ABOUT HONOURS

The Public Health honours is a specialised year of study for those students who have demonstrated a high level of academic achievement in their undergraduate degree. The honours year offers an opportunity to immerse yourself in a research topic under the expert guidance of an academic supervisor, providing you with advanced training in contemporary approaches to health research.

If you have performed well in your undergraduate studies, have a capacity for defining and solving problems, enjoy discussing concepts, and exploring ideas, we encourage you to apply for honours.

Honours has the ability to improve your employment opportunities, as many prospective employees view honours as an indicator of advanced skills and knowledge and an ability to work independently. The completion of an honours year shows that you have persistence, the ability to apply yourself to achieving a complex goal, and are able to manage your time when presented with a large task to complete independently.

Public Health honours students are a select group. If you are successful in your application, we look forward to welcoming you to our stimulating, supportive and growing research community.

YOUR HONOURS COORDINATORS

Associate Professor Jonine Jancey
Research Lead, Collaboration for Evidence, Research and Impact in Public Health (CERIPH)
j.jancey@curtin.edu.au

Dr Justine Leavy
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INSTRUCTIONS TO STUDENTS

We encourage you to review the available projects listed under the School of Public Health themes in this booklet. We then invite you to contact the academic supervisor responsible for the project to discuss the research project in more detail.

ABOUT THE SCHOOL OF PUBLIC HEALTH

The School of Public Health is the largest of the eight Schools within the Faculty of Health Sciences. We teach and conduct cutting edge, world-class research across three main themes in public health: health promotion and disease prevention; occupation and the environment; and health systems and health economics.

The School of Public Health at Curtin University was established in 1979 and has evolved to become a leader in public health in Australia and the broader Asia-Pacific region. We are driven towards developing, testing and implementing innovative solutions to new and emerging public health issues.

The research undertaken within that school has an international outlook supported by a network of strong relationships with universities across Southeast Asia and Europe, making us an attractive destination for international students wanting to pursue education in public health.
CENTRE FOR RESEARCH EXCELLENCE IN CARDIOVASCULAR OUTCOMES IMPROVEMENT
SEX DIFFERENCES IN PRESENTATION, PROCEDURES, COMPLICATIONS, AND OUTCOMES OF PATIENTS UNDERGOING PERCUTANEOUS CORONARY INTERVENTION

SUPERVISOR/S
Dr Si Si, si.si@curtin.edu.au
Prof Chris Reid, christopher.reid@curtin.edu.au

PROJECT DESCRIPTION
The risk of adverse outcomes after percutaneous coronary interventions (PCI) may be higher among women than men, but the evidence is not consistent.1-4 While sex differences in outcomes of PCI may be due to women’s older age and worse health condition at PCI, the sex differential is generally not completely eliminated after adjustment for sex differences in other sociodemographic and clinical characteristics. Moreover, female sex is also a predictor of adverse outcomes in young adults.5-9 For example, a recent study in the US reported that poorer outcomes of PCI in women were only seen among younger patients, which was primarily driven by a higher risk of revascularisation.9 The authors speculated that a more aggressive atherosclerotic phenotype in young women with premature CAD might underpin their higher risk of revascularisation, despite angiographically less extensive CAD. Whether sex differences in the outcomes of PCI also differ between other clinically distinct subpopulations, such as those with or without a history of diabetes, renal impairment, or hypertension, is uncertain. Moreover, sex differences in quality of life following PCI have not been investigated, despite reflecting sex differences in the perception and communication of anginal symptoms post-PCI.

The aim of the present study to study in more detail whether there are differences between men and women in presentation, procedures, complications, and outcomes of patients undergoing PCI.

The specific objectives to:
1. determine the association between sex and the risk of 30-day and 1-year following PCI, independent of, and stratified by, sociodemographic, clinical, and procedural characteristics.
2. examine the association between sex and the risk of post-operative complications following PCI, independent of, and stratified by, sociodemographic, clinical, and procedural characteristics.

SKILLS STUDENT WILL LEARN
literature review & critical appraisal; basic biostatistics; academic writing skills

NECESSARY SKILLS / KNOWLEDGE
Interest in cardiovascular disease; basic knowledge in coronary heart disease and PCI; basic knowledge in biostatistics; experience with STATA/SAS (preferred)
FOOD, NUTRITION AND HEALTH
REPTILE-ASSOCIATED SALMONELLOSIS: RISKS AND RESPONSES

SUPERVISOR/S
Assoc Prof Gary Dykes, gary.dykes@curtin.edu.au

PROJECT DESCRIPTION
Salmonella enterica is a common cause of human gastrointestinal disease worldwide. Symptoms of salmonellosis typical include diarrhea, fever, abdominal cramps and vomiting. More severe symptoms in at risk individuals may result in long-term hospitalization or death. Salmonellosis is most frequently associated with consumption of contaminated food and water, but also with contact with farm animals. There is an increasing evidence from surveillance data and the literature that pet reptiles are becoming a significant contributor to incidence of salmonellosis, particularly among children. This is likely to an increasing interest among people for owning more exotic pets such as snakes, lizards and turtles. The serovars of Salmonella associated with reptile-associated salmonellosis (RAS) tend to be different from those from other sources. In this project a systematic review of the literature on RAS to establish the main risk factors associated with this form of the disease will be conducted. A meta-analysis of data may be conducted if appropriate. There may also be an opportunity, should the student be interested, to conduct a small study on prevalence of Salmonella in pet reptile faeces in Western Australia. The results of the study will be used to identify strategies to reduce the risk of RAS in Australia.

SKILLS STUDENT WILL LEARN
Literature searching, analysis of quantitative data, assessing risk, meta-analysis (if appropriate), isolation/identification/typing of Salmonella (if interested)

NECESSARY SKILLS / KNOWLEDGE
General ability to search literature and write well, some level of quantitative/statistical analysis (at undergraduate level), some microbiology experience (at undergraduate level) if option to isolate bacteria is chosen (optional)

THE IDENTIFICATION OF THE MICROBIAL FLORA WITHIN THE WEST AUSTRALIAN CHICKEN PROCESSING FACILITIES

SUPERVISOR/S
Dr Ranil Coorey, r.coorey@curtin.edu.au
Assoc Prof Gary Dykes, gary.dykes@curtin.edu.au

PROJECT DESCRIPTION
The economic impact due to the spread of food borne illnesses cost Australia around $ 4 billion annually. The consumption of chicken meat has grown exponentially in Australia over the last 10 years. The chicken meat production industry has instituted many different food safety programs. However, Australian Federal Government agencies consider that the highest number of food borne illness outbreaks are due to chicken meat and eggs. These outbreaks have led to many hospitalisations and deaths. The industry is continually working to improve its food safety performance. Under this research program there will be two different projects available for two honours students.

The project will isolate and identify the typical microbial flora within the chicken processing organisations in Western Australia and determine their antibiotic resistant characteristics. The student will have to work with the processing industry partner to isolate and identify the prevalent microorganisms. Once isolated, the antimicrobial characteristics of the typical organisms will be determined

SKILLS STUDENT WILL LEARN
literature searching; research design; critical appraisal of literature and data; data analysis; statistical analysis; database management; research project management; microbiological methods and techniques among others.

NECESSARY SKILLS / KNOWLEDGE
None
THE IDENTIFICATION OF THE MICROBIAL FLORA FROM READY TO EAT CHICKEN PRODUCTS AND DETERMINING THEIR CHARACTERISTICS

SUPERVISOR/S
Dr Ranil Coorey, r.coorey@curtin.edu.au
Assoc Prof Gary Dykes, gary.dykes@curtin.edu.au

PROJECT DESCRIPTION
The economic impact due to the spread of food borne illnesses cost Australia around $ 4 billion annually. The consumption of chicken meat has grown exponentially in Australia over the last 10 years. The chicken meat production industry has instituted many different food safety programs. However, Australian Federal Government agencies consider that the highest number of food borne illness outbreaks are due to chicken meat and eggs. These outbreaks have led to many hospitalisations and deaths. The industry is continually working to improve its food safety performance. Under this research program there will be two different projects available for two honours students.

The project will have access to organisms isolated from chicken retail institutions and from chicken products from the ready to eat food service establishments. As part of the project, the isolated organism will be identified and their heat and antibiotic resistance characteristics will be determined.

SKILLS STUDENT WILL LEARN
literature searching; research design; critical appraisal of literature and data; data analysis; statistical analysis; database management; research project management; microbiological methods and techniques among others.

NECESSARY SKILLS / KNOWLEDGE
None

ADVANCED WEARABLE TECHNOLOGY AS A PHYSICAL ACTIVITY FEEDBACK TOOL IN OVERWEIGHT ADULTS

SUPERVISOR/S
Dr Rhiannon Halse, rhiannon.halse@curtin.edu.au
Dr Joanne McVeigh, joanne.mcveigh@curtin.edu.au

PROJECT DESCRIPTION
Wearable technology is one of the fastest growing areas of consumer wearable devices, with approximately 10% of the Australian population using an activity tracker to monitor PA and sedentary behaviour. These consumer devices can facilitate continuous 24-hour monitoring of activity in real-time and under free-living conditions. Moreover newer devices now offer monitoring of heart rate to inform exercise intensity. Access to the back-end data for researchers is now also possible thus allowing more complex analysis of real-time activity data. This innovative concept is yet to be fully evaluated as a method to improve PA and sedentary behaviours in overweight and obese adults. Until recently, capturing this type of data has been limited to research devices such as accelerometers provided for only short-term (usually a seven day period) monitoring. This project will leverage existing funding from Healthway for a project “Tailored Online Diet and Activity (TODAY) study”. This project will test the feasibility of using detailed backend information obtained from latest generation activity trackers (capable of continuous heart rate recording) to improve physical activity behaviours in 200 overweight and obese Australian adults.

SKILLS STUDENT WILL LEARN
Being part of a research team, skills in conducting interventions targeting physical activity behaviours, skills in fitness trackers, SPSS analysis skills

NECESSARY SKILLS / KNOWLEDGE
Exercise physiology background
BUSH FOOD COMPOSITION, NUTRITIONAL PROFILING AND SAFETY RESEARCH PROGRAM FOR FOOD APPLICATIONS

SUPERVISOR/S
Dr Ranil Coorey, r.coorey@curtin.edu.au
Assoc Prof Gary Dykes, gary.dykes@curtin.edu.au

PROJECT DESCRIPTION
Australian bush foods have been consumed by Australian Indigenous Communities for centuries. However, very few of them are listed on the Food Standards Australia New Zealand (FSANZ). Due to which there are restrictions on its usage and export. In recent years the demand for Australian Bush Foods have grown locally and for export. Due to the FSANZ restrictions, the growth in this industry has been limited. For the sustainable growth of the industry it is imperative to have these Bush Foods listed on FSANZ, which require the compositional and safety of the food is scientifically determined and demonstrated. Hence the industry is inviting research in this area so that these products can be widely applied to everyday food. Under this research program there are few possible research projects and the selected students will be working with Australian Indigenous groups in carrying out their research. The student project series will identify the chemical, nutritional, anti-nutritional composition and its toxicological safety of selected Australian bush foods. The project will also include the determination of food processing techniques that can be applied to inactivate the anti-nutritional and toxicological compounds. Once these are determined, the students will have to develop a commercially acceptable food product. There are four separate student projects available under this topic based on four different raw materials / four different bush foods.

SKILLS STUDENT WILL LEARN
Through these four projects the student will gain skills in: literature searching; research design; critical appraisal of literature and data; data analysis; statistical analysis; database management; research project management; analytical chemistry methods and techniques among others.

NECESSARY SKILLS / KNOWLEDGE
None

THE ENVIRONMENTAL DIMENSION OF ANTIBIOTIC RESISTANCE

SUPERVISOR/S
Assoc Prof Gary Dykes, gary.dykes@curtin.edu.au
Dr Joshua Ravensdale (Research Fellow), joshua.ravensdale@curtin.edu.au

PROJECT DESCRIPTION
Bacterial antimicrobial resistance (AMR) threatens the effective prevention and treatment of an ever-increasing range of infections. The World Health Organization have identified this issue as a critical one. This is specifically because new resistance mechanisms are emerging and spreading globally, impacting our ability to treat common infectious diseases, resulting in prolonged illness, disability, and death. Antimicrobial resistance occurs naturally in the environment over time but the use (and particularly misuse) of antimicrobial for treatment of humans and animals accelerates this process. In order the effectively understand the emergence and spread of AMR organisms it is important that we understand where in a “One Health” context resistance is emerging. This project will focus on the extent and generation of AMR in the environment. A literature search and review will be conducted to establish the broad base of knowledge on the generation of AMR in the environment. This will then be used to identify specific bacteria and/or environments best used to investigate this issue in Western Australia. Samples of these environments will be taken and analysed both microbiologically and molecularly for the presence and extent of AMR. The data generated will help inform approaches to prevent spread of AMR locally and globally.

SKILLS STUDENT WILL LEARN
Literature searching, analysis of quantitative data, microbiological sampling and analysis, molecular analysis of DNA for AMR determinants.

NECESSARY SKILLS / KNOWLEDGE
General ability to search literature and write well, some level of quantitative/statistical analysis (at undergraduate level), some microbiology/molecular biology experience (at undergraduate level).
METABOLIC SYNDROME IS ASSOCIATED WITH GREATER VARIATION IN ENERGY METABOLISM WITHIN THE THERMONEUTRAL ZONE: A RANDOMIZED CROSSOVER TRIAL

SUPERVISOR/S
Assoc Prof Mario Soares, m.soares@curtin.edu.au
Kaveri Pathak, Kaveri.Pathak@curtin.edu.au

PROJECT DESCRIPTION
Metabolic syndrome (MetS) is often quoted as a state of high energy demand due systemic inflammation and attendant metabolic derangements. Current work from the group suggests the possibility that ambient temperature of measurement influences energy metabolism more in this group than normal individuals.
N= 15 adults with and n= 15 without MetS will be exposure to 23 and 27 deg C in random order, on different days. Resting metabolic rate, blood pressure and body composition will be measured after a 1 hr exposure to each temperature, and a fasting blood collected for relevant clinical chemistry.

SKILLS STUDENT WILL LEARN
Subject recruitment. Database management. Clinical trial execution. Journal paper writing

NECESSARY SKILLS / KNOWLEDGE
Literature searching skills. Good writing skills. Good knowledge of biochemistry and human physiology

THE EFFECTS OF DAIRY MILK ON BRAIN CAPILLARIES AND BRAIN INTEGRITY?

SUPERVISOR/S
Prof John Mamo, J.Mamo@curtin.edu.au
Dr Virginie Lam, V.Lam@curtin.edu.au

PROJECT DESCRIPTION
The brain receives approximately 1000L of blood daily to support substantial energy demands. Blood is distributed in brain through a substantial capillary network of microscopic vessels (capillaries). Ordinarily, brain capillaries strictly regulate what components of blood enter brain parenchyme, protecting the brain from pro-inflammatory insults. However, studies from our laboratory have shown that diet can significantly influence capillary function. Dietary induction of capillary leakage caused by excessive intake of saturated fats/cholesterol cause silent neurovascular inflammation that increase risk for neurodegenerative disorders.
Dairy milk contains saturated fatty acids (SFA), however the pattern of SFA in dairy milk is different to SFA consumed through ingestion of meats. Dairy milk also contains classes of lipids with potent bioactive properties that may confer vascular benefit. Dairy milk also has small quantities of ‘trophic’ proteins which notionally would confer vascular benefit. Epidemiological evidence suggests that dairy milk is good for vascular integrity, however this has never been considered specifically in the context of brain capillary function. This study will investigate in a pre-clinical model potential regulatory effects of dairy-milk on cerebral capillary function. The findings will have significant public health implications in the context of risk for vascular based neurodegenerative disorders.

SKILLS STUDENT WILL LEARN
Substantial skill set development in physiological and biochemical experimental design. The study will utilize a murine model with short-term dietary intervention. State-of-art in vivo vascular imaging measures will be taught, in addition to a suite of biochemical analyses. The project is supported by a strong research team including NHMRC Fellows and a significant cohort of postgraduate students.

NECESSARY SKILLS / KNOWLEDGE
Should have knowledge in nutrition science; physiology and/or biochemistry. Students should also be willing to work with rodents.
DO HIGH ENERGY DRINKS COMPROMISE THE BRAIN CAPILLARIES AND BRAIN FUNCTION?

SUPERVISOR/S
Prof John Mamo, J.Mamo@curtin.edu.au
Dr Ryusuke Takechi, R.Takechi@curtin.edu.au

PROJECT DESCRIPTION
The brain receives approximately 1000L of blood daily to support substantial energy demands. Blood is distributed in brain through a substantial capillary network of microscopic vessels (capillaries). Ordinarily, brain capillaries strictly regulate what components of blood enter brain parenchyme, protecting the brain from pro-inflammatory insults. However, studies from our laboratory have shown that diet can significantly influence capillary function. Dietary induction of capillary leakage caused by excessive intake of saturated fats/cholesterol cause silent neurovascular inflammation that increase risk for neurodegenerative disorders.

‘High energy’ drinks contain bioactive substances and compounds that might notionally influence brain capillaries. There is markedly increased consumption of ‘high energy drinks, particularly by young adults. This project will investigate the putative effects of high-energy drinks on brain capillaries in physiologically relevant pre-clinical models.

SKILLS STUDENT WILL LEARN
Substantial skill set development in physiological and biochemical experimental design. The study will utilize a murine model with short-term dietary intervention. State-of-art in vivo vascular imaging measures will be taught, in addition to a suite of biochemical analyses. The project is supported by a strong research team including NHMRC Fellows and a significant cohort of postgraduate students.

NECESSARY SKILLS / KNOWLEDGE
Should have knowledge in nutrition science; physiology and/or biochemistry. Students should also be willing to work with rodents.

ASSESSING DIETARY INTAKE IN PEOPLE WITH MULTIPLE SCLEROSIS

SUPERVISOR/S
Dr Lucinda Black, lucinda.black@curtin.edu.au
Assoc Prof Deb Kerr, deb.kerr@curtin.edu.au
Dr Jun Chih, H.Chih@exchange.curtin.edu.au

PROJECT DESCRIPTION
Data from the 2003-2006Ausimmune Study show that 40% of participants made dietary changes in the first year after a first clinical demyelinating event (a common precursor to MS), with some participants making multiple dietary changes and trying various different types of diets. Such dietary changes included wheat free or gluten free diets, the Swank diet, the Tony Ferguson diet, low glycaemic index, no red meat, vegan, and others. However, there is very little information on the dietary intake of people with MS. We will recruit approximately 200 people with MS and ask them to complete the Australian Eating Survey Food Frequency Questionnaire (http://newcastleinnovation.com.au/aes/). This will allow us to describe the dietary intakes and food patterns of people with MS. The aim is to generate pilot data through community engagement to inform future grant applications in nutrition and MS.

SKILLS STUDENT WILL LEARN
Excellent interpersonal skills; dietary assessment skills

NECESSARY SKILLS / KNOWLEDGE
Nutrition background. Knowledge of, or willingness to learn, Stata
HEALTH PROMOTION
EVALUATING A SELF-ASSESSMENT TOOL FOR MENTAL HEALTH PROMOTION AMONG YOUNG PEOPLE

SUPERVISOR/S
Assoc Prof Sharyn Burns, s.burns@curtin.edu.au
Ms Caroline Jackson Pierce, caroline.jacksonpierce@curtin.edu.au

PROJECT DESCRIPTION
Act-Belong-Commit is an evidence-based population-wide health promotion campaign that encourages people to take action to improve their mental health and wellbeing. To assist young people (aged 12-25 years) to assess their level of involvement in activities conducive to good mental health, Mentally Healthy WA developed a Youth Self-Assessment Tool. Modelled on the Act-Belong-Commit Self-Assessment Tool for adults, the tool was designed to help people appraise their involvement in mentally healthy activities, identify ways to enhance their mental health, and inspire them to be proactive in looking after their mental health. This project will test the applicability of the Youth Self-Assessment Tool for use among young people aged 12-25 years and refine its use as a valuable resource for existing Act-Belong-Commit programs targeting young people, such as the Mentally Healthy Schools Initiative and Youth Connectors. This would involve running focus groups with different age groups (e.g. 12-13 years, 14-15 years, 16-17 years, and 18-25 years) and an online survey conducted with participants at two time points for test-retest reliability.

SKILLS STUDENT WILL LEARN
Critical Analysis, Questionnaire Design, Facilitating focus group discussions, Subject recruitment, Data analysis using SPSS and NVIVO.

NECESSARY SKILLS / KNOWLEDGE
Experience using SPSS and NVIVO, or similar data analysis software.

EXPLORING WATER SAFETY AMONGST OLDER ADULTS IN WESTERN AUSTRALIA

SUPERVISOR/S
Dr Justine Leavy, j.leavy@curtin.edu.au
Gemma Crawford (Curtin) and Lauren Nimmo RLSSWA

PROJECT DESCRIPTION
There has been increasing rates of drowning recorded over recent years amongst older adults aged 65+ years in Western Australia. This project aims to better understand the current level of water safety awareness and knowledge amongst older adults and to identify current levels of participation in aquatic activities and key water safety priority issues affecting this age group. The project will include the collection of data through phone surveys and focus groups. The information from this research will inform the development of water safety programs and intervention targeting older adults.

SKILLS STUDENT WILL LEARN
Skills in subject recruitment, survey design and qualitative research

NECESSARY SKILLS / KNOWLEDGE
Must be able to swim and have a current drivers license. Experience with SPSS.
THE INFLUENCE OF SPORTS CLUBS ON CONNECTEDNESS AND HEALTH ENHANCING BEHAVIOURS

SUPERVISOR/S
Assoc Prof Sharyn Burns, s.burns@curtin.edu.au

PROJECT DESCRIPTION
Community-based sport provides a range a physical, social and emotional health benefits for young people. However, Australian young people participating in sports have been found to drink at higher levels than their non-sporting peers. This study will identify the socio-ecological influences on the initiation and consumption of alcohol among young people involved in sports clubs which will inform further health promotion interventions. The study has the capacity to also collect additional data relating to health promoting sports clubs, for example, nutrition, sun safety etc. Connectedness to club will be measured and the influence of connectedness on alcohol consumption will be investigated. As connectedness is a recognised protective factor for positive mental health these associations will also be measured. The association between attitudes towards alcohol consumption, social and cultural norms, availability and sports sponsorship of alcohol and initiation and level of alcohol consumption will be explored. Qualitative and quantitative methods will be employed to explore the socio-ecological influences of alcohol consumption for young people aged 18-25 years involved in community sports clubs. An online survey and focus groups will be used to collect data. This project has current ethics approval.

SKILLS STUDENT WILL LEARN
Systematic literature review, qualitative and quantitative data analysis, use of SPSS or other relevant data analysis program, use of NVIVO, qualitative data collection (focus groups), questionnaire design (quantitative), interview guide development, subject recruitment (online using social media and purposive for focus groups), report and peer review paper development.

NECESSARY SKILLS / KNOWLEDGE
The project will require initiative and enthusiasm. While programs like SPSS and NVIVO will be used it is not essential to be skilled in the use of these programs as you will learn as part of the project!

WHO LET THE DOGS OUT? AN EXPLORATION OF THE IMPACT OF THERAPY DOGS IN THE UNIVERSITY SETTING.

SUPERVISOR/S
Dr Justine Leavy, j.leavy@curtin.edu.au
Associate Professor Jonine Jancey
Associate Professor Shirley Bode, Shirley.Bode@curtin.edu.au

PROJECT DESCRIPTION
Research supports the efficacy of the human-animal bond and pet therapy in a variety of settings. Furthermore, the social and mental health benefits of pet ownership or simply interacting with a companion animal are now well documented. The literature suggests visits by animals can bring various benefits including relaxation, less agitation and lower blood pressure. However, providing animal-assisted activities to reduce stress in university students is a relatively new concept. This research project will explore the self-reported physical and emotional support, and well-being of Curtin University students during the examination period by providing therapy dogs.

Qualitative and quantitative methods will be employed to explore the variables of interest including an online survey, interviews and focus groups. The project has Ethics approval but will require an amendment.

SKILLS STUDENT WILL LEARN
subject recruitment, questionnaire design, skills to analyse both qualitative and quantitative data.

NECESSARY SKILLS / KNOWLEDGE
Experience with SPSS, good interpersonal and oral communication skills, must love dogs.
HEALTH SYSTEMS AND HEALTH ECONOMICS
THE ROLE OF POLICY NETWORKS OR POLICY COMMUNITIES OR NGOS IN ABORTION LAW REFORM PROCESSES IN DEVELOPING COUNTRIES OR SUB-SAHARAN AFRICAN COUNTRIES.

SUPERVISOR/S
Dr Judith Daire, Judith.Daire@curtin.edu.au

PROJECT DESCRIPTION
Countries that have reformed abortion policies with a particular focus on the role of policy networks or INGOs in influencing that policy change. Again, this will build on research that is being conducted in Malawi in conjunction with the London School of Hygiene. Abortion law reform in Malawi and South Africa has been monitored. This topic can be done by two students, one looking at the role of policy networks in influencing policy change and the other student could look at the role of INGOs.

SKILLS STUDENT WILL LEARN
The student will develop skills in systematic literature review and critical literature appraisal. In addition, the student will gain an insight into the developments in maternal and child health programs and policies both at global and national level.

NECESSARY SKILLS / KNOWLEDGE
none

THE SUCCESSES AND CHALLENGES OF ACHIEVING MATERNAL AND CHILD HEALTH MDGS IN MALAWI: LITERATURE REVIEW

SUPERVISOR/S
Dr Judith Daire, Judith.Daire@curtin.edu.au

PROJECT DESCRIPTION
In the Lancet series on the countdown 2015 country studies on MDGs 4 and 5, a Malawi case study shows that the country achieved the MDG for child health and made remarkable progress towards achieving the MDG for maternal health. The literature review will examine the successes and challenges of meeting MDGs for maternal and child health with the aim of drawing lessons to inform a successful implementation of the SDG for health.

SKILLS STUDENT WILL LEARN
The student will develop skills in systematic literature review and critical literature appraisal. In addition, the student will gain an insight into the developments in maternal and child health programs and policies both at global and national level.

NECESSARY SKILLS / KNOWLEDGE
none
COST EFFECTIVENESS ANALYSIS OF A SOCIAL FRANCHISE MODEL FOR MENTAL HEALTH PROMOTION

SUPERVISOR/S
Dr Delia Hendrie, d.v.hendrie@curtin.edu.au
Ms Abby Mosedale, abby.mosedale@curtin.edu.au
Ms Simone Kerrigan, simone.kerrigan@curtin.edu.au

PROJECT DESCRIPTION
The Act-Belong-Commit campaign makes extensive use of social franchising to facilitate participation in mentally healthy activities and for the delivery and implementation of the campaign at a local community level. The social franchise model enables the Act-Belong-Commit campaign to grow and expand its impact and geographical reach without necessarily increasing the size of the franchiser “hub” (Beckmann and Zeyen 2013). The campaign partners with over 150 organisations in WA, with its success recognised outside of WA with the uptake of the campaign by partners across Australia and internationally in Japan, UK, Fiji, and Denmark’s National Institute for Public Health (Koushede et al. 2015). Through a cost-effectiveness analysis of the social franchise model for the Act-Belong-Commit campaign, this research will demonstrate the success of this model for maximising campaign reach and impact.

SKILLS STUDENT WILL LEARN
Literature searching, Critical Analysis, Data Analysis.

NECESSARY SKILLS / KNOWLEDGE
Experience using SPSS, STATA, or other statistical package.

EVALUATION OF AN ANIMAL MODEL OF SCHIZOPHRENIA

SUPERVISOR/S
Dr Matthew Albrecht, matthew.albrecht@curtin.edu.au

PROJECT DESCRIPTION
Schizophrenia is a debilitating neuropsychiatric disorder affecting 1% of the world’s population with no known aetiology or cure. The most recognisable features of schizophrenia include a set of symptoms associated with a distorted perception of reality termed the ‘positive symptoms’, that primarily include hallucinations and delusions. Negative symptoms (e.g., anhedonia, and amotivation) and cognitive deficits (e.g., episodic memory and perceptual speed impairments) are also a cause significant functional impairment. However, translational models that attempt to capture these symptoms in animals have significant issues and have not kept up to date with the most recent literature. This project will test several novel animal behavioural assessments derived from the most recent clinical literature using common neurodevelopmental rodent models of schizophrenia.

SKILLS STUDENT WILL LEARN
The project is an animal lab based project. Prospective student will develop an appreciation for interspecies comparisons in psychiatry and the strengths and weaknesses of translational neuroscience. Develop expertise in experimental design, behavioural task design, animal testing, rodent handling procedures, rodent drug administration, and statistical analysis with R.

NECESSARY SKILLS / KNOWLEDGE
A strong interest in schizophrenia, neurodevelopmental disorders, mechanisms involved in psychiatric disturbances and their treatments and animal behaviour is required. Students should also be willing to work with rodents.
EVALUATION OF POTENTIAL PROSOCIAL PHARMACOTHERAPIES FOR AUTISM SPECTRUM DISORDERS IN RODENTS

SUPERVISOR/S
Dr Matthew Albrecht, matthew.albrecht@curtin.edu.au

PROJECT DESCRIPTION
Autism spectrum disorders (ASD) are a range of neurodevelopmental disorders characterised by repetitive behaviours, cognitive restriction and social-affective impairment. These behaviours present a substantial financial and psychological burden to the person, their family/carers and society. Unfortunately, no gold-standard treatments exist to aid the core socio-behavioural impairments of ASD, and the need remains to understand the potential of therapeutics in targeting primary ASD social impairments. Using an animal model of ASD, the proposed project will aim to evaluate the novel prosocial drug 3,4-methylenedioxymethamphetamine (MDMA) or the currently FDA approved antipsychotic risperidone for enhancement of social behaviours in rodents.

SKILLS STUDENT WILL LEARN
The project is an animal lab based project. Prospective student will develop an appreciation for interspecies comparisons in psychiatry and the strengths and weaknesses of translational neuroscience. Develop expertise in experimental design, behavioural task design, animal testing, rodent handling procedures, rodent drug administration, and statistical analysis with R.

NECESSARY SKILLS / KNOWLEDGE
A strong interest in autism, neurodevelopmental disorders, mechanisms involved in psychiatric disturbances and their treatments and animal behaviour is required. Students should also be willing to work with rodents.

SYSTEMATIC REVIEW AND META-ANALYSIS OF ILLUSIONS IN SCHIZOPHRENIA OR AUTISM

SUPERVISOR/S
Dr Matthew Albrecht, matthew.albrecht@curtin.edu.au

PROJECT DESCRIPTION
Tasks that involve illusory perceptions are increasingly being used in the cognitive neurosciences in an attempt to better understand psychotic and neurological disorders. Both people with schizophrenia or an autism spectrum disorder (ASD) have shown alterations in the perception of certain illusions, being either more resistant to some but more susceptible to others depending on the context, modality, and illusory mechanism involved. E.g., people with schizophrenia are more susceptible to the visuo-tactile rubber hand illusion yet appear to be more resistant to the audio-visual McGurk illusion. The project entails a systematic review and meta-analysis of the various types of illusions that have been conducted in people with schizophrenia or ASD. Moreover, the project will attempt to identify whether a pattern emerges identifying a common set of underlying features for susceptibility/resistance that would enhance a cognitive-neuroscience understanding of the disorders.

SKILLS STUDENT WILL LEARN
This project involves undertaking a systematic literature review to identify studies showing susceptibility/resistance to a range of illusions. Meta-analysis will then be performed to combine study results where possible. Students will learn how to use the highly flexible and powerful statistical analysis package R.

NECESSARY SKILLS / KNOWLEDGE
A strong interest in schizophrenia and/or autism. Familiarity with Medline, Embase and Psycinfo. Knowledge of statistics.
GEOGRAPHICAL VARIATION IN CANCER SURVIVAL

SUPERVISOR/S
Assoc Prof Rachael Moorin, r.moorin@curtin.edu.au
Mr David Youens, david.youens@curtin.edu.au

PROJECT DESCRIPTION
Project description: Recently a growing body of literature is suggesting that there can be substantial variation between geographical regions, even at a relatively small scale, in diagnoses, in the treatments provided for certain conditions and in outcomes of care. These phenomena have been observed even within homogenous, publicly funded systems which aim to provide a consistent quality of care to all. This project will examine variation in cancer survival between regions of Western Australia and across types of cancer for those diagnosed between 1982 and 2011. Methods: The supervisor currently holds linked administrative data (WA Cancer Registry, WA Death Registry & WA Hospital Morbidity Data Collection) on all incident cancer diagnoses in Western Australia from 1982 to 2011 inclusive. Data include type of cancer, date of diagnosis, postcode of residence at diagnosis, date of death (if relevant), hospital use (from 1997 +) and a range of socio-demographic information. Specific analytical methods used can be agreed by the student and supervisor, and will depend on the student’s level of knowledge and experience. Significance: This work will identify if and where there are areas of relatively poorer cancer survival, or where improvements in survival over time are unusually low, where further research may be required into explanatory factors and service design.

SKILLS STUDENT WILL LEARN
The project will involve, under close supervision, the manipulation of administrative health datasets to generate datasets for analysis incorporating a range of clinical and socio-demographic information. Throughout the project the student will develop skills in data manipulation and analysis techniques, particularly geo-spatial analysis.

NECESSARY SKILLS / KNOWLEDGE
This project requires a student who has strong quantitative skills or who is interested in developing these. Experience with biostatistical techniques is essential. Knowledge of or experience with linked administrative health data, coding practices used in Australian hospitals or health informatics more generally would be beneficial but not essential.

THE IMPACT OF SERIOUS DISEASE IMPACT ON SOCIAL MOBILITY

SUPERVISOR/S
Assoc Prof Rachael Moorin, r.moorin@curtin.edu.au
Mr David Youens, david.youens@curtin.edu.au

PROJECT DESCRIPTION
Previous work by the supervisor has demonstrated that the onset of serious illness is associated with a reduction in migration to Perth amongst those living in rural and remote Western Australia. The implication is that rural and remote populations with serious illness appear unable to migrate centrally to access services which they may require for their condition. This work was limited by incomplete location data, which included individuals’ location only at study start and study end and hence may miss temporary relocations. The supervisor now holds whole of population data detailing all individual changes in postcode, allowing a much more detailed investigation of the impact of disease onset on migration patterns. The aim of this project will be to more fully explore the impact of the onset of serious disease on urban / rural migration and on social mobility in Western Australia. The supervisor currently holds data which include all hospital admissions, emergency department presentations, deaths, and electoral roll records for all West Australians aged 18 and above from the 1980’s up to 2004. The onset of serious disease will be ascertained through hospital morbidity data. Social mobility, based on changes in postcode, will be compared between those with and without serious illness, and before and after the onset of such disease. As data are relatively old, this work will focus on the development and testing of methods for such analyses, rather than providing immediately policy-relevant evidence.

SKILLS STUDENT WILL LEARN
The project will involve, under close supervision, the manipulation of administrative health datasets to generate datasets for analysis incorporating a range of clinical and socio-demographic information. Throughout the project the student will develop skills in data manipulation and analysis techniques.

NECESSARY SKILLS / KNOWLEDGE
This project requires a student who has strong quantitative skills or who is interested in developing these. Experience with basic biostatistical techniques, including linear and logistic regression, is essential. Knowledge of or experience with linked administrative health data, coding practices used in Australian hospitals or health informatics more generally would be beneficial but not essential.
OCCUPATION AND ENVIRONMENT
IMMUNE RELATED CIRCULATING MICRORNAS IN NEWLY ARRIVED AND LONG-TERM CHINESE IMMIGRANTS

SUPERVISOR/S
Assoc Prof Guicheng (Brad) Zhang, brad.zhang@curtin.edu.au
Dr Yong Song, yong.song1@curtin.edu.au

PROJECT DESCRIPTION
Immigrants who migrate from low-risk (for allergy) countries, such as China, to high-risk countries, such as Australia, experience a gradual increase in allergic diseases to the same level as the local population. It is envisioned that there is a shift in plasma levels of microRNAs in the immune related pathways after immigrants adapt to the Western environment. These potential microRNA changes due to the influence of the Western environment may provide an explanation for the unprecedented West-East gradient in the incidence of asthma and allergic conditions between developed and developing countries.

We have recruited 22 newly arrived and 22 age and gender-matched long-term Chinese immigrants. Blood samples have been collected and plasma samples are stored. The Honours project is to compare the levels of 90 immune-related circulating miRNAs in newly arrived and long-term Chinese immigrants. These miRNAs will be measured using the miScriot miRNA PCR Array.

SKILLS STUDENT WILL LEARN
After completing the Honours project the student will learn skills including blood sample collection and plasma preparation, circulating miRNA extraction and cDNA synthesis and miRNA PCR array assay. The student will be expected to complete a scientific paper.

NECESSARY SKILLS / KNOWLEDGE
A student with a potential career development in medical research is an ideal candidate for the project.

ARE OROPHARYNGEAL AND GUT MICROBIOME PROFILES ASSOCIATED WITH TLR PATHWAY IMMUNE RESPONSE IN CHINESE IMMIGRANTS?

SUPERVISOR/S
Assoc Prof Guicheng (Brad) Zhang, brad.zhang@curtin.edu.au
Dr Yong Song, yong.song1@curtin.edu.au

PROJECT DESCRIPTION
Like most Western developed countries, Australia has a significantly higher prevalence of asthma and allergy than Eastern developing countries with a more than tenfold variation between countries. ‘Western’ environmental influences may alter the human microbiome, thereby changing the immune response capacity such as the innate immune pathway of TLR. It is these changes that most likely cause higher allergy and asthma rates in Western countries. Investigating the relationship between the microbiome changes and TLR pathway response may hold the key to understanding why asthma and allergy are more common in Western developed countries.

We have collected oropharyngeal and gut samples from Chinese immigrants and measured 23 cytokines related to the TLR pathway. The Honours project is to analyse the relationship between the relative bacterial abundance and levels of these cytokines in Chinese immigrants. Based on the preliminary results two potentially important TLR pathway genes will be selected and their protein levels will be measured in plasma samples collected in Chinese immigrants.

SKILLS STUDENT WILL LEARN
After completing the Honours project the student will learn the common lab techniques such as blood sample preparation and ELISA methods for measurements of proteins in blood samples. The student will also learn knowledges in data analyses and paper writing.

NECESSARY SKILLS / KNOWLEDGE
A student with some knowledge in statistics is an ideal candidate for the project.
COMPARE DNA METHYLATION PROFILES OF REPORTED ASTHMA CANDIDATE GENES IN CHINESE IMMIGRANTS

SUPERVISOR/S
Assoc Prof Guicheng (Brad) Zhang, brad.zhang@curtin.edu.au
Assoc Prof Phillip Melton, phillip.melton@curtin.edu.au

PROJECT DESCRIPTION
Prevalence patterns for asthma and allergy have consistently been found to be significantly higher in Western countries, including Australia, than in developing countries, including China, and to be higher in urban than in farming/rural areas. These different prevalences cannot be explained by genetic dissimilarity between ancestral populations or rapid genetic changes. Environmental factors through their influences on epigenetic regulation such as DNA methylation, have been proposed as responsible for this disproportionate prevalence of allergic conditions.

We have performed genome-wide methylation analyses in Chinese immigrants in Australia, compared with Chinese people in China. The Honours project is to extract the methylation levels (β values) of approximately 200 asthma candidate genes from the Illumina EPIC datasets. These methylation levels will be compared between newly arrived and long-term Chinese immigrants and compared between Chinese immigrant children living in Australia and Chinese children in China.

SKILLS STUDENT WILL LEARN
After completing the Honours project the student will learn extensive skills in data analysis including knowledge in R programing language, SPSS and STATA. They will also learn some data mining techniques.

NECESSARY SKILLS / KNOWLEDGE
A student with interest in data analysis is an ideal candidate for the project.

IDENTIFY EPIGENETIC BIOMARKERS OF CONGENITAL HEART DEFECTS (CHD) IN PARENTS

SUPERVISOR/S
Assoc Prof Guicheng (Brad) Zhang, brad.zhang@curtin.edu.au
Assoc Prof Phillip Melton, phillip.melton@curtin.edu.au

PROJECT DESCRIPTION
Congenital heart defects (CHDs) are the most common birth defects worldwide. One million children each year are born with one or more CHDs, representing about 1% of children. Although the exact cause for most CHDs is unknown, susceptibility has been associated with maternal nutritional deficiency and genetic abnormalities in mothers and children. There is accumulating evidence that genetic and environmental interactions, mediated through epigenetics, play a critical role in CHD development.

We have compared genome-wide methylation in 24 children with CHDs and 24 controls using Illumina EPIC platform. The methylation levels of more than 1000 CpG sites have been found to be different in children with and without CHDs. The Honours project is to extract the methylation levels (β values) of these identified CpG sites form the Illumina EPIC datasets of their parents. These methylation levels will be compared between parents with CHD children and healthy children’s parents.

SKILLS STUDENT WILL LEARN
After completing the Honours project the student will learn extensive skills in data analysis including knowledge in R programing language, SPSS and STATA. They will also learn some data mining techniques.

NECESSARY SKILLS / KNOWLEDGE
A student with interests in data analysis is an ideal candidate for the project.
OCCUPATIONAL EXPOSURE TO IMMUNOLOGICAL ACTIVE AGENTS AND RISK OF COLORECTAL CANCER

SUPERVISOR/S
Sonia El-Zaemey and other Occupational Epidemiology Group members, sonia.el-zaemey@curtin.edu.au

PROJECT DESCRIPTION
Allergies and asthma may be protective for the development of colorectal cancer (CRC). This dissertation aims to evaluate whether occupational allergens that provoke immune reactivity and asthma through an IgE-mediated pathway are protective for colorectal cancer. The dissertation aims to analyze this possible association using occupational history gathered as part of a case-control study of CRC - The Western Australian Bowel Health Study (WABOHS) which included 1280 individuals (567 cases and 713 controls) aged between 40 and 70 years. Exposure to occupational allergens will be estimated by linkage to asthma-specific job-exposure matrix.

SKILLS STUDENT WILL LEARN
Literature searching, Stata analysis skills, data management

NECESSARY SKILLS / KNOWLEDGE
Epidemiology, biostatistics, experience with Stata

COMPARING DIFFERENT METHODS OF ASSESSING EXPOSURE TO CARCINOGENS

SUPERVISOR/S
Prof Lin Fritschi, lin.fritschi@curtin.edu.au

PROJECT DESCRIPTION
This study would compare two ways of assessing exposure to carcinogens in an Australian working population. One is to individually assess each worker’s exposure based on the tasks they do. For example, a nurse would only be assigned potential exposure to ionizing radiation if she worked in the radiology department. The second is to assign a standard set of exposures to each job. In this method, all nurses would have potential exposure to ionizing radiation. We have data on 5000 Australian workers using the first method. In this project, a job-exposure matrix will be applied to the data to determine exposures on a job by job basis. Depending on the student, we could apply several different job-exposure matrices and determine the advantages and disadvantages of each one.

SKILLS STUDENT WILL LEARN
Statistical analysis skills, understanding of occupational exposure and accuracy of exposure assessment.

NECESSARY SKILLS / KNOWLEDGE
Familiarity with Stata or SPSS statistical packages.
META-ANALYSES OF LIFESTYLE FACTORS AND CANCER

SUPERVISOR/S
Dr Renee Carey, renee.carey@curtin.edu.au

PROJECT DESCRIPTION
Lifestyle and environmental risk factors (including alcohol consumption, physical inactivity, dietary habits) have been linked to a variety of cancer types. We have previously estimated that one in three cancers in Australia could be prevented by avoiding exposure to these risk factors.

This project will examine the link between one of these lifestyle risk factors and one cancer type (for example, inadequate fruit intake and laryngeal cancer). The student will undertake a systematic review and meta-analysis of the literature relating to that risk factor and cancer type.

SKILLS STUDENT WILL LEARN
Literature searching, statistical analysis skills (in particular, meta-analyses)

NECESSARY SKILLS / KNOWLEDGE
Experience with Stata or other statistical analysis package

META-ANALYSES OF WORKPLACE EXPOSURES AND CANCER

SUPERVISOR/S
Dr Sonia El-Zaemey, Sonia.el-zaemey@curtin.edu.au
Professor Lin Fritschi, Lin.fritschi@curtin.edu.au
Dr Jun Chih, h.chih@curtin.edu.au

PROJECT DESCRIPTION
The International Agency for Research on Cancer (IARC) regularly reviews chemicals and other exposures and makes decisions on whether there is evidence that they are carcinogenic to humans. Meta-analyses of the existing data on these chemicals are widely cited and are used in the decision-making process.

IARC have developed a list of chemicals that are to be reviewed in the next few years. https://monographs.iarc.fr/ENG/Publications/internrep/14-002.pdf. They include:

- Aspartame and sucralose – artificial sweeteners
- Beta-carotene - vitamins
- Ethyl acrylate – used in production of polymers
- Indium-tin oxide—used in production of liquid crystal displays (LCDs) and touch screens;
- Iron - in food and as supplements
- Methyl tertiary butyl ether (MTBE), ethyl tertiary butyl ether (ETBE)—used as fuel additives
- Nicotine—increasing population exposure via e-cigarettes
- Phenyl and octyl tin compounds—used as antifouling agents
- Physical inactivity and sedentary work
- Opium—addictive narcotic drug
- Shiftwork
- Job stress
- Talc
- Salt

The student would choose one of the exposures and undertake a systematic review and meta-analysis of literature relating to that exposure and the risk of specific types of cancer.

SKILLS STUDENT WILL LEARN
Literature searching; quality assessment; summarising results; and meta-analysis as well as content knowledge of the topic

NECESSARY SKILLS / KNOWLEDGE
Good writing skills, introductory epidemiology knowledge, logical approach to data are required. Familiarity with occupational chemical use would be useful for some of the topics.
OCCUPATION AND RISK OF BREAST CANCER: A CASE CONTROL STUDY

SUPERVISOR/S
Sonia El-Zaemey and other Occupational Epidemiology Group members, sonia.el-zaemey@curtin.edu.au

PROJECT DESCRIPTION
The aetiology of breast cancer continues to be poorly understood, including the role of occupation. Limited Australian studies have examined breast cancer by occupation. The study aims to explore the association between various occupations and breast cancer. This dissertation will use data from Breast Cancer Employment and Environment Study (BCEES) which is a population case control study involving 1,205 histological confirmed incidence cases and 1,789 controls was conducted in Western Australia in 2007-2011.

SKILLS STUDENT WILL LEARN
literature searching, Stata analysis, data management

NECESSARY SKILLS / KNOWLEDGE
Epidemiology, biostatistics, experience with Stata

OCCUPATIONAL ASBESTOS EXPOSURE AND RISK OF BREAST CANCER, COLORECTAL CANCER AND PANCREAS CANCERS

SUPERVISOR/S
Sonia El-Zaemey and other Occupational Epidemiology Group members, sonia.el-zaemey@curtin.edu.au

PROJECT DESCRIPTION
The evidence for an association between occupational asbestos exposure and breast, pancreas and colorectal cancers is limited. This dissertation aims to analyse this possible association using occupational history gathered as part of case control studies. Asbestos exposure will be estimated by linkage to job exposure matrix (AsbJEM). Ever/never, duration of exposure and cumulative exposure will be examined.

SKILLS STUDENT WILL LEARN
literature searching, Stata analysis, data management

NECESSARY SKILLS / KNOWLEDGE
Epidemiology, biostatistics, experience with Stata
HELPING DIYERS WORK MORE SAFELY

SUPERVISOR/S
Professor Lin Fritschi, Lin.fritschi@curtin.edu.au
Assoc Prof Alison Reid, alison.reid@curtin.edu.au

PROJECT DESCRIPTION
Do-it-yourself renovators may expose themselves to many agents which cause cancer, asthma, hearing loss or other diseases. We know how to prevent and reduce these exposures however, most DIYers have no formal trade qualifications or any occupational health training and may not realize the risks they are taking or what health-damaging agents they may be exposing themselves and their families to.

This project aims to develop and implement an online survey for DIYers to determine whether they are aware of the long term health risks, how concerned they are about these risks, and what tools they would find useful to understand the risks, and how they would like to receive advice on appropriate protective measures. In particular, we are interested in whether mobile-enabled apps would be useful and what sort of information should be included in these apps.

SKILLS STUDENT WILL LEARN
Questionnaire development, occupational health and safety principles, health risks in DIY renovations, questionnaire design, statistical analysis, principles of app design.

NECESSARY SKILLS / KNOWLEDGE
none

INDOOR AIR QUALITY IN MOTOR VEHICLES

SUPERVISOR/S
Dr Krassi Rumchev, k.rumchev@curtin.edu.au
Dr Yun Zhao, y.zhao@curtin.edu.au

PROJECT DESCRIPTION
The population of industrialised countries such as Australia spends approximately more than one hour each day in vehicles. Among many environments, the motor vehicle cabin microenvironment has been of particular public concern. Although commuters typically spend only 5.5% of their time in vehicles, the emissions from various interior components of motor vehicles as well as emissions from exhaust fumes carried by ventilation supply air are significant sources of harmful air pollutants that could lead to unhealthy human exposure due to their high concentrations inside vehicles’ cabins. In this respect, numerous studies have so far addressed outdoor air pollution that arises from traffic. By contrast, only little is known about indoor air quality in vehicles and influences by non-vehicle sources.

The aim of this study is to assess indoor concentration of selected air pollutants in private vehicles.

SKILLS STUDENT WILL LEARN
air quality testing, literature searching, SPSS analysis skills, database management

NECESSARY SKILLS / KNOWLEDGE
none
APPLYING STATISTICAL METHODS TO BETTER QUANTIFY EFFECTS OF RISK FACTORS ON ADVERSE BIRTH OUTCOMES

SUPERVISOR/S
Dr Gavin Pereira, gavin.f.pereira@curtin.edu.au
Dr Aloke Phatak, aloke.phatak@curtin.edu.au

PROJECT DESCRIPTION
Smoking, low socioeconomic status and existing medical conditions are some of the risk factors for adverse pregnancy outcomes such as preterm birth and fetal growth restriction. Preterm birth affects approximately 7% of pregnancies and fetal growth restriction affects approximately 10% of pregnancies. Both outcomes can lead to significant morbidities in childhood and there is some evidence for adverse outcomes later in adulthood. Although some associations are well established, nonlinear effects and threshold effects have not been well documented. We also do not know whether effects are limited to certain ranges of the outcome e.g., whether smoking restricts gestational length mainly at the end of pregnancy. This project will use existing perinatal data from birth registries to better quantify such effects.

SKILLS STUDENT WILL LEARN
The student will learn how to work with large data, assess statistical associations and produce a scientific paper/report.

NECESSARY SKILLS / KNOWLEDGE
Some experience using any statistical software. CWA >75% in a statistical or quantitative unit at third year level.

USING COMPUTATIONAL MODELLING TO PREDICT REGIONAL LUNG DEPOSITION AFTER EXPOSURE TO HAZARDOUS PARTICULATES

SUPERVISOR/S
Dr Ryan Mead-Hunter, r.mead-hunter@curtin.edu.au
Prof Ben Mullins, b.mullins@curtin.edu.au

PROJECT DESCRIPTION
Inhalation is the most common route of exposure to hazardous substances in the workplace. The harmful effects of inhaled particulates are however, not purely determined by the act of being inhaled, rather the location and volume of material deposited. While we expect respirable particles to deposit in different locations to inhalable particles, such broad classifications do not provide detailed information on regional deposition within the respiratory tract. This project will utilise a computational model previously developed by the supervisors to assess regional deposition of a number of different hazardous aerosols that maybe present in the workplace.

The modelling will be carried out using the OpenFOAM computational fluid dynamics software package and customised code developed by the supervisors. A series of simulations will be run on the supercomputers located at the Pawsey Centre. A number of different aerosols will be considered, by varying the model input parameters. Results will be compared to available literature data.

SKILLS STUDENT WILL LEARN
The student will develop skills in utilising mathematical methods for simulation purposes and basic coding.

NECESSARY SKILLS / KNOWLEDGE
Familiarity with Linux based operating systems is desirable. Basic knowledge of lung physiology and aerosol dynamics would be advantageous.
MEASUREMENTS OF NANOPARTICLE DEPOSITION AND CLEARANCE IN A 3D-PRINTED HUMAN LUNG

SUPERVISOR/S
Dr Ryan Mead-Hunter, r.mead-hunter@curtin.edu.au
Prof Ben Mullins, b.mullins@curtin.edu.au

PROJECT DESCRIPTION
Inhalation is the most common route of exposure to hazardous substances in the workplace. The harmful effects of inhaled particulates are however, not purely determined by the act of being inhaled, rather the location and volume of material deposited. While we expect respirable particles to deposit in different locations to inhalable particles, such broad classifications do not provide detailed information on regional deposition within the respiratory tract. This project will utilise 3D printed lung geometries to assess both the deposition of particles and clearance.

A series of laboratory experiments will be performed utilising lung airway geometries generated from composite x-ray computed tomography (CT) scans. Aerosols will be generated in the laboratory and introduced to the geometry such that regional deposition can be determined. The result of experiments will be used to validate the results of concurrent simulations. The project will involve, manipulating x-ray CT data, construction of the experimental apparatus and the utilisation of a number of common test aerosols.

SKILLS STUDENT WILL LEARN
The student will gain experience in using a range of advanced aerosol measurement technology.

NECESSARY SKILLS / KNOWLEDGE
A basic knowledge of lung physiology and aerosol dynamics would be advantageous.

ASSESSMENT AND COMPARISON OF THE ACCURACY AND RELIABILITY OF PORTABLE REAL-TIME AEROSOL MONITORING EQUIPMENT

SUPERVISOR/S
Dr Ryan Mead-Hunter, r.mead-hunter@curtin.edu.au
Prof Ben Mullins, b.mullins@curtin.edu.au

PROJECT DESCRIPTION
The ability to accurately measure and characterise aerosols is important in both occupational and environmental contexts. Portable direct reading instruments offer a convenient and user friendly way of obtaining measurements, though may be subject to limitations in terms of accuracy. Using advanced laboratory based aerosol measurement and characterisation technology we will produce and characterise a range of test aerosols to evaluate a selection of available portable technologies to demonstrate their effectiveness.

This study will also allow any limitations of the devices to be reported and recommendations made in regard to their use. An understanding of the limitations of any particular device will be important for those using them, particularly if health and safety recommendations are being made based on these measurements.

SKILLS STUDENT WILL LEARN
The student will gain experience in using a range of advanced aerosol measurement technology.

NECESSARY SKILLS / KNOWLEDGE
none