PhD projects

Menzies welcomes highly motivated individuals thinking of pursuing a career in medical research. The following PhD projects are available by application. Please contact the supervisor to inquire or apply.

We have five research themes:

PHPC = Public Health and Primary Care
CMHD = Cardio-Metabolic Health and Diseases
NDBI = Neurodegenerative Diseases/Brain Injury
CGI = Cancer, Genetics and Immunology
MSK = Musculoskeletal Health and Diseases

Theme	Supervisor	Title	Goal	Student background
PHPC	Prof Alison Venn alison.venn@u tas.edu.au	Cardio- metabolic risk trajectories from childhood to midlife	Modifiable risk factors account for much of the burden of cardiovascular disease and type 2 diabetes (cardio-metabolic disease) and are very common in young Australians. Using data from the Childhood Determinants of Adult Health study, this project will define the trajectories of adiposity (body mass index and waist circumference) and physical fitness from childhood to adulthood that most strongly determine markers of cardio-metabolic disease in midlife, and ascertain the factors that predict and modify them.	Health Sciences

PHPC	Dr Amanda Neil Amanda.Neil @utas.edu.au	Assessment of the predictors of costs in people with psychosis using the Study of High impact of Psychosis (SHIP) Costs Database and seven-year follow-up linked data.	A data analysis project with a strong health economics focus that will seek to establish the predictors of the costs of psychosis using a pre- existing data source; the Study of High Impact Psychosis (SHIP) Costs Database, and linked datasets.	Health economics and/or psychiatry or psychology and/or biostatistics
PHPC	Amanda.Neil @utas.edu.au	Assessment of costs in people with chronic kidney disease.	A data analysis project with a strong health economics focus that will seek to establish the costs and predictors of the costs in people with chronic kidney disease.	
PHPC	Amanda.Neil @utas.edu.a u	Acute emergency care and other emergency care of current and prior clients of public sector specialized mental health services in Tasmania, by region, 2008-2014.	An epidemiological data linkage project that will aim to: 1) Assess the underlying cause of presentation for all acute emergency care, by region, care status and utilization of the MHHL in patients that are current or prior clients of public specialized mental health services in Tasmania 2) Assess the comparative importance of the Mental Health Helpline (MHHL) as a "gatekeeper" in the care pathway for emergency care in Tasmania 3) Assess the proportion of patients admitted to inpatient care from emergency departments; and waiting times until admission. 4) Assess the levels of representation and re-admissions within 28 days, relative to care status and regionality, and discharge source.	Health economics and/or psychiatry or psychology and/or biostatistics
PHPC	Amanda.Neil @utas.edu.a u	Assessment of the relationship between costs and functionality and quality of life in people with psychosis	Data analysis project with a strong health economics focus that will seek to establish the predictors of the costs of psychosis using a pre- existing data source	Health economics and/or psychiatry or psychology and/or biostatistics

PHPC	Prof Tania Winzenberg tania.winzenberg@utas.edu.au	Co-ordination of care for complex patients in primary care settings: what works for whom and why?	This project will entail a series of complex systematic reviews of the extensive controlled trial literature of different models of care co-ordination delivered for a range of conditions to people with complex medical needs. These in turn will inform a mixed method study examining current care co- ordination practices in Australian general practices from by a range of health professionals. The goal is to provide detailed evidence based advice on how to improve care co-ordination in Australian primary care settings.	Strong understanding of the Australian health system and in particular general practice, together with some experience in reading, critically appraising and interpreting scientific literature.
PHPC	Environment and Health Research Group Dr Fay Johnston Dr Amanda Wheeler Fay.Johnston@utas.edu.au or Amanda.Wheeler@utas.edu.au	Hazelwood Exposure Study	The Hazelwood Mine Fire Health Study is a research program that will investigate whether the smoke emissions from the 2014 Hazelwood coal mine fire has affected the health of local residents. To assess the exposures of infants and young children, parents are being asked to complete an extensive questionnaire on their home characteristics and activities during the fire as well as to submit samples of residential house dust and soil from their gardens. These samples can then be analysed for a suite of chemical markers to understand background and fire smoke exposures in the home. Recruitment is underway and will result in large, high quality datasets and samples that will inform understanding of exposures to emissions from such disasters. There is currently limited understanding of exposures from such events and findings will be used to develop public health practices. There is also the opportunity to apply findings to follow up analyses of health through the child respiratory and cardiovascular measures and through data linkage.	Environmental health, chemistry, exposure assessment or medicine. An aptitude for biostatistics and chemistry is essential.
PHPC	Fay.Johnston@utas.edu.au	Better diagnosing of pollen allergies in Australia: combining smartphone data with novel immunological techniques	Pollen is a major cause of allergic disease, with over 20% of the Australian population suffering regularly from hay fever (allergic rhinitis). This problem is growing but diagnosis and treatment is limited by a lack of information about which pollen types are the most prevalent allergy triggers. In particular, almost nothing is known about the allergenicity of native pollen types and whether they should be considered as clinically-relevant. This project uses symptom data collected by the AirRater app, combined with a powerful immunological technique known as the HalogenImmunoAssay to test whether native pollen types should be considered as allergy triggers. This highly novel	This project will utilise a mixture of epidemiological and immunological techniques. It will suit students with a background in public health, applied science, biostatistics, and/or immunology.

			research will have the potential to significantly contribute to improved allergy treatment and diagnosis in Australia.	
PHPC	Fay.Johnston@utas.edu.au	Is it pollen or is it fungi? Determining the causes of allergies in Tasmania	Fungi are known to be a major trigger for allergies and asthma, yet across Australia a paucity of fungi-based studies means that we have very little understanding about their contribution to asthma and allergy symptoms at a population scale: in particular, how they compare to or interact with pollen and smoke as asthma and allergy triggers. This project will provide the first systematic analysis of the contribution of fungal spores to asthma and allergies by: 1) Counting the number of allergenic fungal spores on daily microscope slides (newly and previously collected for pollen analysis by the 'AirRater' project); and 2) Building a model that tests associations between fungal spore abundance and asthma and allergy symptoms reported by users of the 'AirRater' app. This will provide an important platform for understanding the role of fungi in asthma and allergies in Tasmania, and the degree to which they should be prioritised in clinical and public health settings.	This cross-disciplinary project will involve a combination of microscope work and epidemiological analysis. It will suit students with a background in public health, applied science, biostatistics, microbiology, or environmental health.
PHPC	Fay.johnston@utas.edu.au	Understanding population level impacts	This project is part of an ARC Linkage Project. Our team of collaborators from Canada, Victoria and NSW has specific expertise in fire ecology, fire smoke modelling, epidemiology, land management, environment protection and public health practice. We will use regulatory air quality monitoring, mobile smoke monitoring, remote sensing and atmospheric modelling, to determine how different types of landscape fire regimes affect community exposures to smoke. The aim is to understand if more people will be subject to unacceptable exposures of smoke pollution from occasional bushfires, or from a program of regular planned burns. We will use spatial datasets of ambulance and emergency calls to map how the intensity and duration of smoke exposure influences important health outcomes and which population groups are at greatest risk. New practical	Particularly appropriate for a student familiar with R including spatial analysis in R or ARC GIS.

			approaches to determining smoke exposures for public health management will be developed and evaluated.	
PHPC	Professor Wendy Oddy	Infant feeding and long-term outcomes.	A large body of literature suggests that early infant feeding has long-term impacts on adult health outcomes. Using data from the West Australian Pregnancy Cohort Study followed from before birth to now 26 years. In this project the candidate will examine the impact of early infant feeding (breastfeeding, formula feeding) on long-term cardio-metabolic outcomes including anthropometry data collected throughout childhood, adolescence and into young adulthood.	
PHPC	Professor Matthew Jose & Dr Charlotte McKercher mailto:matthe w.jose@utas.edu.au; Charlotte.McKercher@utas.edu.au	Thepsychosocial determinants of treatment pathways, clinical outcomes and costs in adults with chronic kidney disease (CKD)	Utilising a range of individual level, registry and administrative health data this prospective cohort study will evaluate the relative influence of both biomedical and psychosocial factors on the rate of kidney disease progression, the choice of treatment pathways, hospitalisation, mortality, health-related quality of live and economic outcomes in adults living with CKD. A number of projects are available with specific focus depending on research interests.	Psychiatry, psychology or other allied health and/or epidemiology and/or public health and/or health economics. An aptitude for biostatistics is essential.
PHPC	Wendy.Oddy@utas.edu.au	Omega 3 fatty acids and inflammation	We have previously shown pathways to inflammation through nutrition. In this project, the candidate will examine the role of fatty acids that potentially leads to a suite of inflammatory markers such as hs-CRP, cytokine biomarkers and leptin. The range of dietary intake of omega 3 and 6 fatty acids collected at 3 time-points (ages 14, 17 and 20 years), as well as erythrocyte fatty acids collected at these same time-points will be applied in this project. Data collected within the West Australian Pregnancy Cohort Study are available for these analyses. Other studies based at the Menzies Institute for Medical Research may be used to answer some of the research questions.	

PHPC	Wendy.Oddy@utas.edu.au	Nutritional pathways to adiposity, inflammation and depression.	Any other topic related to dietary intake or nutritional influence on health and disease.	
PHPC	Professor Bruce Taylor Bruce.Taylor@ utas.edu.au	Genetic and environmental factors involved in the onset and progression of MS	To establish how known and novel MS risk factors are associated with the onset and progression of MS, and how these factors interact to increase risk	
PHPC	Bruce.Taylor@ utas.edu.au	The role of vitamin D, ultraviolet radiation and latitude in the progression of MS	To establish how these factors act in increasing the risk of MS and how they influence the progression of MS.	
PHPC	Dr Kylie Smith and Professor Alison Venn k.j.smith@utas.edu.au alison.venn@utas.edu.au	Associations between lifestyle behaviours and serum metabolomic profiles	An opportunity exists to examine the childhood and young adult factors that associate with healthy and unhealthy metabolic profiles and novel biomarkers, using data from the Childhood Determinants of Adult Health study and other studies that began in childhood and have prospectively followed their cohort into adulthood (i3C consortium).	Epidemiology, bio-chemistry analytical background highly desirable. Clinical background would also be useful but not essential.
PHPC	Professor Andrew Palmer Andrew.palmer@utas.edu.au	Health Economics in Bariatric Surgery	Major gaps exist in our knowledge of the long term impact of morbid obesity on quality of life and costs. We are currently collecting from a cohort of approximately 400 patients who enrol for bariatric surgery in Tasmania. Specific PhD tasks 1.Analyze prospective costs collected using data linkage 2. Analyze the impact of bariatric surgery on quality of life 3. Compare sensitivity, concurrent and convergent validity of quality of life instruments in morbidly obese patients both pre-and post-bariatric surgery 4. Develop a health economics model of the long term consequences of bariatric surgery, quantifying impact on CVD and other important complication rates, life expectancy,	Epidemiological/ Analytical background desirable. Clinical background would be suitable.

			quality-adjusted life expectancy, total lifetime costs, and incremental cost-effectiveness of bariatric surgery versus no surgery.	
PHPC	Andrew.palmer@utas.edu.au	Health Economics in Multiple Sclerosis	You will be part of the Multiple Sclerosis Flagship Team analysing all aspects of the health economic impact of MS, including quality of life, costs, employment and productivity, simulation model development and identification of optimal instruments to measure health utility in MS	One or more of the following: public health, epidemiology, economics, medicine, paramedicine, statistics
PHPC	Assoc Prof Ingrid van der Mei Ingrid.vanderMei@utas.edu.au	Examining early retirement in the Australian Multiple Sclerosis Longitudinal Study	Data analysis project that aims to examine which factors are associated with early retirement and change in employment status in people with Multiple Sclerosis, a chronic disabling disease.	Health economics and/or statistics and/or epidemiology
PHPC	Ingrid.vanderMei@utas.edu.au	Can diet reduce the progression of Multiple Sclerosis	Data analysis project which aims to examine which dietary factors are associated with the progression of Multiple Sclerosis using factor analysis	Biochemistry, nutrition, biostatistics, health science, public health
PHPC	Ingrid.vanderMei@utas. edu.au	Comorbidities in Multiple Sclerosis	Data analysis projects available around comorbidities and MS (e.g. influence on disability, quality of life, and burden of disease) using different high quality datasets.	
PHPC	Ingrid.vander Mei@utas.edu.au	Developing a Cognitive Behavioural Intervention for people with MS in the workforce: The MS WorkSmart	Assist with the development of this intervention, analyse different sets of data (qualitative or quantitative) and create publications.	Psychology, epidemiology, public health, qualitative analysis

		Program		
PHPC	Ingrid.vanderMei@utas.edu.au	Physical activity and MS: What should we advise patients?	Systematically review the physical activity and MS literature, develop a physical activity toolkit for people with MS based on the latest international evidence.	Sports science, allied health, public health, implementation science.
PHPC	Professor Peter Dargaville Tanya.OByrne@utas.edu.au	Minimally- invasive surfactant therapy in preterm infants on CPAP	Studies are based at MCRI in Melbourne, and would depend on NHMRC funding	
PHPC	Peter Dargaville Tanya.OByrne@utas.edu.au	Studies of non-invasive respiratory support in the preterm model of the pre-term infant		Health science, medicine, public health, biostatistics
PHPC	Peter Dargaville Tanya.OByrne@utas.edu.au	Studies of non-invasive respiratory support in the preterm model of the pre-term infant		Health science, medicine, public health, biostatistics
PHPC	Dr Verity Cleland verity.cleland@utas.edu.au	Physical activity, sedentary behaviour and obesity epidemiology	There are a number of opportunities to work across a range of projects in relation to physical activity, sedentary behaviour and weight/obesity across the lifecourse. Particular areas of interest include women, children, socioeconomic and geographic (urban-rural) differences in behaviour, environments supportive of healthy behaviours, and active transport. Within a behavioural epidemiologic	

			framework, this program of work aims to establish the links between behaviour and health, ensure appropriate and accurate measurement of behaviour and health outcomes, identify the factors that influence behaviour, develop and evaluate strategies to change behaviour, and translate findings into practice and policy. Projects may be quantitative or qualitative in nature, and students may be involved in analysing existing data and/or collecting new data. Students will be able to apply principles of epidemiology and public health, will become proficient in analysing data using appropriate software packages, and will gain experience in academic writing.	
PHPC	leigh.blizzard@utas.edu.au	Chronic disease benchmarking in Tasmania	The first phase of the proposed work involves the use of hospital separation and clinical costing data to estimate, and monitor trends in, the prevalence of hospital-treated chronic disease (HTCD) in Tasmania. The second phase involves estimation of within-hospital resource use by HTCD patients with an eventual goal of determining levels and costs of avoidable hospitalisations and complications and developing methodology to monitor trends and evaluate interventions.	
PHPC	leigh.blizzard@utas.edu.au	Power calculations and sample size determination	An important component of the design of a project is the determination of the appropriate number of subjects to be included in the study. A number of simple approaches exist, and there are a plethora of websites that provide free or subscription-based calculators. Even for essentially the same design, the estimation method differs according to the test statistic proposed and the distributional assumptions made. Additionally, there are a surprising number of applications for which no simple approach is available. One example is linear regression. Sophisticated data simulations with existing or artificial data may be required in those circumstances. The proposed work will compare the performance of alternative estimation methods and provide published resources and web-based calculators in respect of applications in which existing approaches are deficient or lacking.	

PHPC	leigh.blizzard@utas.edu.au	Analysis of missing data	Statistical analyses with missing data raise issues of great importance. Many techniques have already been developed, and many more will be forthcoming, to handle missing data. Understanding these techniques, and developing new ones where existing approaches are too limited or circumscribed to be reliable, is of great importance to researchers at the Menzies Institute for Medical Research. One of the major research platforms at the Institute is the Childhood Determinants of Adult Disease (CDAH) cohort. The eligible subjects for this cohort are the 8,484 participants in the Australian Schools Health and Fitness Survey of 1985. Some of them have participated in follow-ups during 2004–06 (CDAH1) and 2009-10 (CDAH2), and 2017 (CDAH3). There are substantial numbers of eligible subjects who have not participated at one or more of the follows-up or will not participate at the next follow-up. Making best use of the data collected from participants requires assessment of missing data mechanisms and determination of the best ways of handling the missing data.	
PHPC	leigh.blizzard@utas.edu.au	Analysis of physical activity data	In many applications, analysts are confronted with data that are mal-distributed or implausible. In measurement of physical activity by self-report, for example, the data are typically zero-inflated and right-skewed and some respondents will have reported an implausibly large number of hours of activity. Similar problems arise in the measurement by self-report of diet, cigarette smoking and alcohol consumption. A variety of ad hoc approaches have been used (for example, by truncating total hours of physical activity per day to a maximum of 16 hours). These ad hoc methods are rarely tested in any systematic manner. Primarily using physical activity data from a variety of sources, the proposed work will assess the sensitivity of estimates to the particular assumptions made in data handling and analysis.	
PHPC	leigh.blizzard@utas.edu.au	Implementation of the Petersen-Deddens re-parametrization method for the log binomial model	In work completed, software has been developed to implement the re-parametrization method in Stata and R. There is much still to do: 1. the software needs to be further developed to allow for the advanced features expected of the Stata and R statistical packages; 2. the software needs to be fully documented including help files;	

			3. the accuracy of the estimated coefficients needs to be verified, and the choice of the most appropriate variance estimator needs to be determined, by simulation; 4. the performance of the method must be compared with that of alternative "work-around" methods to verify its superiority over approximate methods; 5. at least one manuscript reporting the results of this work needs to be completed.	
PHPC	leigh.blizzard@utas.edu.au	Investigation of starting values for the log binomial model	We have discovered that there is a second source of numerical difficulties in fitting the log binomial model. Neither the method of calculating starting values that is used in SAS, nor the method that is used in Stata and previously in R, guarantees that the initial values are admissible for a probability model (ie lie between zero and one). The most recent version of R checks whether the default initial values are admissible and requires the user to supply improved starting values if they are not. This issue is important because it seems that mainstream statistical package cannot iterative to a solution inside the parameter space if the starting values are outside of it. The frequency with which this occurs is unknown, and there is no comparison of methods of calculating starting values in the published literature.	
PHPC	leigh.blizzard@utas.edu.au	A mixed model extension of the log binomial model and the Peterson-Deddens method of estimating it.	A mixed model formulation of the LBM is required to enable it to be applied to correlated response data. Correlated response data includes measures of clusters of related subjects and within-subject data with repeated measures of the same individuals. This type of data is common in epidemiological studies. The random effects will allow random intercepts and random slopes, and the grouping structure of the data may consist of multiple levels of nested groups. The overall error distribution of the linear mixed model will be assumed to be Gaussian, and heteroskedasticity and correlations within lowest-level groups will be modelled also. Extensive data simulations will be undertaken to check the performance of the proposed models in terms of bias, mean squared error and confidence interval coverage, and estimation of real world datasets will be undertaken to check the practical utility of the method. It will be a natural extension to apply the Petersen-Deddens re-parametrization method to estimate the fixed coefficients of the random effects log binomial model.	

PHPC	leigh.blizzard@utas.edu.au	Numerical stability in the estimation of the log multinomial model	Blizzard and Hosmer (2007) proposed an extension to estimate the risk and relative of nominal outcomes with more than two attributes. The termed it the “log multinomial regression model” (LnMM). The LnMM offer a practical solution to the problem of obtaining adjusted estimates of risk and relative risk in the multinomial setting. The numerical stability of the LnMM has not been studies, however. It is not known currently whether the estimation of the LnMM is subject to numerical instability, and whether the reparameterization method of Petersen and Deddens (2010) can be extended to this model if it is. Because of the similarity of the characteristics of the LBM and LnMM, there is reason to expect that the numerical strategy used in the Petersen-Deddens approach will be applicable to the LnMM. The aim of this project is to investigate the sources of instability in estimation of the LnMM, and to propose an adaption of the Petersen-Deddens method if instability is found.	
PHPC	leigh.blizzard@utas.edu.au	Numerical stability in the estimation of the ordered log-link models	Three ordered log-link models have been proposed (Blizzard et al, 2013). They are the adjacent categories model, the continuation ratio model, and the proportional risk model. They are estimated by fitting a log multinomial model subject to (different sets of) constraints on the values of its coefficients. Just as the LnMM inherits potential for numerical instability from the LBM, the ordinal log-link models could be subject to the same problems of non-convergence that bedevil the LBM. The aim of this project is to investigate this issue and, if numerical instability is a problem, to determine whether it is possible to estimate the models using an adaption of the re-parametrization method of Petersen and Deddens.	
PHPC	leigh.blizzard@utas.edu.au	Goodness-of-fit tests for the log multinomial model	Risk and relative risk estimates for nominal outcomes with more than two attributes can be obtained from the log multinomial model. Having fitted a model, however, it is critical to assess whether a fitted model adequately represents the data. Goodness-of-fit measures have been developed for multinomial logistic regression. It is not known whether and in what circumstances the goodness-of-fit tests for the multinomial logistic model can be applied to the multinomial log-link model. The aim of this project is to study the application to the log multinomial model of easily derived and computed extensions of binary logistic regression goodness-of-fit tests for the multinomial logistic regression model. The sampling distributions of the test statistics will be examined via simulation.	

PHPC	leigh.blizzard@utas.edu.au	Goodness-of-fit tests for the ordinal log-link models	Each of the ordinal log-link models is log multinomial model estimated subject to constraints on the values of its coefficients. Three equivalent large-sample methods are available to assess whether the constraints result in significant loss of model fit. Each has an asymptotic distribution that is chi-squared with degrees of freedom equal to the number of additional constraints imposed. However, there is no overall goodness-of-fit test available for the ordinal log-link models, and no statistical theory consolidating the contributions of the overall fit of the models and the loss of fit due to the constraints. The aim of this project is to develop methodology to assess the fit of the ordinal log-link models.	
CMHD	Dr Seana Gall seana.gall@utas.edu.au	Sex differences in cardiovascular disease over the life course	Sex differences in cardiovascular and metabolic health are widely acknowledged but the reasons for them are not well understood. This lack of knowledge is potentially limiting our ability to prevent and manage these diseases. This project will use data from the Childhood Determinants of Adult Health (CDAH) study and the Australian Bureau of Statistics to look at sex difference in cardiovascular and metabolic health across the life course. You will explore the contribution of health behaviours, fitness, demographics, socioecononomic status and psychosocial factors to sex differences in cardiovascular and metabolic health from young to mid adulthood. The findings will be used to inform better and more tailored prevention strategies for cardiovascular and metabolic diseases.	A background in a health-related discipline is required. Some knowledge of epidemiology and/or statistics is useful but training will be provided in these areas.
CMHD	Seana.gall@utas.edu.au	REDucing Delays In aneurysmal Subarachnoid Haemorrhage: the REDDISH study	Aneurysmal subarachnoid haemorrhage (aSAH) is a rare but devastating form of stroke. Outcomes can be improved through rapid access to specialised radiological, surgical and intensive care facilities.This study will provide the first estimates of timeliness of care for aSAH and its predictors in Australia. We will determine the optimal window for treatment to reduce complications, improve survival and increase the proportion of people discharged home. This information will enable us to develop interventions to reduce delays and improve outcomes from this devastating disease. This NHMRC funded study includes: (1) a retrospective cohort study of cases of aSAH in Tasmania and Victoria, (2) a qualitative study including cases of aSAH, their families	A background in a health-related discipline is required. Some knowledge of epidemiology, statistics or qualitative research methods would be desirable but training will also be provided in these areas.

			and treatment teams to explore delays in treatment, and (3) the development of a clinical pathway to manage aSAH to reduce delays in treatment. There is scope for several PhD projects for people with an interest in epidemiology and quantative methods; qualtitative research and health services research.	
CMHD	Seana.gall@utas.edu.au	Understanding sex differences in stroke severity	Women appear to have more severe strokes than men with this contributing to their worse outcomes. This project will use data from several sources to gain a better understanding of the underlying mechanisms of this difference. The data sources may include a meta-analysis of pre-clinical experimental data from animal models and human data from clinical trials on stroke severity including neuroimaging. The candidate will work with a team of epidemiologists, laboratory scientists and clinicians.	A background in a health-related discipline is required. Some knowledge of epidemiology and/or statistics is useful but training will be provided in these areas.
CMHD	Prof James Sharman James.Sharman@utas.edu.au	Clinical and health economic usefulness of automated in-clinic blood pressure	A series of studies in patients having blood pressure assessed in general practice, as well as a specialist blood pressure clinic, to determine: 1) Feasibility and clinical usefulness of automated in- clinic blood pressure measurement. 2) Patient outcomes using this different model of care. 3) Cost effectiveness of this model of care in comparison to conventional medical approaches.	Physiology or Medicine
CMHD	Dr Martin Schultz martin.schultz@utas.edu.au James.sharman@utas.edu.au	Exercise Physiology in the Identification and Control of high Blood Pressure: the EPIC BP study.	The broad aims of the EPIC BP study program are to 1) identify those with exaggerated exercise blood pressure at the time of referral to exercise physiologist (EP) services in the community, as well as to determine the effect (and optimisation) of EP intervention on BP control and other hypertension- related markers of CV risk by randomised clinical trial in the EP community sector. This program of research holds excellent potential to influence patient care whilst exploring fundamental cardiovascular physiology in a world- class clinical research setting.	Completed a Bachelor Degree (preferably in exercise science/physiology) with First Class Honours or equivalent degree; or equivalent industry/research experience. - A flexible and team-oriented approach

CMHD	Dr Kazuaki (Kaz) Negishi kazuaki.negishi@utas.edu.au	Air pollution and cardiovascular disease	The goal of this PhD is to elucidate precise functional and biological mechanisms linking air pollution and cardiovascular disease to identify future target for prevention and early treatment. For this, you will be expected 1) to perform review of literature; 2) to run data linkage activity in the existing dataset; and 3) to analyse prospectively collected data.	Health Science (cardiovascular preferably), basic statistical/epidemiological understanding
CMHD	kazuaki.negishi@utas.edu.au	Application and appropriate use of advanced cardiovascular imaging technique on subclinical disease	The goal of this is to demonstrate the usefulness of applying advanced cardiovascular imaging for identifying early, subclinical signal in cardiovascular function for subsequent early intervention. For this, you will be expected 1) to perform review of literature on this topic; 2) to run data linkage activity in the existing dataset; and 3) to analyse prospectively collected data.	Health Science (cardiovascular preferably), basic statistical/epidemiological understanding
CMHD	Dr Michele Callisaya michele.callisaya@utas.edu.au	Improving the physical and cognitive health of older Australians at risk of falls and dementia	1. To examine whether a home-based exercise program delivered via a tablet can improve risk factors for falls in older people at risk of dementia 2. To determine whether there are differences in dual-task walking and concurrent prefrontal brain activity in healthy older people and those with cognitive impairment.	Physiotherapy; exercise physiology; experience working with older people preferred
ND/BI	Prof Tracey Dickson Tracey.Dickson@utas.edu.au	Microfluidic Technology To Help Understand Physical Damage ToBrain Cells	In this proposal we will develop microfluidic technology to allow us to understand changes in brain function at the levels of the cell and the circuit in response to a physical stretch injury. This will serve as a model for traumatic brain injury (TBI) – traumatic damage to the brain that occurs in response to an external force, such as in falls, accidents, violence and sport. The specific aims of the proposal are to: i) construct directional neuronal networks with molecularly defined populations of primary neurons and glia, physically stretch discrete areas of the network and monitor changes using live imaging; and ii) construct a stretchable microelectrode array to evaluate changes in electrophysiology throughout the network after the physical stretches.	Neuroscience, basic laboratory science, primary culture This is an interdisciplinary project combining basic neuroscience with microfabrication and analytical chemistry.

ND/BI	Dr Kaylene Young Kaylene.young@utas.edu.au	Understanding the role of protocadherins in regulating brain function and tumour formation		
ND/BI	Kaylene.young@utas.edu.au	What is the role of calcium in activity-dependent myelination?		
ND/BI	Kaylene.young@utas.edu.au	Using transcranial magnetic stimulation to direct myelin repair in multiple sclerosis		
ND/BI	Kaylene.young@utas.edu.au	Using rare genetic mutations to uncover novel therapeutic targets for multiple sclerosis		
ND/BI	Kaylene.young@utas.edu.au	Genome editing and induced pluripotent stem cells - how can we model multiple sclerosis?		
ND/BI	Dr Owen Marshall owen.marshall@utas.edu.au	Investigating epigenetic changes during Alzheimer's Disease progression	Although there are many different causes of dementia, epigenetic changes in the chromatin of neurons have recently been implicated in the progression of a number of neurodegenerative diseases, including Alzheimer's Disease. We have developed a powerful new technique for profiling genome-wide chromatin changes in the brain, using the fruit fly as a model organism. We will	This project will involve basic molecular biology (PCR, restriction digests, DNA extraction) and confocal microscopy, together with next-generation sequencing and bioinformatic analysis.

			apply this technique to specific populations of neurons at both early and late stages of disease progression. The epigenetic changes we observe will help identify candidate genes and chromatin factors that play a role in Alzheimer's Disease.	
CGI	Assoc Prof Joanne Dickinson Jo.Dickinson@ut as.edu.au Assoc Prof Kathryn Burdon kathryn.burdon@ utas.edu.au Dr Jac Charlesworth jac.charlesworth @utas.edu.au Dr Liesel Fitzgerald liesel.fitzgerald@ utas.edu.au	Elucidation of the genetic and epigenetic drivers of complex disease using established familial and/or case control human genetic resources	To identify key contributors to complex disease risk and disease progression through the study of large families with a dense aggregation of disease and/or case/control genetic resources ascertained on the disease of interest.* *This is a general overview of a range of projects available in complex diseases including cancer and eye disease.	Molecular biological techniques, cell biology and biostatistical/bioinformatic expertise
CGI	Prof Heinrich Korner Heinrich.Korner @utas.edu.au	TNF in alternative ve rsus inflammatory activation; A comparisonbetween mouse andhuman macrophage s in inflammatory models	TNF has a central, non-redundant role in macrophage differentiation and in the perpetuation of the host-protective inflammatory phenotype. Our results demonstrate that the proinflammatory TNF- TNFR1 signalling pathway directs the differentiation of monocytes towards inflammatory macrophages (M1) by repressing the development of alternatively activated (M2) macrophages. Failure to suppress the alternative pathway results in the co-expression of the M2 enzyme Arg1 and the M1-associated enzyme inducible or type 2 nitric oxide (NO) synthase (iNOS or NOS2). The enzymes are metabolic competitors. To explore the breadth of this new concept it needs to be investigated if TLR activation can overrule the role of TNF and if human macrophages respond in a comparable way when TNF is blocked.	

CGI	Heinrich.Korner@utas.edu.au	Do MS-associated genetic changes in Vitamin D metabolism affect the function of T cells	To bring genetic polymorphisms and biological phenotype into a context.	Immunology, biostatistics
CGI	Emeritus Prof Greg Woods G.M.Woods@utas.edu.au	Development of monoclonal antibodies to understand the phenotype and function of the immune response to DFTD*	The goal of this project is to produce monoclonal antibodies against key antigens to study the phenotype and function of devil immune cells.	
CGI	G.M.Woods@uta s.edu.au	Analysis of factors produced by DFTD* cancer cells that could influence the immune response	The goal of this project is to understand more of the DFTD cancer cells to determine if they express factors that suppress the immune response or inhibit lymphocyte migration, preventing lymphocytes from entering the tumour. *Devil facial tumour disease (DFTD) is a unique cancer because it is contagious. The cancer cells are transmitted between devils when they bite. It is killing Tasmanian devils and could cause their extinction. There is something special about the tumour cells that prevent the immune system from responding to the DFTD cancer cells. A limitation to studying devil facial tumour disease is a shortage of biological reagents, such as monoclonal antibodies.	Immunology, cancer biology, molecular genetics, protein biology
MSK	Prof Graeme Jones G.Jones@utas.edu.au	Tbone study- bone development in children from birth to age 25 years		Medicine, epidemiology/biostatistics, and/or public health
MSK	G.Jones@utas.edu.au	TASOAC study 10 year study of osteoarthritis, osteoporosis, falls, vitamin D and bone architecture		Medicine, epidemiology/biostatistics, and/or public health

MSK	Prof Changhai Ding changhai.ding@utas.edu.au	Synovitis, inflammatory makers and knee osteoarthritic changesover 10 years	This project, based on 2 established cohort study with 10 years' follow-up, will examine the associations between MRI-detected effusion-synovitis, Hoffa's synovitis, serum levels of hs-CRP, IL-6, TNF-alpha, knee structural changes including cartilage defects, bone marrow lesions, cartilage loss, and knee symptoms over 10 years.	Medicine, epidemiology, biostatistics, or public health
MSK	Dr Dawn Aitken dawn.aitken@utas.edu.au	Improving our understanding about osteoarthritis, developing new therapeutic treatments and informing strategies that optimise patient care (with an emphasis on the role of exercise in disease management)	Dr Aitken leads a program of research which aims to develop a better understanding of osteoarthritis and identify and test new treatments. She is also interested in the role of exercise in the management of osteoarthritis and improving the conservative (non-surgical) management of the disease. Depending on the student's interest and background a number of projects are available which include: • Long-term cohort studies which use MRI scanning to gain a better understanding of the development and progression of osteoarthritis; • Long-term cohort studies examining the relationship between physical activity and osteoarthritis; • Randomised controlled trials examining new therapeutic treatments for musculoskeletal pain; • Randomised controlled trials examining exercise as a treatment for osteoarthritis; • Research which examines why the conservative management of osteoarthritis is so poor in Australia, performing systematic reviews, meta-analyses and qualitative research methods.	Students from a number of backgrounds are welcome including medical and health sciences, epidemiology, biostatistics, allied health, and public health. Strong writing and statistical skills are desirable.
MSK	Prof Tania Winzenberg and Dr Feitong Wu Feitong.Wu@utas.edu.au	Predictors of falls in middle-aged women: the role of balance and lower limb muscle strength (the Pre-FALL Study)	Falls are a major health issue among older people (>65 years) - approximately 1 in 3 community-dwelling older people fall each year. Falls cause considerable injury, morbidity, mortality and costs. Falls increase with age and most work to date on falls prevention has occurred in older adults (>65 years). However, a high incidence of falls in middle-aged women has also been reported. **This middle-aged group of women has largely been ignored in the context of falls prevention.** An additional concern is that a single fall is one of the strongest risk factors for future falling. Therefore, developing early interventions to prevent a first fall is also an important strategy to reduce long-term falls risk. To address this issue, there is an urgent need to understand both the circumstances and risk factors for falls in middle-aged women.	Medicine, epidemiology, biostatistics, or public health

			Our data show that in middle-aged women, weaker muscle strength is associated with poorer balance. These results suggest that improving muscle strength and balance in midlife may be beneficial for preventing falls in late midlife and even older age. However, evidence is needed to support a direct link between falls risk factors in middle-age and future falls before development of early intervention programs can be justified. We have a unique existing cohort of middle-aged women (mean age 55 years in 2017) in whom we have measures of lower limb muscle strength and balance made in 2011-12, as well as of other potential falls risk factors. With these as baseline data, a further follow-up in 2017-18 will enable us to determine (a) whether modifiable falls risk factors in middle-age predict falls in later life; and (b) if deterioration in these factors create an additional risk of falling in later life.	