## DIVISION OF HEALTH SCIENCES

## LIST OF VACATION SCHOLARSHIP PROJECTS 2019-20



## SUPERVISOR REGISTER

In addition to the list of projects below, the following staff are willing to accept vacation students. Please contact them directly to discuss possible project opportunities.

Dr Sheree Bailey: Flow cytometry, Haematological malignancy, Acute leukaemia, Lymphoma, Cell signalling, Antibody-dependent cell cytotoxicity

Dr Beben Benyamin: Genetics, genomics, motor neuron disease, neurodegenerative diseases, Alzheimer's disease, psychiatric diseases, statistical genomics, genetic epidemiology, cross-ethnic genomic studies, twin study, nature vs nurture, sleep and physical activity genetics

Dr Kristen Bremmell: We use advanced formulation strategies such as porous particles, lipid based systems and nano vesicles to improve the oral delivery of drugs. Improvement in drug solubility, absorption and bioavailability can be achieved. Interesting cell models that mimic the gut wall are used and further developed to investigate how the formulation drives drug absorption. We have a number of projects in this area where a vacation student could select a project according to their interest.

Dr Rose Boucaut: Work health and safety topic research – for example a review of activities undertaken by WHS physiotherapy students; social media use in professional settings by physiotherapy students – evaluation of module content and student perceptions about using social media

Dr Terry Boyle: Epidemiology, cancer risk factors, cancer survivorship, physical activity, lifestyle

A/Prof Kristin Carson-Chahhoud: Evidence-based medicine, technology (e.g. augmented reality, virtual reality, holographics, artificial intelligence), respiratory medicine, Aboriginal health, cardiovascular disease, tobacco use and smoking cessation, healthy lifestyle programs for youth, translational research and policy

A/Prof David Foster: My research interests include the optimisation of pharmacotherapeutic treatment of patients through understanding the factors that are responsible for differences in response to medicines between people. My work aims to employ pharmacometric analysis (modelling and simulation) as a tool to translate basic and clinical research into improved pharmacotherapetic use. Pharmacometrics is the science which deals with the quantitative description of disease, drug effects and variability. Pharmacometric analyses quantify drug, disease and trial information to aid efficient drug use, development, and regulatory decisions. The strength of such analyses is the ability to integrate knowledge from prior understanding, related compounds and biology, together with the ability to include both richly sampled data and more limited/incomplete data typically unusable in traditional statistical approaches.

Prof Sanjay Garg: Formulation development and analysis

Dr Philip Gregory: Breast and prostate cancer, gene regulation, RNA biology, CRISPR

Dr Jacinta Johnson: children**,** balance, motor skills, physical activity, play, childhood overweight/obesity, physical function, paediatric physiotherapy, literature reviews

A/Prof Steve Milanese: Extended scope of practice of health professionals

Dr Carolyn Murray: Aged care, dementia, qualitative research, systematic reviews, neurological impairments (adults)

Dr Karma Pearce: Food Science, Laboratory analysis. Nutrition Science, Protein supplements

Prof Stuart Pitson: cell signalling pathways controlled by sphingolipids, and how they contribute to cancer, viral infections, wound healing and other conditions

Dr Stephanie Reuter Lange: Therapeutic Drug Monitoring, Dose Optimisation, Clinical Pharmacokinetics

A/Prof Lorraine Sheppard: Extended scope of practice of health professionals

Dr May Song: Formulation development and analysis

Dr Margarita Tsiros: children, balance, motor skills, physical activity, play, childhood overweight/obesity, physical function, paediatric physiotherapy, literature reviews

Dr Janette Young: Pets, aged, wellbeing, human-animal relations, religious engagement

A/Prof Rietie Venter: Antimicrobial resistance and the development of novel antibacterial agents

## ALLIED HEALTH EVIDENCE

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| **School** | School of Health Sciences |
| **Centre/Institute** | International Centre for Allied Health Evidence |
| **Project keyword(s)** | Carpometacarpal, arthritis, brace |
| **Project title** | **Aligning the base of the thumb in arthritis, with a simple brace** |
| **Project summary** | Arthritis in the base of the thumb (carpometacarpal joint) occurs in 8-12% of people, but most commonly affects post-menopausal women (Haara et al 2004). It can cause pain and difficulty in gripping and pinching, resulting in weakening of the hand which is often disabling in work, self-care and recreational activities.<br>  <br>Surgical treatment includes removal of the trapezium bone, and replacement with an artificial joint or tissues from the patient's body.<br>  <br>Conservative treatment includes splinting, the use of assistive devices to help grasping, and supplements such as fish oil and chondroitin. There is evidence that splinting can reduce the pain felt in the base of the thumb (Egan et al. 2004) and can improve hand function, but the mechanism, or the efficacy of each type of splint is unknown. Some splints cover the forearm and the hand, others only cover the hand. Some are of rigid material and others are flexible. Further, some splints are custom-made by occupational therapists, while others can be bought commercially.<br>Questions<br>1. Determine the effect of splinting on thumb carpometacarpal pain during joint loading in healthy participants and participants with thumb cmc pain<br>2. Determine the effect of splinting on thumb carpometacarpal position during joint loading in healthy participants and participants with thumb cmc pain |
| **Contact person and details** (Name/Phone/Email) | Nicola Massy-Westropp<br>8302 2486<br>massy-westropp@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | International Centre for Allied Health Evidence |
| **Project keyword(s)** | **Grip, diurnal variation** |
| **Project title** | Diurnal variation in hand grip strength |
| **Project summary** | The aim of this study will be to quantify the naturally occurring variation in hand grip and pinch strength in adults.<br>**Subject recruitment/ or data set**<br>A convenience sample will be sought from the primary researchers' networks. |

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| | Subjects will be eligible if they are over the age of 18 years for consent to the study, able to mentally provide consent, have no pain or injury in their hands or forearms over the last three months. Both genders will be equally recruited.<br>A convenience sample will be sought from the primary researchers' networks. Subjects will be asked to undergo two assessments, both are of methodology described by the American Society of Hand Therapists Clinical Assessment Recommendations.<br>**Methods**<br>The researcher will decide upon critical times of day for data collection and will assess participants at these times. The same participant may be tested on more than one day.<br>The researcher will<br>**Primary/ secondary outcomes**<br>The researcher will be able to offer variability guidelines for those who routinely assess strength, so that they will know what is normal intra0subject variability and what is real change<br>**Analysis approach**<br>The researcher will descriptively analyse the data providing measures of variation. |
| **Contact person and details** (Name/Phone/Email) | Nicola Massy-Westropp<br>8302 2486<br>massy-westropp@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | International Centre for Allied Health Evidence |
| **Project keyword(s)** | Pets, ageing, health, wellbeing, qualitative |
| **Project title** | **Pets, Ageing and health – how older people perceive their pets to impact on their health** |
| **Project summary** | We have a wealth of data from interviews undertaken with 35 older people exploring how their pets impacted on their health, but it is only partially analysed. The project would be joining with a team of researchers to further analyse (dig into!) this data looking for themes and insights |
| **Contact person and details** (Name/Phone/Email) | Dr Janette Young<br>8302 2616<br>janette.young@unisa.edu<br><br>In partnership with Drs Carmel Nottle, Helen Banwell, Caroline Adams, Matthew Leach and Carolyn Murray |

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| **School** | School of Health Sciences |
| **Centre/Institute** | International Centre for Allied Health Evidence |
| **Project keyword(s)** | Cats, ageing, animal welfare, human wellbeing, observation |
| **Project title** | **Foster cats in aged care – monitoring the cats and the people** |
| **Project summary** | This project involves monitoring the impacts of interactions between cats and older people in an aged care setting. Ethics approval is being sought prior to the summer break. You will be part of a keen team of enthusiastic researchers and animal lovers who are seeking to evaluate the impacts of cat fostering in a residential aged care facility. |
| **Contact person and details** (Name/Phone/Email) | Dr Janette Young<br>8302 2616<br>janette.young@unisa.edu<br><br>In partnership with Drs Carmel Nottle, Helen Banwell, Caroline Adams and Matthew Leach |

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| **School** | School of Health Sciences |
| **Centre/Institute** | International Centre for Allied Health Evidence |
| **Project keyword(s)** | Cats, data analysis |
| **Project title** | **Fit*barks* for cats (don't tell the cats!)** |
| **Project summary** | This project involves developing baseline data on the activity levels of cats across a range of settings (private homes, aged care, animal shelters). Students will be accessing and compiling data from fitbarks on cats, attending project meetings and some site visits. |
| **Contact person and details** (Name/Phone/Email) | Dr Carmel Nottle<br>8302 1443<br>carmel.nottle@unisa.edu.au<br><br>In partnership with Drs Janette Young, Helen Banwell, Caroline Adams |

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| **School** | School of Health Sciences |
| **Centre/Institute** | |
| **Project keyword(s)** | Brain Injury; choice; control; qualitative research; meta-synthesis |
| **Project title** | **Choice and control for people with Acquired Brain Injury: A systematic review and meta-synthesis** |
| **Project summary** | The research team received funding from the Lifetime Support Authority to explore the meaning and experience of choice and control for people with traumatic brain and/or spinal cord injury. Both head injury and spinal cord injury impact significantly on the ability of a person to be able to continue to engage in the life they knew prior to injury. Previous research has indicated that health professionals who enable and empower people to gain control over their own life by exercising choices facilitate improved participation. As part of this project, we commenced a systematic review focusing on qualitative research exploring choice and control for people with acquired brain injury. The review worked through the stages of screening arriving at 30 papers for critical appraisal and data extraction/ synthesis. As the searches were conducted in 2016, the student would need to re-run the searches and then take the lead in critical appraisal, data extraction and synthesis with support of the supervisory team. The anticipated product is submission of a manuscript to a relevant peer review journal.<br>A similar review has just been published about choice and control following spinal cord injury<br>https://www.archives-pmr.org/article/S0003-9993(19)30089-9/pdf |
| **Contact person and details** (Name/Phone/Email) | Dr Carolyn Murray<br>8302 2485<br>Carolyn.murray@unisa.edu.au<br><br>Research Team: Assoc Prof Shylie Mackintosh; Dr Michelle Guerin; Dr Gisela van Kessel; Dr Caroline Fryer |

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| **School** | School of Health Sciences |
| **Centre/Institute** | International Centre for Allied Health Evidence |
| **Project keyword(s)** | undergraduate physiotherapy students, Work health and safety |
| **Project title** | **Analysis of undergraduate physiotherapy students' activities in Work health and safety** |
| **Project summary** | Review of past student activities on placement conducting small WHS projects for industry partners. This project will help inform curriculum and provide an overview of the nature and extent of student activities in WHS. This will form the basis for a cost benefit analysis for such projects from the stakeholder perspective. |
| **Contact person and details** (Name/Phone/Email) | Rose Boucaut<br>8302 2068<br>rose.boucaut@unisa.edu.au |

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| **School** | Health Sciences |
| **Centre/Institute** | International Centre for Allied Health Evidence |
| **Project keyword(s)** | Occupational therapy, physiotherapy, disability, NDIS |
| **Project title** | **Occupational therapy and physiotherapy for people with a disability funded by the NDIS** |
| **Project summary** | Exploring and documenting the services OT and Physiotherapy provide under the NDIS is now needed, as the current fee for service by the NDIS has not captured the many components of the OT's role. Anecdotally physios and OTs in addition to the evidenced based therapeutic interventions, advocate for their clients, provide support coordination and considerable liaison with families and other health providers.<br>This project will involve the development and delivery of a survey of OT and Physiotherapists who provide NDIS services to present a snapshot of the current service delivery model. |
| **Contact person and details** (Name/Phone/Email) | A/Prof Lorraine Sheppard<br>8302 2424<br>Lorraine.sheppard@unisa.edu.au<br><br>A/Prof Steve Milanese<br>8302 1053<br>steve.milanese@unisa.edu.au |

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| **School** | Health Science |
| **Centre/Institute** | International Centre for Allied Health Evidence |
| **Project keyword(s)** | Hip Abduction lag |
| **Project title** | **Abduction lag – a normative study in asymptomatic individuals** |
| **Project summary** | Degenerative pathology in specific muscles on the outside of the hip (gluteus medius and minimus) that work during functional activities such as walking, |

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| | climbing stairs and standing on one leg, are considered a primary source of lateral hip pain. Weakness in these muscles has been demonstrated in patients with confirmed pathology (gluteal tendinopathy) although currently it is not known whether this weakness predisposes to the development of pathology or is a consequence.<br>The Hip Abduction Lag Test, HALT) compares the difference between the hip abduction movement performed actively by the subject only to that performed passively by the examiner. The difference between the active and passive range of movement is referred to as the "Hip Abduction Lag". Normative data are not available in the literature for this abduction lag. Clinically those with normal function can usually lift their hip into an abduction range that is within 5-10 degrees of their passive range.<br>This study will involve subjects with no history of hip soft tissue injuries who will be asked to undertake the Hip Abduction Lag Test (HALT) on both hips, as per standard protocol. This will involve the patient performing a maximal hip abduction movement in side lying and the angle measured using a standard inclinometer. The hip will then be passively abducted by the researcher and the angle remeasured.<br>The proposed vacation project involves<br>a) Undertaking a scoping review of the literature regarding hip abduction lag<br>b) Researching and developing the research protocol for a normative study of hip abduction lag |
| **Contact person and details** (Name/Phone/Email) | A/Prof Steve Milanese<br>8302 1053<br>steve.milanese@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | UniSA Cancer Research Institute, Centre for Translational Cancer Research |
| **Project keyword(s)** | Pressure readings, mammography, volpara |
| **Project title** | **Mammographic pressure readings using Volpara software** |
| **Project summary** | Worldwide, the most prevalent type of cancer for women is breast cancer. Early detection of breast cancer is dependent on image quality, which has been associated with breast compression. The mammographer performing the examination controls the degree of compression, measured by the force applied to the breast in Newtons (N). Breast compression improves image quality through the minimisation of geometric and motion unsharpness, and separation of superimposed breast structures. Breast tissue superimposition can conceal malignancies and cause low sensitivity of mammography for cancer detection. Compression will also reduce scattered radiation, thereby reducing radiation absorbed in glandular tissue.<br><br>Currently, there are no optimal values of compression force found in evidence-based guidelines. Key measures of optimum compression are subjective and variable. Mammographic units measure force applied in Newtons (N). A relatively new objective measure of appropriate compression is compression pressure measured in kilopascals (kPa). This is the ratio of compression force and the breast surface area in contact with the paddle. Volpara is a new retrospective software which gives a reading on the pressure which was applied. A standardised compression pressure of 10 kPa has been associated with less pain and only a small increase in breast thickness of less than 10%.<br><br>This project is a retrospective clinical audit on mammographic pressure readings using Volpara software. This would be undertaken at a Breast Clinic in tertiary public hospital and would involve a short literature review on compression and volpara software before undertaking a supervised clinical audit. |
| **Contact person and details** (Name/Phone/Email) | Mr Shayne Chau<br>8302 2905<br>Shayne.Chau@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | UniSA Cancer Research Institute, Centre for Translational Cancer Research |
| **Project keyword(s)** | Diagnostic reference levels, paediatric, fluoroscopic examinations |
| **Project title** | **Diagnostic reference levels for common paediatric fluoroscopic examinations in a tertiary hospital** |
| **Project summary** | Fluoroscopic examinations can be associated with high radiation dose, with less standardisation of screening technique than plain radiography. It is thus expected that there will be a great variation in the dose delivered by different operators for the same radiological examination and patients of the same age, gender, body mass and thickness. In the case of paediatric patients, the cooperation of the child |

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| | and immobilisation techniques used are extremely important for the success of the investigation and hence the resulting dose to the patient. Radiation protection for our paediatric patients has always been very important as it was recognised that the incidence of ionising radiation induced cancer for children is higher than adults. In this study, a large amount of paediatric fluoroscopic data will be analysed to (1) establish local DRL, and (2) compare this data with the national and international standards. |
| **Contact person and details** (Name/Phone/Email) | Mr Shayne Chau<br>8302 2905<br>Shayne.Chau@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | UniSA Cancer Research Institute, Centre for Translational Cancer Research |
| **Project keyword(s)** | **Ottawa Knee Rules, radiography, acute knee injuries** |
| **Project title** | Application of the Ottawa Knee Rules in assessing acute knee injuries |
| **Project summary** | Acute knee injuries are very common and account for a significant number of presentations in general practice and hospital emergency department settings. As fractures are an important consideration in such injuries, many clinicians may be tempted to order routine radiographs for all patients who present with an acute knee injury. However, a systematic review in 2003 showed that while 74.1% of a large sample of patients presenting to Canadian hospital emergency departments with knee injuries were sent for knee radiographs, only 5.2% of these patients actually had a fracture. They identified that routine X-ray in patients with knee injuries may not be cost effective or in the best interests of the patient. The Ottawa knee rules (OKRs) were first derived and validated in Ottawa, Canada, with the aim of reducing the number of unnecessary radiographs ordered after knee trauma without compromising patient care. Patients who do not meet the fracture predictor of the OKRs are highly unlikely to have clinically significant fractures and can have knee radiographs safely deferred. The primary objective of this study is to conduct a review of current literature to determine whether The Ottawa knee rule accurately rules out knee fractures and can substantially reduce the need for x-rays in patients with acute knee injuries. The second objective of this study is to perform a clinical audit to evaluate appropriateness of the referrals for knee radiography in acute knee injury with reference to the Ottawa Knee Rule. |
| **Contact person and details** (Name/Phone/Email) | Mr Shayne Chau<br>8302 2905<br>Shayne.Chau@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | UniSA Cancer Research Institute, Centre for Translational Cancer Research |
| **Project keyword(s)** | Ottawa Knee Rules, radiography, acute knee injuries |
| **Project title** | **Traumatic Ankle Injury - Adequacy of Clinical Information with Reference to the Ottawa Ankle Rules in a Teaching Hospital** |
| **Project summary** | Blunt ankle trauma is a common presentation to an emergency department; traditionally, radiographs are ordered for virtually all such patients, and typically 85% of these examinations do not find a fracture. According to clinical research findings, radiography is not always needed to exclude an ankle or foot fracture. The Ottawa ankle rules (are a clinical decision tool that aids the efficient use of radiography in acute ankle injuries. A systematic review published in 2003 (Stiell et al.) confirmed that the Ottawa ankle rules accurately exclude ankle and mid-foot fractures in patients with ankle injuries and can reduce the number of unnecessary radiographs by 30-40%.<br>The Ottawa ankle rules state that ankle radiographs are only required if there is malleolar pain and bone tenderness of the posterior distal tibia/medial malleolus tip, the posterior distal fibula/ lateral malleolus tip or an inability to weight bear both immediately and in the Emergency Department (ED) for 4 steps. The primary objective of this study is to conduct a review of current literature to determine whether the Ottawa ankle rule accurately rules out ankle fractures and can substantially reduce the need for x-rays in patients with acute ankle injuries. The second objective of this study is to assess whether adult ankle radiograph requests for traumatic ankle pain in the Emergency Department (ED) of an Australian tertiary hospital have provided adequate clinical information with reference to the Ottawa Ankle Rules (OAR).<br><br>Stiell IG, Greenberg GH, McKnight RD, Nair RC, McDowell I, Reardon M, et al. Decision rules for the use of radiography in acute ankle injuries: refinement and prospective validation. JAMA1993;269:1127-32 |
| **Contact person and details** (Name/Phone/Email) | Mr Shayne Chau<br>8302 2905 |

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| **School** | School of Health Sciences |
| **Centre/Institute** | UniSA Cancer Research Institute, Centre for Translational Cancer Research |
| **Project keyword(s)** | Systematic review, clinical practice guideline, acute pulmonary embolism |
| **Project title** | **Systematic review of clinical practice guidelines in the diagnosis and management of acute pulmonary embolism.** |
| **Project summary** | Pulmonary embolism is one manifestation of venous thromboembolism, the other being deep vein thrombosis. Pulmonary embolism occurs when a deep vein thrombosis breaks free, passes through the right side of the heart, and lodges in the pulmonary arteries. About 90% of pulmonary emboli come from the legs, with most involving the proximal (popliteal or more central) veins. Prevention of pulmonary embolism therefore requires both prevention of venous thromboembolism and effective treatment of deep vein thrombosis when it occurs. There is a wealth of high-quality individual studies, meta-analyses and guidelines to guide the diagnosis and treatment of pulmonary embolism. However, no systematic review to assess the quality and consistency of the recommendations of international clinical practice guidelines (CPGs) for the diagnosis and management of acute pulmonary embolism. Student undertaking this summer research project will work with the research and academic staff to synthesise the current evidence to assist physicians in making appropriate recommendations. |
| **Contact person and details** (Name/Phone/Email) | Mr Shayne Chau<br>8302 2905<br>Shayne.Chau@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | UniSA Cancer Research Institute, Centre for Translational Cancer Research |
| **Project keyword(s)** | Systematic review, clinical practice guideline, diagnosis, treatment, spontaneous pneumothorax |
| **Project title** | **Systematic review of clinical practice guidelines in the diagnosis and treatment of primary spontaneous pneumothorax.** |
| **Project summary** | Primary spontaneous pneumothorax (PSP) is defined as a spontaneous pneumothorax occurring in patients without a prior known underlying lung disease. PSP is associated with low rates of morbidity and mortality, typically affects a young population and has a recurrence rate of between 17% and 54%. The last few decades have seen advances in both the diagnosis and the treatment of spontaneous pneumothorax. Some newer approaches, however, remain poorly implemented in standard clinical practice. This systematic review will synthesise the current evidence and assess the quality and consistency of the recommendations of international clinical practice guidelines for the diagnosis and treatment of primary spontaneous pneumothorax to assist physicians in making appropriate recommendations. |
| **Contact person and details** (Name/Phone/Email) | Mr Shayne Chau<br>8302 2905<br>Shayne.Chau@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | UniSA Cancer Research Institutee, Centre for Translational Cancer Research |
| **Project keyword(s)** | Meta-analysis, patient discomfort, intravenous iodinated contrast materials |
| **Project title** | **A meta-analysis of reported patient discomfort associated with the use of intravenous iodinated contrast materials** |
| **Project summary** | Iodinated contrast media (CM) are essential to intravascular imaging procedures utilizing ionizing radiation. The development of CM has progressed from high-osmolar contrast media (HOCM) with osmolality (particle concentration in milliosmoles per kilogram of water) of ~2000 mOsm/kg, to low-osmolar contrast media (LOCM) with a range of ~600-800 mOsm/kg, to iso-osmolar contrast media (IOCM) at 290 mOsm/kg that is isotonic to blood. The intensity and frequency of adverse-effects associated with intravascular CM injections were reduced considerably with changes in usage from HOCM to LOCM. Nevertheless, patient discomfort during the intravascular administration remains a clinical challenge. More than a third of patients in controlled clinical trials have been known to report CM-injection-related discomfort, particularly local pain and an intense, unpleasant sensation of warmth. The degree of discomfort and tolerability, generally considered to be directly proportional to the osmolality of CM, can influence the quality of the examination. Pain and discomfort may cause patients to move, thus resulting in motion artifacts and suboptimal images. Thus, it is of clinical value to further improve patient comfort and the diagnostic quality of radiological images. Practice recommendations and guidelines issued by national societies have |

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| | focussed on the risk of renal and cardiac complications after contrast and have not considered potential differences in pain and discomfort. Similarly, most reviews and meta-analyses available in the literature have reported on contrast-induced acute kidney injury as the outcome of interest. Patient-reported subjective outcomes are infrequently reported in the radiology literature. One meta-analysis of reported patient discomforted was conducted in 2014. Therefore, the goals of the current study are to update the current findings and to pool available data available to compare the frequency and severity of discomfort associated with IOCM to those reported with various LOCM agents. |
| **Contact person and details** (Name/Phone/Email) | Mr Shayne Chau<br>8302 2905<br>Shayne.Chau@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | UniSA Cancer Research Institute, Centre for Translational Cancer Research |
| **Project keyword(s)** | **Systematic review, clinical guideline, diagnosis, management, spontaneous intracerebral haemorrhage** |
| **Project title** | Systematic review of clinical practice guidelines in the diagnosis and management of spontaneous intracerebral haemorrhage. |
| **Project summary** | Spontaneous, nontraumatic intracerebral haemorrhage (ICH) remains a significant cause of morbidity and mortality throughout the world. Although ICH has traditionally lagged behind ischemic stroke and aneurysmal subarachnoid haemorrhage in terms of evidence from clinical trials to guide management, the past decade has seen a dramatic increase in studies of ICH intervention. Population-based studies show that most patients present with small ICHs that are readily survivable with good medical care. This suggests that excellent medical care likely has a potent,<br>direct impact on ICH morbidity and mortality. In the past decades, multiple clinical guidelines have been published but no systematic review of clinical guidelines has been conducted to provide an evidence-based framework for the care of patients with ICH. Student involving in this project will alongside with the research and academic staff in Medical Radiations team to synthesise the current evidence in the diagnosis and treatment of ICH. |
| **Contact person and details** (Name/Phone/Email) | Mr Shayne Chau<br>8302 2905<br>Shayne.Chau@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | UniSA Cancer Research Institute, Centre for Translational Cancer Research |
| **Project keyword(s)** | **Meta-analysis, full-body CT, conventional radiography** |
| **Project title** | Meta-analysis of selective conventional radiographic procedures of injured patients compared to immediate full-body computed tomography. |
| **Project summary** | Since the introduction of helical computed tomography (CT) in the early 1990, CT has become more important in trauma care. This introduction made full-body CT technically feasible its high diagnostic accuracy makes it an attractive diagnostic tool for the initial radiographic imaging of injured patient. An increasing number of trauma centres are encouraging the use of immediate total-body CT in the diagnostic phase of primary trauma care. Whether the advantages of such scanning justify the higher radiation dose remains controversial. The aim of this meta-analysis is to assess the value of immediate full-body CT during the primary survey of the injured patients in contrast to selective conventional radiographic procedures. |
| **Contact person and details** (Name/Phone/Email) | Mr Shayne Chau<br>8302 2905<br>Shayne.Chau@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | Cancer Research Institute, Centre for Translational Cancer Research |
| **Project keyword(s)** | Systematic review, imaging, pathway, staging, lymphoma |
| **Project title** | **Systematic review of imaging pathways in the staging of malignant lymphoma.** |
| **Project summary** | Computed tomography (CT) is currently the most commonly used means for staging malignant lymphoma. 18F-fluoro-2-deoxyglucose positron emission tomography (FDG-PET), FDG-PET/CT fusion,<br>and whole-body magnetic resonance imaging (WB-MRI) are potential alternatives. The purpose of project is to systematically review published data on the diagnostic performance of CT, FDG-PET, FDGPET/CT fusion, and WB-MRI in staging of malignant lymphoma. In addition, technicalities, procedures, advantages, and disadvantages of each imaging modality will also be investigated. |

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| **Contact person and details**<br>(Name/Phone/Email) | Mr Shayne Chau<br>8302 2905<br>Shayne.Chau@unisa.edu.au |

# BIOMATERIALS AND NANOMEDICINE

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Applied Chemistry and Translational Biomaterials |
| **Project keyword(s)** | osteoporosis, bisphosphonate, drug-eluting implant |
| **Project title** | **Drug-eluting implants for the treatment of osteoporosis** |
| **Project Summary** | Osteoporosis is a disease resulting in reduced bone strength that significantly increases the risk of broken bones. Osteoporosis can be caused by a number of factors and is particularly prominent in older people, with 70% of those over the age of 80 being affected. Currently, osteoporosis is treated with bisphosphonates that have to be taken orally each day over long periods (3+ year) to be effective. Some of the major drawbacks with bisphosphonates taken orally is their very low bioavailability (~0.6%), which means that large doses need to be consumed, and they can cause esophageal ulceration and cancer. Furthermore, patient compliance can be an issue, as with any oral medications that requires frequent doses. To avoid these problems, this project aims to develop a drug-eluting implant, that can provide sustained release of bisphosphonates at the target location over a period of 6+ months. For more details please contact Dr. Blencowe. |
| **Contact person and details** (Name/Phone/Email) | Dr. Anton Blencowe<br>8302 2493<br>anton.blencowe@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Applied Chemistry and Translational Biomaterials |
| **Project keyword(s)** | 3D printing, drug eluting materials, controlled delivery |
| **Project title** | **3D printing for the manufacture of drug eluting implants and stents** |
| **Project Summary** | **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 develop new prosthetics, implants, and many other technologies that will pave the way for advances in regenerative medicine, drug delivery and personalized treatments, tackling current health care challenges. A unique feature of 3D printing is that it allows the manufacture of complex structures not obtainable through other manufacturing techniques, as well as the potential for personalized drug delivery systems. This project aims to develop novel drug eluting implants and stents that provide temporal and spatial control over drug delivery for the treatment of medical conditions such as cancer, providing more efficacious and safer delivery of therapeutics with reduced systemic side-effects. For more details please contact Dr. Blencowe. |
| **Contact person and details** (Name/Phone/Email) | Dr. Anton Blencowe<br>8302 2493<br>anton.blencowe@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Applied Chemistry and Translational Biomaterials |
| **Project keyword(s)** | pH responsive, micelle, drug delivery |
| **Project title** | **pH Responsive Delivery Systems for the Intracellular Delivery of Therapeutics** |
| **Project summary** | Many types of cancer evade normal cell death cycles by switching their energy production from oxidative phosphorylation to glycolysis. This project aims to develop a pH responsive, therapeutic delivery system that can reverse this process, and involves the development of polymer micelles for the targeted delivery of glycolysis inhibitors that target the metabolism of cancer cells. The micelles are designed to target cancer cells and undergo pH triggered disassembly at the endosomal pH, resulting in inhibitor release inside the cancer cells. The potential outcome of the project is a novel and safer approach to the treatment of multi-drug resistant cancers that are not treatable using traditional chemotherapeutic agents. For more details please contact Dr. Blencowe. |
| **Contact person and details** (Name/Phone/Email) | Dr. Anton Blencowe,<br>8302 2493<br>anton.blencowe@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Applied Chemistry and Translational Biomaterials |
| **Project keyword(s)** | native animals, wildlife protection, introduced predators |
| **Project title** | **Saving native wildlife from introduced predators** |

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| **Project summary** | Invasive species, such as feral cats, pose a tremendous threat to native Australian species and 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 species, such as quolls, are reintroduced they are naïve to their predators 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 implants that can be used to save native wildlife. For more details please contact Dr. Blencowe |
| **Contact person and details** (Name/Phone/Email) | Dr. Anton Blencowe<br>8302 2493<br>anton.blencowe@unisa.edu.au |

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|---|---|
| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Applied Chemistry and Translational Biomaterials |
| **Project keyword(s)** | Click chemistry, bioconjugation, cycloaddition |
| **Project title** | **Biocompatible and orthogonal coupling chemistries** |
| **Project summary** | There is significant scope for the development of new coupling chemistries that proceed rapidly at low temperatures, don't require complex precursors or catalysts, and are specific to particular functionalities. The project will involve the development of a new type of coupling chemistry based on Diels-Alder chemistry. The aim will be to optimise the system to proceed rapidly in water, without the addition of catalysts. The coupling strategy will be used to conjugate biofactors to surfaces for guided cell growth, tag delivery devices with probes, and build 3D tissue engineering scaffolds capable of encapsulating cells. For more details please contact Dr. Blencowe. |
| **Contact person and details** (Name/Phone/Email) | Dr. Anton Blencowe<br>8302 2493<br>anton.blencowe@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Science |
| **Centre/Institute** | ACTB Group |
| **Project keyword(s)** | peptides, organic synthesis, amino acids |
| **Project title** | **Revolutionizing peptide synthesis and peptide therapeutics** |
| **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. For more details please contact Dr Blencowe |
| **Contact person and details** (Name/Phone/Email) | Dr. Anton Blencowe<br>8302 2493<br>anton.blencowe@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Applied Chemistry and Translational Biomaterials |
| **Project keyword(s)** | crown ether, ring-opening, cation complexes |
| **Project title** | **New catalytic approaches towards crown ethers** |
| **Project summary** | Crown ethers are cyclic compounds that are well known for their ability to complex cations, and have been extensively used for phase transfer catalysis, environmental remediation, ion selective electrodes, and separation systems. More recently, they have also been investigated as potential antimicrobials and anti-cancer agents. Currently, the synthesis of crown ethers involves multiple steps, and resultingly only simple crown ethers are commercially available at cost. A novel catalytic ring-opening approach that provides crown ethers in a single step from a wide family of precursors has recently been developed by the ACTB group, and provides access to complex multifunctional crown ether scaffolds not previously accessible. Therefore, the aim of this project is to further develop this chemistry to provide a suite of crown ethers and assess their ability to selectively bind cations for various applications. For more details please contact Dr Blencowe |
| **Contact person and details** (Name/Phone/Email) | Dr. Anton Blencowe<br>8302 2493<br>anton.blencowe@unisa.edu.au |

# CANCER BIOLOGY

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| **School** | |
| **Centre/Institute** | Centre for Cancer Biology |
| **Project keyword(s)** | Cancer, Diabetes, Blood vessels |
| **Project title** | **New discoveries in cancer** |
| **Project summary** | The Vascular Biology & Cell Trafficking 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.<br>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.<br>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).<br><br>See here for recent publications and additional details of the Research Group and projects. |
| **Contact person and details** (Name/Phone/Email) | Professor Claudine Bonder<br>8302 7833<br>claudine.bonder@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Centre for Cancer Biology |
| **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-practice 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.<br>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:<br>• analysis of patient tumour cells and tissues by immunofluorescence microscopy and flow cytometry<br>• cytotoxicity assays to test the ability of CAR-T cells to kill tumour cells<br>• functional studies to understand various aspects of CAR-T cell biology, such as their ability to migrate toward cancer cells |
| **Contact person and details** (Name/Phone/Email) | Dr Lisa Ebert<br>8302 7817<br>Lisa.ebert@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Centre for Cancer Biology, Acute Leukaemia Laboratory |
| **Project keyword(s)** | Flow cytometry, Antibody-dependent cell cytotoxicity, Natural killer cells, Monoclonal antibody, Apoptosis, Cancer |
| **Project title** | **The utility of the flow cytometric antibody-dependent cell-mediated cytotoxicity (ADCC) assay in cancer cells.** |
| **Project summary** | Monoclonal antibodies (mAbs) have emerged as a successful strategy for cancer therapy and new monoclonal antibodies are being developed for targeted cancer |

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| | cell killing. Antibody-dependent cell-mediated cytotoxicity (ADCC) by natural killer cells is a mechanism of action for mAbs to eliminate tumor cells. This project evaluates the activity of mAbs to trigger ADCC in cancer cell lines and human primary cells using flow cytometry. This model of cytotoxic function can be used to predict the clinical efficacy of ADCC mAb therapy. |
| **Contact person and details** (Name/Phone/Email) | Sheree Bailey<br>8302 2317<br>sheree.bailey@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | Centre for Cancer Biology |
| **Project keyword(s)** | Breast cancer, Gene regulation, MicroRNAs, CRISPR |
| **Project title** | **How do breast cancer cells gain invasive properties?** |
| **Project summary** | This project will explore how microRNAs control gene expression in breast cancer cells using cutting edge molecular techniques such as CRISPR |
| **Contact person and details** (Name/Phone/Email) | Dr. Philip Gregory<br>8302 7829<br>Philip.gregory@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Centre for Cancer Biology |
| **Project keyword(s)** | Lung cancer, Ovarian Cancer, antibody drug conjugates, cancer therapy, PET imaging |
| **Project title** | **Developing novel therapies for imaging and treating cancer** |
| **Project summary** | Lung cancer and ovarian cancer are two cancer types with poor treatment outcomes. Antibodies, which specifically target tumour cells, can be harnessed for the detection and eradication of these tumour cells. We are currently developing two novel antibodies which can be used as predictive markers of tumour response to treatment. We can also harness these antibodies to deliver potent drugs or radiation directly to the tumour site, resulting in greater tumour treatment with less off-target toxicity.<br>Our team aims to develop these antibodies for detection and treatment of lung and ovarian cancer and the student project will contribute to these aims by performing techniques such as:<br>• Culturing and growing tumour cells as spheroids<br>• analysis of tumour spheroids by immunofluorescence microscopy, flow cytometry and Western Blot<br>• functional studies to understand how chemotherapy alters the expression of our target tumour proteins |
| **Contact person and details** (Name/Phone/Email) | Dr Alex Staudacher<br>8302 7823<br>Alex.Staudacher@unisa.edu.au |

## NEUROSCIENCE

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Quality Use of Medicines and Pharmacy Research Centre |
| **Project keyword(s)** | Dementia, Plan, Vietnam |
| **Project title** | **Strengthening responses to dementia: Building an evidence platform for the development of Vietnam's National Dementia Plan** |
| **Project summary** | Dementia is a costly condition in its social, economic, and health dimensions that has a significant impact on individuals, their carers and society. Low- and middle-income countries including Vietnam will be the home of two-third of global dementia cases by 2050. The number of people with dementia in Vietnam is predicted to increase from 660,000 in 2015 to 2.4 million in 2050, with resultant dementia-related costs of US$ 960 million and US$ 3.5 billion, respectively. However, Vietnam's health and social care systems are not well-developed or well-funded, resulting in lack of diagnosis and poor quality of treatment and care, which is unresponsive to the needs of people with dementia, their carers and families. Urgent action is necessary for the development of Vietnam's national dementia plan (VNDP) to ensure that adequate care and services are provided to people with dementia and their carers now and in the future. In this project, research capacity in dementia will be built using policy, epidemiological and qualitative analyses, and local stakeholders will be engaged to develop an understanding of the impact of dementia, population needs and existing resources in Vietnam with the aim of formulating sound recommendations for an effective VNDP. |
| **Contact person and details** (Name/Phone/Email) | Dr Tuan Anh Nguyen<br>8302 2817<br>tuan.nguyen@unisa.edu.au |

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| **School** | Health Sciences |
| **Centre/Institute** | Biomedical and Health Innovation |
| **Project keyword(s)** | Neuroscience, Brain injury, inflammation, adolescence, pre-frontal cortex |
| **Project title** | **Does age at which a concussion occurs affect long-term outcome?** |
| **Project summary** | A concussion describes a physical blow to the head which is sufficient to cause short-term alterations to the functioning of the brain as seen by disorientation and loss of balance. Recent research has found that this disruption to neuronal functioning may not only occur at the point of injury, but may cause subtle alterations in the environment within the brain causing ongoing neuronal damage. Recent research has suggested that adolescents take twice as long to recover from the acute effects of a concussion, but little is known if this has long term implications. Importantly during adolescence the pre-frontal cortex is still developing which is key for maturation of executive functions encompassing judgement, planning, motivation and decision making. This project will examine if there are persistent inflammatory changes within the pre-frontal cortex following a concussion in mid-adolescence vs adulthood using techniques including immunohistochemistry and western-blot in archival tissue. |
| **Contact person and details** (Name/Phone/Email) | Dr Frances Corrigan<br>8302 1289<br>frances.corrigan@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | Body in Mind |
| **Project keyword(s)** | Stroke; Rehabilitation; Neuroscience; Neuroimaging |
| **Project title** | Structural imaging biomarkers of motor function |
| **Project summary** | Stroke is a leading cause of adult disability and recovery requires extensive rehabilitation. Understanding how recovery can be influenced by structural damage to descending motor pathways is important given the heterogeneity of stroke. There are several MRI based measures available to quantify damage to motor pathways following stroke, but it is not clear whether these measures provide unique information or whether one is more informative than another. This project will investigate different MRI based measures of motor pathway damage.<br><br>There is flexibility within this project to tailor particular components towards the students interests. For example, the student may be involved in one part of the project that could involve MRI data processing, data analysis or a literature search. The work conducted by the student will contribute to a large body of work being conducted by the supervisor. |
| **Contact person and details** (Name/Phone/Email) | Brenton Hordacre<br>83021286<br>Brenton.hordacre@unisa.edu.au |

# NUTRITION AND EXERCISE

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| **School** | School of Health Sciences |
| **Centre/Institute** | Alliance for Research in Exercise, Nutrition and Activity (ARENA) |
| **Project keyword(s)** | Social norms; youth sport; spectator behaviour |
| **Project title** | **On the sidelines: Examining the social influences associated with negative parental sport behaviours** |
| **Project summary** | This study will aim to examine the sport social environment and potential factors associated with parents engaging in negative behaviours at youth sport events. Termed the "ugly parent syndrome", majority of research has qualitatively examined negative parent sport behaviour, with an indication that the sport culture encourages parents of youth sport to engage in anti-social behaviours towards coaches, referees, and even youth athletes. This study will expand on previous research by using an online survey to examine social factors (e.g., social norms) that may be associated with negative parental sport behaviours.<br><br>It is hoped that ethics approval will be obtained prior to the Summer Vacation Scholarship beginning. As such, the Summer Vacation Scholarship student would be involved in data collection, analysis, and writing a manuscript for publication, with the student listed as a co-author. |
| **Contact person and details** (Name/Phone/Email) | Dr Alyson Crozier<br>8302 2094<br>alyson.crozier@unisa.edu.au |

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| **School** | School of Health Science |
| **Centre/Institute** | International Centre for Allied Health Evidence |
| **Project keyword(s)** | exercise, RPE, education |
| **Project title** | **Development of exercise RPE information resources** |
| **Project summary** | The purpose of this project is for students to develop a serious of resources relating to exercise Rating of Perceived Exertion (RPE) that can be used to supplement training and other information provided to the members of a rural town to assist them with using outdoor exercise training equipment located in the town. The resources would be developed for individuals with a wide range of prior exercise knowledge and health literacy, as well as age demographics and varying cultural groups. |
| **Contact person and details** (Name/Phone/Email) | Dr Carmel Nottle<br>8302 1443<br>carmel.nottle@unisa.edu.au<br><br>In partnership with Dr Janette Young |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Alliance for Research in Exercise, Nutrition and Activity (ARENA) |
| **Project keyword(s)** | Mediterranean diet, food cravings, health outcomes |
| **Project title** | **The effect of a Mediterranean diet on food cravings and health outcomes** |
| **Project summary** | Food cravings are thought of as "an intense desire for a specific food that is difficult to resist". They can mediate uncontrolled and excessive eating, lead to poor weight control and non-adherence to dietary programs. The MedLey study is a randomised controlled trial compared the effect of a Mediterranean diet with habitual diet over a 6 month period in 166 older Australian men and women, on risk factors for cardiovascular disease and cognitive performance. Data has been published from MedLey on the cardiovascular and cognitive outcomes showing that the Mediterranean diet significantly reduced cardiovascular risk compared with habitual diet. Food craving data was collected from 58 individuals using a modified version of the Food Craving Inventory. This questionnaire measured the frequency and type of food craved for 27 food items over the last month. The questionnaire generated 4 sub-scales: high fats; carbohydrates; sweets and fast food fats and a total score representing general food cravings.<br>The aim of this project will be to compare the effect of a Mediterranean diet with habitual diet on food cravings over the duration of the intervention. The student will explore the effects of the diet on different types of food cravings compare this with level of adherence to a Mediterranean diet and offer insight as to why the Mediterranean diet might impact food cravings.<br>Trial data has been collected. The student will gain experience in working with the food cravings questionnaires, excel datasets, data checking, some statistical analyses, interpretation and should time permit, write up in manuscript form in preparation for a publication in an international journal in the area of nutrition and dietetics. |
| **Contact person and details** | Dr Karen Murphy |

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| (Name/Phone/Email) | 8302 1033<br>Karen.murphy@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Alliance for Research in Exercise, Nutrition and Activity (ARENA) |
| **Project keyword(s)** | Mediterranean diet, dietary inflammatory index, risk of mortality |
| **Project title** | **The dietary inflammatory index of the Mediterranean diet and relationship with cardiometabolic health** |
| **Project summary** | Inflammation is thought to be an underlying pathophysiological cause of a range of chronic diseases including cardiovascular disease (CVD), but can be modified by diet. Western diets, typically characterised by processed foods, red and processed meats, refined carbohydrates and added sugars, have been shown to be positively associated with inflammatory markers, while a Mediterranean diet, rich in plant foods and low in processed foods, has been shown to have a contrasting effect. The dietary inflammatory index (DII) was developed to determine the inflammatory potential of a dietary pattern. Positive DII scores indicate a pro-inflammatory diet and negative scores indicate an anti-inflammatory diet. This study sought to evaluate the change in dietary quality and dietary inflammatory index following the administration of a traditional MedDiet in older Australian adults.<br>Trial data has been collected and the DII of the diet determined. The student will gain experience in working with datasets, including data checking, statistical analyses and interpretation of relationships between dietary markers and health outcomes like blood pressure. Should time permit, the student will have an opportunity to prepare a report in manuscript form in preparation for a publication in an international journal in the area of nutrition and dietetics. |
| **Contact person and details** (Name/Phone/Email) | Dr Karen Murphy<br>8302 1033<br>Karen.murphy@unisa.edu.au |

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| **School** | Schools of Pharmacy and Medical Sciences and Health Sciences |
| **Centre/Institute** | Alliance for Research in Exercise, Nutrition and Activity (ARENA) |
| **Project keyword(s)** | Multi-site dietary intervention trial, physical activity, Mediterranean diet, older individuals, dementia risk |
| **Project title** | **A diet and lifestyle intervention trial to reduce dementia risk in older Australians.** |
| **Project summary** | While there is currently no definitive way to prevent dementia, there are several lifestyle changes that may help to reduce the risk of its development. These include physical activity and healthy dietary choices. Our team is currently investigating the long-term effect of a Mediterranean diet and physical activity program on reducing dementia risk in older individuals. The student will have the opportunity to learn about and be involved in the preparation and organisation of dietary intervention trials. They will also be involved in study planning and setup, development of trial tools including handouts to volunteers, dietary tools like recipe books, trial recruitment and possibly data collection and entry. The student will also be involved in the broader team meetings and see how large multi-disciplinary teams collaborate. |
| **Contact person and details** (Name/Phone/Email) | Dr Karen Murphy<br>8302 1033<br>Karen.murphy@unisa.edu.au |

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| **School** | Schools of Pharmacy and Medical Sciences and Health Sciences |
| **Centre/Institute** | Alliance for Research in Exercise, Nutrition and Activity (ARENA) |
| **Project keyword(s)** | Dietary oils, osteoarthritis, intervention trial |
| **Project title** | **Exploring the effect of dietary oils on health outcomes in osteoarthritis patients.** |
| **Project summary** | Osteoarthritis has now been recognised as an inflammatory condition as well as being related to age, mechanical stress and body mass index, due to presence of elevated inflammatory proteins in blood and synovial fluid. Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), the two omega-3 fats, are substrates for resolvins and protectins, which have anti-inflammatory actions. However, few trials have yet investigated the effects of dietary oils, such as omega-3, on symptoms and progression of osteoarthritis. We will conduct a trial exploring the daily consumption of three different dietary oils on inflammatory and health outcomes in osteoarthritis patients over 3 months.<br><br>The student will have the opportunity to assist with some trial data collection, gain experience in data entry and quality control and analyses of dietary oils for fatty acid composition. It is likely the student will have the opportunity to work with part of the trial team located at the Queen Elizabeth Hospital on some occasions within the scholarship period. |

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| **Contact person and details** (Name/Phone/Email) | Dr Karen Murphy and Dr Courtney Davis<br>8302 1033<br>Karen.murphy@unisa.edu.au Courtney.davis@unisa.edu.au |

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| **School** | Schools of Pharmacy and Medical Sciences and Health Sciences |
| **Centre/Institute** | Alliance for Research in Exercise, Nutrition and Activity (ARENA) |
| **Project keyword(s)** | Mediterranean diet, physical activity, chatbot technology, intervention trial |
| **Project title** | **Level of engagement of volunteers to the chatbot driven MedLiPal Mediterranean diet and physical activity program.** |
| **Project summary** | MedLiPal is an artificial-intelligence chatbot driven lifestyle program which aims to assist volunteers to adopt a Mediterranean diet and increase their physical activity. The chatbot performs several key roles in the MedLiPal program including introducing volunteers to the Mediterranean diet, increasing physical activity and goal-setting and self-monitoring. To improve the program in future, we are interested in examining how people engaged with the program - which features they used or didn't use, how often (and whether this changed across the 12 week program), what types of questions they asked the bot, and whether engagement was related to health outcomes.<br>The student will work closely with the MedLiPal team to examine data collected from volunteers in the trial. The student will gain experience in working with trial data, analysing quantitative and qualitative data, working on their own and as part of a larger team; being part of regular team meetings. The student will also have the opportunity to co-author a manuscript, if this is of interest.<br>The student will also develop skills in exploring the literature to determine how engagement to website and technology has been achieved previously and compare with outcomes from the present study. |
| **Contact person and details** (Name/Phone/Email) | Dr Karen Murphy and A/Prof Carol Maher, Dr Courtney Davis, Dr Rachel Curtis<br>Ph: 8302 1033<br>Karen.murphy@unisa.edu.au Carol.maher@unisa.edu.au,<br>Courtney.davis@unisa.edu.au Rachel.curtis@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Alliance for Research in Exercise, Nutrition and Activity (ARENA) |
| **Project keyword(s)** | Mediterranean diet; Community Engagement |
| **Project title** | **Examining community attitudes towards the Mediterranean diet** |
| **Project summary** | Strong research evidence shows that a Mediterranean diet can improve cardiovascular health. Mediterranean diets have also been linked with higher levels of cognitive function and reduced risk of dementia. Given that cardiovascular disease and dementia are the leading causes of death and disability in older Australians, the Mediterranean diet has the potential to drastically improve the health and well-being of our community.<br><br>However, the majority of nutritional research is conducted in clinical settings, and little is known about the wider population's knowledge and attitudes toward the Mediterranean diet. This is highly relevant if we are to conduct large-scale public health interventions.<br><br>Our project aims to engage with a range of communities in and around metropolitan Adelaide, to gauge knowledge and attitudes about the Mediterranean diet. We also hope to provide an opportunity for community members to learn more about the diet.<br><br>As part of this summer scholarship you will gain first-hand experience conducting a community engagement project. You will be responsible for assisting in the development of surveys, data collection and data analysis. |
| **Contact person and details** (Name/Phone/Email) | Dr Karen Murphy<br>8302 1033<br>Karen.murphy@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Alliance for Research in Exercise, Nutrition and Activity (ARENA) |
| **Project keyword(s)** | Protein supplements |
| **Project title** | **Sensory analysis of protein supplements in the elderly** |
| **Project summary** | **Background:** Sarcopenia is the loss of muscle mass specifically related to aging. Sarcopenia affects your gait, balance, and overall ability to perform daily tasks. For a long time, researchers have believed that this deterioration was inevitable. But they're now beginning to look into treatments that might prevent or slow down this process. Resistance training is widely reported to reduce / halt the rate of |

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| | muscle wastage and there is emerging evidence there may a synergistic effect of additional supplementation with exercise. This project will involve the sensory analysis of a number of protein supplements in elderly free living people.<br>**Project summary:** This project will involve the sensory analysis of a number of protein supplements in elderly free living people individuals attending strength training sessions at Southern Cross Homes with the view of establishing preferences for protein supplementation. The project will also involve the sensory evaluation of 4 protein-based supplement drinks.<br>**Student qualities:** Students must have a desire to work with elderly people and have attention to detail. It would suit either a Nutrition, Food Science or Health science student interested in nutrition for the elderly.<br>**Skills gained:** Work as part of a team, working with the general public, skills in nutrition, sensory analysis and data collection, data entry and analysis.<br>**Location:** City East campus and Southern Cross Homes Myrtle Bank. |
| **Contact person and details** (Name/Phone/Email) | Dr. Karma Pearce<br>8302 1133<br>Karma.Pearce@unisa.edu.au<br><br>Dr. Karen Murphy<br>830 21033<br>Karen.Murphy@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Alliance for Research in Exercise, Nutrition and Activity (ARENA) |
| **Project keyword(s)** | Protein intake, dietary analysis |
| **Project title** | **Dietary analysis in the elderly** |
| **Project summary** | **Background:** Sarcopenia is a disease associated with the ageing process. Loss of muscle mass and strength, which in turn affects balance, gait and overall ability to perform tasks of daily living, are hallmark signs of this disease. Scientists have long believed muscle loss and others signs associated with aging are an inevitable process. However, researchers are looking for ways in which we can slow the aging process, specifically in relation to loss of muscle mass and strength. While it is widely acknowledged that the elderly has an increased daily requirement for protein, the best time for delivery of protein is largely unknown.<br>**Project summary:** This project will involve the collection and analysis of diet histories of free living elderly individuals attending strength training sessions at Southern Cross Homes with the view of establishing the amount and timing of protein intake over the day.<br>**Student qualities:** Students must have a desire to work with elderly people and have attention to detail. It would suit either a Nutrition, Food Science or Health science student interested in nutrition for the elderly.<br>**Skills gained:** Work as part of a team, working with the general public, skills in nutrition, Foodworks and data collection, data entry and analysis.<br>**Location:** City East campus and Southern Cross Homes Myrtle Bank. |
| **Contact person and details** (Name/Phone/Email) | Dr. Karma Pearce<br>8302 1133<br>Karma.Pearce@unisa.edu.au<br><br>Dr. Karen Murphy<br>830 21033<br>Karen.Murphy@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | Alliance for Research in Exercise, Nutrition and Activity (ARENA) |
| **Project keyword(s)** | Weight loss, diet, nutrition, clinical trial |
| **Project title** | **Snacking and weight loss** |
| **Project summary** | This project involves testing whether 2 weight loss interventions that differ in nutrient composition based on snacks provided. The study involves a 3 month weight loss phase followed by a 6 month weight maintenance phase. The student will work with a large team running the clinical trial and learn about assessing a range of cardiovascular and metabolic outcomes, body composition and dietary assessment techniques and appetite regulation. |
| **Contact person and details** (Name/Phone/Email) | A/Prof Alison Coates<br>8303 2313<br>Alison.coates@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | Alliance for Research in Exercise, Nutrition and Activity (ARENA) |

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| **Project keyword(s)** | Weight loss, diet, nutrition, clinical trial |
| **Project title** | **Timing and distribution of energy intake and weight loss success in shiftworkers** |
| **Project summary** | This project involves testing 3 weight loss interventions that differ in the timing and distribution of energy intake. The study involves a 6 month weight loss phase followed by a 12 month weight maintenance phase. The student will work with a large team running the clinical trial and learn about assessing a range of cardiovascular and metabolic outcomes, body composition and dietary assessment techniques. |
| **Contact person and details** (Name/Phone/Email) | A/Prof Alison Coates<br>8303 2313<br>Alison.coates@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | Alliance for Research in Exercise, Nutrition and Activity (ARENA) |
| **Project keyword(s)** | Dementia; Cognition; Diet; Physical activity |
| **Project title** | **Living your best day – Optimising activity and diet compositions for dementia prevention** |
| **Project summary** | Engaging in the right kind of physical activity and eating a healthy diet could be the best way to slow the progression of age-related cognitive decline and dementia. However, it's currently unknown how different lifestyle factors, like diet and physical activity, interact with each other to influence cognitive function.<br><br>This study will collect physical activity and dietary data from older Australians to better understand the relationships between daily time use, diet composition and cognitive outcomes. Our findings will be used to develop a user-friendly tool that will support older people to make positive lifestyle changes to reduce their risk of dementia.<br><br>The summer scholarship will involve assisting researchers to set up this large-scale study. Based in our clinical trials facility, you will gain experience working with older participants to collect diet and physical activity data. You will also have the opportunity to learn about cognitive measures and perform cognitive testing. |
| **Contact person and details** (Name/Phone/Email) | Dr Ashleigh Smith<br>8302 1735<br>Ashleigh.Smith@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | Alliance for Research in Exercise, Nutrition and Activity (ARENA) |
| **Project keyword(s)** | Physical Activity, Outside School Hours, Sedentary Behaviour |
| **Project title** | **What is happening after school in SA? Physical activity participation and well-being among school students.** |
| **Project summary** | The South Australian Department of Education conducts a census survey of approximately 70,000 school students across South Australia. The purpose of the survey is to collect information from students about their participation in school, sport and their emotional well-being. This census survey an excellent resource to improve our understanding of current activity amongst South Australian school students and how we can better support their wellbeing and increase their physical activity.<br>The proposed project will help to determine what children are doing specifically in the after school period; and identify relationships that may exist between their wellbeing and physical activity.<br>This project will contribute to a larger scale project investigating physical activity in the after school period. It will allow the student to learn skills in literature searching to identify current evidence through a systematic review. In addition, they will develop skills in analysing cross sectional data, and will have the opportunity to work with industry partner in the SA Department of Education and Child Development. Long term, we envisage that this research will help guide the development of new physical activity programs to be implemented into schools, to help improve physical activity rates and maintain and improve mental health and wellbeing.<br>This study will be conducted as a secondary analysis of an existing dataset. Pre-approval has been received from the SA Department of Education to use the data from the Department of Education – Student engagement and well-being census survey. This has data from 2013 to 2019 on over 70,000 students from year 5 to year 9 at school.<br>UniSA HREC approval will be required from the student and will need to be provided to the Department of Education before the full dataset can be released. |
| **Contact person and details** (Name/Phone/Email) | Ms Rosa Virgara (co-principal supervisor)<br>Rosa.Virgara@unsia.edu.au |

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| | Associate Professor Carol Maher (co-principal supervisor)<br>8302 2315<br>Carol.Maher@unisa.edu.au<br><br>Mr Sam Luddy (co-supervisor)<br>Samuel.Luddy2@sa.gov.au<br><br>Dr Rachel Curtis<br>Rachel.curtis@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Alliance for Research in Exercise, Nutrition and Activity (ARENA) |
| **Project keyword(s)** | Food Science, Analysis |
| **Project title** | **Analysis of artisan beverages for resveratrol** |
| **Project summary** | **Background:** Resveratrol is part of a group of compounds called polyphenols. They're thought to act like antioxidants, protecting the body against damage that can put you at higher risk for things like cancer and heart disease. While levels of resveratrol are widely reported in red fruits and vegetables as well as wine, their levels present in artisan beverages are largely unknown.<br>**Project summary:** This project will involve the modification of an existing method of analysis for resveratrol for use in artisan beverages and subsequent calibration for resveratrol and subsequent calibration for resveratrol and its primary metabolite. After the method of analysis is established, a range of artisan beverages will be analysed.<br>**Student qualities:** This is a laboratory based project and the student will be working with me in the lab. They will need to have meticulous laboratory skills as analytical results will be confirmed by a secondary method. It is envisaged that the results of this project will be published.<br>**Skills gained:** The student will gain experience in using HPLC methods of analysis, confirmatory analysis and statistical methods of data.<br>**Location:** City East campus |
| **Contact person and details** (Name/Phone/Email) | Dr. Karma Pearce<br>8302 1133<br>Karma.Pearce@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | Alliance for Research in Exercise, Nutrition and Activity (ARENA) |
| **Project keyword(s)** | Technology, social media, physical activity, health behaviour change |
| **Project title** | **How can mobile technology be used to promote positive health behaviours?** |
| **Project summary** | The rapid growth of technologies presents numerous possibilities for delivering personalized, accessible and supportive health programs. Our research team is working on a series of projects examining how mobile technologies such as smartphone apps, chatbots and social media can be used to promote positive health behaviour change, for example increases in physical activity. The student will work with the team across 2 projects: (1) a systematic review examining how chatbots have been used to promote health behaviour change; and (2) a randomized controlled trial investigating whether getting people to follow Instagram fitspiration experts helps increase physical activity intention and behaviour.<br><br>The student will gain skills in systematically searching the literature, collecting data using online survey methods, and analysing quantitative data. |
| **Contact person and details** (Name/Phone/Email) | Dr Rachel Curtis<br>8302 2455<br>Rachel.Curtis@unisa.edu.au<br><br>A/Prof Carol Maher<br>8302 2315<br>Carol.Maher@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Alliance for Research in Exercise, Nutrition and Activity (ARENA) |
| **Project keyword(s)** | Women, weight loss, gestational diabetes |
| **Project title** | **Experiences of women who have had gestational diabetes following completion of a weight loss trial – a qualitative study** |

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| **Project summary** | Women who have had gestational diabetes (GDM) are at much greater risk of developing type 2 diabetes in the five years after GDM especially if they gain weight. We have conducted a survey showing that the barriers to weight loss in this group of people particularly relate to family responsibilities. Following the survey a weight loss intervention study was conducted. At the end of the intervention a qualitative study (interviews) was undertaken to understand the real-life experiences of weight loss and the barriers and facilitators of weight loss in a sub-group of the women who completed the study. This project aims to identify the themes relating to barriers and facilitators to weight loss revealed in the interviews. If you are interested, please contact Jennifer or Kristy to discuss this project further |
| **Contact person and details** (Name/Phone/Email) | A/Prof Jennifer Keogh and Ms Kristy Gray<br>Jennifer is available on 83022579<br>Jennifer.keogh@unisa.edu.au. Kristy.gray@unisa.edu.au |

# PHARMACY AND MEDICAL SCIENCES

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | |
| **Project keyword(s)** | X-linked Hypophosphatemia; Bone disease |
| **Project title** | **Novel therapies to heal X-linked Hypophosphatemic Rickets** |
| **Project summary** | X-linked Hypophosphatemia (XLH) affect 1 on 20,000 children with the major effect causing major bone disease. XLH has no cure or therapy meaning kids with this disease face a life-time of bone defects and orthopaedic surgeries. This project will work with existing experimental bone and blood material to demonstrate the effectiveness of a novel therapy in healing bone in XLH. Skills obtained include histological training (generate sections and analyse), micro-computed tomography (scanning and analyses) and biochemical analyses. The data generated will be published in 2020. The skills and knowledge obtained are directly transferable to parallel projects on treatments for chronic kidney disease – mineral bone disorder projects 2020-2023. |
| **Contact person and details** (Name/Phone/Email) | Associate Professor Paul Anderson<br>paul.anderson@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | |
| **Project keyword(s)** | Chemotherapy; mucositis; vitamin D |
| **Project title** | **Novel therapies to prevent Chemotherapy-induced side-effects** |
| **Project summary** | Chemotherapy is used to treat cancers. However, the side-effects of chemotherapy are severe and often can cause more harm than good. Indeed, significant morbidity and mortality can arise directly from using chemotherapy. As well, the side-effects such as intestinal damage leading to diarrhea, dehydration and weight loss can limit the further use of chemotherapy to treat cancer. This project will extend on novel data showing that intestinal damage due to chemotherapy can be prevented using a novel compound targeting vitamin D activity. The objective is to describe the mechanism by which this compound works against chemotherapy-induced intestinal damage. Skills obtained include histological training to generate sections, immunohistochemistry and biochemical analyses. The data generated will be published in 2020. The skills and knowledge obtained are directly transferable to continuing projects in 2020. |
| **Contact person and details** (Name/Phone/Email) | Dr Andrea Stringer<br>andrea.stringer@unisa.edu.au |

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| **School** | |
| **Centre/Institute** | Centre for Cancer Biology |
| **Project keyword(s)** | Cancer, Diabetes, Blood vessels |
| **Project title** | **Curing diabetes** |
| **Project summary** | The Vascular Biology & Cell Trafficking 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.<br>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).<br>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).<br>See here for recent publications and additional details of the Research Group and projects. |
| **Contact person and details** (Name/Phone/Email) | Professor Claudine Bonder<br>8302 7833<br>claudine.bonder@unisa.edu.au |

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| **School** | |
| **Centre/Institute** | Centre for Cancer Biology |
| **Project keyword(s)** | Reproduction, Fertility, embryo development |
| **Project title** | **The role of extracellular vesicles in reproduction and fertility** |
| **Project summary** | The ability of cells within our body to communicate with each other is vital for all stages of reproduction, from gamete and embryo formation right through to the birthing process. Cells do this by secreting signalling molecules and genetic material packaged into small membrane bound particles called extracellular vesicles. In this project, we will be extracting and characterising the extracellular vesicles from various reproductive tissues using mouse models. The techniques involved in this project include dissection of mouse tissues, vesicle counting using Nanoparticle Tracking Analysis, protein detection by immunohistochemistry and western blot, and gene detection by qPCR. These studies will contribute to the understanding of the importance of extracellular vesicles in reproduction and the formation of healthy babies. |
| **Contact person and details** (Name/Phone/Email) | Dr Natalie Foot<br>8302 7910<br>natalie.foot@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Centre for Cancer Diagnostics and Therapeutics (CCDT), Cancer Research Institute |
| **Project keyword(s)** | Analytical method development and validation, control release formulation, in-vitro evaluation |
| **Project title** | Esomeprazole analytical method validation and control release formulation evaluation |
| **Project summary** | Analytical method establishment and validation is the first step of any formulation development that has several standard guidelines, e.g. international Conference on Harmonisation (ICH) or European Medicines Agency (EMA). Experience in this area can be very useful skill for research or industry work. Control release formulation is a novel delivery system with the required release profiles. Follow the standard requirements in USP, in-vitro evaluations for the developed formulation will be carried out. |
| **Contact person and details** (Name/Phone/Email) | Dr May Song<br>8302 2429<br>May.song@unisa.edu.au<br><br>Prof Sanjay Garg<br>830 21575<br>sanjay.garg@unisa.edu.au |

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| School | School of Pharmacy & Medical Sciences |
| Centre/Institute | Quality Use of Medicines and Pharmacy Research Centre |
| Project keyword(s) | Therapeutic Drug Monitoring, Dose Optimisation, Antibiotics, Pharmacokinetics |
| Project title | Examining appropriateness of vancomycin dosing and therapeutic drug monitoring strategies |
| Project summary | Vancomycin is a critical antibiotic for the treatment of MRSA. Given its narrow therapeutic index, dosing must be individualised through therapeutic drug monitoring (TDM) to ensure treatment is both effective and safe.<br>The current TDM protocol requires dose adjustment based on trough concentrations; however, there is insufficient data correlating trough concentrations with efficacy endpoints, suggesting that current treatment practices may be inappropriate. Furthermore, guidelines for dose adjustment based on TDM levels require examination to establish an evidence-basis for their use.<br>Working with collaborators in SA Pharmacy and the Women's and Children's Hospital, this project will use pharmacokinetic modelling and simulation to assess the ability of current treatment protocols to achieve efficacy targets and will be used to help inform the clinical management of vancomycin. |
| Contact person and details (Name/Phone/Email) | Stephanie Reuter Lange<br>8302 1872<br>stephanie.reuterlange@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Cancer Research Institute |
| **Project keyword(s)** | microsome, fetus, pregnancy, P450 enzyme |
| **Project title** | **Fetal and maternal drug metabolism in complicated pregnancies** |
| **Project summary** | To obtain the best outcomes for both mom and fetus during pregnancy, drugs are often required to treat illness. However, there is limited information available on |

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| | the short and long term adverse fetal effects of a large proportion of drugs used during pregnancy. Animal studies can provide preliminary data regarding the safety of a drug during pregnancy.<br>There is a large amount of human and animal evidence showing hormonal and metabolic changes that occur in both the mother and the fetus because of reduced or accelerated fetal growth. These changes could affect maternal, placental and fetal expression of drug metabolising enzymes and drug transporters and hence alter fetal drug exposure.<br>This project will isolate microsomes from maternal and fetal livers in animal models of high and low substrate supply. Using in vitro protocols, we will assess the activity of cryptochrome P450 enzymes to determine if pregnancy complications impair drug metabolism.<br>https://www.unisa.edu.au/research/Health-Research/Research/Early-Origins-of-Adult-Health-Research-Group/ |
| **Contact person and details** (Name/Phone/Email) | Tamara Varcoe<br>tamara.varcoe@unisa.edu.au<br><br>Professor Janna Morrison<br>8302 2166<br>Janna.Morrison@unisa.edu.au<br><br>A/Professor Michael Wiese<br>8302 2312<br>Michael.wiese@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Cancer Research Institute |
| **Project keyword(s)** | kidney, intrauterine growth restriction, fetus, histology |
| **Project title** | **Kidney development in growth restricted fetuses** |
| **Project summary** | Intrauterine growth restriction (IUGR), where a baby weighs below the 10th percentile for their gestational age, occurs in 6.5 % of live births. Children born growth restricted are at greater lifelong risk of developing cardiometabolic disorders including hypertension, cardiovascular disease, insulin resistance and end-stage renal disease. Animal studies have demonstrated that IUGR leads to reduced nephron endowment at birth, although the mechanism by which this occurs is unknown.<br><br>This study will determine the impact of IUGR upon the nephrogenic zone within the developing fetal sheep kidney. Kidneys from control and IUGR sheep fetuses were collected from 131 to 140 days of gestation, embedded in paraffin and sectioned at 5µm. Sections will be stained with haematoxylin and eosin and assessed for nephrogenic zone width.<br>https://www.unisa.edu.au/research/Health-Research/Research/Early-Origins-of-Adult-Health-Research-Group/ |
| **Contact person and details** (Name/Phone/Email) | Tamara Varcoe<br>tamara.varcoe@unisa.edu.au<br><br>Professor Janna Morrison<br>8302 2166<br>Janna.Morrison@unisa.edu.au |

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| **School** | Pharmacy and Medical Science |
| **Centre/Institute** | |
| **Project keyword(s)** | AGE formation, protein glycation, polysaccharides |
| **Project title** | **Seafood polysaccharides as potential inhibitors of 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 |

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| | 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.<br>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 polysaccharides to inhibit AGE formation and protein oxidation.<br>The project is in collaboration with researchers from National University of Fiji and Labway Biotechnology Ltd, Hong Kong. |
| **Contact person and details** (Name/Phone/Email) | Dr Permal Deo<br>8302 1189<br>Permal.deo@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Science |
| **Centre/Institute** | |
| **Project keyword(s)** | antibacterial, nisin, |
| **Project title** | **Efficacy of Nisin as an antibacterial agent in different food conditions** |
| **Project summary** | Nisin, a bacteriocin produced by many *Lactococcus lactis* strains, has been used as a preservative mainly in the dairy, canned food, brewing and alcohol fermentation industries in several countries. The biotechnological application of nisin for the control of food-borne pathogenic bacteria has increased with the discovery of its inhibitory effects on various organisms such as *Bacillus cereus*, *Listeria monocytogenes*, and *Staphylococcus aureus*.<br>In the food industry, nisin is an expensive substance and hence the cost of commercial use of this agent may be restricted for many food industries, especially when high concentrations are needed to achieve satisfactory antimicrobial effects in foods. Also, the use of high concentrations of nisin may encourage selective growth of nisin-resistant bacterial sub-populations.<br>This is an industry linked project where the industry is interested in understanding the efficacy of nisin as an antimicrobial against different food conditions. Thus the aim will be to investigate the antimicrobial activities of nisin against selected gram-positive and gram- negative bacteria in different food matrix.<br>The project is in collaboration with an industry partner. |
| **Contact person and details** (Name/Phone/Email) | Dr Permal Deo<br>8302 1189<br>Permal.deo@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | UniSA Cancer Research Institute |
| **Project keyword(s)** | Nitroreductase, Synthetic Chemistry, Cancer Biology, Fluorescence |
| **Project title** | **Nitroreductase Fluorescent Sensors** |
| **Project summary** | Hypoxia (a lack of oxygen) is a key factor in defining cancer cell metabolism. The nitroreductase (NTR) enzyme, which reduces aryl nitro groups to the corresponding aryl amine in the presence of NADH, is upregulated in hypoxic environments. Several NTR probes currently exist but very little work has been focussed on exploring the biodistribution of NTR in hypoxic disease states. This project aims to synthesise a small series of novel fluorescent probes, capable of detecting NTR by providing a “turn-on” fluorescent response, which are equipped with organelle targeting ligands to direct the NTR-sensors to various parts of the cell. The project will incorporate synthetic medicinal chemistry and analytical techniques as well as cellular biology work which will be conducted in collaboration with the research group of Professor Doug Brooks. |
| **Contact person and details** (Name/Phone/Email) | Dr Shane Hickey<br>0407531819<br>Shane.hickey@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | UniSA Cancer Research Institute |
| **Project keyword(s)** | Nitroreductase, Synthetic Chemistry, Cancer Biology, Fluorescence |
| **Project title** | **Treating Reactive Oxygen Species with Novel Theranostic Agents** |
| **Project summary** | The aberrant proliferation of reactive oxygen species (ROS) has been linked with numerous diseases including neurodegenerative disorders, cancer and several mitochondrial diseases. It is the ability of ROS (when over produced) to exert devastating damage, by means of oxidative stress on key cellular components such |

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| | as proteins, lipids, DNA and organelle membranes, that makes them an important therapeutic target. The emerging field of theranostic agents offer medical science new systems where diseases can be *detected* and *treated* simultaneously. This project aims to synthesise novel theranostic agents which can detect and simultaneously reducing excessive ROS production in diseased cells. The project will incorporate synthetic medicinal chemistry and analytical techniques as well as cellular biology work which will be conducted in collaboration with the research group of Associate Professor Sally Plush and Shandon University (China). |
| **Contact person and details** (Name/Phone/Email) | Dr Shane Hickey<br>0407531819<br>Shane.hickey@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | UniSA Cancer Research Institute |
| **Project keyword(s)** | Nitroreductase, Synthetic Chemistry, Cancer Biology, Fluorescence |
| **Project title** | **Graphene Quantum Dot Cation Sensors** |
| **Project summary** | The monitoring of essential metal ions, such as $Ca^{2+}$, $Zn^{2+}$ and $Mg^{2+}$, and toxic metals such as $Hg^{2+}$, has critical implications for both the medical and environmental fields. Host-guest chemistry is fundamental to cation recognition and a range of known cation chelators have been reported. In order to detect the binding event, many researchers attach a chromophore capable of eliciting a measurable fluorescent signal. Graphene quantum dots (GQDs) are graphitic water-soluble materials which are inherently luminescent and have found use as biosensors. In this project, a series of cation chelating groups will be appended to a GQD framework and evaluated for their cation sensing capabilities. |
| **Contact person and details** (Name/Phone/Email) | Dr Martin Sweetman<br>0400 099 445<br>martin.sweetman@unisa.edu.au<br><br>Dr Shane Hickey<br>0407531819<br>shane.hickey@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Quality Use of Medicines and Pharmacy Research Centre |
| **Project keyword(s)** | Frailty, medication, adverse events |
| **Project title** | **Reducing Medicine Induced Deterioration and Adverse Events (ReMInDAR) trial** |
| **Project summary** | Older people commonly use multiple medicines, which places them at risk of adverse drug events and frailty. In addition, some medicines contribute to cognitive impairment and if people use more than one of these medicines, the effects on cognition can be worse, but hard to detect. Stopping medicines or reducing the dose can help avoid adverse events, frailty or medicines-induced cognitive impairment, but we need to intervene early, before the adverse events are accepted as 'just a part of getting older'. The Reducing Medicine Induced Deterioration and Adverse Events (ReMInDAR) trial is investigating whether a pharmacy service that uses a suite of validated tools to enable early identification of signs and symptoms of medicine-induced deterioration can prevent or reduce frailty and subsequent adverse events, such as injurious falls, fractures and delirium. In this project, the student will have the opportunity to be involved in the work of the ReMInDAR trial. Research activities performed by the student may include preparation of case studies, qualitative interviews with pharmacists delivering the trial intervention, or thematic analysis of pharmacist training sessions. The student will have the opportunity to work in one of UniSA's designated research centres with a team of leading pharmacists and health services researchers. |
| **Contact person and details** (Name/Phone/Email) | Dr Lisa Kalisch Ellett<br>8302 1121<br>lisa.kalisch@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Pharmaceutical Innovation and Development Group |
| **Project keyword(s)** | Pharmaceutical Sciences, Formulation development, Veterinary products |
| **Project title** | **Development and optimisation of oil based formulations for the oral delivery of drugs.** |
| **Project summary** | Oral delivery of drugs remains one of the preferred and most convenient routes of administration of therapeutics, however, significant development of formulations are required to ensure optimal drug stability and bioavailability for a particular drug. Therefore, an important component of research in the pharmaceutical sector is directed towards developing new formulations with suitable characteristics for oral delivery and understanding drug interaction and release parameters. The PIDG |

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| | specialises in drug formulation for the treatment of various medical conditions in humans and animals. In this project, the aim is to develop and optimise a novel oil-based oral formulation for the treatment of equine Cushing's disease in horses, which is a serious condition that can severely reduce the quality of life and life expectancy of the horse. Therefore, this Pharmaceutical Science project will give the student an insight into what it takes to prepare, extract and measure a drug from an oil-based oral formulation. Providing the student with hands-on industry relevant experience on techniques, equipment and analytical instruments (e.g., HPLC) used globally in the pharmaceutical sector. For further information please contact Amanda Bergamin. |
| **Contact person and details** (Name/Phone/Email) | Amanda Bergamin<br>8302 2437<br>amanda.bergamin@unisa.edu.au<br><br>Prof. Sanjay Garg<br>8302 1575<br>sanjay.garg@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Pharmaceutical Innovation and Development Group |
| **Project keyword(s)** | Anthelmintic drug, taste masking |
| **Project title** | **Taste masking of anthelmintic drug by polymer carrier system** |
| **Project summary** | Anthelminthic drugs are safe and effective for treatment against schistosomiasis in humans including adults and children. A drawback is its intensive bitter and metallic taste, which is often accompanied by poor compliance with oral dosage forms, especially for children.<br>The purpose of this research is to mask their intensely bitter taste. Taste masking will be optimized by complexing the drug with polymers in different ratios. Drug-polymer complexes will be tested for drug content, *in vitro* taste in simulated salivary fluid (SSF) of pH 6.2, and molecular property. The complex that would not release the drug in SSF will be considered for further study. |
| **Contact person and details** (Name/Phone/Email) | Dr. Ankit Parikh and Prof Sanjay Garg<br>8302 1575<br>Sanjay.Garg@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Science |
| **Centre/Institute** | Pharmaceutical Innovation and Development Group |
| **Project keyword(s)** | 3D printer, Drug eluting stent, Cancer |
| **Project title** | **Development of Drug Loaded Polymeric Stents (DPS) using 3D printing technology for oesophagus cancer** |
| **Project Summary** | Stents are currently the primary choice for the treatment of both vascular and non-vascular occlusions and/or stenosis. Following the similar concept of coronary drug eluting stents, non-vascular drug eluting stents are being investigated to reduce non-vascular restenosis caused by tumour growth, enhance stenting functions, and increase their effectiveness in the treatment of obstructive gastrointestinal cancers.<br>This study introduces for the first time the feasibility of a patient specific DPS constructed from 3D printing technology and the latest computational tools. The DPS will be characterized for physical strength, drug release and biocompatibility properties. |
| **Contact person and details** (Name/Phone/Email) | Dr. Ankit Parikh and Prof Sanjay Garg<br>8302 1575<br>Sanjay.Garg@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | |
| **Project keyword(s)** | Contaminant, antimicrobial resistance, compost |
| **Project title** | **The fate of contaminants in soils implicated for emergence of antimicrobial resistance** |
| **Project summary** | Composting has been demonstrated as an effective means of converting organic waste into a useful soil amendment. Advances in materials means that previously non-compostable materials, such as plastics and nappies, can now be added to organic waste for degradation. However, the presence of faecal matter in the nappies can lead to transmission of pathogens and genes related to antimicrobial resistance into the compost. There is some evidence that composting can reduce the incidence of antibiotic resistant genes but typically under specialised (e.g. very high temperature) conditions. This project aims to assess the fate of antibiotic resistant genes, as well as contaminants that can increase the expression of these |

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| | genes (such as metals), within compost produced at a commercial composting facility receiving nappies. |
| **Contact person and details** (Name/Phone/Email) | Dr Des Williams<br>8302 2254<br>des.williams@unisa.edu.au<br><br>Dr Mike Williams<br>8303 8515<br>mike.williams@csiro.au<br><br>Project based at CSIRO Land and Water (Waite Campus) |

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| **School** | School of Pharmacy and Medical Science |
| **Centre/Institute** | UniSA Cancer Research Institute |
| **Project keyword(s)** | Genetic Disease, Lung, Immunohistochemistry |
| **Project title** | **Immunohistochemical analysis of Mucopolysaccharidosis IIIA Mouse Lung Tissue** |
| **Project summary** | Mucopolysaccharidosis IIIA (MPS IIIA) is a lysosomal storage disorder (LSD) characterised by excess storage of incompletely degraded molecules in lysosomes; the major degradative compartment in cells. Respiratory dysfunction in MPS IIIA is currently attributed to gross anatomical changes including upper respiratory tract, trachea and thoracic cavity. However, we know very little about the changes in lung parenchyma and the small airways. Pulmonary surfactant is a complex mixture of lipids and proteins that is synthesised in alveolar type II cells and stored in specialised organelles, known as lamellar bodies, which are derived from lysosomes. Hence, any disruption to lysosome biosynthesis will also affect surfactant biosynthesis. Our **overarching hypothesis** is that alterations in pulmonary surfactant may be a common underlying cellular mechanism of all LSDs. This dysfunction may contribute to an accumulating and worsening respiratory pathology over time which may lead to an increased susceptibility to fatal respiratory infection as is observed in lysosomal storage disorder patients.<br>This project aims to identify changes in the presence and distribution of surfactant proteins and endosome-lysosome proteins associated with pathology and pulmonary surfactant in control and MPS IIIA mouse lung tissue using immunohistochemistry. |
| **Contact person and details** (Name/Phone/Email) | Professor Sandra Orgeig<br>sandra.orgeig@unisa.edu.au<br><br>Dr. Emma Parkinson-Lawrence<br>emma.parkinson-lawrence@unisa.edu.au |

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| **School** | School of Pharmacy and Medical Science |
| **Centre/Institute** | Pharmaceutical Innovation and Development Group |
| **Project keyword(s)** | Nanotechnology, Antibacterial drug |
| **Project title** | **Develop and evaluate nanotechnology-based targeted delivery system loaded with the antibacterial drug to improve safety and efficacy.** |
| **Project summary** | Bacterial infections are recurrent, persistent and are difficult to treat because of poor penetration and limited availability of antibiotics within macrophages and epithelial cells. The targeted drug delivery using nanotechnology 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 *invitro* antibacterial assay will be used to assess the efficacy of the antibacterial drug. |
| **Contact person and details** (Name/Phone/Email) | Dr. Ankit Parikh and Prof Sanjay Garg<br>8302 1575<br>Sanjay.Garg@unisa.edu.au |

## POPULATION HEALTH

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| **School** | School of Pharmacy and Medical Sciences |
| **Centre/Institute** | Quality Use of Medicines and Pharmacy Research Centre |
| **Project keyword(s)** | Dementia, Plan, Vietnam |
| **Project title** | **Strengthening responses to dementia: Building an evidence platform for the development of Vietnam's National Dementia Plan** |
| **Project summary** | Dementia is a costly condition in its social, economic, and health dimensions that has a significant impact on individuals, their carers and society. Low- and middle-income countries including Vietnam will be the home of two-third of global dementia cases by 2050. The number of people with dementia in Vietnam is predicted to increase from 660,000 in 2015 to 2.4 million in 2050, with resultant dementia-related costs of US$ 960 million and US$ 3.5 billion, respectively. However, Vietnam's health and social care systems are not well-developed or well-funded, resulting in lack of diagnosis and poor quality of treatment and care, which is unresponsive to the needs of people with dementia, their carers and families. Urgent action is necessary for the development of Vietnam's national dementia plan (VNDP) to ensure that adequate care and services are provided to people with dementia and their carers now and in the future. In this project, research capacity in dementia will be built using policy, epidemiological and qualitative analyses, and local stakeholders will be engaged to develop an understanding of the impact of dementia, population needs and existing resources in Vietnam with the aim of formulating sound recommendations for an effective VNDP. |
| **Contact person and details** (Name/Phone/Email) | Tuan Anh Nguyen<br>8302 2817<br>tuan.nguyen@unisa.edu.au |

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| **School** | School of Health Sciences |
| **Centre/Institute** | Australian Centre for Precision Health |
| **Project keyword(s)** | Technology, Cognitive behavioural therapy, CBT, psychology, young people, asthma, evidence-based medicine, translational research and policy, clinical guidelines |
| **Project title** | **Using mixed reality and holographic technologies (iHealth) for delivery of cognitive and behavioural therapy for treatment of anxiety among teenagers with asthma** |
| **Project summary** | Technological innovation is imperative for the future success of healthcare delivery, regardless of discipline. This study will be one of the first studies world-wide to establish the evidence-base for novel iHealth technologies (namely augmented reality, virtual reality and holographic technology) for delivery of cognitive and behavioural therapy (CBT) to manage anxiety among young people with asthma. Asthma and mental health disorders are two of the biggest health threats facing Australian youth today. Half of young people with asthma have co-morbid anxiety/depression primarily due to fear of exacerbations, double the rate in the wider community, contributing to functional impairment and preventable hospitalisation and mortality. iHealth tools can address issues of poor health literacy and can be personalised based on age and gender. Students will gain skills in creating technological resources, conducting independent research, writing publications and will make practical contributions to the evidence base for asthma management. |
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| **School** | School of Health Sciences |
| **Centre/Institute** | Australian Centre for Precision Health |
| **Project keyword(s)** | Technology, smoking, patient, evidence-based medicine, best-practice, clinical guidelines, cardiovascular disease, respiratory disease, stroke, vascular disease |
| **Project title** | **Using mixed reality and holographic technologies (iHealth) for delivery of smoking cessation treatment among patients admitted to hospital with tobacco-related illnesses** |
| **Project summary** | Technological innovation is imperative for the future success of healthcare delivery, regardless of discipline. This study will be one of the first studies world-wide to establish the evidence-base for novel iHealth technologies (namely augmented reality, virtual reality and holographic technology) for delivery of smoking cessation education for smokers admitted to hospital with tobacco related illnesses. Tobacco use continues to be one of the leading causes of preventable mortality and morbidity globally, costing the health system billions of dollars each year. Hospitalisation offers an opportunistic environment for |

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| | smoking intervention, with the potential for a real-world impact in the lives of individuals as well as a population level. iHealth tools can address issues of poor health literacy and can be personalised based on age and gender. Students will gain skills in creating technological resources, conducting independent research, writing publications and will make practical contributions to the evidence base for asthma management. |
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