project keyword(s)	Antibiotic resistance, drug efflux proteins, reversal of resistance
Project title	***Reversing antibiotic resistance with efflux pump inhibitors***
Project summary	Antibiotic-resistant infections cost the Australian government billions of dollars a year. Without new strategies to address drug resistance, we are heading for a post-antibiotic era where small injuries and minor infections will once again be fatal. Central to resistance is the expression of efflux pumps, through which bacteria extrude drugs. These efflux pumps are also implicated in bacterial virulence and biofilm formation. Moreover, functional efflux pumps are necessary for the selection of drug-resistant bacteria. Despite their crucial role in bacterial pathogenesis and multidrug resistance, there are currently no inhibitors of drug efflux pumps in clinical use. This summer project will form part our wider research objective of characterising drug efflux pumps from Gram-negative bacteria and developing inhibitors of these efflux pumps. The student will test the activity of various compounds against drug resistant pathogens and characterise the interaction of inhibitors with efflux pumps.
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School	School of Pharmacy and Medical Science
Centre/Institute	Sansom Institute for Health Research
Project keyword(s)	Pharmacists, mandated Medication Assisted Treatment for Opioid Dependence (MATOD) training, clinical practice changes
Project title	***The influences of mandated training on pharmacist's clinical practice in the provision of treatment for opioid dependence.***
Project summary	Opioid dependence syndrome refers to a state of compulsive drug use despite related harm. Continued use of opioids (injected or oral) may correlate with drug-related impairment such as sedation, accidents and even overdose. Long term addiction can result in significant long-term morbidity and an increased risk of death. The provision by pharmacists of Medication Assisted Treatment for Opioid Dependence (MATOD) with drugs such as methadone and buprenorphine is one way of managing this condition. MATOD has shown to lead to significant improvement in both physical and social health outcomes (reducing drug-related crime, blood-borne viral spread and overall mortality). The Australian Government has legislated that all pharmacists providing MATOD services must undertake training to ensure the safety and efficacy of their practice. The aim of this project is to gain deeper understanding of any changes in attitudes and clinical practice of pharmacists who are providing MATOD services to their clients after having undertaken this mandatory training. This project will be done in collaboration with Drug and Alcohol Services South Australia (DASSA) and Mr Kevin Foreman (Former Senior Pharmacist – Alcohol and Drug Program, Mental Health, Justice Health and Alcohol & Drug Service, ACT Health Directorate)
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School	School of Pharmacy and Medical Science
Centre/Institute	Sansom Institute for Health Research
Project keyword(s)	Post-surgery pain treatment, pattern of opioids usage
Project title	***Investigation of hospital opioid prescribing among opioid naïve surgical patients***
Project summary	Opioids are commonly used to treat post-operative pain following acute hospitalisation. However, prescribing of opioids can lead to a range of short and long-term adverse effects. At present it is unclear how post-operative opioid usage contributes to long term patterns of opioid use, particularly among opioid naïve patients. This project aim to answer the following questions: 1. What are the current patterns for the use of opioid analgesia in this unique population? 2. How does this use influence the adverse effects and level of pain relief experienced by this population? This will be a mixed (retrospective/prospective) observational study of opioid naïve patients undergoing surgery at Flinders Medical Centre (FMC). Data on socio-demographics, medical and medication history, and pain levels and inpatient opioid requirements will be obtained at recruitment while the patient is admitted to FMC. Medications prescribed at discharge will be recorded from patients' discharge summaries. Patients will be contacted at 1 week and followed up for months 1, 3, 6 and 12 after discharge to assess patterns of opioid use, pain levels and patient-reported problems and concerns using validated measurement tools such as the Prescribed Opioid Difficulties Scale (PODS) and the Numerical Opioid Side Effect (NOSE) assessment tool, among others. This project will be conducted in collaboration with Flinders Medical Centre Pharmacy department. It is expected that the student will work closely with the pharmacists at FMC.
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School	School of Pharmacy and Medical Science
Centre/Institute	Sansom Institute for Health Research
Project keyword(s)	methamphetamine, prevention, health campaign
Project title	***Methamphetamine prevention campaigns: types and which ones work?***
Project summary	The use of methamphetamine or 'ice' in South Australia has doubled in the past four years. The long-term effects of this steady increase in the use of methamphetamine are not fully understood but our research has revealed a concerning similarity between the brains of young methamphetamine users and older people who have been diagnosed with Parkinson's disease. Young methamphetamine users are generally unaware about the long-lasting health consequences of their drug use and raising awareness about the link between methamphetamine use and the way that we move may help discourage young people from using this drug. Next year, our research team will be making a television-quality health message about the link between methamphetamine use and movement dysfunction. The project will bring together medical, marketing, and advertising knowledge to solve a health promotion challenge: how to discourage use of methamphetamine in the community. The High Achiever Research Vacation Scholarship student will assist researchers in this process by performing a literature review on past methamphetamine prevention campaigns to document the types of strategies used and their efficacy. The student will work within a cross-disciplinary team and will have an opportunity to observe other aspects of the project, including the laboratory-based assessment of movement and movement-related brain regions.
Contact person and details (Name/Phone/Email)	Dr Gabrielle Todd (School of Pharmacy and Medical Sciences) or Associate Professor Svetlana Bogomolova or Lucy Simmonds (Ehrenberg-Bass Institute for Marketing Science, UniSA) Tel: +618 8302 1979 gabrielle.todd@unisa.edu.au

POPULATION HEALTH

School	Health Sciences
Centre/Institute	Sansom Institute/Centre for Population Health Research (CPHR) (SAHMRI campus)
Project keyword(s)	Physical activity, genes, cognitive function, obesity
Project title	***Can physical activity help to prevent cognitive decline or depression? : gene-environment interaction study***
Project summary	This is an exciting opportunity for a high performing student to join the Nutritional and Genetic Epidemiology group based at the SAHMRI campus. The student will need to be research orientated, and interested in developing strong skills in statistical analyses and research reporting. The supervisory team will consist of Prof Elina Hypponen, Dr Ang Zhou and Mr Anwar Mulugueta (PhD student). It is expected that the project will lead to publication of a research paper in a rebuttable journal which will be co-authored by the student (depending on level of contribution, possibly led by the student). Genes influence our health, but genes are not our destiny. This project will work to establish whether higher levels of physical activity can help to overcome genetically determined increases in disease risk. Based on the interests of the student, there are two separate focus areas to choose from and the overall aim will be either to establish if physical activity can help to overcome the adverse effects of genetically determined obesity risk on 1) cognitive function or 2) depression/anxiety. The project will be based on the UK Biobank with over 500,000 participants, and benefit from earlier work done on data cleaning and management. Student will be expected to conduct literature reviews, to conduct statistical analyses (closely supported and advised by the NGE team), and to prepare a full manuscript draft, complying with standards of high quality research reporting.
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School	Health Sciences
Centre/Institute	Sansom Institute/Centre for Population Health Research (CPHR) (SAHMRI campus)
Project keyword(s)	Obesity, depression, genes, interactions
Project title	***Obesity, genetic susceptibility and depression risk: a gene-environment interaction study***
Project summary	Obesity and depression are both global public health problems. The exact causes of these disorders are not yet clearly understood. There is a genetic component, with heritability estimates varying between 40 to 70% for obesity and 40 to 50% for depression. Modifiable environmental factors also affect depression risk, and among others, obesity is one of the proposed risk factors. However, little is still known about the joint effects between genes and environment, or how genetic susceptibility to obesity affects the association between obesity and depression risk. In this project, the student will investigate whether the association between obesity-related genetic variants and depression is different among obese and non-obese individuals of African-ancestry living in the UK. This project will contribute to larger to cross-ethnic analysis, and complement the work we are currently undertaking in a Caucasians ancestry population. Data will be derived from the UK Biobank, which is one of the largest population-based studies of this kind (~ 500,000 participants). This project will be suited for students who have an interest in deepening their knowledge on statistical analyses, and in strengthening their research skills. It will be particularly well suited for a well-performing student who consider progressing in their studies all the way to a PhD.
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RURAL HEALTH

School	Division of Health Sciences
Centre/Institute	Department of Rural Health
Project keyword(s)	Depression; Web-based health information; Quality of information
Project title	***The quality of web-based information on anxiety management [QWAM]***
Project summary	The internet is increasingly being used as an information resource by the general population to assist with health care decision making. While this information may help to inform consumers of their health status and their health care options, it may also contribute to misinformation; this can have a potentially negative impact on health outcomes through misdiagnosis, unnecessary delays in treatment or inappropriate management. This can be particularly problematic for vulnerable populations, including those suffering from mental illness. To understand the extent of this misinformation, this project will examine the quality of information presented on a random selection of websites providing guidance on the management of a highly prevalent mental health condition, anxiety. Students undertaking this project will develop skills in critical appraisal, systematic review and research writing.
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School	Division of Health Sciences
Centre/Institute	Department of Rural Health
Project keyword(s)	Psychosocial care; Cardiovascular disease; Rural health
Project title	***Understanding the psychosocial after care needs of people following a cardiovascular event***
Project summary	Up to thirty percent of people living with cardiovascular disease (CVD) experience depression. Co-morbid depression reduces life expectancy, is distressing for the person and their family and results in greater use of health service resources. This study aims to understand the experiences of aftercare services for people following a CVD event. The study will interview survivors of CVD events and explore the helpful and unhelpful aspects of care and how the aftercare provided to people recovering from CVD can be improved. The findings will be used to inform the development of a training program for rural health care professionals aimed at providing a holistic model of care for people recovering from CVD. Students undertaking this project will develop skills in interviewing, transcribing and research writing.
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School	Division of Health Sciences
Centre/Institute	Department of Rural Health
Project keyword(s)	Residential aged care facilities; Antipsychotics; Allied health care; Rural Health
Project title	***Quality of Care in Regional Residential Aged Care Facilities (RACF)***
Project summary	The use of antipsychotic medication in residential aged care facilities (RACF) is high. While these agents are used to treat behavioural and psychological symptoms of dementia (BPSD) in residents in RACF, there is limited evidence of efficacy and concerns about their safety. Services provided by allied health care professionals could potentially lead to decreased use of antipsychotic medication and improved quality of life in patients living with dementia. Under the Aged Care Act 1997, approved providers of RACF services are required to provide access to allied health care for residents. However, some allied health services may not be available in regional and rural areas or there may be other barriers to access. This project is part of a broader project that aims to investigate the use of antipsychotic medication and other measures of quality of care in regional RACF. The student will undertake a literature review or conduct a survey of availability and use of allied health care services in RACF in regional SA. The student will work in a research team and have excellent opportunities for developing skills in systematic reviewing, or survey design and administration.
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