These are the Projects available this year; some project adverts will have an early deadline. As projects are filled the online table and the pdf project listing will be updated accordingly - We recommend bookmarking this webpage and keep checking for updates.

Who can apply for the Summer Studentship programme?

- The Summer Studentship is open to any undergraduate student who is currently enrolled at the University of Otago and at any NZ Universities.
- The purpose of the studentship is to encourage undergraduate students into research careers and therefore is NOT designed for those with PhD's, Masters, who have already graduated or set to graduate later in the year.

How to apply for a summer project?

- Students should select which project/s they are interested in applying for and send a brief one page CV to the contact email address of the supervisor listed on the project. If a supervisor has listed more than one project, it would be helpful to include the project reference #
- Students are asked to provide the name of a referee (Supervisor or Dean of School) if they are not currently studying with the University of Otago.

You need to read the student handbook before applying

NB: At this present time, the Research Office is in the process of securing funding for some projects. Once funding is secured and you have been selected, both the student and supervisor will be notified.

As projects are filled, the online table will be updated immediately. (sometimes the online pdf version will take at least 48hours to be uploaded)

Students need to note that until funding is successfully secured there will be a possibility some projects will not go ahead.

The deadline for project funding and placement is 1\textsuperscript{st} October.
<table>
<thead>
<tr>
<th>Primary Supervisor</th>
<th>Project #</th>
<th>Project Title</th>
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<tbody>
<tr>
<td>Prof. Sarah Romans</td>
<td>17-50</td>
<td>Bariatric surgery in the Seriously Mentally Ill</td>
</tr>
<tr>
<td>Dr. Richard Carroll</td>
<td>17-55</td>
<td>A pilot study to assess the feasibility of a regional familial endocrinopathy registry</td>
</tr>
<tr>
<td>Dr. Carol Johnson</td>
<td>17-58</td>
<td>10 yr Audit of Adjuvant Vaginal Vault Brachytherapy</td>
</tr>
<tr>
<td>Dr. Mickey Fan</td>
<td>17-59</td>
<td>Cold exposure and energy expenditure</td>
</tr>
<tr>
<td>Dr. Nanette Schleich</td>
<td>17-62</td>
<td>Study into the preservation of mouse brains through plastination for use in micro-CT imaging</td>
</tr>
<tr>
<td>Prof. Michael Baker</td>
<td>17-63</td>
<td>Health hazards: Perception and reality</td>
</tr>
<tr>
<td>Dr. Max Berry</td>
<td>17-67</td>
<td>Preserving life and limb: large animal models of critical care interventions</td>
</tr>
<tr>
<td>Dr. Max Berry</td>
<td>17-68</td>
<td>Effect of early life environment on maternal-pup interactions</td>
</tr>
<tr>
<td>Dr. Max Berry</td>
<td>17-69</td>
<td>Size matters: experimentally induced fetal growth restriction in guinea pigs</td>
</tr>
<tr>
<td>Prof. Sue Pullon</td>
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<td>Dispelling common nutritional myths</td>
</tr>
<tr>
<td>Prof. Sue Pullon</td>
<td>17-71</td>
<td>Pick the winners – predicting lifestyle change success</td>
</tr>
<tr>
<td>Dr John Wyeth</td>
<td>17-73</td>
<td>Equity of access for exceptional circumstances (NPPA) applications</td>
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</table>
**Project Title:**

**17-50 Bariatric surgery in the Seriously Mentally Ill**

<table>
<thead>
<tr>
<th><strong>Primary Supervisor</strong></th>
<th>Prof. Sarah Romans</th>
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<tr>
<td><strong>Email</strong></td>
<td><a href="mailto:sarah.romans@otago.ac.nz">sarah.romans@otago.ac.nz</a></td>
</tr>
<tr>
<td><strong>Co-Supervisors</strong></td>
<td>Dr. Susanna Every-Palmer, Dr. Mark Huthwaite</td>
</tr>
<tr>
<td><strong>Funding:</strong></td>
<td>The Research Office is still seeking funding opportunities for this project</td>
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<tr>
<td><strong>Ethics</strong></td>
<td>Ethics Required, to be determined once funding is secured</td>
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**Project Description:**

**AIM**

To identify how many patients in an inpatient psychiatric hospital setting, identified as being moderately to severely obese meet internationally accepted criteria for bariatric surgery (BS) and to enquire from a sub sample of this group what they know about BS and what their attitude to BS is?

**METHOD**

This project will utilize a mixed methodology of qualitative and quantitative data collection, including a literature review, a retrospective audit of patient files, and a structured interview of patients.

A review of relevant literature and policy will be conducted to explore the evidence for the efficacy and acceptability of BS in patients with severe mental illness. The audit will be retrospective examination of the clinical records of people in a forensic and rehabilitation inpatient psychiatric service to identify those meeting the criteria for bariatric surgery. Semi structured interviews will be conducted with a sub group of these patients to find out their views on this form of intervention; interviews are necessary as many have low literacy. A thematic analysis of these interviews will be conducted and key themes identified. Links will be made to relevant literature, and best practice both locally and internationally to develop recommendations for improving the health outcomes for people with severe mental illness who have the additional health burden of obesity.

**SIGNIFICANCE**

Patients admitted to forensic and rehabilitation inpatient facilities are commonly those with the high mental health morbidity, many of whom carry the additional health burden of obesity. Obesity is causally associated with numerous disease states and premature mortality in people with psychiatric disorder. Dieting and exercise, the conventional approaches to weight loss have been shown to be of little value as an intervention for moderate to severe obesity. People with severe mental illness are a significantly disadvantaged group with low levels of health literacy, whose physical health needs are often overlooked or not advocated for.

BS has been shown to be highly effective for patients without mental illness with moderate to severe obesity. The following criteria internationally regarded as eligibility criteria for surgery: a Body Mass Index (BMI) of above 40 kg/m2 or a BMI of 35 kg/m2 with comorbidities (type 2 diabetes mellitus, hypertension, obstructive sleep apnoea and or knee osteoarthritis) and BS should not be overlooked in this often stigmatised and discriminated against group of people.

Findings from this research will highlight a specific area of health need in patients with severe mental illness who are obese and will explore an important aspect of health literacy in patients carrying the additional health burden of obesity. Furthermore, it may identify areas for future research and policy development in this area. It builds on previous work carried about the the supervisors in the same clinical group.
<table>
<thead>
<tr>
<th>STUDENT ROLE</th>
<th>S/he will:</th>
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<tbody>
<tr>
<td></td>
<td>1. search the literature on acceptibility and efficacy of this interviews for obesity in people with serious mental illness and collate the findings</td>
</tr>
<tr>
<td></td>
<td>2. help construct a semistructured interview schedule to assess knowledge and attitudes to bariatric surgery</td>
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<tr>
<td></td>
<td>3. conduct these interviews with 80-100 inpatients</td>
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<tr>
<td></td>
<td>4. undertake simple univariate statistics for frequencies and means of the variables</td>
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<tr>
<th>EXPOSURE TO SCIENTIFIC METHOD</th>
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<tbody>
<tr>
<td>1.</td>
<td>literature management skills</td>
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<td>2.</td>
<td>interview schedule construction</td>
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<tr>
<td>3.</td>
<td>experience conducting semistructured interviews</td>
</tr>
<tr>
<td>4.</td>
<td>data management (cleaning, recording, simple frequency statistical analyses)</td>
</tr>
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</table>

| STUDENT PREREQUISITES | Medical student with library search and interviewing skills preferred |
# Project Title:

**17-5 A pilot study to assess the feasibility of a regional familial endocrinopathy registry**

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<thead>
<tr>
<th>Primary Supervisor</th>
<th>Dr. Richard Carroll</th>
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<tbody>
<tr>
<td>Email</td>
<td><a href="mailto:richard.carroll@ccdhb.org.nz">richard.carroll@ccdhb.org.nz</a></td>
</tr>
<tr>
<td>Co-Supervisors</td>
<td>Alana Gould (Endocrine Nurse Specialist)</td>
</tr>
<tr>
<td>Funding:</td>
<td>The Research Office is still seeking funding opportunities for this project</td>
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<tr>
<td>Funding:</td>
<td>The Research Office is still seeking funding opportunities for this project</td>
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</table>

## Project Description:

### AIM

To assess the feasibility of a 3DHB/Central NZ region registry for patients and families with familial endocrine tumour syndromes.

### METHOD

Increasingly, a predisposing germline mutation is suspected or identified in patients who develop an endocrine tumour. This mutation may predispose to tumours within one endocrine gland (isolated pituitary or parathyroid tumour syndromes, or more typically predispose to a syndrome of endocrine and none endocrine manifestations (MEN1-MEN4, Phaeochromocytoma-paraganglioma syndromes, etc). There are no data in New Zealand to indicate the frequency of these genetic mutations within our population, or the likelihood of any underlying germline mutation in those who present with established disease.

The scope of this registry project is currently under discussion with interested parties and it is likely the project will evolve prior to the student commencing the summer studentship. Ethical approval for the agreed project will be sought in advance of the studentship. This project would establish the feasibility of a regional registry collecting data on patients and their families with confirmed germline mutations, along with data on those patients who are referred for genetic testing based on clinical suspicion. The project will assess practical aspects around the creation of such a registry with respect to identification of appropriate cases and collection of relevant data. Patients domiciled within the 3DHB or Central NZ region (depending on initial numbers identified) with confirmed or clinically diagnosed germline endocrine tumour syndromes will be identified. Relevant demographic, genetic, clinical, biochemical, radiological, and interventional data will be extracted from medical records.

### SIGNIFICANCE

If creation of a regional registry is feasible and practical, this will be extended to a national registry which would potentially have a number of significant implications for clinical management and research in this field:

- As above, there are no data indicating the prevalence of germline endocrine tumour mutations in NZ. Work around this registry would therefore allow improved guidance on the appropriate use of genetics testing in those who present with established disease, and more appropriate resourcing of required management approaches.
- Many syndromes display a specific genotype-phenotype relationship, and data on this in the NZ population would help to inform biochemical and radiological surveillance programs. Alternatively, the phenotype of some mutations known to be present within the NZ population is only poorly understood presently; increased knowledge would aid the development of appropriate surveillance programs.
- The current management of patients and families with confirmed germline mutations differs significantly throughout NZ despite available clinical guidelines for many mutations. It is likely that a registry identifying these families will facilitate the standardization of clinical practice throughout NZ as has been observed with similar registries in other fields. Indeed this will be an active goal of the project.
| SIGNIFICANCE | This registry would greatly facilitate research within the field. As an example, patients with MEN1 frequently develop pancreatic neuroendocrine tumours which are generally low grade and indolent. Those that are perceived to have a higher risk of malignancy are generally removed, although this may be associated with significant morbidity. Identification of additional factors that may help differentiate between tumours that are likely to be clinically significant and those that are unlikely to cause concern throughout life would greatly improve clinical management and establishment of this registry would greatly aid research like this. |
| STUDENT ROLE | The student will be involved in all aspects of this initial phase of data collection. It is expected that the study could present outcomes of this project at relevant meetings, and would likely be invited to participate in the national Endocrine Society conference later in 2018 to present on this. |
| EXPOSURE TO SCIENTIFIC METHOD | Data collection, registry management. |
| STUDENT PREREQUISITES | Medical student with an interest in endocrinology, genetics, epidemiology, clinical research |
# Project Title:

**17-58 10 yr Audit of Adjuvant Vaginal Vault Brachytherapy**

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<thead>
<tr>
<th><strong>Primary Supervisor</strong></th>
<th>Dr. Carol Johnson</th>
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<tr>
<td><strong>Email</strong></td>
<td><a href="mailto:carol.johnson@ccdhb.org.nz">carol.johnson@ccdhb.org.nz</a></td>
</tr>
<tr>
<td><strong>Co-Supervisors</strong></td>
<td>Dr. Javier Stroud</td>
</tr>
<tr>
<td><strong>Funding:</strong></td>
<td>Waiting funding confirmation from the Cancer Society of New Zealand [Wellington Division]</td>
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<tr>
<td><strong>Ethics</strong></td>
<td>Ethics Required, to be determined once funding is secured</td>
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## Project Description:

### AIM

Wellington Hospital provides brachytherapy services to the lower half of the North Island. We have over 10 years' experience of treating patients with High Dose Rate brachytherapy (HDR) and have treated approximately 180 patients with vaginal vault brachytherapy. Some patients have been followed up locally with prospective data collection but many will have been followed up at other centres.

The aim of this audit is to report on two cohorts – those treated with HDR as sole adjuvant therapy and those who have in addition had adjuvant external beam radiation. The audit will focus on local control and toxicity with other end-points including overall survival, cancer specific survival, disease free survival, patterns of relapse.

A second component to the study will look at applicator choice - the dose deliverable by the 2 different types of applicators to the target and the stand-off to the vaginal mucosa.

### METHOD

A letter/audit form will be sent out to GPs/gynaecologists/relevant clinicians to collect data (prior to commencement of studentship) to supplement data held within CCDHB records.

Tumour control and toxicity outcome data will be determined and reported against international benchmarks.

The vaginal mucosa will be contoured and dose to surface calculated and absolute maximum stand-off measured. Those patients scanned with both applicator options will have comparative reports.

### SIGNIFICANCE

This will be the first audit of this service component. As a regional service we have a responsibility to our referring DHBs to report on the outcomes – always a balance of efficacy and toxicity – and to inform our patients referred to our service. There is a choice of applicators but the planning complexity is greater with one (ovoids) than the other (cylinder). The study will assess the difference in coverage achieved for those using the more complex applicator treatment (ovoids) and describe the frequency of applicators used for equipment replacement planning.

### STUDENT ROLE

The student will complete a database entering data from paper prospective data, clinical letters on Concerto and from retrospective audit forms.

The student will determine the outcomes with respect to tumour control and toxicity.

The student will identify the target vaginal mucosa (for the planner to calculate dose) and measure the stand-off from mucosa to applicator.

The student will identify to what extent dose delivery is improved by using ovoids and determine the frequency ovoids may be selected over cylinders.

### EXPOSURE TO SCIENTIFIC METHOD

- Retrospective audit.
- Various end-points both tumour control and toxicity.
- Use of both volumetric and single measurement comparisons.

### STUDENT PREREQUISITES

Preference given to medical student in clinical years. Must have ability to set up and query database.
**Project Title:**

**17-59 Cold exposure and energy expenditure**

<table>
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<tr>
<th><strong>Primary Supervisor</strong></th>
<th>Dr. Mickey Fan</th>
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<tr>
<td><strong>Email</strong></td>
<td><a href="mailto:mickey.fan@otago.ac.nz">mickey.fan@otago.ac.nz</a></td>
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<td><strong>Funding:</strong></td>
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<tr>
<td><strong>Ethics</strong></td>
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**Project Description:**

**AIM**

To determine the body’s metabolic response to environment cold

**METHOD**

Using NZ’s only environmental and calorimetry suite at the Centre for Translational Physiology, we will assess the changes in metabolism during acute exposure to environmental cold. In an effort to replicate a standard day for office workers, metabolic rate will be assessed using whole-room calorimetry during an 8-hour mild cold exposure (17°C).

**SIGNIFICANCE**

Obesity is the result of a positive energy balance due to a mismatch between energy intake and expenditure. Despite efforts to improve our diet and lifestyle, obesity remains a worsening global problem. Elevating resting metabolism is an untapped avenue for combating the rising prevalence of obesity worldwide. By assessing dynamic metabolic changes during cold exposure, this study aims to identify the pathways responsible for elevating resting metabolism. Findings from this study could constitute novel targets for energy balance management.

**STUDENT ROLE**

Successful candidate will be involved in participant recruitment and assist in experimental testing and data analysis.

**EXPOSURE TO SCIENTIFIC METHOD**

The project will expose the student to a wide range of cutting edge experimental techniques used in integrative physiological research such as whole-room calorimetry and neuroimaging.

**STUDENT PREREQUISITES**

Any student
**Project Title:**

**17-62 Study into the preservation of mouse brains through plastination for use in micro-CT imaging**

<table>
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<tr>
<th>Primary Supervisor</th>
<th>Dr. Nanette Schleich</th>
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<tr>
<td>Email</td>
<td><a href="mailto:nanette.schleich@otago.ac.nz">nanette.schleich@otago.ac.nz</a></td>
</tr>
<tr>
<td>Co-Supervisors</td>
<td>A/Prof Niels Hammer</td>
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<tr>
<td>Funding</td>
<td>The Research Office is still seeking funding opportunities for this project</td>
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<tr>
<td>Ethics</td>
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**Project Description:**

**AIM**

This proposal aims at studying different tissue conservation methods (plastination) for their suitability for mouse brain micro computed tomography (CT). The study is part of a larger research project on spectral CT and monoenergetic synchrotron CT imaging for pre-clinical research into brain cancer treatments. In particular, the aims for this summer student project are:

- to test (and modify if necessary) a custom-built sample holder for the SkyScan micro-CT scanner;
- to image existing plastinated samples with conventional micro-CT and analyse the results;
- to plastinate several samples over the Christmas / New Year holiday period;
- to image the newly plastinated samples with micro-CT, analyse the results and assess the suitability of the plastination technique;
- to evaluate the results in the context of existing spectral CT and synchrotron CT scans.

There may be an opportunity to also perform scans with spectral CT in Christchurch (TBD).

**METHOD**

The plastination of tissues consists of several steps – fixation, dehydration, vacuum impregnation, and curing – which can be performed with different solvents and polymers. Preservation ideally retains the properties of the original sample, but depending on the choice and combination of plastination agents, the results will vary in properties such as deformability and solubility, and the original tissue may have undergone shrinkage. Of relevance for spectral and monoenergetic CT imaging are in particular the photon attenuation properties of the resulting plastinated tissues.

The wider research project, of which this study is part of, investigates different combinations of fixation, dehydration and curing techniques. Each technique is tested on a small number of specimens, and the techniques providing the most satisfactory results is further optimised and repeated with the long-term aim to achieve several plastinated mice for the research into spectral and monoenergetic CT imaging of healthy mouse brain. Timeframes for the techniques vary between two weeks to two months for mouse brains and longer for whole mice.

For this student project, plastination techniques that can be achieved within 2–3 weeks will be chosen and several specimens prepared in December, to be ready for imaging in January. Plastination work will be performed in the Department of Anatomy, UO Dunedin, with the help of the supervisors and a staff member who is an experienced plastinator. To assess the suitability of each technique, the plastinated specimens will undergo conventional micro-CT scans using a SkyScan 1172 scanner at the Anatomy Department. Previously prepared plastinated mice will be scanned and/or analysed for comparison. A custom-built sample holder for use with the SkyScan will be tested, and if necessary, modified.

CT images will be analysed using SkyScan specific software as well as open source image processing software (e.g. ImageJ) and/or Matlab routines.

**SIGNIFICANCE**

This is a study to test different tissue conservation methods (plastination) for their suitability for spectral CT and monoenergetic synchrotron CT imaging of healthy mouse brain. The study is part of a larger research project – Spectral CT and synchrotron CT for pre-clinical research into brain cancer treatments: PI Nanette Schleich – whose purpose is to develop spectral and monoenergetic CT to detect and monitor brain tumours in mice in-vivo non-invasively.
**SIGNIFICANCE**

Work performed previously using the MARS Spectral CT scanner located at the UO Christchurch campus and the Imaging and Medical Beamline (IMBL) at the Australian Synchrotron, Melbourne, included scans of healthy euthanized mice, either freshly culled or LN2-snap-frozen, to test different imaging protocols for mouse head scans and to develop and test different sample holder solutions to allow for scanning of frozen mice.

Whilst imaging freshly euthanized mice has shown good results, and each freshly culled mouse can be used for several scans, this approach is not ideal. With frozen mice and cryogenic sample holders a number of technical difficulties have also been experienced (such as ice accumulation impacting on image quality). Even though new technical solution for keeping frozen mice cooled inside the MARS scanner or on the translation table of the IMBL have been developed, they will not easily allow for repeat scanning of samples with different modalities (not least as shipping of frozen animals between NZ and AU is fearfully expensive).

We therefore have in 2016 started to test different plastination techniques for their suitability for monoenergetic and spectral CT imaging of healthy mouse brain, and imaged the first four plastinated mice with conventional micro-CT (Skyscan, Dunedin, Nov 2016), spectral CT (MARS, UOC, Nov/Dec 2016) and synchrotron CT (Beamtime IMBL M11305, Melbourne, Dec 2016, PI Nanette Schleich), respectively.

Using plastinated mice will:
- avoid the need for euthanizing a new mouse for each scanning session;
- avoid errors and uncertainties introduced into the comparison of scans with different settings due to culling, mounting, inter-animal variations etc, and thus support more meaningful results;
- ensure direct comparability of scans with different scanner settings as they can be performed on the same plastinated specimen, even if scanned on different days.

The PI has current valid euthanasia approvals at UO Dunedin and UO Christchurch (2016–19). Materials and instrumentation required for this research (including plastination chemicals, mice, scanner time, phantoms, workshop time) are already available and/or have been funded through other grants.

**STUDENT ROLE**

This Summer Studentship Project is expected to be completed within 10 weeks and will complement current research of the supervisors into plastination techniques suitable for spectral and synchrotron CT.

The student will be supported throughout the project by the supervisors and staff at the Department of Anatomy (in particular the plastinator).

The student will:
- review relevant plastination techniques and the basics of conventional CT versus monoenergetic and spectral CT imaging;
- review mouse plastinations performed to date within the wider project, imaging results and analyses;

**EXPOSURE TO SCIENTIFIC METHOD**

The student will be exposed to scientific work including literature review, hypothesis and experimental design, and write-up. The student will learn/revise basics of medical imaging, in particular conventional and spectral/monoenergetic CT, and will be introduced to data reconstruction and analysis in the context of CT and image quality assessment. The student will gain experience with research in the novel field of plastinations and in micro-CT imaging, and undertake experimentation and preparation of research for publication.

**STUDENT PREREQUISITES**

The student must be based on the Dunedin campus over summer. There may be an opportunity for a short research trip to use a different CT scanner. The student will ideally have a relevant science background (such as medical physics, bioengineering, physics, chemistry, medical sciences) or a background that includes a suitable science component.
Project Title: 17-63 Health hazards: Perception and reality

Primary Supervisor | Prof. Michael Baker
Email | michael.baker@otago.ac.nz
Co-Supervisors | A/Prof Simon Hales
Funding: Yes, Otago Research Committee
Ethics | Ethics is Required

Project Description:

AIM

1. To describe how the media presents diverse human health hazards (the hazardscape*) to the population of Wellington.

2. To describe in broad terms how this hazardscape is managed across sectors, along with important gaps, inconsistencies and potential improvements.

* The term ‘Hazardscape’ describes “...the net result of both natural and human-made (anthropogenic) hazards and the cumulative risks that they pose across a given geographical area. This includes the interactions among nature, society, and technology at a variety of spatial scales, creating a mosaic of risks that affect places and the people who live there.” (Kelley and Covi. Environmental Health Insights 2013:7 67–69).

METHOD

1. The media hazardscape - Media coverage of hazards will be described by conducting a systematic text search of news media report sampled from a year of coverage (from sources such as the Dominion Post Newspaper and Stuff website). The project supervisors will work with the student to develop a standard way of extracting information about media reports of hazards. This will include fields such as the nature of the hazard, its setting, risk of health effects, seriously of these health effects, apparent importance of the hazard, potential for the public to protect themselves, and government agency responsible for managing that hazard.

   This information will be entered onto a database (Excel) and then analysed.

2. The health protection hazardscape - The student will describe the hazards managed by key agencies in Wellington (local, regional, national Government levels). This process will be based on:
   • A search of the websites of the public agencies responsible for hazard management along with key documents and legislation to identify an inventory of the hazards they manage.
   • A search of documents produced by these key agencies.
   • Interviews of key staff to identify their broad approach to assessing and managing hazards.

3. Synthesis - The student will compare the hazardscape that is being presented to the public with the hazardscape that is being managed by key agencies. This will draw out key themes, as noted under significance (below).
### SIGNIFICANCE

This project is testing two important hypotheses:

- That the public is exposed, via the media, to a wide hazardscape that might threaten their health and wellbeing, but without providing them with good ways of ranking the importance of these hazards and managing their risk.

- That the agencies that manage hazards across different sectors use quite diverse ways of assessing, ranking, and managing hazards that may prevent resources being applied to the most important hazards, thus limiting effective interventions.

The information from this project will be used in two ways:

- To produce a paper that summarises the main findings and suggests ways of improving our management of the human hazardscape at a societal level (potential viewpoint article for NZ Medical Journal).
- As a contribution to the Health Protection paper being taught in the Department of Public Health.

### STUDENT ROLE

The student will be an active participant in all stages of this project, including: Literature review; Refinement of methods; Extraction of data from a sample of media reports, websites, and documents; Data analysis; and Preparation of a draft paper based on the findings.

### EXPOSURE TO SCIENTIFIC METHOD

This project will expose the student to a wider set of public health and social science research skills including: Conceptualising a research study; Refining hypotheses; Study design; Design of data extraction tools; Data analysis; Scientific writing; and Preparing work for publication.

### STUDENT PREREQUISITES

Excellent analytical thinking and writing skills.
**Project Title:**

**17-67 Preserving life and limb: large animal models of critical care interventions**

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<tr>
<th><strong>Primary Supervisor</strong></th>
<th>Dr. Max Berry</th>
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<tr>
<td><strong>Email</strong></td>
<td><a href="mailto:max.berry@otago.ac.nz">max.berry@otago.ac.nz</a></td>
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<tr>
<td><strong>Co-Supervisors</strong></td>
<td>Dr Rebecca Dyson</td>
</tr>
<tr>
<td><strong>Funding:</strong></td>
<td>Waiting funding confirmation from the Surgical Research Trust</td>
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<td><strong>Ethics</strong></td>
<td>Ethics Required, to be determined once funding is secured</td>
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**Project Description:**

**AIM**

To review the literature around the use of large animal models to assist with development and retention of surgical and critical care skills. The advantages, limitations and ethical considerations will be explored.

**METHOD**

The student will comprehensively review the literature on the use of animal models in emergency care. In collaboration with the supervisory team, key areas of interest will be identified (e.g., critical airway management, cardiac injury) and developed further. The regulatory, ethical and resource implications of large animal training models will be explored. Their role as an adjunct to other training modalities such as augmented reality, simulation, and didactic clinical training will be explored.

**SIGNIFICANCE**

The development and retention of skills necessary to preserve life and limb in the context of an unexpected acute event are difficult to teach and maintain in routine clinical practice. We have extensive experience of using anaesthetised large animals as a training model for acute care teams (prehospital, ED, anaesthesia) to refine these essential skills and develop improved care techniques. It would be very valuable to those working in the field to have an updated review paper describing the benefits / limitations and ethical issues around the use of animal models of this kind.

**STUDENT ROLE**

The student’s primary role is the preparation of a review paper on the use of large animals as a model for critical care skills training, for which they will be an author. The student will work with clinical academics, post doctoral researchers, the technical staff of the Biomedical Research Unit and clinicians from acute care disciplines. They will be able to participate in the on-going development and running of courses available to ED physicians and anaesthetists.

**EXPOSURE TO SCIENTIFIC METHOD**

The student will be part of an interdisciplinary team that works co-operatively to develop critical care skills training. They will learn about the stringent requirements of biomedical research including the ‘3-Rs’ principals, the process of making an application to the animal ethics committee, and ethical care and treatment of research animals. They will be taught how to use search engines such as PubMed effectively to identify relevant publications and develop skills in literature review including the critical appraisal of medical and educational literature. They will be assisted in the preparation of a publication standard manuscript.

**STUDENT PREREQUISITES**

Biomedical background
**Project Title:**

17-68 Effect of early life environment on maternal-pup interactions

<table>
<thead>
<tr>
<th><strong>Primary Supervisor</strong></th>
<th>Dr. Max Berry</th>
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<tr>
<td><strong>Email</strong></td>
<td><a href="mailto:max.berry@otago.ac.nz">max.berry@otago.ac.nz</a></td>
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<tr>
<td><strong>Co-Supervisors</strong></td>
<td>Dr Rebecca Dyson</td>
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<tr>
<td><strong>Funding:</strong></td>
<td>The Research Office is still seeking funding opportunities for this project</td>
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<td><strong>Ethics</strong></td>
<td>Ethics Required, to be determined once funding is secured</td>
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### Project Description:

<table>
<thead>
<tr>
<th><strong>AIM</strong></th>
<th>To develop the analysis techniques to assess maternal-pup interaction in guinea pigs following changes in perinatal environment.</th>
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</table>
| **METHOD** | Students will review high-definition videos of newborn maternal-pup interaction in guinea pigs to develop a scoring matrix defining the frequency, type and quality of mother-pup behaviours including grooming, feeding and vocalisation.  

The differences in maternal-pup interactions between groups will be examined and the findings prepared for publication. |
| **SIGNIFICANCE** | Events in early life are a major determinant of later health and wellbeing – the DOHaD (Developmental Origins of Health and Disease) paradigm. Mother-offspring interactions in the newborn period can have powerful and pervasive effects on physical (such as blood pressure) and psychological outcomes.  

We have a number of experimental models that reflect important, clinically relevant, early life perturbation including fetal exposure to maternal drug use, preterm birth and/or operative birth. Understanding how these early life experiences alter maternal-pup interaction is an important foundation step towards being able to improve physical and psychological health in affected offspring. |
| **STUDENT ROLE** | Tools are already available to assess maternal-offspring interaction in older guinea pigs and in newborn rodents, but not in the newborn guinea pigs. The student will work with our interdisciplinary team of clinical-academics, post-doctoral scientists, animal technician and clinicians to (i) develop a scoring system for the assessment of maternal-pup interactions and (ii) see how they differ between experimental groups. In addition, the student will assist with the preparation of a manuscript describing the findings. |
| **EXPOSURE TO SCIENTIFIC METHOD** | The student will be part of an interdisciplinary team that works co-operatively to understand the mechanisms underpinning the DOHaD phenomenon. They will learn about the stringent requirements of biomedical research including the ‘3-Rs’ principals and ethical care and treatment of research animals. They will be taught how develop and validate new assessment tools and to analyse the results using appropriate statistical software and will be assisted in the preparation of a publication standard manuscript. |
| **STUDENT PREREQUISITES** | Biomedical background |
### Project Title:

**17-69 Size matters: experimentally induced fetal growth restriction in guinea pigs**

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### Project Description:

#### AIM

To assess the efficacy of gestation within a hypoxia chamber as a model for induced fetal growth restriction in guinea pigs.

#### METHOD

Pregnant time-mated guinea pig sows will be transitioned to a hypoxic chamber in early gestation and remain there until 3 days prior to delivery. The impact of maternal hypoxia on fetal and placental growth, pup number, birth weight and postnatal growth will be compared to that achieved in control animals maintained in normoxia.

#### SIGNIFICANCE

Events in early life are a major determinant of later health and wellbeing – the DOHaD (Developmental Origins of Health and Disease) paradigm. Intrauterine growth restriction (IUGR) has profound adverse effects that persist into adult life; amongst others, increased rates of neurodevelopmental impairment, hypertension, diabetes and obesity. Before we can develop novel therapeutic interventions to address these issues we need to reliably induce experimental IUGR that mirrors the same pathophysiological characteristics seen in affected human infants. Maternal hypoxia has been used extensively in sheep and other rodents. However, guinea pigs are physiologically more closely aligned to humans and therefore this translational biomedical model will be a powerful tool for the development of novel, clinically important interventions.

#### STUDENT ROLE

The student would be responsible for assisting with caring for sows exposed to a hypoxic environment. The student will work with our interdisciplinary team of clinical-academics, post-doctoral scientists, animal technicians and clinicians to (i) assess the wellbeing of sows maintained in the hypoxic chamber (ii) assess fetal and postnatal offspring characteristics (including ultrasound measures of fetal growth and wellbeing, DXA measured postnatal body composition, administration and analysis of glucose tolerance tests) and see how they differ between experimental groups. In addition, the student will assist with the preparation of a manuscript describing the findings.

#### EXPOSURE TO SCIENTIFIC METHOD

The student will be part of an interdisciplinary team that works co-operatively to understand the mechanisms underpinning the DOHaD phenomenon. They will learn about the stringent requirements of biomedical research including the ‘3-Rs’ principals and ethical care and treatment of research animals. They will be taught how to work with an interdisciplinary team to develop a new biomedical model, to quantify and analyse the outcomes and will be assisted in the preparation of a publication standard manuscript.

#### STUDENT PREREQUISITES

Biomedical background
## Project Title:

**17-70 Dispelling common nutritional myths**

### Primary Supervisor Information

<table>
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<tr>
<th>Primary Supervisor</th>
<th>Prof. Sue Pullon</th>
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<tr>
<td>Email</td>
<td><a href="mailto:sue.pullon@otago.ac.nz">sue.pullon@otago.ac.nz</a></td>
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<tr>
<td>Co-Supervisors</td>
<td>McHugh P, Smith M</td>
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<tr>
<td>Funding</td>
<td>Yes, RNZCGP (College of GPs)</td>
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<td>Ethics</td>
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### Project Description:

**AIM**

The rising burden of chronic disease has thus far been largely under addressed in NZ and Western countries, yet it threatens to cripple the health system. There has to be a better approach, and we are doing our part to help with one small piece of the puzzle.

How do you dispel nutritional myths? Well, you find out what people believe first. This will involve a combination of qualitative methods and case based scenarios in order to address or dispel common myths held by members of the community, including health care practitioners.

**METHOD**

The project will involve a wide scope of learning, including literature review, data collection in the form of interviews with key stakeholders/community members, and data analysis, with emphasis on progressing towards publication. You will collect information from a range of sources on common nutritional advice / beliefs / myths surrounding a plant based diet, and review the evidence in a systematic way, including crafting case reports from available data and reviewing previous research on this.

**SIGNIFICANCE**

In Tairāwhiti we run a charitable trust which is delivering a community programme. Our previous research has focused on the use of a plant-based diet for various chronic diseases, mainly obesity.

The local team, supported from the Dept PHC&GP at UOW, is composed of Nick Wright, Morgen Smith, Patrick McHugh and Bruce Duncan. You’ll work mostly with Nick and Morgen, but all of us will play a role in supervising you. We run a community programme during the year, and have collected data from this. People love a good story, and as long as this is crafted well, it will present a range of views that will inform the next stages of research by the local team and be very publishable.

**STUDENT ROLE**

As the summer student you would be involved in a wide scope of learning, including literature review and data analysis, with emphasis on progressing towards publication. You will be collecting the ‘myths’, collate these, research background around these, correct those who are wrong and confirm those who are right. You’ll be crafting the paper, but have a lot of input from the other people in the research team on this.

**EXPOSURE TO SCIENTIFIC METHOD**

You’ll be working with a group of healthcare professionals who are working on research, familiar with what will work and what won’t, and how to go about the details. You’ll learn how to take a project from inception to publication - literature and other resources review, develop your interview skills, and undertake data collation and analysis, synthesis and writing the report.

We’ll walk you through reviewing scientific evidence, you’ll be able to present your own ideas to us and we can review those, helping you to craft something of scientific rigour and give you more understanding of the science behind research.

**STUDENT PREREQUISITES**

This project is open to health professional students. Preferentially, it will be available to students who come from the Tairāwhiti region. We envision that the majority of the work will be undertaken in Tairāwhiti, with the ability to spend 3-4 days in Wellington for training at the start of the studentship. A similar period may be required at the end of the period.
**Project Title:**

**17-71 Pick the winners – predicting lifestyle change success**

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<td>Co-Supervisors</td>
<td>Duncan B, Wright N, McHugh P</td>
</tr>
<tr>
<td>Funding:</td>
<td>Yes, RNZCGP (College of GPs)</td>
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**Project Description:**

**AIM**

If you told someone to change their diet, but they weren’t ready, then you’d have little chance of success. The use of scarce resources necessitates that we use our public healthcare dollar wisely. So, is there a way to predict later success with a lifestyle change? We want you to begin to answer this big question: what are the factors that are associated with success in a dietary change? This could be anything from personality factors, to age, to financial situation.

**METHOD**

You will undertake a literature (and other publicly available resources) review, including including information from our work to date, which will enable you to begin to collate points of interest. Who was successful, and under what circumstances? You’ll get qualitative methods experience in analyzing written documents, synthesising the results and develop your skills in report and publication writing.

**SIGNIFICANCE**

The rising burden of chronic disease has thus far been largely under addressed in NZ and Western countries, yet it threatens to cripple the health system. There has to be a better approach, and we are doing our part to help with one small piece of the puzzle.

In Tairāwhiti, we run a charitable trust which is delivering a community programme. Our previous research has focused on the use of a plant-based diet for various chronic diseases, mainly obesity. This work will help support ongoing research in this important area, in Tairawhiti but also in NZ more generally.

**STUDENT ROLE**

You’ll be working with a group of healthcare professionals who are working on research, familiar with what will work and what won’t, and how to go about the details. The local team, supported but the Dept of PHC&GP at UOW, is composed of Nick Wright, Morgen Smith, Patrick McHugh and Bruce Duncan. You’ll work mostly with Nick and Bruce, but all of us will play a role in supervising you. You’ll learn how to take a project from inception to publication.

**EXPOSURE TO SCIENTIFIC METHOD**

You will undertake a literature (and other publicly available resources) review. You’ll get qualitative methods experience in analyzing written documents, synthesising the results and develop your skills in report and publication writing.

**STUDENT PREREQUISITES**

This project is open to health professional students. Preference will be given to students who come from the Tairāwhiti region. The majority of the work will be undertaken in Tairāwhiti, with the ability to spend 3-4 days in Wellington for training at the start of the studentship. A similar period may be required at the end of the period.
**Project Title:**

**17-73 Equity of access for exceptional circumstances (NPPA) applications**

**Primary Supervisor Information**

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<tr>
<th>Primary Supervisor</th>
<th>Dr John Wyeth</th>
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<td>Email</td>
<td><a href="mailto:john.wyeth@pharmac.govt.nz">john.wyeth@pharmac.govt.nz</a></td>
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<tr>
<td>Co-Supervisors</td>
<td>Dr Scott Metcalfe</td>
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<tr>
<td>Funding</td>
<td>YES, PHARMAC</td>
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**Project Description:**

**AIM**

To describe and determine access to NPPA by socio-demographic characteristics.

**METHOD**

Review of existing database with non-identifiable patient data of applications which contains information on disease, treatment and other factors.

Compare findings to an earlier review of exceptional circumstances applications.

**SIGNIFICANCE**

PHARMAC objective is to obtain best health outcome from available funding. If there is inequitable access to medicines this will compromise health outcomes achieved.

**STUDENT ROLE**

The student will be part of the medical directorate at PHARMAC with support from other directorates in obtaining the data and in analysis.

**EXPOSURE TO SCIENTIFIC METHOD**

The project will give experience in working with databases, use of simple statistics and review of published literature. The student will also have the opportunity of working within PHARMAC and learn about funding of pharmaceuticals, critical appraisal of papers, and health economics.

**STUDENT PREREQUISITES**

medical student