<table>
<thead>
<tr>
<th>FACULTY OF ARTS &amp; SOCIAL SCIENCES:</th>
<th>PROJECTS 1 – 11</th>
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<tbody>
<tr>
<td>Environmental Planning</td>
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<td>Health Science</td>
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<td>Women and Gender Studies</td>
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<th>FACULTY OF COMPUTING &amp; MATHEMATICAL SCIENCES:</th>
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<tr>
<td>Computer Science</td>
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<td>Crime Science</td>
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<td>Mātauranga Māori</td>
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<td>26-30</td>
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<td>FACULTY OF SCIENCE &amp; ENGINEERING - SCHOOL OF SCIENCE</td>
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<td>57</td>
<td>TE PIRINGA – FACULTY OF LAW</td>
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<td>58-66a</td>
<td>WAIKATO MANAGEMENT SCHOOL</td>
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ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
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<tr>
<th>Supervisor/s:</th>
<th>Kate Mackness and Catherine Raeburn (NCC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Urban Design Controls</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FASS</td>
</tr>
<tr>
<td><strong>Field:</strong> Planning / Environmental Planning</td>
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</table>

EXPECTED OUTCOMES:

1. An understanding on the cost/benefits of introducing various design controls
2. An assessment of how the introduction of design controls may impact on NCC’s growth objectives
3. Knowledge of successful implementation and outcomes of Council-initiated urban design controls

STUDENT TASKS:

1. Researching best practice
2. Summarising and reporting findings
3. Interviews with planners from councils who have implemented design controls (via phone or in person)
4. Presentation of findings to Napier City Council City Development Team (powerpoint and written report)

REQUIRED SKILLS:

1. Prefer a environmental planning/social sciences student
2. Research and data gathering methods and analysis
3. Someone with attention to detail, critical thinking and report writing skills

PROJECT ABSTRACT:

The Ministry for the Environment describe urban design as a process and outcome that makes connections between people and places, between public and private space, between the natural and built environment, between movement and urban form, and between the social and economic purposes for which urban space is used.

Councils have a number of tools in the toolbox to promote and regulate good urban design at a range of spatial scales. These scales include the regional structure of suburbs and town centres, down to private lot design and include tools such as District Plans, Structure/Masterplans Plans, design briefs and specific design guidelines.

Achieving better standards of urban design requires a careful mix of both regulatory and non-regulatory measures in order to be successful.
Napier City Council are in the process of reviewing their District Plan which currently does not have a particularly strong focus on achieving good urban design outcomes.

Fortunately, there has been much research and practice around the country recently that assesses the value of the different methods of urban design controls, versus the costs of regulation. An example of a potential cost is the impact that design controls can have on a region’s growth objectives.

The purpose of this research is to provide the Council with a stocktake of the extent of design controls in residential and commercial zones around the country. The research would focus on the range of design controls that have recently been introduced nationally and provide a summary of the options evaluated in the RMA Section 32 report required for their introduction.

The student will be required to visit Napier early in the project, but can undertake the majority of the work remotely.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
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<tr>
<th>Project #:</th>
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<tbody>
<tr>
<td>Supervisor/s:</td>
<td>Kate Mackness</td>
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<tr>
<td>Project Title:</td>
<td>Intensification Areas</td>
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<tr>
<td>Faculty:</td>
<td>FASS</td>
</tr>
<tr>
<td>Field:</td>
<td>Planning</td>
</tr>
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</table>

### EXPECTED OUTCOMES:

1. Overview of CPTED literature for intensely re-developed areas
2. Report summary of analysis of district plan provisions related to CPTED for intensification areas; and of selected resource consents
3. Report summary of analysis of crime data
4. Summary of on-site locational CPTED audit
5. Identification of features unique to the intensification areas with implications for CPTED
6. Recommendations to address matters arising from the above Outcomes

### STUDENT TASKS:

1. Overview of CPTED literature relating to more intensely re-developed areas
2. Collect and analyse relevant crime data
3. Analysis of relevant sections of the Hamilton City Operative District Plan; and a selection of relevant resource consents
4. On-site locational CPTED audit
5. Summarise and collate information into a written report

### REQUIRED SKILLS:

1. Environmental Planning student, or student with knowledge of EP
2. High quality written skills
3. Research skills
4. Self motivated and well organised
The New Zealand Ministry of Justice defines Crime Prevention Through Environmental Design (CPTED) as a crime prevention philosophy based on proper design and effective use of the built environment, intended to reduce crime and fear of crime by reducing criminal opportunity and fostering positive social interaction among legitimate users of space. Local authorities have statutory responsibilities under the Resource Management Act 1991 and the Local Government Act 2002 for enabling people to provide for their social, economic and cultural well-being, and for their health and safety. Council responsibilities include providing for community needs for infrastructure, management of public streets, public places and other public infrastructure such as museums, libraries, pools and interface areas. CPTED, and urban design in general, is therefore of great interest to planners.

Redevelopment and intensification areas can pose particular challenges in terms of design of the built environment which may affect crime and perceptions of crime in the area. The purpose of this research is to compare two intensification areas identified in the Hamilton City Operative District Plan to investigate whether there are features of these intensification areas which influence the nature of crime in these areas, and if so, to explore the nature and implications of these differences. The research would focus on analysing New Zealand Police and Statistics New Zealand crime data for these selected areas; undertaking an on-site locational CPTED audit; analysis of relevant sections of the Hamilton City Operative District Plan; and analysis of a selection of relevant resource consents sourced from Hamilton City Council. It is anticipated that the research results would be used as a resource to assist local authority planners in building sustainable environments that provide for the economic and social well-being of the community, as well as potentially as a basis for a publication.
ACADEMIC PROJECT SUBMISSION DETAILS:

PROJECT #: 3

Supervisor/s: Silvia Serrao-Neumann and Kim Anstey (Napier City Council)

Project Title: State of the Environment Snapshot Report

Faculty: FASS | Field: Environmental Planning

EXPECTED OUTCOMES:

1. A spreadsheet of resource consent data
2. A spatial map of subdivision consents by zone
3. A summary report identifying key patterns and themes

STUDENT TASKS:

1. Reading and categorising resource consents
2. Displaying the data in an appropriate format (e.g. excel spreadsheet, spatial map)
3. Provide a snapshot report on the types of resource consents issued and any key themes identified

REQUIRED SKILLS:

1. Prefer a planning/social science student
2. Statistical methods and analysis
3. Critical thinking
4. Report writing

PROJECT ABSTRACT:

The Resource Management Act 1991 (RMA) requires local councils to ensure that effects on the environment are managed sustainably. The mechanism to achieve this is through rules on land use activities and subdivision in a District Plan. The district plan rules state whether an activity is permitted, or whether it requires a resource consent. The resource consent process enables the Council to assess the land use activity for its effect on the environment and enables us to grant a consent with conditions, or decline the consent.

Councils are required to monitor and report on the efficiency and effectiveness of the objectives, policies and rules in a District Plan. One way of doing this is by assessing and summarising the data from resource consents that have been granted in the Napier District over the past 5 years.
The types of data we need to gather include:

- How many non-residential activities were given consent in residential zones?
- What rules and/or conditions triggered a requirement for a resource consent?
- How many resource consents were granted in each zone?
- How many consents were refused and how many granted?
- How many consents were for new activities and how many were for alterations to existing activities?
- How many dwellings have been approved in the fringe commercial zone?
- A spatial map our subdivision and multi unit developments
- What earthworks consents have been granted in each zone?

This data will need to be presented in a way that easy to read and interpret. An additional task will involve analysing the overall data for common themes that will help inform the upcoming review of our District Plan. The student will be required to spend a portion of the time at Napier City Council while also being able to complete some tasks remotely.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th><strong>Supervisor/s:</strong></th>
<th>Lynne Chepulis, Dr Ralph val Dalen, Judy Warren (Registered nurse) and Prof Ross Lawrenson</th>
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<tbody>
<tr>
<td><strong>Project Title:</strong></td>
<td>Do Māori with colorectal cancer present with the same stage and receive the same treatment than non-Māori?</td>
</tr>
<tr>
<td><strong>Faculty:</strong></td>
<td>FASS</td>
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<tr>
<td><strong>Field:</strong></td>
<td>Medicine / Biomedical / Epidemiology</td>
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</table>

### EXPECTED OUTCOMES:

1. To determine whether there are inequalities between Maori and non-Maori in the Waikato region with regard to treatment offered for CRC.
2. Produce work that is suitable for publication in a peer-reviewed journal

### STUDENT TASKS:

1. Ensure that all CRC records are accurately entered into the database
2. Retrieve missing patient records from the patient management system
3. Upload missing files into the Dendrite CRC database
4. Assist with data analysis of data comparing treatment of Maori vs non-Maori (under guidance of Dr Chunhuan Lao)
5. Draft a paper for publication

### REQUIRED SKILLS:

1. Good time management
2. Familiar with Microsoft Office
3. Proficient with data entry
4. Basic knowledge of statistical analysis and readiness to learn further
5. Able to communicate well with peers and medical staff (as required)
6. Must be prepared to sign confidentiality agreement
Colorectal cancer (CRC) is the most commonly registered cancer in New Zealand (NZ) each year, with over 3200 registrations during 2014. Further, NZ has one of the highest rates of colon and rectal cancer in the world. The incidence of CRC is greater in non-Maori and in those who live in high deprivation areas, and is the fourth most common cancer and second most common cause of death from cancer for Maori. Maori have a 30% lower CRC incidence but only a 9% lower mortality rate than non-Maori. While incidence and mortality rates of CRC in Maori are less than those of non-Maori, the incidence rate for Maori is increasing at a higher rate than non-Maori.

NZ patients are less likely to present with surgically curable CRC than patients in Australia, UK or USA [4]. A case control study showed Maori and non-Maori patients had similar rates of surgical resection, although Maori patients were less likely to undergo extensive lymph node clearance and were more likely to die during the postoperative period. The Waikato Colorectal service has developed a database of newly presenting cases of colorectal cancer. This dataset includes data not only on pathology but also on cancer stage including T, N and M status and treatment. It thus allows a prospective assessment of outcomes. The proposed study is designed to evaluate CRC data from the WDHB in 2017 and 2018 and to evaluate whether there are differences in the presentation and treatment offered for Maori compared to non-Maori.
### Academic Project Submission Details:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Ross Lawrenson and Tania Blackmore</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Investigating the psychological support needs of patients with newly diagnosed lung cancer</td>
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<tr>
<td>Faculty:</td>
<td>FASS</td>
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<tr>
<td><strong>Field:</strong></td>
<td>Population Health/Psychology</td>
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### Expected Outcomes:

1. A paper submitted to a peer reviewed journal
2. Presentation of the results of the study
3. Report provided to The Midland Cancer Psychological & Social Support Service

### Student Tasks:

1. Build a relational data base that includes all lung cancer patients identified over the 2 year study period from the Midland Lung Cancer Register
2. Link these data to additional data on Anxiety and Stress scores and referral to the service
3. Examine the records of approx. 50 lung cancer patients who have received psychological support in the 2 year period
4. Draft a paper on the psychological needs of patients with newly diagnosed lung cancer
5. Undertake a literature review
6. Write up the methodology for the study
7. Present the data
8. Help construct a discussion

### Required Skills:

1. Research skills
2. Familiarity with Microsoft office
3. Effective time management
4. Basic statistical knowledge
The Waikato DHB has approx. 190 new cases of lung cancer diagnosed each year. (Lawrenson et al. 2018 (under review)). Eighty percent of these cases have advanced cancer and the one year survival rate is only 35%. While Māori have 2-3 times the age standardised incidence of lung cancer, Māori only make up 26% of cases in the Waikato. Lung cancer is associated with a greater symptom burden than other cancers, yet little is known about the prevalence of psychological problems (Morrison et al. 2017). Psychological problems at diagnosis have been associated with younger age, being female, current cigarette smoking, current employment, advanced stage of disease and surgical or chemotherapy treatment (Morrison et al. 2017). Health-related stigma associated with lung cancer due to associations with negative characteristics such as smoking appear to contribute to poorer adjustment by constraining interpersonal discussions about cancer and heightening feelings of threat (Chambers et al. 2015). The Waikato Cancer Network Psychological Support Services receive almost 300 referrals a year of which approximately 30 are for patients diagnosed with lung cancer. The Midland Lung Cancer Group maintain a comprehensive register of lung cancer patients which includes demographic details, smoking records, pathological details including staging and treatments recommended including surgery, radiotherapy, chemotherapy and referrals to palliative care.

The aim of the study will be to 1) ascertain the characteristics associated with need for referral to psychological support for patients with lung cancer 2) to assess the psychological needs of these lung cancer patients.
### ACADEMIC PROJECT SUBMISSION DETAILS:

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<tr>
<th>Supervisor/s:</th>
<th>Timothy Edwards and Clare Browne</th>
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<tr>
<td>Project Title:</td>
<td>Fish-detection with dogs: Evaluating influences of sample preservation on detection performance</td>
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<td>Faculty:</td>
<td>FASS</td>
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<tr>
<td>Field:</td>
<td>Behavioural Science &amp; Biological Science</td>
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### EXPECTED OUTCOMES:

1. Data from experimental sessions involving preserved samples
2. Statistical and graphical analyses of influences of preservation on dogs' performance
3. Written summary of these outcomes

### STUDENT TASKS:

1. Manage fish in aquatic laboratory: feeding and water flow
2. Collect water samples from aquatic laboratory
3. Run experimental sessions in canine scent-detection facility: operation of automated scent-detection apparatus
4. Care for dogs in canine scent-detection facility: walking, toileting, etc.
5. Processing glassware in chemistry laboratory: acid wash, rinse, dry, transport to and from facility
6. Data analysis: graphing accuracy data weekly to evaluate ongoing performance; statistical analysis at conclusion of project

### REQUIRED SKILLS:

1. Analyse behaviour as a function of environmental/training factors
2. Communicate effectively with other members of the research team
3. Work with animals (previous experience with dogs preferable)
4. Graphing (Excel, Sigmaplot, or other)
5. Data analysis (basic statistical tests)
This research project will involve working with scent-detection dogs that have been trained to discriminate between water sampled from aquaria containing a target species (koi) and other water samples. An operational system using this system would involve collection of samples from aquatic systems and transportation of the samples to a central screening facility. Understanding the influences of sample preservation methods, such as freezing or chemical stabilization, on the dogs’ performance is a critical step in the process of evaluating this scent-detection system’s potential for operational utility as there will be some delay between sample collection and evaluation in application. The research student will be involved in running the research and caring for dogs in the scent-detection laboratory for two days each week, collecting samples and managing the fish in the aquatic laboratory throughout the week, and processing glassware in the chemistry laboratory throughout the week for the duration of the summer research period. One sample preservation method, to be determined based on the outcome of research that is currently in progress, will be selected for evaluation by the research student. Standard operating procedures have been developed for each aspect of the project. Training will be provided at the outset, and ongoing support will be available throughout the research period, including support with data analysis and summary.
### Academic Project Submission Details:

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<tr>
<th>Supervisors:</th>
<th>Maryanne Garry</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Evidence of the Sunny Side of Dissociation</td>
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<tr>
<td>Faculty:</td>
<td>FASS</td>
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<tr>
<td>Field:</td>
<td>Clinical Psychological Science</td>
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### Expected Outcomes:

1. Publications
2. Possible groundwork for external funding

### Student Tasks:

1. Working seriously, consistently, and enthusiastically, on an international team
2. Helping develop materials
3. Helping to collect data
4. Helping to analyse and interpret data
5. Presenting data in project meetings
6. Conducting literature searches
7. Reading scientific literature critically and discussing it at project meetings

### Required Skills:

1. Dedicated, focused, careful, responsible
2. Skill on a Macintosh desirable
3. Decent stats background
4. Good background in cognitive psychology desirable

### Project Abstract:

Have you ever driven into your garage and realised you had ‘zonked out’ for much of the ride? Or become so engrossed in a book or movie that you did not hear another person talking to you? These experiences are common, harmless or even pleasant examples of dissociation. Yet there is a widespread assumption that dissociation is not simply negative, but is the consequence of negative experiences. The purpose of this research project is to determine the extent to which people have pleasant and unpleasant dissociative experiences. To address this issue, we will ask people a number of questions about their experiences of different types of dissociation, and then rate how positive or negative their experience was.
We predict that positive forms of dissociation will be more common than negative ones, even among people who routinely experience negative forms of dissociation. This project stands to turn a widespread assumption on its head. Our research team comprises Maryanne Garry, Professor of Psychology and an internationally regarded expert in human memory, trauma, and clinical cognition; Andrea Taylor, a PhD student working in the same field; and Steven Jay Lynn, a Distinguished Professor of Psychology, Director of The Psychological Clinic at the State University of New York at Binghamton, and one of the world's leading experts in dissociation and clinical cognition.
### ACADEMIC PROJECT SUBMISSION DETAILS:

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<th>Supervisor/s:</th>
<th>Maryanne Garry</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>When people decide if their memories are helpful or harmful, do they make up their answers based on how they feel at that moment?</td>
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<tr>
<td>Faculty:</td>
<td>FASS</td>
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<tr>
<td>Field:</td>
<td>Clinical/cognitive psychological science</td>
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### EXPECTED OUTCOMES:

1. Publications
2. Possible groundwork for external funding

### STUDENT TASKS:

1. Working seriously, consistently, and enthusiastically on an international team
2. Conducting literature searches
3. Reading scientific literature critically, and discussing it at project meetings
4. Helping to develop experimental materials
5. Helping to collect data
6. Helping to analyse and interpret data
7. Presenting findings in lab meetings

### REQUIRED SKILLS:

1. Dedicated, focused, careful, responsible
2. Good critical thinking skills
3. Decent background in statistics and quantitative research methods
4. Good background in cognitive psychology desirable
5. Proficient with computers (Excel, SPSS, etc.)
6. Skill on a Macintosh desirable
We draw on our memories to forge our identity, to guide our behaviour, and to cement our bonds with other people. In other words, many of our memories don't just sit inert inside our heads; instead, they serve functions. Some of these functions are surprising. For example, we have discovered that people's traumatic memories often serve a mix of helpful and harmful functions. But previous research has assumed that the functions of our memories are a stable property, much like the boiling point of water, or the location of the sun.

By contrast, we hypothesise that people unknowingly make up the functions of their memories, based not on how they felt when they had the experiences but rather on how they feel right now, when they recall those memories. This hypothesis has serious implications for our understanding of the role of memory in clinical disorders and treatment, and might suggest ways that people could come to reappraise or reinterpret their harmful memories as being (at least somewhat) helpful.

To address this issue, we will carry out an experiment manipulating how easy or difficult it feels for people to bring to mind instances when a memory served a specific function. Then, we will ask those people to make judgements about the extent to which that memory serves that specific function.

We predict that when it is easy for people to recall examples of when specific memories were helpful, people will then rate those memories as helpful. But if we later change the experimental conditions so the same people have difficulty recalling examples when those same memories were helpful, everyone will then rate those memories as less helpful or perhaps even harmful.

Our research team comprises Maryanne Garry, Professor of Psychology and an internationally-regarded expert in human memory, trauma, and clinical cognition; Ryan Burnell, a PhD student working in the same field, and international colleagues.
ACADEMIC PROJECT SUBMISSION DETAILS:

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<tr>
<th>Supervisor/s:</th>
<th>Isabelle Delmotte</th>
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<tr>
<td>Project Title:</td>
<td>Representations of neurological impairments in movies</td>
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<tr>
<td>Faculty:</td>
<td>FASS</td>
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<tr>
<td>Field:</td>
<td>Screen and Media Studies</td>
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</table>

EXPECTED OUTCOMES:

1. A set of tangible comparative data for my current research on representation of epilepsy in film
2. A peer-reviewed publication highlighting the differences in movie representations between specific neurological impairments
3. The production of a poster for the Summer Scholarship public event (if possible timewise)

STUDENT TASKS:

1. Perform a literature review focused on representational differences between specific neurological diseases in films. The student will be trained and briefed, but will work autonomously for the first 10 days.
2. Help to source and select appropriate movies
3. Watch fiction films that include representations of various neurological conditions
4. Contribute to a data collection of film segments and their descriptive indexing
5. Contribute to a first descriptive data analysis
6. Write a short Comparative Analysis (2000 to 3000 words)
7. Produce a poster for the Summer scholarship public event (if possible timewise)

REQUIRED SKILLS:

1. Ability to assess and understand film narrative devices
2. Ability to perform a critical interdisciplinary literature review
3. Ability to use NVivo for data collection and qualitative analysis (in depth training will be provided but the task requires independent learning practice and attendance to specialised workshops)
4. Highly preferable: Demonstrate a deep curiosity, and/or knowledge, about neurological disorders
5. Preferable: Ability to critically appraise representations in film
6. Preferable: Ability to think laterally
This summer scholarship focuses on data collection and critical appraisal of the representation of neurological disorders in fiction films. These films influence our collective knowledge and individual experiences of medical conditions. For example, they have helped to show the human face of progressive neurological disorders like Alzheimer's disease. With epilepsy however, many cinematic portrayals still channel mythical divinity, madness and vulnerability, thus reinforcing damaging stereotypes. Data collection and analysis are required to perform a comparative qualitative analysis between representations of different neurological diseases in movies. The research to be performed during the summer scholarship contributes to an existing enquiry which examines the ways film industries influence movie representations of people subject to epilepsies, and the ensuing cultural beliefs that are generated despite advances in medical knowledge. To start this summer investigation, we will consider diagnoses of neurological conditions found in inter-disciplinary literature. The diseases of interest include: Alzheimer's disease, dementia, Amyotrophic lateral sclerosis (ALS), migraine, multiple sclerosis, and Parkinson's disease. We will perform a literature review and filmography of various neurological conditions in a specific range of films. We will then source and watch these movies to appraise acting techniques and storylines which are used to represent each of these conditions. This comparative analysis is an important methodological step. Our indexing will contribute to the on-going project and data analysis linked to epilepsy in films. The data collection and analysis will require extensive use of Endnote and NVivo software (training will be provided). Our findings will provide a better picture of comparative cinematic techniques (visual and audio) and plot narratives used in the representation of various neurological conditions.
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<th>ACADEMIC PROJECT SUBMISSION DETAILS:</th>
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<tbody>
<tr>
<td>Supervisor/s:</td>
<td>Karen Barbour</td>
</tr>
<tr>
<td>Project Title:</td>
<td>Wellbeing in dance</td>
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<tr>
<td>Faculty:</td>
<td>FASS</td>
</tr>
<tr>
<td>Field:</td>
<td>Arts, Dance, Philosophy, Health</td>
</tr>
</tbody>
</table>

**EXPECTED OUTCOMES:**

1. Annotated bibliography on dance and wellbeing
2. Planning of dance activities for local community
3. Documentation of dance activities through journals, video and photography

**STUDENT TASKS:**

1. Development of an annotated bibliography on wellbeing and dance
2. Support in developing dance activities in the local community
3. Participation in and documentation of a creative process

**REQUIRED SKILLS:**

1. Research skills using library, online and social media sources
2. Use of Zotero software
3. Documentation skills including observation, journal documentation, video and/or photography
4. Participation in creative and contemporary dance activities, potentially include performance

**PROJECT ABSTRACT:**

Wellbeing studies are a growing area of research and discussion with a wide range of initiatives and interventions offered in community and professional contexts. Drawing on research and practice in professional and community arts, the scholar will research wellbeing initiatives and interventions through art practices and particularly through dance. The scholar will begin by familiarising themselves with the literature and current examples of wellbeing studies in the context of the arts, in order to prepare an annotated bibliography of relevant material and using Zotero. Consequently, researching literature, media and various art practices will necessitate use of advanced library and online research skills across a range of academic and artistic disciplines (such as dance studies, community and social psychology, sociology, community development, philosophy, health, artistic and creative practice). Creativity in presentation of the annotated bibliography is encouraged particularly to link to websites and social media platforms. Mentoring and support will be provided by the project supervisor.
The scholar will also participate in and reflect on the creative process involved in dance activities engaging local community members. This will involve working with members of Waikato Contemporary Dance Projects Trust, requiring adaptability from the scholar in working alongside both professional and community artists. The scholar should have a background in dance and/or theatre creative practice, and it would be particularly valuable to have experience in contemporary dance. They should be willing to contribute to the creative process including potentially dancing with Waikato Contemporary Dance Projects Trust. Part of this contribution may include documenting the process through recording video, sound, still images and journal entries based on observations.

As research in the performing arts can be represented in a range of ways (written, performative, images, oral), this Summer Scholarship offers the successful student experience learning about creative research outputs and the process for writing about creative practice as research. Consequently, this opportunity will assist in developing the scholar’s research skills, understanding of writing processes and creative practice that will support them moving into further studies and future employment.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Adele Norris and Juan Tauri</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Framing of Gangs in Housing Parliamentary Speeches from 1986-2016</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FASS</td>
</tr>
<tr>
<td>Field:</td>
<td>Sociology</td>
</tr>
</tbody>
</table>

EXPECTED OUTCOMES:

1. Conference presentation
2. Journal article/book chapter

STUDENT TASKS:

1. Literature review of relevant scholarship
2. Retrieve related speeches Residential Tenancies Bill and the Residential Tenancies Amendment Bill from 1986-2016
3. Analyze speeches, code, and organize code into the emergent themes
4. Help develop interview questions for property speculators/landlords/rental agents and tenants

REQUIRED SKILLS:

1. Familiarity with social policing, indigenous criminology, indigenous feminist scholarship
2. Background in sociology and understanding of intersectionality theory
3. Time management skills: Able to meet hard deadline (extensions are tolerated)
4. Ability to read 5-7 journal article/book chapters per week (Literature Review) (Part 1)
5. Ability to review and analyze 40 years of speeches and provide a report every two weeks (Part 2)

PROJECT ABSTRACT:

In the past two decades the social policing of the poor has received increased attention, especially in relation to growing precariat work. It is well established that negative stigmas are used to dehumanize and to limit, restrict and deny assistance to the poor, especially poor single mothers. While Indigenous scholars have examined racial social control especially with regard to gangs, how the stigma of gang affiliation influences access to quality housing has not received scholarly attention. As housing is a key issue on the government agenda, the process by which property speculators, landlords, rental agents screen potential tenants based on preconceived characteristics is of critical importance and is under researched.
The framing of 'gangs' and individuals perceived as 'gang affiliates' in housing discourse influences the general perceptions of the 'good' vs the 'bad' tenant. This qualitative case study answers the twofold question: When did gangs enter the housing rhetoric and how are gangs framed in relation to women accessing quality housing. A discourse analysis is used to examine parliamentary speeches related to the Residential Tenancies Bill from 1986-2016 to trace the trajectory of the entrance of 'gangs' into housing discourse. It is the goal of this study to extend the discussion of access to quality housing by understanding how narratives/messages around gangs and perceived gang affiliations are framed.
# Summer Research 2018/19

## Project Abstract

### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Lynne Chepulis and Ryan Paul</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>The influence of diabetes on the gut maternal and neonatal microbiome during and after pregnancy</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FASS</td>
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<tr>
<td>Field:</td>
<td>Health Science</td>
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</tbody>
</table>

### EXPECTED OUTCOMES:

1. To provide research assistant support to an existing, funded study led by Drs Paul and Chepulis.

   NOTE: This project has ethics approval and is due to start recruitment in Aug 2018. The project will use a rolling recruitment over many months, but aims to recruit 75 women between Aug 2018 and Jan 2019. Given the nature of the study, and the fact that we do not know how long it will take to recruit the required number of women it is hard to predict what phase of the study we will be in between Nov and Feb. Almost certainly, we will have women at different stages of enrolment. Thus there will be a variety of different tasks that the student can do to support this project during this time.

### STUDENT TASKS:

Under supervision, and depending on the speed and ease of recruitment, the student may be asked to assist with any of the follow:

1. Liase with midwives to support recruitment (after the 24 week screening test for GDM)
2. Collection of patient data (demographics, dietary intake, height, weight, BMI, HbA1c, OGTT results) and record into a secured study database. Produce a patient study overview spreadsheet with dates for follow-up / further sample collection time points.
3. Collection of samples (from diabetes clinic/obstetrics clinic) for delivery to University lab (these are collected previously by the participant using the kit provided and stored in special tubes)
4. Assisting with the processing of samples for bacterial DNA extraction (optional)
5. Collection of neonatal demographic and birth data into spreadsheet (for mothers who give birth during this time period). Liasing with midwives to make note of any women who deliver through caesarean.
6. Time permitting, data entry of dietary intake data from mothers
7. Time permitting, start compiling background literature on the importance of the microbiome in pregnancy, and gestational diabetes.
REQUIRED SKILLS:

1. Good time management skills
2. Basic understanding of health sciences and diabetes
3. Community engagement skills (you will need to be comfortable talking to women from many walks of life)
4. Understanding of clinical research procedures and study recruitment (the specifics will be explained to you)
5. Knowledge of cultural competency
6. Some knowledge of molecular biology (if you wish to assist with sample preparation in the lab, this is optional)
7. Use of Microsoft Office products (word, excel)

PROJECT ABSTRACT:

Approximately 7% of babies in New Zealand are born to mothers with gestational (pregnancy-induced) diabetes mellitus (GDM), and both these women and their babies are at a higher risk of developing obesity, type 2 diabetes (T2DM) and metabolic disease after birth. Currently, the mechanisms for why this occurs are poorly understood, and in up to half of all women with GDM there is no obvious cause for the disease (e.g family history).

A growing number of studies suggest that there is a strong correlation between the types of bacteria present in the gut and the development of particular diseases. For example, particular types of bacteria are known to present in obese people, and in those with T2DM. The bacterial populations in the gut are also known to differ throughout the three trimesters of pregnancy, though it is not known whether this occurs different in women with GDM.

The student project is to provide research support to a funded, existing study that is designed to evaluate the change in gut bacterial populations that occur in women with GDM as compared with healthy controls. We plan to follow a group of 75 women from mid pregnancy onwards to determine i) do gut microbiome populations differ in GDM women during pregnancy (compared to healthy pregnant controls), ii) are specific gut microbiome patterns of the mother passed onto the child during birth, and iii) do any altered gut microbiome patterns seen during pregnancy persist after birth.

This study will involve working with midwives, medical staff at the WDHB Diabetes in Pregnancy service and pregnant women to facilitate sample and data collection.
### ACADEMIC PROJECT SUBMISSION DETAILS:

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<tr>
<th>Supervisor/s:</th>
<th>Felipe Bravo and Andreea S. Calude</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Māori Borrowings in Science Digital Media</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FCMS</td>
</tr>
<tr>
<td>Field:</td>
<td>Machine Learning, Linguistics, Māori, Social Media Discourse</td>
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</tbody>
</table>

### EXPECTED OUTCOMES:

1. **THE CORPUS.** We hope that the project will produce code which will enable the collection of a body of tweets from Twitter, sufficiently large in order to allow us to study the use of Māori loanwords in New Zealand English tweets.

2. **AUTOMATIC EXTRACTION & TAGGING.** Our second goal is to produce code which will automatically tag words inside Tweets by language of origin (Māori, English or other) and part-of-speech.

3. **SOME RESULTS.** Once data is collected and the code is set up for automatic extraction of loanwords and part-of-speech tagging, we hope to use the code to explore how various loanwords are used.

4. **A PAPER.** We anticipate that our results will be summarised in the form of a written journal article to be submitted for publication in a peer-reviewed journal.

### STUDENT TASKS:

1. **INITIAL STEPS** Discussions with us about the background of the project, preliminary readings on the use of loanwords in order to build familiarity with the topic of Māori loanwords in NZE.

2. **CORPUS SET-UP** Build a corpus of tweets containing Māori words using the Twitter API.

3. **DATA-CODING** Perform a descriptive analysis of the corpus (e.g., report popular Māori words and hashtags, identify relevant users).

4. **TRENDS** Extract new knowledge using machine learning (e.g., classify Māori words by sentiment, discover semantic similarities between English and Māori words).

5. **PAPER** Time permitting, draft up a report of the findings which would serve as a starting point for an article in a peer-reviewed journal (under our guidance).
REQUIRED SKILLS:

1. Good language skills, excellent (New Zealand) English ability, ideally be native or near-native and possess some knowledge of Te Reo Māori.
2. Willingness to work as part of an inter-disciplinary team.
3. Ability to program in Python or Java
4. Basic knowledge in a machine learning library such as Weka or Scikit-learn
5. Ability to pay attention to detail and maintain good accuracy and focus in coding data.

PROJECT ABSTRACT:

This project has the ultimate goal of studying language change in New Zealand. We hope to design computational tools which can automatically tag words for their language of origin, either Māori or (NZ) English, and extract further information their use in context.

Linguists have known for some 80 years now (!!! ever since the 1940s, see Anderson and Baker for instance), that words of Māori origin are trickling into New Zealand English and the general consensus is that the trend is set to continue. In addition, we know that spoken conversation in New Zealand English will contain about 6 words per 1,000 of Māori (according to Kennedy 2001 and Macalister 2006). Other genres also exhibit steady use of Māori loanwords, for example, newspaper articles, children's picture books, and (more recently) even the language of the internet. A recent project conducted by our team has uncovered that online websites of the 11 questions which make up the National Science Challenge projects are rich in Māori loanwords. Surprisingly, New Zealand English uses a wide variety of Māori words, and is constantly adding new words which were not used previously (e.g., “Matariki”, “Mātauranga”). But in order to study this phenomenon, painstaking manual labour is required: someone needs to read through large amounts of written text (sometimes written transcriptions of oral language) and pick out all the Māori loanwords. Not only is this exercise time-consuming but also likely to result in errors.

Our project will use machine learning algorithms to automatically extract data from Twitter and code each word for language of origin: English, Māori or other. Twitter is a large platform of readily available data and a new genre for the study of Māori loanwords.

Because words are used in groups rather than in isolation, they tend to acquire connotations through this repeated use in certain contexts. For example, “cause” tends to occur with negative events “cause an accident”, “cause a disaster” or “cause a commotion”. In theory, it is possible to “cause a wonderful moment of happiness”, but English speakers and writers just do not use this “cause” in this way. It remains largely an open question as to why that might be. In the second phase of our project, we are interested to document the connotations of the loanwords we extract from Twitter. To this end, the code needs to also perform automatic part-of-speech tagging (e.g., “I ate kai with my whanau” would be coded as “EN_word EN_word MA_loanword EN_word EN_word MA_loanword”). One option will be to then classify loanword uses by sentiment. Another would be to build semantic similarity matrices.

This research project is innovative and exciting because it allows us to peek into the secret life of a living and changing language by combining computational skills with linguistic knowledge.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th></th>
<th>PROJECT #: 13</th>
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<tbody>
<tr>
<td><strong>Supervisor/s:</strong></td>
<td>Shaoqun Wu and Andreea Calude</td>
</tr>
<tr>
<td><strong>Project Title:</strong></td>
<td>Mining language models from Family Violence Reports</td>
</tr>
<tr>
<td><strong>Faculty:</strong></td>
<td>FCMS</td>
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<tr>
<td><strong>Field:</strong></td>
<td>Computer Science</td>
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</tbody>
</table>

EXPECTED OUTCOMES:

1. Learned state-of-art natural language processing techniques
2. Identified linguistic features
3. Software tools to facilitate linguistic features extraction from family violence reports

STUDENT TASKS:

1. Data cleaning
2. Literature research on Natural Language Processing
3. Textual feature extraction
4. Charting and report generation
5. Source code documentation and packaging

REQUIRED SKILLS:

1. Python or Java programming
2. Data mining

PROJECT ABSTRACT:

The project will investigate ways to analyse and identify salient linguistic patterns and features (e.g., verb types, pronoun use, Māori loanwords, adjectives classes) from Family Violence Reports. The outcome could be used for a range of policing applications including risk factor analysis, crime prevention, and family violence awareness education, and report template generation with automatic populated headings, keywords/phrases and values.

The project involves using data mining and natural language processing techniques to carry out text analysis and pattern extraction. Knowledge of data mining and solid programming skills are essential. You will experience with some text mining and natural language processing techniques using real world datasets.
**ACADEMIC PROJECT SUBMISSION DETAILS:**

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Te Taka Keegan</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Macroniser Web Analytics</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FCMS</td>
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<tr>
<td>Field:</td>
<td>Web Analytics/Computer Science</td>
</tr>
</tbody>
</table>

**PROJECT #:** 14

**EXPECTED OUTCOMES:**

1. An updated Macroniser home page that shows usage statistics.
2. Knowledge about how, when and from where the Macroniser is being used.
3. An ability to generate publicity, funding and further research based on the first two outcomes.

**STUDENT TASKS:**

1. Understand how the Macroniser is stored in the NZDL.
2. Create a logger that will record web transactions of the Macroniser.
3. Generate statistical data and graphs from the transaction logs and display these on the Macroniser home page.
4. Determine what statistics can be generated by using Google Analytics.

**REQUIRED SKILLS:**

1. An understanding of web server technology.
2. An ability to generate statistical and graphical data from logs and/or databases.

**PROJECT ABSTRACT:**

The Māori Macron Restoration Service (or Macroniser) receives Māori text in various forms and will return it in a correct orthographic form i.e. the macrons will be correctly placed over the appropriate vowels. The software can be run at http://www.nzdl.org/macroniser. We currently have no indication of how much this tool gets used, by who, and what texts it is mostly used to macronise. However we do have anecdotal evidence that it is being used because it has been mentioned by the Māori Language Commission.

This project involves creating a logger so that the macroniser's activity is recorded and summary statistics are generated. This work will build on initial work that was undertaken in a previous projects.
### ACADEMIC PROJECT SUBMISSION DETAILS:

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<th>PROJECT #:</th>
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<tbody>
<tr>
<td>Supervisor/s:</td>
<td>Justin Kurland and Devon Polaschek</td>
</tr>
<tr>
<td>Project Title:</td>
<td>Rugby, Violence, and Family Harm: A New Zealand Case Study</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FCMS</td>
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<tr>
<td>Field:</td>
<td>Criminology/Crime Science</td>
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</tbody>
</table>

### EXPECTED OUTCOMES:

1. Academic Peer Reviewed Journal Article
2. Police Report Briefs
3. Potential stadia specific follow up study
4. External grant/funding support

### STUDENT TASKS:

1. Data collection
2. Data analysis
3. Literature review

### REQUIRED SKILLS:

1. Database development
2. Excel
3. Crime Science
4. Criminology
5. Knowledge of rugby in NZ
6. Policing intelligence

### PROJECT ABSTRACT:

This project seeks to explore the relationship, if any, between professional rugby and violent calls for service in New Zealand with particular focus on family harm and domestic violence. More specifically, the research will address the hypothesis that rugby matches in New Zealand played by the All Blacks, the various New Zealand based Super Rugby teams and the Warriors Rugby League team generate a significantly greater number of violent calls for service than on relative comparison days.

If the hypothesis is correct, the findings can provide the the evidence base for police to more confidently make claims about the so-called increase in violent calls for service and domestic violence on rugby match days.
Further, the research can give leverage to the police and politicians to put pressure on the professional rugby organisations to invest in prevention. Contrariwise, if our hypothesis is false NZ Rugby can confidently claim that the sport, at least in New Zealand, does not generate a greater amount of additional violent calls for service.
**ACADEMIC PROJECT SUBMISSION DETAILS:**

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Steven Miller and Deane Searle</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Statistical analysis of Right Track Waikato recidivist offender data.</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FCMS</td>
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<tr>
<td><strong>Field:</strong></td>
<td>Crime Science/Statistics</td>
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</table>

**PROJECT #: 16**

**EXPECTED OUTCOMES:**

1. Data set of offence histories and trajectories for RTW participants and non participants
2. Report on basic parameters (to follow NZISCS report template)

**STUDENT TASKS:**

1. Check the accuracy of existing data against the NIA database.
2. Add additional information fields to database to identify post course offence trajectory under supervision of District Manager Intelligence WPD
3. Develop matching offender control group database under supervision of District Manager Intelligence WPD.
4. Complete initial statistical analysis with the guidance of UoW academic supervisor.
5. Complete report for Waikato Police District and Waikato Regional Council Enduring Safer Outcomes Programme

**REQUIRED SKILLS:**

1. Non parametric statistical methods and analysis.
2. Excel and Microsoft Word
3. Basic programming knowledge. Training in Business objects searches will be given
4. Excellent grades in statistics.
5. To complete a vetting check (New Zealand Police).
6. To complete a confidentiality and security agreement.

**PROJECT ABSTRACT:**

Right Track Waikato statistical analysis.

Right Track Waikato (RTW) is a ten-week programme designed for offenders convicted of drug or alcohol driving offences. The programme is run by Waikato Police District of New Zealand Police and partially funded by Waikato Regional Council. The Alcohol Impairment Education programme runs similar one day Marae based training for recidivist offenders.
The programmes have a database of circa 500 participants from the last five years. There are records from courts and police for each participant for factors such as offence, previous offence history, dates of offence, and sentence. Is there evidence that either of these programmes effectively alter subsequent behaviour of participants?

This project is for one or two students.

The aims are:

1. To complete an initial analysis of participant history, offence trajectory, and post participation record.
2. To create a matching control group for a retrospective evaluation of the participant group, subsequent to this project.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Panos Patros</th>
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<tr>
<td>Project Title:</td>
<td>GC Interference Reduction on Eclipse Open J9</td>
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<tr>
<td>Faculty:</td>
<td>FCMS</td>
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<tr>
<td><strong>Field:</strong></td>
<td>Cloud Computing/Language Runtimes</td>
</tr>
</tbody>
</table>

### EXPECTED OUTCOMES:

1. Gain visibility by participating in a high-calibre product in a hot research area
2. Expand current conference paper to a journal paper co-authored with the student
3. Leverage this project to gain funding for a broader Marsden Startup.
4. Create transferable knowledge for another student to be hired through a Medium SIF.
5. The student will gain significant exposure to industrial level software and practices

### STUDENT TASKS:

1. Familiarise themselves with Open J9 development
2. Add a module that detects load
3. Add a module that throttles the number of cores and/or threads the GC can use
4. Add a module that decides how many cores/threads the GC should be used depending on the load
5. Add a new flag for java (e.g., `java -XGCInteference`) that activates the new modules
6. Set up a small Docker Swarm cluster
7. Experiment and test
8. Make a pull request with your solution to the repo of the open source J9 project

### REQUIRED SKILLS:

1. C/C++
2. Operating Systems
3. Parallel and Concurrent Programming
4. Java
5. Software Engineering
Non-dedicated clouds offer the same computing resources to multiple of their tenant applications. However, this can result in an aggressive tenant interfering with the performance of co-located applications. High-level languages, such as Java, are frequently used on the cloud. A convenience they offer is automatic memory management, also referred to as Garbage Collection (GC). GCs tend to be greedy when running, which can spike resource usage and increase performance interference.

For this project, you will extend the open source Eclipse Open J9 Java Language Runtime with a new GC Interference Reduction mode. When turned on with a new flag you’ll set up, the GC components of Java will use fewer resources depending on the application’s load. Afterwards, you will test your solution on a Docker Swarm cloud to investigate potential benefits. In the end, you will make a pull request to integrate your code in the public repository. You will need good skills in C/C++ and basic knowledge of Operating Systems, Parallel Programming and Software Engineering. It would be good, if you are familiar with Java. This project will enable you to interact with experts from around the world.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Sonja Arndt</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Intercultural pedagogies in Aotearoa/Danish early childhood education</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FEDU</td>
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<tr>
<td>Field: Early Childhood Education</td>
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</tbody>
</table>

### EXPECTED OUTCOMES:

1. Written responses x 2 to comparative video (Denmark/NZ)
2. Annotated bibliography
3. Endnote library
4. Poster
5. Possibly an abstract for a future publication

### STUDENT TASKS:

1. Learn about video cued ethnography
2. Analyse and respond to the video
3. Participate in international discussions
4. Conduct policy review and analysis
5. Analyse curriculum document
6. Conduct literature review
7. Write annotated bibliography
8. Create poster of findings
9. Possibly contribute to an abstract for future publication/presentation

### REQUIRED SKILLS:

1. At least 1-2 years study in the field of early childhood teacher education
2. Interest in international perspectives in education
3. Interest in cross-cultural or intercultural studies
4. Concern with equity and diversity in ECE
5. Competent use of library systems
6. Competent use of endnote (or willing to learn)
7. Competent academic writing skills (or willing to strengthen)
8. Ability to independently read and analyse text
PROJECT ABSTRACT:

We are looking for a scholar who is interested in cross-cultural and intercultural understandings and practices in early childhood settings. The aim of the study is to examine what guides and regulates early childhood teachers' cross- and intercultural practices in Aotearoa New Zealand early childhood settings. This study is part of an international collaboration and comparative project between Roskilde University in Denmark and Waikato University, that is focused on what it means to be 'ready for school' in the two countries. One of the preliminary findings of this larger study is the importance of effective cross-cultural relationships and, in particular, teachers' cross-cultural pedagogies. The work of the research scholar will be a crucial component of the overall project, as it will help us to understand how early childhood teachers form their attitudes and their practices with children, families and teachers who come from diverse cultural backgrounds.

The project will involve a familiarization period with the larger study up to now. This will include participating in a discussion about practices in a video of New Zealand and Danish early childhood teaching and learning. The scholar will be introduced to a method called video cued ethnography, where the video is watched and analysed, sparking discussion and reflection on the practices observed. The video has been produced by the Danish collaborators in this project, and this conversation will take place with the researchers in Denmark. This video cued work will take place for a week at the beginning of the scholarship period, and will be repeated at the end of the scholarship period, to capture any shifts in thinking following the interim work on reviewing policies and literature.

In the middle 8 weeks of the study, the research scholar will work with support, to develop a policy and theoretical grounding for the intercultural practices in early childhood settings in Aotearoa. This review period will be broken down into two focus areas of 4 weeks' each: One will be a policy analysis. The research scholar will first conduct a review of relevant policies related to early childhood teachers' work and engagements with cultural or linguistic diversity in Aotearoa. This part will include an in-depth analysis of the revised curriculum document Te Whāriki. The second focus area will be a review of the most recent academic literature related to early childhood teachers’ work and engagements with cultural or linguistic diversity in Aotearoa. The review of the policies, curriculum and literature will be presented in an annotated bibliography.

This policy analysis, the literature review and the contributions to the international video cued conversations will add to the long-term project with Roskilde University and inform a cross-national funding application. It will lead to the development of a poster, and the possibility of participating in a joint publication and/or conference presentation with the research team, as well as to the possibility of further ongoing participation in research activities by the research scholar.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Lynne Parmenter and Nigel Robertson</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Student Perceptions of Learning in the FSEN - School of Engineering</td>
</tr>
<tr>
<td>Faculty:</td>
<td>CETTL</td>
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<tr>
<td>Field:</td>
<td>Engineering education</td>
</tr>
</tbody>
</table>

### EXPECTED OUTCOMES:

1. Baseline student data to inform the ongoing Engineering teaching and learning project to facilitate comparative analysis in 2019/20
2. Initial set of research-based learning resources for Engineering students
3. Possibility of co-authored conference presentation or article

### STUDENT TASKS:

1. Student survey data entry and cleaning
2. Assistance with analysis of student survey data
3. Transcription and coding of student interview data
4. Assistance with analysis of student interview data
5. Development of learning resources for students in response to needs identified from the data analysis

### REQUIRED SKILLS:

1. Willingness to engage with literature and data on student learning
2. Willingness to learn how to analyze quantitative and qualitative data
3. Willingness to contribute to research discussions about the student data and its implications
4. Excellent general computer skills
5. Interpersonal communication skills
6. Time management and self-management skills
7. Initiative to design and produce research-based learning resources for Engineering students
8. High level of ethical awareness and integrity
The Summer Scholar project forms part of a larger 2-year research study aimed at investigating student and staff learning-related perceptions, expectations, and needs in the FSEN - School of Engineering. This larger study is being conducted in parallel with the design and implementation of teaching and learning reforms in the School.

The Summer Scholar project will be a clearly defined sub-project of this larger study, focusing specifically on student data that will have been collected in B semester 2019. The Summer Scholar appointed to this project will contribute and develop research capability in three main areas:

The first part of the Summer Scholarship will be a small-scale, focused literature review on approaches to student learning in Engineering education. This will contribute to subsequent data analysis and will orient the Summer Scholar to some of the main trends and issues in Engineering education.

The second part will be assistance with analysis of data that will have been collected through a student survey and interviews/focus groups with students during B semester 2018. The analysis will contribute to a set of baseline data that will inform the ongoing study and will be used for comparison in 2019. For the Summer Scholar, this part of the project will provide opportunities to develop skills in quantitative and qualitative data analysis.

The third part will be the design and creation of learning resources for Engineering students based on the results of the data analysis. The format and style of these resources will be informed by the literature review and the data analysis and may include, for example, documents, web pages, and videos. This will contribute directly to student learning, as resources will be shared with Engineering students in 2019. For the Summer Scholar, this is an opportunity to use research data to directly inform practice by disseminating findings in a way that benefits those who participated in the research.

Overall, the Summer Scholar will develop capability in reviewing and synthesising research literature, data analysis and research dissemination, and the creation of learning resources for Engineering students.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Chris Eames and Melissa Brignall-Theyer (Cape to City project / DoC Napier Office)</th>
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</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Education for, and in, the the environment</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FEDU</td>
</tr>
<tr>
<td>Field:</td>
<td>Education</td>
</tr>
</tbody>
</table>

EXPECTED OUTCOMES:

1. Hawke's Bay-based pre-service teacher educators (at EIT) will be more aware of the range of environmental initiatives in the region and have understanding of options for utilising the environment as a context for learning throughout the curriculum.
2. A clear and strategic pathway will be identified for utilising local and national resources for educating pre-service teachers to be able to use the environment effectively throughout the curriculum.
3. Research report (~15 pages) detailing successful examples of teacher education programmes which utilise environmental initiatives, insights from the stakeholder survey/interviews and recommending next steps for incorporating the environment into pre-service teacher training at EIT.

STUDENT TASKS:

1. Complete a desk-based literature review - what do we know about utilising the environment in teacher education
2. Compile a database of environmental education programmes and resources currently available in Hawke's Bay
3. Design and conduct a stakeholder survey or interviews addressing the perspectives of schools, pre-service teachers and teacher education staff at EIT on their interest and ideas on how to use the environment as a context for learning, and their ability to implement this.
4. Identify resource gaps and barriers to embedding the use of the environment as a context for learning
5. Make recommendations for steps to incorporate environmental initiatives into teacher education at EIT

REQUIRED SKILLS:

1. Prefer a pre-service teacher/ education or social sciences student
2. Confident to arrange meetings and interview a variety of stakeholders
3. Interest in the environment and conservation
4. Familiar with completing a literature review, gap analysis, and making recommendations
5. Self-motivated and have own transport
PROJECT ABSTRACT:

The natural environment is an effective learning setting for young people. Not only does learning in the environment establish pro-environmental attitudes and behaviours that bode well for our planet's future, its tactile, experiential nature supports better retention and application of the knowledge and values gained there.

Hawke’s Bay currently hosts a wide range of environmental initiatives that are engaging communities in conservation activities - pest control, habitat restoration, and translocation of native animal species. These present a wealth of experiential opportunities in which young people could learn in, and about, the natural environment. One of these initiatives, the Cape to City project, has worked with children and teachers over ~7 years, meaning that there is now considerable experience and understanding about how children respond to learning in, about, and for the environment, and what teachers need in order to confidently teach using the environment as a resource.

Cape to City and Hawke's Bay-based tertiary education provider Eastern Institute of Technology (EIT) are now seeking to identify a way forward for infusing the environment into pre-service teacher education (early childhood and primary level) such that, at graduation, beginning teachers are confident in their ability to use the natural world in their teaching practice across all subjects. Rather than adding an 'environmental education' module to an already full curriculum, the focus is on using the environment as a context for learning within the existing curriculum.

This project will ascertain how Cape to City and EIT can incorporate existing Hawke's Bay-based environmental and conservation activities into the Bachelor of Teaching (ECE) and Bachelor of Teaching (Primary) curriculum at EIT. Initially, the Scholar will identify examples of good practice of incorporating the environment as a learning tool across the curriculum, and complete a stock-take of environmental initiatives that could be utilised in teacher education. A stakeholder survey or interviews (current teachers, pre-service teachers, and staff within EIT’s School of Education and Social Sciences) will enable us to better understand the perspectives of key education stakeholders. This information will be used to identify barriers and opportunities, after which a series of priority tasks to further this initiative will be developed (recommended).

This is an opportunity for a student to be strategically involved in shaping how Cape to City and EIT could utilise a range of existing environmental initiatives to enhance environmental knowledge and educational experiences in Hawke's Bay. In doing so, it will contribute to EIT’s focus on inquiry-based learning through which pre-service teachers and their future pupils gain skills in critical and creative thinking, problem solving, and curriculum integration.

Please note: This project's stakeholders and host organisation (DoC Napier office and EIT) are located in Napier (Hawke's Bay). Ideally, the Scholar would reside in Hawke’s Bay for the duration of the project to interact with project stakeholders.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Bronwen Cowie</th>
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</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>TC-VITAL (Threshold concepts - Visions of inclusive teaching and learning)</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FEDU</td>
</tr>
<tr>
<td>Field:</td>
<td>Education/ Social sciences</td>
</tr>
</tbody>
</table>

EXPECTED OUTCOMES:

1. An up to date and comprehensive database of relevant literature linked to threshold concepts for diversity and inclusion in teaching
2. Initial analysis of student work samples
3. Scan of publicly available university initial teacher education websites to identify the scope of focus on issues and ideas linked to teaching diverse students.
4. Initial draft of a paper based on the systematic literature review
5. Student has experience of working in a collaborative international team

STUDENT TASKS:

1. Conduct a systematic literature review, building on the existing project review (see Bearman et. al., 2012). This will include consultation to refine search terms, possible authors, databases and summarising articles using agreed categories.
2. Using insights from the review to collaboratively analyse student written assignment work
3. Conduct a scan of the publicly available material on designated university websites - universities and programmes will be identified for the scholar. The scan will focus on learning outcomes related to diversity, equity & inclusion in organisation descriptions of their teacher education programs.
4. Draft, with the team, a paper that scopes current research on threshold concepts in practice-based professions and the intersection of this with diversity, inclusion and equity in and for teaching.

REQUIRED SKILLS:

1. Ability to search, read, analyse, critique and summarise key themes in research literature
2. Willingness to learn new research approaches and techniques and strategies to analyse data
3. Understanding of document analysis and or willingness to learn relevant processes
4. Capacity and interest in working in a dynamic and enthusiastic team.
5. Strong organisational skills
6. Strong analysis and writing skills
PROJECT ABSTRACT:

Classes today are characterised by diversity - in student backgrounds, languages and interests. How to work with and respond productively to this diversity is a challenge for all teachers, especially beginning teachers. This project is part of a New Zealand-Australia collaboration the includes two NZ (Waikato, Otago) and three Australian (Melbourne, Sydney, Tasmania) universities. The goal of our collaborative project is to identify what counts as a ‘threshold concept’ for student teachers and teachers who are charged with teaching diverse groups of students. Threshold concepts are those concepts which, once mastered, transform both a person’s understanding and how they view themselves and others. Threshold concept theory and what might count as threshold experiences offers an as yet largely unexplored entry point into this challenging part of teacher learning and work.

The Summer Scholar will develop their experience in four areas: First they will conduct a systematic literature review of recent (post 2010) research studies on threshold concepts in practice-based tertiary education and on diversity and inclusion in teaching. The review will deepen and extend the review data base and analysis the team has developed to date. The Scholar will be guided through the review process - pursuing articles and authors we have identified and using a revised set of search terms and sources. Second, the Scholar will be mentored in the analysis of qualitative data (student work samples) collected from student teachers from an Australian course focused on diversity. Ethics has been gained for data collection. Where practicable they will skype interview a small number of volunteer students from the Australian course. Third, using a proven model, they will be supported to scan and map the learning outcomes related to diversity in publically available course outlines in the seven New Zealand universities, and in two key initial teacher education providers in each of the Australian states. Finally, we will focus on developing a framework for and drafting a co-authored paper based on the project work.

While the project focuses in on initial teacher education studies of threshold concepts in other practice education fields indicate that the understandings of threshold concepts gained will be relevant to those in practice based professional courses such as law, medicine, health and engineering more generally.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Anna Rolleston</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Validation of a treadmill protocol as a measure of stress for the prevention of chronic disease</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FHSHP</td>
</tr>
<tr>
<td>Field:</td>
<td>Clinical Exercise Physiology</td>
</tr>
</tbody>
</table>

### EXPECTED OUTCOMES:

1. Validation of protocol
2. Development of an RCT to test interventions for stress

### STUDENT TASKS:

1. Literature review
2. Engaging with stakeholders
3. Participating in data collection
4. Participating in workshops with stakeholders

### REQUIRED SKILLS:

1. Culturally responsive
2. Good knowledge and experience with database searching for literature
3. Good communication and relationship skills
4. Completed a physiology based academic paper as part of degree programme
5. Student will need to be based in Tauranga for the duration of the project

### PROJECT ABSTRACT:

Stress is a difficult concept to define and to measure. In many cases people do not realise a) that they are stressed, b) the physiological consequences of stress and c) what to do about it in a society that is not stress management literate.

Our project aims to validate a 'stress protocol' on a treadmill that will establish that a person has a stress response, the extent of that response and then to determine effective strategies to reduce and/or eliminate the response.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Kim Hebert-Losier</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Evidence-based bike-fit for the elite and recreational cyclist</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FHSHP</td>
</tr>
<tr>
<td>Field:</td>
<td>Biomechanics, Sport Science, Health Science</td>
</tr>
</tbody>
</table>

### EXPECTED OUTCOMES:

1. Brief report on bike fit recommendations
2. Pilot data comparing 2D to 3D bike fit data
3. Brief report (abstract form) of pilot data findings
4. Preliminary assessment of the feasibility and interest in 3D bike fitting services, with potential for a new income stream at the Adams Centre for High Performance
5. Pathway to a masters or PhD project in cycling and/or triathlon for the student

### STUDENT TASKS:

1. Review the scientific literature on 2D / 3D bike fitting (search and summarise articles)
2. Write a brief report of evidence based bike fit guidelines
3. Collect and compare bike data from 2D and 3D video analyses systems
4. Write a brief report on the collected data

### REQUIRED SKILLS:

1. Bike fitting experience / interest
2. Strong written and oral communication skills
3. Basic human anatomy and human movement knowledge
4. Use of reference manager software (preferred, but not required)

### PROJECT ABSTRACT:

At the Adams Centre for High Performance, we are striving to become a world class Sport Science hub that conducts high-quality research and provides evidence-based services to the high performance athlete, recreational athlete, and community. Three-dimensional (3D) motion analysis is considered the ”gold-standard” to quantify human movement. In the last few years, some overseas high performance centres have started to offer 3D bike-fit analyses. These 3D bike-fits provide even more information than ever before and could be made available at the Adams Centre for High Performance and the community, which would be a unique offering in New Zealand.
However, how do 2D video bike-fits (as done in shops) compare to more advanced 3D bike-fitting techniques? What are the recommended bike-fit parameters from 3D motion analysis bike-fits? We are seeking for a student to work in Mount Maunganui over the summer to investigate evidence-based bike fit parameters, and compare measures between high-speed 2D videos and advanced 3D video analyses. This summer scholarship provides an opportunity for a student to participate in the longer term research plans of the Faculty of Health, Sport and Human Performance, and the potential to partner and support high performance and community sports (i.e., cycling and triathlon).

This project should also contribute towards providing evidence of the feasibility and interest in 3D bike fitting services, with potential for a new income stream at the Adams Centre for High Performance. Finally, this project offers a pathway to a masters or PhD project in cycling and/or triathlon.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
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<tr>
<th>Supervisor/s:</th>
<th>Liis Uiga and Rich Masters</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Perception of height and action capabilities in penalty shooting</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FHSHP</td>
</tr>
<tr>
<td>Field:</td>
<td>Sport psychology; motor control</td>
</tr>
</tbody>
</table>

PROJECT #: 23

EXPECTED OUTCOMES:

1. The research project will considerably increase the student's research capability by offering an opportunity for the student to familiarise themselves with the relevant literature, to learn the basics of data collection methods and to develop knowledge in quantitative data analysis.
2. The expected outcome of the research project will be to write up a manuscript for publication in a sport psychology journal, co-authored by the student and supervisors, and to present findings at an international sport science conference.

STUDENT TASKS:

1. Search the literature in order to locate and review empirical research related to action capabilities and size perception
2. Work with the supervisory team to finalise the study design and logistics
3. Recruit participants to attend one experimental session
4. Collect and analyse the data (with assistance from the supervisory team)
5. Assist with writing the manuscript for publication

REQUIRED SKILLS:

1. An interest in sport psychology, motor performance or football, or all three
2. Basic understanding of experimental research
3. Ability to use academic search tools
4. Good time-management skills
5. Basic understanding of quantitative data analysis

PROJECT ABSTRACT:

People in power overestimate their own height (Duguid & Goncalo, 2012), but underestimate the size of others, whereas people not in power tend to overestimate the size of others (Yap, Mason, & Ames, 2013). Furthermore, people with power/authority status (e.g., a professor) are perceived to be taller than they are compared to people not in power/authority (e.g., a student) (Dannenmeir & Thumin, 1964; Wilson, 1968).
Similarly, the status held by sporting icons (e.g., David Beckham) has been shown to influence perceptions of their size (Masters, Poolton, & van der Kamp, 2010). Taken together, these findings suggest that power/authority status influences the way people see others and themselves but also suggest that athletes’ action capabilities influence perceptual judgements of their height.

In this study, we propose to manipulate a goalkeeper's action capabilities to gain further insight into perceptions of size. Specifically, we will examine whether wearing strapping (indicative of injury) reduces power status and causes a goalkeeper to be perceived as shorter than they are compared to not wearing strapping. Furthermore, we will examine whether reducing the power status and, consequently, action capabilities of the goalkeeper will change shooters' actions. As an example, would reduced power status and action capabilities of the goalkeeper cause penalty takers to shoot closer to the goalkeeper rather than aiming for corners?

We also propose to manipulate participants’ (n=30) action capabilities by asking them to wear a sling on their non-dominant arm for half of the penalty shoots. This manipulation will allow us to examine, whether 'being injured' causes people to perceive themselves as less powerful and thus overestimate the size of opponents (i.e., goalkeeper) and underestimate their own size and whether it has consequences on shooting performance.

To do this work, the successful student will work closely with supervisors to investigate the literature on action capabilities and size perception and will be assisted with data collection and analysis.

ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Alice Te Punga Somerville</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Pacific writers in 'Pacific Islands Monthly'</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FMIS</td>
</tr>
<tr>
<td>Field:</td>
<td>Pacific Studies/ Literary Studies/ Media Studies/ Indigenous Studies</td>
</tr>
</tbody>
</table>

EXPECTED OUTCOMES:

1. Index of Pacific writers published in 'Pacific Islands Monthly' 1930-1975
2. Brief biographical sketches and list of creative works by specific Pacific writers
3. Notes on advertisements in PIM that relate to the project

STUDENT TASKS:

1. Work your way through the publication 'Pacific Islands Monthly,’ reading it from cover to cover and making up a list of all of the Pacific writers published up to 1975 and noting details about what they write about.
2. For some specific writers, undertake online and library searches to see what other writing or art they produced over their lives.

REQUIRED SKILLS:

1. Confidence with reading
2. Some Pacific, literary, or Indigenous Studies background would be an advantage
3. Ability to take good notes
4. Confidence with database and library searches

PROJECT ABSTRACT:

Who and where were some of the earliest Pacific writers? This project asks you to read a magazine focused on the Pacific to find out which Pacific people it published and what they were writing about. Pacific Islands Monthly was published in Sydney between 1930 and 2000 and you will focus on the period until 1975. Over that time period, the Pacific region changed a great deal: lots of places gained their independence from colonial powers, and people across the region moved around and beyond their homes for all kinds of reasons.

This research is part of a wider project I am doing on Indigenous writers who publishing in newspapers, magazines and books between 1900 and 1975. Pacific Islands Monthly is a very important publication in the development of creative writing in the Pacific and many of the people known as the foundational figures in Pacific literature were published in its pages. It has been fully digitized which means it is able to be read online.
For the first stage of this summer scholarship, you will work your way through the publication, reading it from cover to cover and making up a list of all of the Pacific writers published up to 1975 and noting details about what they write about. In addition, we will work together to come up with some other things for you to look out for and track as you read, such as advertisements and opinion pieces that relate to the topic. This kind of careful reading is quite time-consuming but because of the changes in the region over the time period the magazine itself also changed a lot, so it won't feel repetitive.

Once you have identified the Pacific writers in Pacific Islands Monthly, we will work together on deciding a few for you to focus on for the rest of your time. For these writers, you will do some online and library searches to see what other writing or art they produced over their lives.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
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<tr>
<th>Supervisor/s:</th>
<th>Haki Tuaupiki</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Ngā Karakia Whakatere Waka - Māori voyaging and navigation waka chants</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FMIS</td>
</tr>
<tr>
<td>Field:</td>
<td>Mātauranga Māori</td>
</tr>
</tbody>
</table>

### EXPECTED OUTCOMES:

1. The key outcome of this project will be in the form of a significant collection of traditional karakia whakatere waka. These pertinent karakia whakatere waka will directly support a larger Māori-specific navigation knowledge project currently undertaken by the PI.
2. The results of this proposed research will support a journal article on Karakia whakatere waka which will be submitted to the Te Katihihi Journal.

### STUDENT TASKS:

1. Identify relevant traditional oral sources and literature pertaining to Māori-specific voyaging and navigation karakia.
2. Search and document all relevant karakia.
3. Create a database to record these karakia.

### REQUIRED SKILLS:

1. Must have completed a te reo Māori major, or have equal te reo Māori expertise.
2. Must have sound research skills to undertake literature searches and documentation.
3. APA referencing skills.

### PROJECT ABSTRACT:

This proposed research will investigate Māori-specific navigation knowledge and practices in relation to non-instrument, long-distance voyaging found in karakia (chant). It will specifically collect and document karakia whakatere waka (voyaging and navigation chants) that endure in the traditional oral and literature record.

We know that Māori ancestors undertook deliberate and planned, navigated voyages to and from Aotearoa New Zealand over successive generations, and that, by the 14th century, Māori-specific navigation declined rapidly.
This proposed project builds from the University of Waikato 2017/2018 Summer Scholarship and two current research projects currently undertaken in collaboration with Ngā Pae o te Māramatanga scoping and seeding excellence fund 2018/2019 and the University of Waikato SIF grant 2018.

It will specifically support a broader Māori-specific navigation project which seeks to recover unique Māori navigation knowledge to support the regeneration of Māori-specific voyaging and navigation knowledge in Aotearoa today.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Seokho Jeong</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Characterisation of the fundamental site periods in the Hamilton urban area using the H/V spectral ratio method</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Engineering</td>
</tr>
<tr>
<td>Field:</td>
<td>Civil Engineering/Earthquake Geophysics</td>
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</table>

### EXPECTED OUTCOMES:

1. The fundamental site vibration periods in the Hamilton urban area, which will be made available for future use by researchers and engineers.
2. Feasibility of using the microtremor H/V technique in identifying faults in the Waikato region.
3. It is anticipated that the collected data will feed into the refinement of the New Zealand seismic velocity model, which is a key input for the national- and regional-scale seismic hazard analysis and the ground motion simulations.

### STUDENT TASKS:

1. Test planning
2. Driving
3. Sensor installation and removal
4. Data collection
5. Data processing and plotting
6. Report writing

### REQUIRED SKILLS:

1. Punctual and responsible
2. Ability to learn quickly
3. Good understanding of physics and geology
4. Computer literacy; past experience with Python is desirable
5. Strong hands are required for operating the equipment
Many damaging earthquakes in the past, including the 2010-2011 Canterbury earthquakes and 2016 M7.8 Kaikōura earthquake, demonstrated that the dynamic response of soft soil on hard rock amplifies and prolongs the ground shaking. Therefore, accurate characterisation of the in-situ dynamic response characteristics such as the shear wave velocity and the sediment thickness profile is essential for the satisfactory prediction of earthquake ground motion intensities at a given site. However, despite the high seismicity of New Zealand and the past lessons on the influence of shallow local geological conditions on the ground motion intensities, little progress has been made in characterising the site dynamic properties of New Zealand urban areas, except in the Canterbury region after the 2010-2011 Canterbury earthquakes.

As part of the ongoing nation-wide collaborative effort into quantifying the site dynamic characteristics of New Zealand urban areas, this research utilizes the horizontal-to-vertical (H/V) spectral ratio techniques, to estimate the fundamental site periods in the Hamilton urban area from the measured ambient ground vibration. The H/V spectral ratio method, first introduced in the late 80's, quickly became a very popular tool for measuring the site fundamental frequency, due to its simplicity and cost-effectiveness. The site period is a key parameter in determining the site subsoil class within the New Zealand building design standard (NZS 1170.5:2004). The collected site period data will be made publicly available for the future use by researchers and engineers. It is anticipated that the collected data will feed into the refinement of the New Zealand seismic velocity model, which is a key input for the national- and regional-scale seismic hazard analysis and the ground motion simulations.

This research involves fieldwork and data processing. The student will learn the necessary techniques and perform the sensor installation, data collection and processing. Testing equipment and computer software will be made available. Full driver's license will be required for fieldwork and a desk space will be arranged for data processing and report writing.
### Academic Project Submission Details:

<table>
<thead>
<tr>
<th>Supervisor(s)</th>
<th>James Neale and Amir Tarighaleslami</th>
</tr>
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<tbody>
<tr>
<td>Project Title</td>
<td>2nd Generation Spray Dryer exhaust heat recovery</td>
</tr>
<tr>
<td>Faculty: Field</td>
<td>FSEN - Engineering Mechanical/Process Engineering</td>
</tr>
</tbody>
</table>

### Expected Outcomes:

1. Good quality data that accurately represents the performance of a condensing heat recovery coil across a range of temperatures and flow rates
2. Clear understanding of potential fouling rates for the coils and document fouling rates
3. Identify cleaning requirements for the coils - if required
4. Identify potential heat pump cycles to economically upgrade the recovered waste heat

### Student Tasks:

1. Operation of a heat recovery pilot plant located on an operational milk powder spray dryer
2. Regular monitoring of heat recovery coils and associated equipment
3. Data collection - flow rates, temperatures and static pressure measurements
4. Heat Recovery system analysis and possible optimisation
5. Monitoring of fouling and required cleaning regimes for recuperator coils
6. Desk top analysis of potential heat pump cycles for upgrading the recovered heat
7. Preparation of a report summarising the potential opportunities for full scale implementation

### Required Skills:

1. Awareness of basic health and safety practices in a factory setting
2. Good experimental observation capability and data collection
3. Proficient in working with Microsoft Excel - data analysis
4. Not afraid of heights - the pilot plant is 50m in the air, fully guarded with a fantastic view!
5. Some previous experience in a factory setting would be an advantage.
PROJECT ABSTRACT:

With a clear mandate to reduce greenhouse gas emissions in the dairy processing sector it is imperative that the utilisation of waste heat sources are maximised to increase the thermal efficiency so as to reduce the specific greenhouse gas emissions for these plants. Our energy research group has successfully developed and piloted a sensible waste recovery system that is currently being applied to several large scale factories in New Zealand. This project will build on this work to develop and test a second generation spray dryer exhaust heat recovery system that recovers latent and additional sensible heat from these exhaust streams that will then be heat pumped to generate hot water at useable temperatures to displace current steam use.

The project in the first instance will look at the operation and performance of the condensing coils that will be installed on the top of Dryer 5 at Fonterra Te Rapa, including an evaluation of any fouling (powder build up) of the coils and any associated impacts on operational parameters. All equipment and instrumentation are or will be in place by October 2018. The second stage of the project will use a desktop study to investigate the best options for heat pumping the recovered heat with either ammonia or trans-critical CO₂ heat pumps systems. The aim of this part of the project will be to identify the optimal level of sensible and latent heat recovery, water loop flow rates and preferred hot water supply temperatures from the selected heat pump cycles.

Co-operation form the factory staff, including all relevant health and safety requirements, staff time and plant access are already in place for this project to proceed immediately.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Leandro Bolzoni</th>
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</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>On the development of low-cost powder metallurgy Ti-based alloys</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Engineering</td>
</tr>
<tr>
<td>Field:</td>
<td>Materials Science and Engineering</td>
</tr>
</tbody>
</table>

### EXPECTED OUTCOMES:

1. This research project aims to develop new alloys, therefore the data about their behaviours will be of scientific interest and publishable in peer-review international journals or presentable at international conferences.
2. Proper analysis of the results obtained via the work performed through this Summer Research Scholarship will also provide knowledge about the manufacturing behaviour of the alloys studied and set the basis for future development of other Ti-based materials.
3. The project will expand the research portfolio of the Titanium Research Group and provide scientific understanding for future bidding of external funding.

### STUDENT TASKS:

1. The student will participate to all the steps needed to create new alloys either leading the task or contributing to its proper achievement as specific training but might be necessary. The student will collaborate on:
2. Production of new powder metallurgy alloys: this involves handling, weighting and mixing of the starting powders;
3. Manufacturing of the billets: the powder mixtures will be compacted via uniaxial pressing at room temperature;
4. Sintering of the material: the transformation of the compacted powder into solid material will be carried out via vacuum or induction sintering;
5. Study the effect of composition and processing parameters on the properties of the alloys: measurements of physical properties, quantification of the tensile behaviour, metallographic preparation and microstructural analysis will be required;
6. Critically analyse the results to explain the behaviour of the alloy using scientific and engineering principles.
REQUIRED SKILLS:

1. Understanding of materials science's basic concepts such as phase diagrams and how they can be used to develop new alloys.
2. Good practical skill and previous experience on materials' preparation is a must.
3. Knowledge on manufacturing processes, especially powder metallurgy is desirable.
4. Ability to use fundamental engineering knowledge to solve technical issues related to applied experimental research.
5. Good communication and writing skills combined with a solid materials science background to be able comment, discuss and interpret experimental results on the basis of scientific principles.

PROJECT ABSTRACT:

Titanium is the ideal material for a great variety of engineering applications; however, its extensive industrial adoption is still hindered by the high cost. This project aims to create new low-cost Ti-based alloys by combining cost-effective alloying elements and cost-affordable powder metallurgy (PM) techniques to reduce the final cost of Ti alloys. On the one hand, cheap alloying elements such as Fe or Al will be used to substitute more expensive elements such as V and the targeted compositions will be obtained via blending of the starting powders.

On the other hand, the alloys will be consolidated using the simples and cheapest PM processing route of pressing and sintering. Post consolidation treatments might also be considered to enhance the performance of the new alloys. Quantification of the physical, mechanical and microstructural behaviour of the material will be performed and the results obtained analysed to understand and justify the properties of these new Ti-based materials.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Martin Atkins and Michael Walmsley</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Geothermal Electricity Generation - Energy and Environmental Footprint Evaluation</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Engineering</td>
</tr>
<tr>
<td>Field:</td>
<td>Engineering</td>
</tr>
</tbody>
</table>

EXPECTED OUTCOMES:

1. Report
2. Excel Spreadsheets
3. Paper Manuscript

STUDENT TASKS:

1. Data Collection
2. Data Analysis
3. Report Writing

REQUIRED SKILLS:

1. Thermodynamics
2. Life Cycle Analysis
3. Mass & Energy Balances
4. Spreadsheets

PROJECT ABSTRACT:

Geothermal electricity makes up a significant part of New Zealand's electricity generation with over 850 MW of installed capacity and will play a major role in meeting renewable targets. However, despite being renewable, geothermal electricity is not carbon neutral and therefore rigorous environmental footprints are important to understand the relative impacts of different renewable energy sources.

Energy Return on Energy Invested (EROI) in also an important factor for renewable technologies. Few estimates of EROI values of geothermal electricity exist and they are contradictory or location specific. This project will use Life Cycle Analysis techniques and energy systems analysis to determine EROI values for each of the geothermal power plants in New Zealand.
The research will involve liaising with generating companies to acquire data for the analysis. We have previously determined EROI values for each individual wind farms in New Zealand and this work will form a basis to be applied to geothermal. Furthermore correlations between important factors such as geothermal fluid enthalpy, power cycle and EROI value will be investigated. It is anticipated that a manuscript will be prepared to be submitted to a high quality international journal.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Amir Hossein Tarighaleslami and James Neale</th>
</tr>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Carbon Footprint and Energy Transition Life Cycle Assessment for New Zealand Dairy Production Industry</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Engineering</td>
</tr>
</tbody>
</table>

EXPECTED OUTCOMES:

1. Proposing a pathway through emission reduction within New Zealand dairy plants
2. Assessing energy transition phase for New Zealand dairy industry

STUDENT TASKS:

1. Literature review
2. Learning the openLCA software
3. Studying New Zealand dairy plant
4. Analysing the results
5. Writing the report

REQUIRED SKILLS:

1. Good knowledge of energy and mass balance
2. Good knowledge of thermodynamics
3. Chemistry and environmental knowledge
4. Programming knowledge is an advantage.

PROJECT ABSTRACT:

Greenhouse Gas (GHG) emissions and their potential effect on the environment has become an important national and international issue. Dairy production plants, along with all other types of process industries, is a recognised source of GHG emissions, but little study exists on the net emissions from dairy plants. It is estimated that in 2016 New Zealand's food, dairy and beverage industries consume about 49 PJ energy in term of process heat.
Life Cycle Assessment (LCA) is the preferred methodology to assess carbon footprint per unit of milk in dairy plants. The objective of this research is to apply an LCA method to compare carbon footprints considering energy transition toward fuel switching in dairy plants. Currently, New Zealand dairy industry uses coal, natural gas and biomass as main fuels in factories to overcome site's heat demand. Therefore, LCA analysis will provide the opportunity to undertake a robust assessment on replacing current fuels with carbon-free fuels such as hydroelectricity, biomass, and wave energy.

The applicant must have good knowledge of energy and mass balance, thermodynamics, chemistry and environmental knowledge.

For this project, programming knowledge is an advantage.

The applicant will do a robust literature review on the field and will learn and work with the OpenLCA software.
# Summer Research 2018/19  
## Project Abstract

<table>
<thead>
<tr>
<th><strong>ACADEMIC PROJECT SUBMISSION DETAILS:</strong></th>
<th><strong>PROJECT #:</strong> 31</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supervisor/s:</strong></td>
<td>Clare Browne and Alison Campbell</td>
</tr>
<tr>
<td><strong>Project Title:</strong></td>
<td>Video analysis of rabbit behaviour data: Time budgets and impacts of spatial enrichment on animal welfare</td>
</tr>
<tr>
<td><strong>Faculty:</strong></td>
<td>FSEN - Science</td>
</tr>
<tr>
<td><strong>Field:</strong></td>
<td>Animal behaviour</td>
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</tbody>
</table>

### EXPECTED OUTCOMES:

1. The student will gain an understanding of the processes involved in applied animal behaviour and welfare research.
2. The student will also gain experience analysing animal behaviour data.
3. The data generated by this project will offer new insights into New Zealand pet rabbit behaviour - and determine if a low-cost spatial enrichment option offers tangible welfare benefits to this species.
4. The research findings produced at the end of this data analysis project will be prepared as part of a peer-reviewed journal article. The findings will also be disseminated to relevant companion animal welfare organisations and agencies, as well as pet rabbit owners.

### STUDENT TASKS:

1. Watching video footage of hutch-living pet rabbits, and using behaviour analysis software to measure the behaviours displayed by the subjects (based on a prepared ethogram).
2. Careful recording of the observed behaviours into a spreadsheet and performing simple analyses of these behaviours.
3. Writing a report summarising the findings.

### REQUIRED SKILLS:

1. Careful and precise observation and recording of animal behaviour, working from an ethogram (experience is preferred, but training will be provided if necessary).
2. Computer skills, including the ability to learn how to use video analysis software and Microsoft Excel spreadsheets.
3. The ability to work at computer-based tasks for long periods of time (i.e., watching hours of rabbit behaviour video footage).
4. Some knowledge of rabbit behaviour would be advantageous.
Rabbits display a wide repertoire of behaviours under appropriate environmental conditions. However, it is known that spatial restriction can result in rabbits displaying fewer natural behaviours (Dixon et al., 2010) which is considered to reduce their welfare, and international research has highlighted the fact that these pets are often kept in conditions which are below acceptable welfare standards (Rooney et al., 2014). Despite there being an estimated 100,000+ pet rabbits in New Zealand (NZCAC, 2016), the welfare of this species is under-researched in comparison to other companion animals such as dogs and cats. Rabbits in New Zealand are commonly housed in hutches or similar structures, and so it would be valuable to know more about the welfare status of these pets and if simple environmental enrichment changes might improve their welfare.

The aim of this project is to analyse video data that have been collected on New Zealand hutch-living pet rabbits. Individual rabbits were filmed multiple times while living under their normal conditions over the 2017/2018 summer; this research project will involve the analysis of this video footage to help answer two research questions. Firstly, we are interested in learning about the behavioural repertoires of hutch-living pet rabbits, and so basic time budgets of these animals will be constructed from analysing the video footage. Secondly, some rabbits received a temporary extension to their normal hutches that provided extra vertical space - these rabbits’ video data will be examined to see if this enrichment altered their behaviour (and thus perhaps offers a low-cost means of enhancing their welfare). We have 168 hours of footage that needs to be watched and analysed; it is estimated that this could take up to 400 hours. We are seeking a dedicated and conscientious student to analyse this video footage and to help us answer these questions about the welfare of hutch-living pet rabbits.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Nick Ling and Clare Browne</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Can scent-detection dogs find whitebait spawning sites?</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td>Field:</td>
<td>Animal behaviour and conservation</td>
</tr>
</tbody>
</table>

PROJECT #: 32

EXPECTED OUTCOMES:

1. The student will gain an understanding of processes involved in animal behaviour research; specifically, working on detection dog research projects.
2. The student will gain experience in the collection and analysis of animal behaviour data
3. This project will produce data informing us on the ability of dogs to detect galaxiid eggs in laboratory conditions
4. Data produced in the project will form the basis for further research, including field trials.

STUDENT TASKS:

1. Completing appropriate training and laboratory inductions prior to commencement of the project.
2. Caring for and training pet dogs coming into the detection dog research facility, as per Standard Operating Procedures. Liaising with the dogs' owners.
3. Sample preparation as per Standard Operating Procedures, which may include time spent at a biology laboratory (e.g., the aquatic facility).
4. Running experimental sessions at the detection dog facility, taking care to ensure that procedures are followed precisely, that the equipment is running correctly, and that data are recorded accurately.
5. Careful cleaning of all equipment, including at the detection dog facility and in a chemistry laboratory.
6. Data analysis and a summary report.

REQUIRED SKILLS:

1. Experience working with dogs. The student must be confident with handling, training, walking, and cleaning up after the dogs - as well as being willing to follow established procedures on the dogs' care and well-being (training will be provided).
2. Relevant course work in animal behaviour/behavioural science (biology and/or psychology courses).
3. The ability to follow instructions precisely, particularly regarding experimental procedures (including sample preparation, handling, and cleaning).
4. Basic computer skills, including the ability to manage and process data (e.g., Microsoft Excel).
5. Good communication skills for liaising with dog owners.
Many of New Zealand's native freshwater fish are threatened by loss of habitat and degradation of spawning areas. Whitebait are the juveniles of five migratory galaxiid species, inanga, banded kokopu, giant kokopu, shortjaw kokopu and koaro that return from the sea each spring after being spawned in estuaries and tidal areas the previous autumn. While the returning whitebait runs are well studied the preferred locations and conditions of migratory galaxiid spawning areas are poorly known. It is thought that these fish predominantly spawn along tidal river banks during spring high tides and the egg masses are left uncovered amongst the long grasses for up to two weeks until the next spring tides. During the following spring tide the eggs hatch and the larvae are washed out of the estuary into the sea as the tide falls, returning as juvenile whitebait in the spring.

Regional councils and the Department of Conservation seek to protect estuarine spawning areas as inanga are known to return to the same spawning sites year after year. However, comparatively few spawning sites have been identified due to the difficulty in identifying spawning sites. The small egg size, concealed nature of spawned eggs amongst the grass and limited period of exposure between spring tides make it logistically difficult to identify spawning sites. The ability to detect galaxiid spawning areas would allow governmental agencies to protect these sites from further decline and provide an opportunity to conduct research aimed at enhancing these areas. Ultimately, this would reverse population declines and help provide a sustainable recreational whitebait fishery.

Scent-detection dogs have made significant contributions to biosecurity, law enforcement and terrestrial conservation, such as the Department of Conservation's Conservation Dogs Programme. We have established a canine scent-detection laboratory at the University of Waikato, through which several scent-detection projects are run. In one such project, dogs have recently demonstrated the ability to detect specific fish species from water samples at extremely low biomass concentrations under laboratory conditions. We seek to determine if scent-detection dogs can distinguish the presence of galaxiid eggs under laboratory conditions. The unique scent-detection system developed at the University of Waikato uses dogs recruited from the community: pets, who are accommodated at the scent-detection facility on their workdays but otherwise live with their owners. The scent-detection apparatus employed in this project provides an inventive solution to many methodological issues that confound animal scent-detection research, and allows the dogs, once fully trained, to work on their own (albeit supervised by a handler via video camera from an adjacent room). This project aims to train up to six dogs to reliably distinguish the presence of both isolated galaxiid eggs and water exposed to galaxiid eggs at environmentally realistic abundances. If successful, this work will form the basis for further scent-dog detection research in this area, including field trials.
### ACADEMIC PROJECT SUBMISSION DETAILS:

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<tr>
<th>Supervisor/s:</th>
<th>Charles Lee and Maria Monteiro</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>From wet to dry: the effect of environmental change in microbial communities from the McMurdo Dry Valleys of Antarctica</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td><strong>Field:</strong></td>
<td>Biological Science</td>
</tr>
<tr>
<td><strong>PROJECT #:</strong></td>
<td>33</td>
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</tbody>
</table>

### EXPECTED OUTCOMES:

1. The expected results from this project will begin with an assessment of the extent to which the structure and composition of microbial communities change along environmental gradients in aquatic and terrestrial systems.
2. A final report written by the student mentioning the main results. The report will need to include the following sections: introduction, methodology, results, discussion and references.
3. The student will be able to improve and demonstrate good laboratory skills and experience with different molecular techniques.
4. The student will demonstrate the ability to apply basic research methods in microbial ecology including research design, data analysis, data interpretation and writing skills.

### STUDENT TASKS:

1. Extraction of DNA from microbial and soil samples.
2. PCR amplification of the 16S rRNA gene.
3. Preparation of PCR amplicons for amplicon sequencing.
4. Quantification of moisture, total nitrogen, total carbon and organic matter content in the soil samples.
5. Analysis of sequencing data using in-house pipelines.

### REQUIRED SKILLS:

1. The student needs to be autonomous, interested and focused on the project.
2. Fast learning capacity to quickly become confident with molecular biology techniques.
4. High level of organisation.
PROJECT ABSTRACT:

The McMurdo Dry Valleys (MDVs) of Antarctica is a vast inland ice-free area with a pristine and distinct landscape comprising of mountain ranges, ice-covered lakes, streams, ponds, glaciers and heterogeneous soils. Climate, hydrology and ecology of the MDVs are inter-related. Terrestrial and aquatic ecosystems harbour a diverse microbiome, which entail a fundamental role: to manage the recycling of nutrients and energy throughout the system. Nonetheless, microbial life and its ecological processes are dependent on water availability, which is scarce in these systems and controlled by climatic events.

New models predict that, over the coming decades, climate change will potentially increase temperature by several degrees, altering water-ice dynamics and temperature regimes. The increased availability of water will affect the hydrological reservoirs of the MDVs, increasing the hyporheic zones and promoting alterations of salinity gradients and nutrient concentrations, which will likely result in a structural and functional response from the terrestrial and aquatic microbiome.

Although the structure and composition of microbial communities has been widely investigated in both aquatic and terrestrial systems, fundamental questions remain concerning the structure and functions of these communities such as: which part of the community is active and contribute to ecological processes, and are these communities stable and resilient to changing environmental conditions?

This summer research project is part of a major project that seeks to measure the stability and functional resilience of Antarctic microbiomes to future environmental change. Our hypothesis is that resilience is positively related to community complexity and environmental variability. The final goal is to understand to what extent microbial communities are able to retain their structure and function under a regime of change.

To accomplish our goal, a spatial sampling procedure was taken from terrestrial, through inland aquatic systems in the Wright and Taylor Valleys in the MDVs. Soil samples were sampled along a wetness gradient from Antarctic lakes and ponds, in which the water level has been stable (Lake Brownworth, and two Upper Wright valley ponds) and dynamic (Lake Vanda, Lake Fryxell and two Upper Wright Valley ponds) for the past 20 years. Microbial mats were sampled along a depth gradient, simulating different light intensities in the same lakes and along a conductivity gradient in the Upper Valley ponds.

The student will be processing soil and mat samples taken from environmental gradients from previous field expeditions. The student will be required to learn how to extract DNA from soil and microbial mat samples using CTAB method and to amplify and analyse the structure and composition of microbial communities using 16S gene. The latter requires learning how to perform a PCR (polymerase chain reaction) and prepare samples for amplicon sequencing. The student will also learn how to conduct geochemical analyses such as the quantification of total Carbon and total Nitrogen, soil moisture and organic matter.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Andrew Barnes</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Exploring invertebrate biodiversity in New Zealand forest soils</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td>Field:</td>
<td>Biology/Terrestrial Ecology</td>
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</table>

PROJECT #: 34

EXPECTED OUTCOMES:

1. The student will learn key techniques in sampling and identifying belowground invertebrates and will contribute to a larger project investigating the reassembly of soil food webs in urban forest restoration sites around New Zealand.
2. The student will determine how climatic conditions affect the abundance of different invertebrate functional groups in the soil, which will serve as a baseline data set for future research on New Zealand soil food webs.

STUDENT TASKS:

1. Field data collection, including taking soil cores from forest reserves and extracting soil fauna from samples using heat extractors and wet extraction techniques
2. Identification and counting of arthropods
3. Measurement of arthropod traits
4. Data entry

REQUIRED SKILLS:

1. A good level of fitness and the general ability to work in the field is essential.
2. Some experience in terrestrial ecology would be preferred.
3. Some knowledge of arthropod identification would be beneficial.

PROJECT ABSTRACT:

There is considerable knowledge about New Zealand's forest fauna that can be found aboveground, but we know very little about what is found belowground in forest soils. These belowground systems harbour immense biodiversity and are crucial for carrying out a range of processes that support important ecosystem services like carbon storage and disease control. Faunal communities in forest soils comprise a wide range of species that play various roles in food webs such as predation, herbivory, detritivory, and parasitism, making them an additionally fascinating model system to study species interactions.
Determining how different environmental changes (such as degradation or restoration of forest habitat) affect soil food webs requires a baseline understanding of how they are structured in undisturbed forest. Specifically, an initiative to assess how soil food webs respond to decades of forest restoration in urban locations throughout New Zealand has been planned for the start of 2019. To understand the trajectory in which soil food webs are regenerating in these urban sites, we require comparisons with non-degraded forests that give a reference point for undisturbed soil communities.

This project will explore belowground invertebrate communities in Whewell's Bush Scientific Reserve (near Hamilton) and Stevenson's Bush Scenic Reserve (near Dunedin), which represent two climatically contrasting reference forest sites. The student will collect soil samples from these sites from which all fauna will be extracted (e.g., insects, mites, collembola, nematodes) using specialised soil extraction methods. The extracted fauna will be identified to general taxonomic groups, which will later contribute to work on constructing soil food webs.

This project will provide a first look at the diversity of soil fauna inhabiting New Zealand's lowland forests and will provide a crucial baseline dataset that will be used for future assessments of soil food web restoration in urban areas throughout New Zealand.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
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<tr>
<th>Supervisor/s:</th>
<th>Andrew Barnes</th>
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<tr>
<td>Project Title:</td>
<td>Invasive mammal impacts on the emergence of soil invertebrates in forest fragments</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
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<tr>
<td>Field:</td>
<td>Biology/Terrestrial Ecology</td>
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EXPECTED OUTCOMES:

1. The student will learn key techniques in sampling and identifying belowground and aboveground invertebrates, as well as contributing to a larger project assessing the benefits of belowground biodiversity in forest remnants to adjacent agricultural systems.
2. The project will develop an understanding of how invasive aboveground mammalian predators affect native invertebrate biodiversity belowground in the Waikato region.

STUDENT TASKS:

1. Field data collection, including setting up and collecting samples from insect emergence traps.
2. Identification of arthropods
3. Measurement of arthropod traits
4. Data entry

REQUIRED SKILLS:

1. A good level of fitness, ability to use a handheld GPS, and general ability to work in the field is essential.
2. Some experience in terrestrial ecology would be preferred.
3. Some knowledge of arthropod identification would be beneficial.

PROJECT ABSTRACT:

Forest ecosystems provide crucial habitats for native arthropods that live in soil as larvae and have an aboveground stage as an adult. When these arthropods emerge to the aboveground system, they can then disperse into adjacent pasture habitats. Thus, remnant forest fragments might help to maintain biodiversity of native arthropods in agricultural soil ecosystems. This is important because soil-dwelling arthropods drive important ecosystem functions such as decomposition and nutrient fluxes, but also play vital roles in aboveground processes such as pollination and biological control through predation and parasitism.
The dispersal of arthropods emerging from soil into adjacent ecosystems typically relies on an adult aboveground stage in their lifecycles, during which time they are potentially susceptible to predation by mammalian predators such as rats and hedgehogs. The aim of this project is to determine if invasive mammalian predators have negative impacts on soil arthropod communities by consuming the aboveground adult arthropods that emerge throughout the summer.

The role of the summer research student will be to assess the diversity and abundance of emerging belowground arthropod taxa from a range of forest fragments and reserves throughout the Waikato region. By collecting and identifying arthropods from soil emergence traps in forest remnants spanning a range of predator control, this project will develop an understanding of how invasive mammalian predators affect belowground arthropod communities.

The student will also contribute to a larger initiative to understand how these potential predator effects will influence the dispersal and recruitment of soil arthropods into adjacent pasture habitat and the effect of invasive predators on ecosystem functioning of arthropod communities in agricultural landscapes.
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<tr>
<th>ACADEMIC PROJECT SUBMISSION DETAILS:</th>
<th>PROJECT #: 36</th>
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<tbody>
<tr>
<td>Supervisor/s:</td>
<td>Gregory Jacobson and Steve Bird</td>
</tr>
<tr>
<td>Project Title:</td>
<td>Can gut and mouth bacteria be detected in the blood of heart patients using DNA as a biomarker?</td>
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<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
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**EXPECTED OUTCOMES:**

1. Determine whether cell-free DNA evidence for bacteria can be found in the blood of healthy people and/or people with heart disease.
2. Describe whether there are different patterns in any bacteria detected between healthy people and heart patients.
3. Develop a major research paper reporting the study findings (student will be included as an author).
4. Organisms found in the blood samples could be potential therapeutic drug/antibiotic targets to reduce inflammation and thereby heart disease.
5. Strengthening of the research relationship between the University of Waikato scientists and Waikato hospital clinicians.

**STUDENT TASKS:**

1. Use kit-based approach to purify DNA.
2. Quantify purified DNA.
3. Carry out PCR analysis of DNA.
4. Search online public databases of known bacterial taxonomy.
5. Record results as tables and perform simple statistical analyses.
6. Coordinate new sample processing and storage.
7. Write a short literature review on cell-free DNA in heart disease (for inclusion in journal article).
8. Liaise with clinicians and affiliated hospital staff in sample collection and storage.
REQUIRED SKILLS:

1. Experience in molecular biology (DNA extractions, PCR)
2. Basic knowledge of biological databases and statistics
3. Willingness to work with human biological samples (blood, stool, swabs)
4. Good academic English language skills
5. Attention to detail in lab work and record keeping
6. Public speaking in presentation of study findings

PROJECT ABSTRACT:

Studies in both healthy and ill people have shown that bacteria and bacterial products can sometimes cross from the gut and/or mouth into the circulatory system, and are detectable in a blood sample as either complete bacteria, fragments of bacteria, or tell-tale DNA from these bacteria. There is evidence that in some people this type of bacterial transit could cause long-term inflammation, which has been linked to a potentially fatal disease called ‘hardening of the arteries’ (atherosclerosis). This is particularly dangerous when it arises within the heart's own blood supply vessels (the coronary arteries), causing coronary artery disease (CAD).

To study associations between bacteria and heart disease, we recently formed a team of researchers that combines the expertise of Waikato University scientists and Waikato hospital clinicians. Our primary study aim is to fully characterise patterns of bacteria (the microbiome) in the gut and mouth of patients suffering from heart disease. This is important research, as understanding the role these bacteria play in this disease may open up new treatment options for reducing rates of atherosclerosis and heart disease. Another of our research questions relates to whether bacteria can also be found outside of the gut and mouth body-sites within the blood and, if so, how these blood-borne species relate to organisms in the mouth and gut of people with heart disease.

The aims relevant to the student project are to: (A) concentrate and purify bacterial ‘cell-free’ DNA from blood samples of study participants, and (B) quantify and compare differences in the quantity of bacterial DNA between study participants (grouped by health status, i.e. heart disease or healthy). To achieve these goals, the summer student will use specialised kit-based tools to collect the total cell-free DNA from all participant blood samples and measure quality and abundance of this molecule. Next, an enzyme-based assay called the ‘polymerase chain reaction’ (PCR) will be used to characterise the taxonomy of the bacterial DNA present. In addition the student will also assist in the processing of new study samples as they arrive over the summer period. Lastly, all DNA samples will be submitted for next-generation DNA sequencing, and data from this included in subsequent analyses, and as part of major study outputs (e.g. journal articles).

To date, ethical approval has already been obtained, recruitment of patients begun (with a target of 150 participants: 50 ‘heart healthy’, 50 ‘chronic heart disease’ and 50 ‘heart attack/acute heart event’) and methods for collecting DNA optimized. Currently we already have stool, oral and blood samples from 30 participants.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Marcus Wilson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Modelling muscle twitches due to magnetic stimulation of the brain</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td>Field:</td>
<td>Biophysics, Mathematics, Computer Modelling</td>
</tr>
</tbody>
</table>

### EXPECTED OUTCOMES:

1. A model of a motor-evoked potential due to a TMS pulse, validated at least partly
2. Written documentation of the model
3. A contribution to a journal article (after the SRS period) detailing the modelling process, its results and validation

### STUDENT TASKS:

1. Study population-based neural modelling methods
2. Learn how to use the NFTSim software
3. Interpret the neural pathways from the motor cortex to the fingers in terms of mathematical parameters in population-based neural activity
4. Construct an appropriate model with NFTSim
5. Use MATLAB software to process and display results of NFTSim
6. Compare the results and predictions of the software against existing experimental data
7. Document what has been done using a lab notebook, software documentation, written report and poster

### REQUIRED SKILLS:

1. Mathematical ability: At about 200-level - students will need to interpret differential equations in more than one dimension
2. Computer skills: Students need to have basic familiarity with using mathematically-based computer software. Although NFTSim is written in C++, and we will use MATLAB to process results, specific experience in these areas is not required.
3. Science ability: Fundamental science skills are required - reading a scientific paper, keeping a good record of work, interpreting results against predictions and hypotheses
4. Although knowledge of the biophysics of the brain would be an advantage, it is not required. Some basic physics knowledge including voltages, electric and magnetic fields, etc, would be advantageous.
PROJECT ABSTRACT:

In Transcranial Magnetic Stimulation (TMS), pulses of current are applied to a coil positioned on the scalp in order to stimulate neurons and neural pathways in the brain. TMS is used to treat depression, tinnitus and other disorders, but just how it works is unclear.

A big problem for researchers is that the effects of TMS are hard to quantify; one cannot simply insert electrodes inside a human brain to see how neuron behaviour has changed. Instead, researchers typically study Motor-Evoked-Potentials (MEPs), which are the voltages produced on the skin above muscles. These are often experienced as twitches. However, the MEP is a very indirect measure of what is going on in the brain and is hard to interpret.

The University of Sydney has produced the software NFTSim that allows for modelling of the activity of populations of neurons in the brain. In this project we aim to extend the modelling to consider the MEPs that result from TMS. This will then allow us to compare better the results of NFTSim with experiment. We will consider the neural and nerve pathways from the motor cortex through to the fingers, and put each stage of this processes into an NFTSim model. We will then compare the output of the software against existing experimental measurements and consider refinements where necessary.

The research will be computer/office-based; laboratory work is not expected.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Merilyn Manley-Harris</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Prebiotic Honey</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td>Field:</td>
<td>Food Science - Honey</td>
</tr>
</tbody>
</table>

PROJECT #: 38

EXPECTED OUTCOMES:

1. Characterisation of the oligosaccharides in "concrete" honey
2. Demonstrated prebiotic qualities of the oligosaccharides in vitro
3. Production of an appropriate blend

STUDENT TASKS:

1. HPLC to isolate the oligosaccharides in concrete honey
2. NMR to characterise the oligosaccharides
3. Attempt to grow bifidobacteria in vitro using the oligosaccharides.
4. Attempt to obtain an appropriate blend of honey with correct characteristics

REQUIRED SKILLS:

1. Background in chemistry
2. Reasonable practical skills

PROJECT ABSTRACT:

Honeydew honey is derived when bees collect secretions from sap-sucking insects. When these secretions derive from the giant willow aphid the honey thus produced is termed "concrete" honey because the high levels of oligosaccharides present cause it to crystallize readily; this results in the honey being discarded as it is unfit for sale. Oligosaccharides can have prebiotic properties, that is they are not digested by humans but are fermented by "good" bacteria in the colon thus improving gut health.

This research aims to investigate "concrete" honey to see if with appropriate blending a prebiotic honey can be produced.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Fiona Petchey and Megan Grainger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Testing the ancient waters. Developing a better understanding of natural 14C variation in estuarine shells.</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td>Field:</td>
<td>Radiocarbon, Chemistry</td>
</tr>
<tr>
<td>PROJECT #:</td>
<td>39</td>
</tr>
</tbody>
</table>

### EXPECTED OUTCOMES:

1. This work will provide data to support a Marsden application 2019
2. A publication in a peer reviewed paper
3. Poster presentation at Summer Scholarship function

### STUDENT TASKS:

1. Refine experimental design
2. Sort and prepare shells for isotopic analysis using standard wet chemistry techniques
3. Learn how to run the CCIA-46 EP Isotope Analyser and evaluate results
4. Refine the experimental design and rerun as required
5. Select and prepare samples for laser ablation ICPMS and evaluate results
6. Prepare a report focussed on isotope and elemental results.
7. Prepare poster for Summer Research Scholarship event
8. As part of this work the student is expected to become familiar with the processes undertaken during radiocarbon dating of shell. The student will therefore assist with all aspects of the daily activities of the radiocarbon lab. Training will be given as required.

### REQUIRED SKILLS:

1. Basic laboratory skills
2. Care and attention to detail
3. Ability to work regular hours
4. Ability to communicate clearly and work both individually and as part of a team.
5. Good writing skills
6. An interest in archaeology, chemistry or ocean sciences
Limestone forms the bedrock of more than 25% of islands in the Pacific Ocean. Shellfish harvested from the marine and estuarine waters surrounding these islands often have radiocarbon (14C) values that reflect uptake of ancient carbon from this limestone (termed a hardwater effect whereby bicarbonate ions - generated by seepage through calcareous strata - become incorporated into the shells of animals living in the water). Unfortunately, this complicates the dating of ecosystem and oceanographic changes thought to be responsible for cultural changes observed in archaeological sites across the western Pacific between 3000 and 2400 years ago.

Recent studies have indicated that shell carbonate 13C and 18O isotopes can sometimes be used to differentiate between shellfish that inhabit estuarine waters potentially influenced by terrestrial carbon, and those animals that have a fully marine signal. Unfortunately, this tool is complicated by isotopic variation within estuarine and lagoonal waters caused by a range of factors, and doesn’t work for some shellfish, such as carnivorous or algal grazing gastropods that directly ingest ancient carbon.

This Summer School project tests the use of 18O and 13C analysis in combination with trace element characterisation of shell growth rings to specifically identify shells intermittently influenced by terrestrial sources of carbon.

The student will be expected to prepare for isotopic analysis 200 shell samples from the 2630-year-old archaeological site of Talisu on the limestone island of Tongatapu. At this site shellfish gathered from the central lagoon are affected by hardwaters resulting in 14C ages over 300 years to old, while shellfish gathered from coastal locations are unaffected. Sclerochemical analysis will then be carried out using laser ablation ICPMS on selected shells (10) to reconstruct past terrestrial influences with particular focus on identifying a hardwater signature.

Please note: The Keck Radiocarbon Laboratory at UCI has agreed to cover the costs of graphite (14C) analyses for up to 5 radiocarbon dates if required.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Megan Grainger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Separation and Concentration of a Novel Compound from a Fermentation Broth</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td>Field:</td>
<td>Chemistry</td>
</tr>
</tbody>
</table>

PROJECT #: 40

EXPECTED OUTCOMES:

1. Separation of a novel compound from a fermentation broth
2. Concentrate novel compound

STUDENT TASKS:

1. Ascertain the separation efficacy of an appropriate range of solvents
2. Separate compounds using techniques such as funnels and rotary separation
3. Progress monitoring
4. Analysis of compounds by ion chromatography
5. Concentrate separated compounds

REQUIRED SKILLS:

1. Prior understanding of organic separation processes for small organic molecules such as short chain carboxylates; including diffusion coefficients, solvent selectivity and separation factors
2. Prior knowledge of rotary vacuum separation and Soxhlet separation
3. Confident to use ion chromatography
4. Careful laboratory skills and data keeping
5. Attention to detail
6. Ability to follow instructions
7. Willingness to take responsibility and work independently

PROJECT ABSTRACT:

Innovent Compounds Ltd. (NZ) has been working with Centre for Anti-invective Research and Development (CAIRD), Hartford Hospital, CT, USA, testing murine model efficacy of a naturally sourced therapeutic product. Tests to date have been of the compound in a pasteurised ultra filtered fermentation broth fraction as a therapeutic, but still in a mix with other chemical entities. Further development requires separation/purification and concentration.
The broths' other chemical entities are predominantly short chain carboxylic acids (SCCA) and the target compound.

The target is of a much higher molecular weight (1500 - 2000 da) but at low concentration (ppm) and appears to be more heat tolerant than, but in most other chemical aspects is very similar to SCCAs.

Further development requires;

Tests across a full range of solvents, possibly using rotary evaporation.

Craig method sequential extraction, ideal for SCCA and complex organic extractions.

Maybe Soxhlet extraction.

Maybe Large volume chromatographic separation.

As well as producing concentrated product for testing we are looking for a method suitable for scale up.

There is a well developed and robust ICS analysis method to measure any progress.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Megan Grainger and Amanda French</th>
</tr>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Thinking big, on a nano scale: Method development for nanoparticle analysis and small sample mass by ICP-MS</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td>Field:</td>
<td>Chemistry</td>
</tr>
</tbody>
</table>

### EXPECTED OUTCOMES:

1. Development of a method for analysis of nanoparticles in water
2. Development of sample digestion for samples with small sample mass
3. Draft journal article for publication

### STUDENT TASKS:

1. Work with chief and co-supervisor to progress method development
2. Help generate data that will lead to a publication of a new method
3. Prepare samples and standards for analysis
4. Potential Field work: Collect environmental water samples for analysis by the developed method

### REQUIRED SKILLS:

1. Careful laboratory skills
2. Willingness to take responsibility and work independently
3. Organised and have attention to detail
4. Have good record taking and writing skills
5. Skilled at using Excel
6. Able to follow instructions
7. Prepared to undertake repetitive tasks
8. Confident to use instrumentation
This summer research scholarship project will contribute to a larger research project on toxicity of environmental factors to honey bees (Apis Mellifera). The main aim of this project is to successfully create an inductively coupled plasma mass spectrometry (ICP-MS) method for the analysis of various metallic nanoparticles with the ability to separate different sizes of nanoparticles. Nanoparticles will be synthesised in the laboratory to confirm the usefulness of the method. Digestion methods for small mass samples will also be investigated. If time allows, environmental water samples will be collected to test the real-world application of the developed methods.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Carolyn King and Kerry Weston</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Analysis of Video Footage at Braided Riverbed Nests</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td>Field:</td>
<td>Conservation ecology</td>
</tr>
</tbody>
</table>

### EXPECTED OUTCOMES:

1. A clear documentation of predation risk affecting birds nesting in open braided river habitats
2. Formulation of some potential management actions to mitigate this risk
3. Publication of (1), following a similar project on rock wren nests completed last summer

### STUDENT TASKS:

1. Identifying predatory species,
2. classifying and documenting their behaviours,
3. recording a timeline of events around each visit,
4. documenting the life stage of each damaged nest (eggs, chicks or sitting adult),
5. and answering any questions provided by DOC.
6. Student will be encouraged to write a first draft report of their analysis as a basis for the proposed paper, with tuition/assistance from Prof King, to be submitted to a journal.

### REQUIRED SKILLS:

1. Patience
2. Familiarity with handling and manipulating video files
3. Excellent skill at close observation of small images and identifying animals
4. Good capability with Excel spreadsheets and subsequent data analysis
5. Strong interest in conservation of native birds

### PROJECT ABSTRACT:

For this project the student's role will be to review footage provided by the Department of Conservation of birds nests on braided riverbeds, monitored by 40 fixed video cameras, and analyse the behaviour of predators during their visitations to the nesting sites. Video clips showing any predation event will be labelled, strung together, analysed in slow motion, and the results published in a suitable journal.
ACADEMIC PROJECT SUBMISSION DETAILS:  

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>David Lowe and Adrian Pittari</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Identifying Kaharoa tephra (volcanic ash) in lake sediment cores: providing a 700-year-old marker for volcanic ashfall hazard analysis and first human impacts in the Waikato area</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td><strong>Field:</strong></td>
<td>Earth sciences: volcanic hazards, environmental history</td>
</tr>
</tbody>
</table>

EXPECTED OUTCOMES:

1. We anticipate obtaining a new record of spatial deposition for the Kaharoa tephra across the central Waikato region from the analysis of lake sediment cores, with a three-fold output:
2. provision of essential data to help develop improved models for volcanic ashfall hazards for the area that take into account the presence of Kaharoa tephra as a cryptotephra;
3. provision of an accurate datum (Kaharoa tephra) of known age in the youngest lake sediment cores, which are not able to be dated accurately by any other method; and
4. ability to test a new two-step hypothesis for the timing and extent of Polynesian impact on the environment through deforestation within the first two centuries of settlement.

STUDENT TASKS:

1. Assist in detecting and extracting glass shards from lake sediments spanning the past 1000 years in multiple lake sediment cores from the central Waikato region
2. Help prepare the glass shards for major- and trace-element analysis on individual shards and to assist in undertaking such analyses using electron microprobe and laser-ablation inductively coupled plasma mass spectrometry (LA-ICP-MS)
3. Assist in preparing a report (and possibly also an article for publication in a scientific journal) that documents the findings and their significance

REQUIRED SKILLS:

1. Earth sciences or geochemistry training with aptitude and ability for undertaking detailed sampling and extraction techniques, and an interest in geoanalytical techniques including undertaking (under supervision) the techniques listed in (2) below
2. Separation of glass shards from sediments, preparation of glass shards for microanalysis, microanalysis of glass shards using electron microprobe and LA-ICP-MS techniques, and organization and interpretation of analytical data
3. Ability to work closely with others
4. Ability to record data and write with accuracy and clarity
Explosive volcanic eruptions generate large volumes of volcanic ash (tephra) that rain out over wide geographic areas. Much of North Island is blanketed with innumerable layers of tephra that have accumulated over millennia from such eruptions. Early studies focussed on thick, visible tephra layers, usually limited to areas relatively close (proximal) to volcanoes, but more recent work has included thin layers (down to a few millimetres in thickness) preserved in sediments at more distant (distal) sites. These proximal to distal tephra layers, together with maps of distribution and thicknesses, provide the basis for current volcanic hazard modelling and prediction in New Zealand. But such volcanic hazard models are limited because they do not take into account tephras of sub-millimetre thickness, termed cryptotehras (Greek kryptein, 'to hide').

Cryptotehras are fine-grained glass-shard concentrations preserved in sediments that are insufficiently numerous to be visible as layers to the naked eye. They provide a potentially much more comprehensive record of volcanic events than that revealed by visible tephra layers alone. Further, such deposits, although appearing innocuous, are actually very hazardous during eruptions because the typically fine particles of glass can potentially be inhaled into the lungs, they pose an expensive aviation hazard, and they can damage crops, machinery, and infrastructure. To augment a current project investigating cryptotehras in lake sediments in the Waikato area for hazard analysis since about 22,000 years ago, we are seeking a summer scholar to help us focus on perhaps the most interesting part of the record, namely the last 1000 years in which two important events took place: (1) an extremely violent rhyolitic eruption, the Kaharoa eruption, occurred at Mt Tarawera in the winter of 1314 ± 12 CE (i.e., about 700 years before the present), depositing the Kaharoa tephra widely; and (2) the earliest Polynesian seafarers (the descendants of whom became Māori) arrived in the Waikato area around 1280 CE. Hence our main aim is to find evidence of the Kaharoa eruption as a cryptotehra deposit in a series of lake sediment cores (already collected). We want the summer scholar to help us to detect and extract volcanic glass shards from the sediment and to then help analyse them chemically using geoanalytical techniques to 'fingerprint' the material to confirm its identification as Kaharoa tephra. Such confirmation will allow us to transfer the known date for the Kaharoa eruption (~1314 CE) to the sediment cores, hence informing our volcanic hazard analysis and also providing a precise datum for testing a new hypothesis that the initial deforestation by early Māori of the New Zealand landscape occurred in two steps rather than as one synchronous event. The positive identification of Kaharoa tephra in the Waikato region is essential for the volcanic hazard analysis because current models assume that it is not present. The summer scholar will thus become part of a project encompassing two themes (volcanic hazard analysis, environmental impacts of early Māori) within wider volcanic and paleoenvironmental projects, and will learn a range of techniques involved with research on cryptotehras.
**ACADEMIC PROJECT SUBMISSION DETAILS:**

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Kevin Collier and Sue Clearwater</th>
</tr>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Field studies of freshwater mussels and crayfish</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science \ Field: Freshwater Ecology</td>
</tr>
</tbody>
</table>

**EXPECTED OUTCOMES:**

1. Knowledge of crayfish-habitat-riparian vegetation associations in streams to support management
2. Understanding of freshwater mussel reproductive strategies and juvenile habitat requirements
3. Information of the effects of invasive macrophytes and fish on freshwater mussels and crayfish

**STUDENT TASKS:**

1. Preparation and cleaning of field equipment
2. Field work including crayfish and mussel surveys
3. Processing of samples collected in the field
4. Laboratory studies to support field sampling
5. Data entry from field surveys and other work

**REQUIRED SKILLS:**

1. Experience working in/near water or outdoors in general
2. Ability to work in a team in challenging field conditions
3. Excellent listening and communication skills
4. Willingness to take responsibility, follow instructions and work independently
5. Reliable and positive attitude
6. Systematic and structured approach to conducting research
7. Full clean driver’s licence
**PROJECT ABSTRACT:**

Mussels and crayfish are considered keystone species in freshwater ecosystems. The University of Waikato and NIWA have a suite of studies underway aimed at understanding mussel and crayfish life histories, habitat requirements and interactions with invasive species in the Waikato Region through a series of PhD and MSc studies currently underway.

This summer project will involve up to two students working across these studies to provide support for field work including crayfish and mussel surveys, and other activities such as sample processing and data entry. It is envisaged successful candidates will experience a breadth of research methods and acquire skills that may be relevant to their own post-graduate research.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Kevin Collier and Gary Rushworth (HBRC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Distribution and abundance of lowland riverine fish - habitat associations</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td>Field:</td>
<td>Freshwater ecology</td>
</tr>
</tbody>
</table>

### EXPECTED OUTCOMES:

1. Fish distribution and abundance data for the Hawke's Bay region
2. Development of a robust and repeatable methodology for measuring habitat associations
3. An understanding of the relationship between different habitats and fish distribution and abundance

### STUDENT TASKS:

1. Help select sites and design a survey of freshwater fish
2. Undertake training as required in survey techniques and health and safety
3. Undertake surveys using appropriate methods e.g. snorkeling, following HBRC safe operating protocols
4. Enter data onto spreadsheets and databases, and conduct preliminary data analysis
5. Complete a short report (~15 pages)

### REQUIRED SKILLS:

1. Experience in freshwater ecology and/or fish ecology
2. Is able to work independently and get on well with others
3. Committed to following HBRC health and safety and other organisational guidelines
4. Have a full, clean drivers licence
5. Experience in field work including fish identification skills
6. Experience in data analysis and good writing skills

### PROJECT ABSTRACT:

Healthy communities of native fish in rivers are of great cultural and ecological importance. Furthermore, fish provide an integrated picture of ecosystem health. Some indigenous fish are exclusively marine or freshwater species, while others require both to complete their life cycles. The lower reaches of Hawke's Bay's rivers have become degraded over the last few decades. This is due to a variety of issues including river channel modification and management, invasive aquatic plants, sediment deposition, and water quality problems.
There is perceived decline in key native species, such as Pātiki (Black Flounder). The proposed study will look at the distribution of different fish species across structurally diverse habitats within the lower freshwater reaches of the Tutaekuri River.

Please note: the project work is located in Hawke's Bay, focusing on the Tutaekuri River between Napier and Hastings. Preferably, the Scholar will reside in Hawke's Bay for the duration of the research so that they can conduct the research and interact with staff from Hawke's Bay Regional Council. This project is being done in conjunction with a second Summer Research Scholarship project (on estuarine fish) and, in practice, the two Scholars will work together across the two projects.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Ian Duggan and Darcel Rickard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Tools for Māori lake managers and communities</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td>Field:</td>
<td>Māori and Freshwater Environments</td>
</tr>
</tbody>
</table>

### EXPECTED OUTCOMES:

1. The project will result in the collection of data that will inform the development of community based biophysical lake monitoring tool.
2. The project will result in understandings of kaupapa Māori research methodologies and the development of freshwater community monitoring tools.
3. The project will provide an amazing opportunity for an emerging researcher to experience and take the first step to a career in mātauranga Māori, freshwater sciences and/or resource management.

### STUDENT TASKS:

1. Complete a literature review of existing community-focused lake monitoring tools.
2. Assist with organising engagement with whanau/hapu, including resources in preparation for kanohi kitea hui.
3. Participate in engagement hui with whanau/hapu and collate information on their needs from a biophysical lake monitoring tool.
4. Assist with the development of tools and protocols.
5. Assist with in field trials of monitoring tools.
6. Collate key finding from the engagement hui and field trials and present back to the Te Kawaha team.

### REQUIRED SKILLS:

1. Must have understandings of tikanga Māori and be comfortable in Māori settings.
2. Must be highly motivated and hard working.
3. Must have initiative and enjoy working as part of a team.
4. Should have some level of knowledge/understanding of freshwater ecology/Māori perspectives/ research.
5. Pay attention to detail and have an ability to work to a high standard.
7. A full drivers licence would be useful but not essential.
PROJECT ABSTRACT:

Āotearoa-New Zealand's lakes are core national assets, providing significant cultural, economic, social, and environmental benefits. Competition for the use of these freshwater resources is intensifying, and many of our lake and river ecosystems are now degraded, reducing the inherent values and services they provide for society. The health, integrity and sustainability of ancestral lands, waters, forests, mahinga kai (food gathering place), wāhi tapu (sacred place) and nohoanga (dwelling place) are critical social and biophysical determinants of the health and wellbeing of ecosystems, Māori people and Māori communities. There is an enormous potential for the use of mātauranga Māori to enhance our understanding of lake ecosystems, underpin culturally appropriate restoration approaches, and provide a more holistic and integrated perspective for monitoring, planning and policy.

Te Kawaha, NIWA's Māori Environmental Research Group, assists Māori communities throughout Aotearoa-New Zealand by providing support through both mātauranga Māori and science-based knowledge, tools and resources to assist in the management of natural resources. In this work, Te Kawaha is committed to developing and maintaining effective long-term relationships with Māori to meet their research needs. This project will involve tikanga Māori/kaupapa Māori methodologies to meaningfully engage with iwi/hapu, to better understand their needs and inform the development of biophysical lake monitoring tools. This project seeks to address lake monitoring from a Māori perspective, contributing to the development and testing of tools that will (in the future, beyond the life of this scholarship) empower Maori communities in the monitoring and management of lake resources.
# Summer Research 2018/19

## Project Abstract

### Academic Project Submission Details:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Simon Stewart and Troy Baisden</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Title:</strong></td>
<td>Finding hot nitrogen: Tracing geothermal nitrogen inputs into Lake food webs using stable isotopes</td>
</tr>
<tr>
<td><strong>Faculty:</strong></td>
<td>FSEN - Science</td>
</tr>
<tr>
<td><strong>Field:</strong></td>
<td>Earth science/Freshwater ecology</td>
</tr>
</tbody>
</table>

### Expected Outcomes:

1. Oral presentation of Bay of Plenty Regional Council staff
2. Publication of a 'fact sheet' on geothermal N inputs to lakes suitable for a general audience
3. Contribution to a peer reviewed article (with authorship)

### Student Tasks:

1. Collecting environmental samples along the length of a stream
2. Collecting environmental samples off a boat in a lake
3. Sample preparation for stable isotope analysis
4. Liaising with analysts to acquire stable isotope data
5. Interpretation of stable isotope data
6. Descriptive statistics (e.g., mean and variance)
7. Quantification of geothermal N source contribution using a stable isotope mixing model
8. Presentation of results to regional council staff
9. Publication of a 'fact sheet' on geothermal N inputs to lakes suitable for a general audience.

### Required Skills:

1. Freshwater ecology
2. Nutrient cycling and management
3. Wet chemistry
4. Data analysis (excel or R)
5. Adequate fitness level
PROJECT ABSTRACT:

The Rotorua Lakes region is unique in that many of the lakes receive inputs of geothermal water. Previous research has shown that these geothermal inflows are significant sources of nitrogen, particularly ammonium-N, for the receiving lakes. These N sources have the potential to impact lake water quality and as a result active management of geothermal N inputs is currently being investigated by regional council. One important consideration is whether the impacts of geothermal N are localized or widespread. What proportion of the geothermal N is making its being taken up to algae and how does this vary across a lake? Natural abundance nitrogen stable isotopes (δ¹⁵N) are a naturally occurring tracer that enable tracking of the sources and fate of N in the environment. Geothermal N has been shown previously to have a unique δ¹⁵N signature which makes it particularly compatible for quantification using an isotope tracing study.

This study proposes to conduct field work collecting water samples and algae along a transect of a geothermal stream (the Tikitere Springs) and into the receiving lake (Lake Rotoiti). The aim of the study is to quantifying the cycling and fate of geothermal N sources in Lake Rotoiti. The successful candidate will be given mentoring and training in the appropriate field and laboratory techniques as well guidance on the principles nitrogen isotope biogeochemistry. As such it is expected the candidate will conduct field sampling in the Rotorua Lakes region, perform sample processing and preparation for stable isotope analyses, gain a working understanding of nitrogen stable isotope biogeochemistry. Outputs from the project will be a presentation to Bay of Plenty Regional Council staff and interested stakeholders, creation of a brief general audience "fact sheet" on geothermal N sources for as well as contribution, with authorship, to a peer-reviewed journal article that it is hoped will eventuate from this work. The ideal candidate will:

Have an interest in freshwater ecology and nutrient management
Be confident conducting fieldwork around water and in boats (training provided)
Some previous experience in wet chemistry
Be considering postgraduate study
An interest in or connection to the Rotorua Lakes region will also be advantageous.

For any further questions, please email Dr Simon Stewart: simon.stewart@waikato.ac.nz or Prof. Troy Baisden: tory.baisden@waikato.ac.nz.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Emily Douglas and Conrad Pilditch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Exploring the role of estuaries in processing nitrogen at the land-sea interface</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td>Field:</td>
<td>Marine Ecology</td>
</tr>
</tbody>
</table>

PROJECT #:  48

EXPECTED OUTCOMES:

1. Data collected during this project will contribute to publications in international science journals.
2. Most importantly, this project provides a unique opportunity for a student keen on a career in marine science to gain valuable experience as well as contacts in the science community.

STUDENT TASKS:

1. Assist with organisation of and preparation for field work, including testing equipment and instruments.
2. Assist with field experiments and sampling. This will include set-up of intertidal chamber incubations and sampling of sediments and fauna.
3. Assist with laboratory analysis of sediment and fauna samples
4. Data entry and checking

REQUIRED SKILLS:

1. Technical skills and background are not important, full training provided
2. Highly motivated, enthusiastic and hard working
3. Must enjoy field work and being part of a team
4. Strong interest in marine ecology
5. Good attention to detail and ability to follow instructions
6. Competent with Microsoft Word and Excel
7. A full driver's license preferred but not essential

PROJECT ABSTRACT:

Estuary soft sediment ecosystems are sites of important biogeochemical processes influencing the transfer of nutrients and organic matter from the land to the sea. One of these processes, denitrification, removes excess bioavailable nitrogen and therefore reduces the harmful effects of excess nutrient loading (i.e. eutrophication) to coastal ecosystems. Land use intensification is significantly increasing nutrient loads to coastal ecosystems and as a result, habitats are becoming homogenised, and their functioning is changing. These changes may translate into widespread degradation, and loss of ecosystem services including denitrification.
The main aim of this project is to identify where in the estuary (i.e. different habitats) nitrogen is being stored and processed, and increase our understanding of what controls denitrification. Ultimately, this knowledge is necessary to support effective limit setting of nitrogen inputs and conservation of healthy aquatic ecosystems.

We will be conducting research this summer to explore ecosystem functioning (with a focus on nitrogen cycling) across different estuary habitats (e.g. intertidal flats, seagrass beds, mangrove fringes). This will involve field work making measurements of ecosystem functions (e.g. denitrification) and collecting samples for laboratory analysis of habitat characteristics (e.g. sediment type, benthic faunal community).

We are looking for an enthusiastic and motivated student to join our research group for the summer. The student will assist with field and lab work associated with the project, but there will also be many opportunities for involvement in other ongoing projects in our benthic ecology research group. This project is part of a wider 'Hilltops to Oceans' project in collaboration with scientists and students at the Institute of Marine Science, University of Auckland, funded by the George Mason Centre for the Natural Environment.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisors:</th>
<th>Rebecca Lawton and Chris Battershill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Exploiting the ecology of sea lettuce for commercial seaweed cultivation</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td>Field:</td>
<td>Aquaculture/Marine ecology</td>
</tr>
</tbody>
</table>

EXPECTED OUTCOMES:

1. Documentation of abundance and distribution of Ulva species in the western Bay of Plenty region
2. Understanding of natural reproductive cycles for common Ulva species in the western Bay of Plenty region
3. Pilot scale demonstration of growth rates of key Ulva species in lab cultures
4. Identification of species of Ulva to target for commercial cultivation as part of the EU Macroalgal Biotechnologies project

STUDENT TASKS:

1. Fortnightly field surveys of Ulva abundance and distribution
2. Fortnightly field collection of Ulva samples
3. Lab analysis of Ulva samples to determine reproductive state
4. Establishment and maintenance of lab cultures of Ulva
5. Measurement of growth in Ulva cultures
6. Documentation of reproductive events in Ulva cultures

REQUIRED SKILLS:

1. Ability to work independently
2. Strong communication skills
3. Background in ecology/biology/marine science
4. Some experience undertaking fieldwork
5. Basic understanding of seaweed ecology is an advantage

PROJECT ABSTRACT:

The growth of macroalgal based industries in the Bay of Plenty region, and more widely New Zealand, is severely limited by a shortage of algal biomass. Commercial scale cultivation of algal biomass will enable the development of these industries and grow the ‘blue’ economy of New Zealand. Sea lettuce grows prolifically in Tauranga during the summer months and is a target for commercial cultivation in the recently funded Entrepreneurial Universities Macroalgal Biotechnology Enterprises project.
However, sea lettuce is the common name that is used to refer to multiple distinct species of the genus Ulva. Selection of Ulva species and development of cultivation methods for selected species is hampered by a limited understanding of Ulva ecology in the Bay of Plenty region. Knowledge of which species of Ulva occur in the Western Bay of Plenty and which are the key bloom forming species, patterns of abundance in different habitats and environmental conditions, and natural reproductive cycles in this region is lacking. However, this information is vital to determine which species of Ulva will be suitable targets for commercial cultivation. Therefore, this project will document the ecology of Ulva species in the western Bay of Plenty as a first step to selecting species of Ulva for commercial cultivation.

Fortnightly surveys of representative habitats in the western Bay of Plenty will be undertaken to determine the abundance and distribution of species of Ulva across different habitat types. Ulva samples will also be collected as part of these surveys. These samples will be analysed in the lab using light microscopes to determine reproductive state. This information will be used to build an understanding of natural reproductive cycles over the summer months for each species. Intensive tumble cultures of the most common species will be established. Growth rates of each species will be measured and the occurrence of reproductive events in these cultures will also documented. This information will help to determine which species will be best suited to intensive cultivation.

This project will involve a mix of field work and lab work. The student will be based within a larger team of researchers and technicians on an industry focused project that is working to develop novel science to grow a new high value macroalgal biotechnology industry in the Bay of Plenty.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Conrad Pilditch and Anna Madarasz-Smith (HBRC)</th>
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</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Distribution and Abundance of Estuarine Fish - Habitat Associations</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td>Field:</td>
<td>Marine Ecology</td>
</tr>
</tbody>
</table>

EXPECTED OUTCOMES:

1. Field distribution and abundance data
2. Development of a robust and repeatable methodology for measuring habitat associations
3. An understanding of the relationship between different habitats and fish distribution and abundance

STUDENT TASKS:

1. Design a stratified fishing survey
2. Undertake fishing
3. Analyse data
4. Complete a project report for HBRC (~20 pages)

REQUIRED SKILLS:

1. Prefer a marine ecology/fish ecology student
2. Able to work independently
3. Experience in field work
4. Experience of working alone

PROJECT ABSTRACT:

As the interface between land and sea, estuarine habitats are distinctive and dynamic environments. Estuarine flora and fauna must contend with harsh conditions including prolonged periods of emersion and immersion, and changes in salinity, temperature and oxygen availability. Despite these challenges, estuaries remain one of the most productive ecosystems on the planet, providing key ecological services that help to sustain environmental quality and integrity.

Estuarine habitats support a diverse array of fish species during different stages of their development. Complex biogenic habitat can provide spawning, nursery and feeding grounds.
The proposed study will look at the distribution and abundance of fish species throughout the Ahuriri and Waitangi Estuaries in Napier, using habitat maps developed through a previous SRS project to identify fish/habitat associations.

Please note: This project will be conducted from Napier, Hawke's Bay. Two similar projects have been proposed (this one on estuarine fish, the other on river fish) and, in practice, the two Scholars would work across both projects, taking the lead on one whilst assisting each other as needed to complete work in both habitats.
# Summer Research 2018/19

## Project Abstract

### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Conrad Pilditch and Kura Paul-Burke</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Tuhono ki a Tangaroa</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
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<tr>
<td><strong>Field:</strong></td>
<td>Māori and marine environments</td>
</tr>
</tbody>
</table>

### EXPECTED OUTCOMES:

1. The project will result in the collection of information to assist field based mātauranga Māori and marine science field activities with coastal Māori entities.
2. The project will result in understandings of kaupapa Māori field research methodologies and the development of marine science research projects underpinned by mātauranga Māori.
3. The project will provide an amazing opportunity for an emerging researcher to experience and take the first step to a career in mātauranga Māori, marine science and/or resource management.

### STUDENT TASKS:

1. Assist with organising engagement with hapū/iwi, including resources in preparation for marine workshops/wānanga.
2. Participate in marine research activities with hapū/iwi authorities. Collate relevant data information of marine field based activities and priorities for Māori and marine environments. Develop and maintain data/resources inventory.
3. Report. Conduct literature review of one identified research priority area (tbc - as determined by key themes arising in Task 2).
4. Present findings of engagement information and literature report to team members of Te Kauwhaha National Centre Māori Environmental Research, NIWA.

### REQUIRED SKILLS:

1. Must have understandings of tikanga Māori and be comfortable in Māori settings.
2. Must be highly motivated and hard working
3. Must have initiative and enjoy working as part of a team
4. Should have a strong interest in Māori perspectives/marine ecology/research
5. Pay attention to detail and have an ability to work to a high standard
6. Must be comfortable in marine environments/snorkelling/rocky reefs
7. Be competent using Microsoft Excel and Word
8. A full drivers licence would be useful but not essential
PROJECT ABSTRACT:

Today, there are grave concerns regarding the state of marine mahinga kai (traditional harvesting areas/practices); taonga (culturally important) species and their associated environments. There is a lack of local, regional and national data on the degradation of coastal marine habitats and ecosystems in Aotearoa New Zealand. This makes it difficult for decision-makers to draw firm conclusions and quantify the state of marine habitats or the full ecological impacts of anthropogenic activities on coastal and open ocean ecosystems. Further, there is a lack of skilled and experienced practitioners (both Māori and non-Māori) working across disciplinary areas of mātauranga Māori, science (biophysical/social), marine/environmental management and knowledge communication and transfer, which is a significant challenge for Aotearoa New Zealand. Research on ways in which mātauranga Māori can be utilised, in accordance with tikanga Māori and incorporated into marine cultural monitoring approaches and management models is a high priority.

Te Kawaha, NIWA's Māori Environmental Research Group, assists Māori communities throughout Aotearoa New Zealand by providing support through both mātauranga Māori and science-based knowledge, tools and resources to assist in the management of natural resources. In this work, Te Kawaha is committed to developing and maintaining effective long-term relationships with Māori to meet their aspirations and needs.

The purpose of this project is to engage with coastal Māori in hands-on science and localised mātauranga Māori, through place-based experiential learning activities with their rohe moana (traditional marine areas), marine taonga species and associated environments.

We are looking for a highly motivated student to join our research group for the summer. Your job will be to assist in engaging with hapu/iwi to assist their marine research needs, aspirations and requirements. However, there will also be opportunities to experience other current and exciting projects within NIWA that are exploring ecosystem services, mātauranga Māori values and attributes, aquaculture initiatives and restoration of marine taonga species in freshwater, estuaries and coastal ecosystems. This scholarship offers an exciting opportunity to interact with Māori environmental researchers, kura kaupapa Māori, hapu/iwi kaitiaki, runanga environmental managers and NIWA scientists.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Michael Clearwater</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>The effects of soil fertility on manuka growth, flowering, and nectar production.</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
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</tbody>
</table>

EXPECTED OUTCOMES:

1. Records of plant growth, flowering time and intensity
2. Measurements of nectar flow and chemistry, and how they vary during the flowering period of individual plants

STUDENT TASKS:

1. Plant growth measurements
2. Tagging and monitoring of flowering plants
3. Nectar sample collection and analysis
4. Field surveying of wild plants
5. Data entry and analysis

REQUIRED SKILLS:

1. Careful record keeping, sample collection and handling
2. Basic knowledge of plant biology and physiology
3. Effective work as part as a team, and independently
4. Full driver's license preferred

PROJECT ABSTRACT:

NZ mānuka honey production has expanded rapidly in recent years to become a major export industry, but is still unable to meet international demand. The honey is made from the floral nectar of wild mānuka plants growing on sites that are highly variable in their soil characteristics. The plants are also highly variable in their flowering and nectar production characteristics. Despite the obvious importance for the mānuka honey industry, the effects of soil fertility on nectar per plant have not been well studied, and hence are the focus of this research. Mānuka plants from two different regions in NZ will be grown in pots at the University of Waikato and supplied with nutrient treatments varying in nitrogen and phosphorus content, the two nutrients limiting most ecosystems.
Regular measurements of plant vegetative growth and photosynthesis will be taken, flowering duration and intensity will be monitored, and nectar will be carefully collected and analysed, and compared between the treatments.

There will also be additional greenhouse experiments investigating the role of phosphorus nutrition and its potential involvement in the production of the unique nectar component that results in the famous and valuable antimicrobial properties of mānuka honey. This research forms part of a larger government funded collaboration between the University of Waikato, Crown Research Institutes and several iwi groups with the ultimate goal of improving the production and value of NZ native honeys. The Summer Scholar's role will be to act as a field assistant to graduate students and staff working within the program, and to run their own experiments examining the potential role of phosphorus and other environmental variables in nectar composition. The scholar will also contribute to sample and data analysis in the laboratory.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Bruce Clarkson and Keiko Hashiba (HBRC)</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Revegetation strategy for Ngaruroro River berms</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td>Field:</td>
<td>Ecology, plant science</td>
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</table>

EXPECTED OUTCOMES:

1. We will know the ecological outcomes are in short, medium and long term, and how this could contribute to existing conservation projects in Hawke's Bay.
2. We will have a roadmap of management actions to restore a range of vegetation/habitat types along the Ngaruroro River.
3. We will better understand how revegetation impacts flood protection activities along this river system.
4. The above information will contribute to a revised Revegetation Strategy that complements and aligns with the Ngaruroro River EMEP
5. Short (~15 page) report with key methodology, results and conclusions (road map)

STUDENT TASKS:

1. Review Ngaruroro EMEP, in particular Chapter 4 (Pp. 8 - 38) which covers the revegetation work.
2. Meet with project managers of key conservation activities in Hawke's Bay (e.g. Cape to City, Poutiri Ao o Tane, HB Biodiversity Guardians)
3. Agree with relevant HBRC staff the remnant native plant sites to include in the study.
4. At each site, conduct vegetation and other ecological assessments (such as bird counts)
5. Identify what actions are required for restoration of these sites, likely outcomes from this, and time frames for outcomes
6. Interview HBRC teams to identify priorities for flood protection and ecological enhancement: Interview the HBRC Engineering Team for their current operational requirements and procedures within Flood Protection Scheme area, Interview HBRC Open Space Team (who are in charge of regional parks
7. Present learnings to the HBRC Engineering and Open Space, and any other interested HBRC staff and agencies (such as DOC)
### REQUIRED SKILLS:

1. A student who studies restoration ecology, or river engineering with specific interest in the ecosystem management, and has the ability to carry out vegetation surveys/plant identification and bird identification. Other ecological skills such as insect and lizard ID are welcomed.

2. Capable of using GPS and Geographic Information System (such as ArcGIS or other mapping systems)

3. Capable of communicating - with HBRC staff, with his/her colleagues and supervisors, members of the public where necessary

4. Clear driver's license

### PROJECT ABSTRACT:


This project will help clarify the way forward by contributing to a revised revegetation strategy that protects and enhances existing native vegetation and associated habitats along the berms of the Ngaruroro River.

Activities include:

- Assess a subset of the remnant native shrub, tree and forest sites to determine processes for successful revegetation, particularly given the limitations of small size (1-5 ha) and presence of many weeds. Sites will be selected to represent the range of native habitat remnants present on the river berms.
- Identify the likely short, medium, and long-term ecological outcomes for braided river riparian ecosystems, if HBRC was to restore native vegetation in the remnant patches. How would this work contribute to other conservation projects in Hawke's Bay?
- Identify HBRC team priorities for achieving flood protection services and ecological outcomes within the Flood Protection Scheme (lower 36km section of the river).
- Outline key habitat restoration actions (roadmap) to achieve ecological outcomes, taking into account HBRC priorities for flood protection.

Please note: This project is supported by Hawke's Bay Regional Council and its focus is the Ngaruroro River located between Napier and Hastings in Hawke's Bay. In order to complete the work and interact with HBRC staff, the Scholar will need to be resident in Hawke's Bay for the duration of the project (10 weeks of project work, with a break for the Christmas/New Year period as agreed by the scholar and host).
## ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>PROJECT #:</th>
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</thead>
<tbody>
<tr>
<td>Supervisor/s:</td>
<td>Chris Lusk</td>
</tr>
<tr>
<td>Project Title:</td>
<td>Mind the gap: how treefall gaps protect palatable plants from deer browsing in old-growth forests</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td>Field:</td>
<td>Ecology</td>
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</table>

## EXPECTED OUTCOMES:

1. Position the supervisor to apply for funding from the Biological Heritage National Science Challenge
2. Publication of a paper in Forest Ecology and Management
3. Development of the student's research and writing skills
4. Enrolment of the student in UoW MSc program

## STUDENT TASKS:

1. Become familiar with literature on deer browsing
2. Select suitable treefall gaps and matching understorey plots at Te Miro, Te Tapui and Maungatautari (assisted by supervisor)
3. Map spatial distribution of woody debris in gaps using drone photography (with help of supervisor)
4. Identify and map spatial positions of saplings in gaps, with help of research assistant
5. Analyse data, with help of supervisor
6. Write manuscript for submission to Forest Ecology and Management, with help of supervisor

## REQUIRED SKILLS:

1. Plant ID skills OR familiarity with native trees and shrubs of the Waikato
2. Good oral and written communication skills
3. Teamwork skills
4. Good organization skills
5. Must have a genuine interest in ecology, and must enjoy fieldwork
A major issue in the management of New Zealand's remaining native forests is whether the presence of introduced deer is compatible with conservation goals. Deer can drastically reduce the abundance of their preferred plant species, but their impact appears to vary geographically and with forest type. Beech forest understoreys appear to be especially vulnerable to deer browsing. In North Island old-growth podocarp-broadleaf forests, however, there is evidence that woody debris in tree-fall gaps shelters regeneration of palatable tree and shrub species, enabling their saplings to grow out of the browse zone before deer can reach them. This protective effect is especially apparent in gaps created by the fall of large Beilschmiedia tawa trees, the crowns of which often remain largely intact after the treefall and take several years to collapse. However, this effect has yet to be quantified systematically. We will begin to address this knowledge gap this summer by taking advantage of University of Waikato's proximity to New Zealand's largest mainland island (Maungatautari), using this mammal-free area as a reference site for comparison with nearby similar forests still populated by deer.

The student will sample the floristic composition of treefall gaps and understories in two Waikato reserves with fallow deer (Dama dama) populations that are controlled by recreational hunting (Te Tapui and Te Miro Scenic Reserves). Sampling will also be carried out in a similar forest where all mammalian herbivores have been excluded since 2006 by fencing and poisoning (Maungatautari Ecological Island). The distribution of woody debris in gaps in all three reserves will be mapped with the aid of a drone. The student will carry out statistical comparisons of the data from the three reserves, to determine the impact of browsing on the abundance and distribution of plant species preferred by deer. With the help of the supervisor, the student will then prepare a manuscript for submission to the international journal Forest Ecology and Management. This summer project will serve as a pilot study for more widespread investigation of the role of treefall gaps and woody debris in mediating the impact of deer browsing in New Zealand forest understoreys.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Kiri Wallace and Bruce Clarkson</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Environmental thresholds for enrichment plant survival in restored urban forests</td>
</tr>
<tr>
<td>Faculty:</td>
<td>ERI</td>
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<tr>
<td>Field:</td>
<td>Terrestrial Ecology</td>
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</tbody>
</table>

EXPECTED OUTCOMES:

1. Student report
2. Contribution to city council restoration management practice in Hamilton, Napier and New Plymouth

STUDENT TASKS:

1. Data collection - plant measurements
2. Data collection - environmental conditions measurements
3. Data analysis

REQUIRED SKILLS:

1. Completion of basic terrestrial ecology paper
2. Field work experience/ability
3. A basic understanding of the field of plant ecology
4. Experience with threatened plants

PROJECT ABSTRACT:

Restoration plantings have been initiated in cities throughout New Zealand. While establishment of the initial canopy has been relatively successful, long-term success for forest restoration depends on the sustainability of plantings and the recovery of natural ecosystem processes. The survival of the environmentally sensitive, late successional native tree, shrub, and epiphyte species beneath the canopy of the initial planting is a key process in forest succession, and is therefore a key indicator of restoration success. However, we know little about the environmental factors that constrain or promote successful native plant survival in urban forest restoration.

In this project a student will measure survival of late-successional enrichment plantings and correlate with environmental data. A chronosequence approach will be used to experimentally test for thresholds in environmental optimums for late successional species.
This information can then be used to accelerate an increase in structural and species diversity of young restoration plantings. This in turn can facilitate urban forest succession to improve wildlife habitat and ecosystem service provision.

The project involves monitoring 3 species of planted enrichment species: the shade tolerant canopy tree Dacrydium cupressinum (Rimu), the understorey shrub Piper excelsum (Kawakawa) and the epiphyte Griselinia lucida (Akapuka). All of these species enhance wildlife habitat, providing positive-reinforcement of native plant regeneration and dispersal mechanisms with reduced ongoing maintenance costs to land managers. This is one of the first studies on urban forest epiphyte restoration in the world.

The successful student will measure late-successional plantings in 27 established plots (10m x 20m). Nine plots exist in each of the three cities and the plots span restored forest ages of 5-58 years. Dataloggers measuring air temperature, relative humidity and soil temperature have been deployed, and those data can be used to explore relationships between enrichment plant growth/survival and microclimate thresholds.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s</th>
<th>Kiri Wallace and Eva Collins</th>
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<tbody>
<tr>
<td>Project Title</td>
<td>The theory and practice of urban restoration ecology - People, Cities &amp; Nature</td>
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<tr>
<td>Faculty</td>
<td>FSEN - Science</td>
</tr>
<tr>
<td>Field</td>
<td>Ecology</td>
</tr>
</tbody>
</table>

### EXPECTED OUTCOMES:

1. Literature review
2. Ecological restoration plan

### STUDENT TASKS:

1. Become familiar with the key principles of urban restoration ecology by conducting a literature review relevant to a selected ecological restoration project
2. Produce a restoration plan for a selected ecological restoration project

### REQUIRED SKILLS:

1. Excellent communication
2. Ability to work independently
3. Ability to work in a team
4. Organised
5. Literature database searching skills
6. Ability to understand and summarise academic literature

### PROJECT ABSTRACT:

In New Zealand, ecological restoration has traditionally focused on large national parks, reserves and offshore islands. However, in the last two decades, the research and practice of restoration has been expanded to include degraded urban environments, which present different challenges and opportunities. Like restoration in all zones, urban restoration strives to improve ecosystem biodiversity, function and resilience but it also prioritises ecosystem services, people’s connection with nature, educational opportunities and environmental aesthetics.

People, Cities & Nature is a multi-disciplinary programme leading urban ecological restoration research in New Zealand. Established in 2016, this government-funded programme comprises six inter-related projects in ecology, business, Māori studies and social science. This summer research project will focus on the theory and practice of urban restoration ecology within the People, Cities & Nature Programme.
Urban ecological restoration projects are underway across New Zealand with varying degrees of support from current scientific knowledge, planning or monitoring. This project will focus on a community-based urban ecological restoration project selected by the student and supervisors and will have two key components:

**Literature review:**
Review of the key principles of urban ecological restoration from the scientific literature, particularly in relation to the selected restoration project.

**Ecological restoration plan:**
Development of a comprehensive ecological restoration plan for the selected project based on Hobbs & Norton's (1996) Key Processes in Restoration:

1. Identify processes leading to degradation or decline
2. Develop methods to reverse or ameliorate the degradation or decline
3. Determine realistic goals for re-establishing species and functional ecosystems, recognizing both the ecological limitations on restoration and the socioeconomic and cultural barriers to its implementation
4. Develop easily observable measures of success
5. Develop practical techniques for implementing these restoration goals at a scale commensurate with the problem
6. Document and communicate these techniques for broader inclusion in land-use planning and management strategies
7. Monitor key system variables, assess progress of restoration relative to the agreed-upon goals, and adjust procedures if necessary

This project will contribute to our understanding of urban restoration ecology in both national and international contexts. It will enhance the ecological restoration practices of the selected project and also contribute to end-user relationships for the MBIE-funding People, Cities & Nature Research Programme.
ACADEMIC PROJECT SUBMISSION DETAILS:

| Supervisor/s:          | Chrissen Gemmill, Stacey Meyer (Waikato)                     |
|                       | Donna Campbell, Jordan Waiti and Donna Kerridge            |
|                       | (http://www.nzamh.org.nz/donna-kerridge/)                   |
| Project Title:        | Kūmarahou: connecting taxonomy and mātauranga Māori         |
| Faculty:              | FSEN - Science                                             |
| Field:                | plant systematics/ Ecology and Biodiversity and mātauranga Māori |

EXPECTED OUTCOMES:

1. Contribute data relevant taxonomic review of New Zealand *Pomaderris* based on morphology and molecular phylogenetics
2. Opportunity for student to earn authorship to manuscript to be submitted to special issue of New Zealand Journal of Ecology “Mātauranga Māori shaping ecological futures”
3. Student developing appreciation of both plant systematics and mātauranga Māori, and exploration of the intersection of these two world views

STUDENT TASKS:

1. Collect morphological data for each taxon from the literature
2. Collect morphological measurements for all New Zealand and relevant Australian taxa from herbarium specimens
3. Conduct analyses to test if taxa form morphological groups in 3D character space
4. Learn through discussions and guidance of supervisors about mātauranga Māori, with focus on kūmarahou and relatives
5. Compile and review relevant literature relating to mātauranga Māori

REQUIRED SKILLS:

1. Interest in native plants of Aotearoa
2. Knowledge or interest in gaining knowledge of plant systematics and taxonomy
3. Knowledge or interest in gaining knowledge of mātauranga Māori
4. Interest in exploring the intersection of Western science and mātauranga Māori
5. Ability to work independently and as a team member
PROJECT ABSTRACT:

Kūmarahou (*Pomaderris kumeraho*, Rhamnaceae) features prominently in mātauranga Māori and is renowned for its use in rongoā Māori for healing. It is used to treat a broad range of ailments including treatment of the blood, kidneys and urinary issues, lung disease such as bronchitis, pulmonary tuberculosis, coughs, colds, asthma, and all skin problems, including cancer. Other species of *Pomaderris* are also of great cultural importance, such as tainui (*P. apetala*) which is said to have sprung from the sides of the great Tainui waka. Given the lasting importance of kūmarahou in mātauranga Māori, it is surprising that *Pomaderris* has been little studied within a complementary Western context. Our overarching goal is to begin to explore the intersection of Western systematics and mātauranga Māori, and to present the knowledge from these two world views for a holistic understanding. Together our team will work with the students explore the intersection of Western science and mātauranga Māori with a focus on kūmarahou, to reveal commonalities and differences.

*Pomaderris* is native to Australia and Aotearoa and is comprised of about 70 species. Eight species are recognized in Aotearoa, with most found only on the upper North island. There are multiple Māori names for most of the taxa indicating the recognition of diversity of these plants. Understanding the taxonomy (*pūnaha whakarōpū*) and evolutionary relationships is of importance to Western science. However, the taxonomy, and hence conservation of the taxa, is not straightforward. Some of the species have one subspecies in New Zealand while the other subspecies is restricted to Australia. Further complicating the picture of this small group of species is that while most species have a chromosome number of 2n= 36, one species has 2n-24 and another have 2n=48. Furthermore, of the eight taxa currently recognized, four have a conservation status (1 threatened - nationally critical; 3 at risk, naturally uncommon).

We will collect morphological data from herbarium specimens to test the current taxonomic classification, as no comprehensive review of this genus has been undertaken since 1961. Measurements of vegetative and reproductive characters will be made from herbarium specimens (AK, CHR, WAIK, WELT and overseas herbaria), guided by the current literature, and carry out statistical multidimensional analyses. The student will work alongside our team in the Te Pā Whakahaumia o Te Whare Wānanga o Waikato, our University herbarium, learning skills relating to identification of native plants, plant systematics and gaining knowledge on the evolution of our flora. Importantly we will also explore the mātauranga Māori of kūmarahou from multiple perspectives. This work will likely lead on to an interesting interdisciplinary MSc/MSc(Research) project.

We have diverse expertise in plant systematics as well as a broad experience in mātauranga Māori. These data underpin our larger project that aims to form a new nexus of Western science with concepts of whakapapa, mātai hauropi, mātauranga Māori, rongoā Māori, and matai rongoā. We will begin developing a track record in this area by contributing an article to a special issue of New Zealand Journal of Ecology “Mātauranga Māori shaping ecological futures”. Furthermore we envision that this work will become the foundation for exciting future interdisciplinary external proposals to a wide range of agencies.
**ACADEMIC PROJECT SUBMISSION DETAILS:**

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Steve Bird</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Testing the bioactivity of next generation novel antibiotics from New Zealand organisms</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN – Science</td>
</tr>
</tbody>
</table>

**EXPECTED OUTCOMES:**

1. Screening of CAMPs to determine if they kill pathogenic microorganisms.
2. Screening of any potential therapeutic CAMPs using human cell lines to determine any toxicity.
3. Inclusion of findings into a major research paper that requires validation of the bioactivity of the CAMPs we have already discovered (student will be included as an author).

**STUDENT TASKS:**

1. Culturing of human cell lines and bacterial cell cultures.
2. Testing the antimicrobial activity of previously purified CAMPs on microorganisms.
3. Testing the toxicity of CAMPs on human cell lines.
4. Keeping accurate records of experimental work.
5. Helping develop experimental design.
6. Help writing up methods and results (for inclusion in journal article)

**REQUIRED SKILLS:**

1. Experience in molecular biology
2. Ability to keep accurate records
3. Attention to detail in lab work
4. Public speaking to present findings of study to laboratory colleagues
5. Good academic English language skills
6. Ability to work in a team
Governments across the world are emphasizing that antimicrobial-resistant (AMR) infections will be a bigger threat to humankind than cancer, causing 10 million deaths and costing $100 trillion every year by 2050. Over several decades AMR has grown, preventing effective treatment within a range of infections caused by bacteria, parasites, viruses or fungi. Natural resistance has always been seen in microbial populations, however it is due to the misuse of antibacterial drugs in both humans and food-producing animals that has favored the selection and spread of resistant organisms. Reports are now warning that conventional antibiotics will be useless within 12-15 years, leading to a medical 'Dark ages' in which common infections and minor injuries will kill. This has led to the White House recently investing $1.2 billion to fight AMR and a European consortium, COMBACTE to be funded â‚¬195 million to develop new antibiotics and develop a new clinical trials platform to test them. This threat is now so serious, that 193 countries of the United Nations agreed a landmark declaration in 2016 to begin the process of ridding the world of drug-resistant infections.

These warnings that current antibiotics will be ineffective within a relatively short period of time means there is an urgent need to discover new antimicrobials. Cationic antimicrobial peptides (CAMPs) exist in every organism on the planet and are excellent candidates as next generation antibiotics. They can effectively kill a broad-spectrum of pathogens (includes bacteria, protozoa, fungi and viruses) and it is difficult for microbes to form any type of resistance against them, increasing their therapeutic potential. Within New Zealand's unique and diverse biota there is a huge pool of novel CAMPs waiting to be discovered and tested. Recent investigations at the University of Waikato, have already identified a range of these CAMPs, within selected New Zealand invertebrates and vertebrates. Some of these have been produced using bacterial protein expression systems and are now ready to be tested against a range of disease causing microorganisms, to identify therapeutic candidates against the growing antibiotic resistance. The successful candidate will be exposed to a range of techniques, such as cell culture and assays for testing antimicrobial activity. If antimicrobial activity is confirmed for any of the peptides tested we anticipate that they could be used as lead compounds for design of highly specific and potent drugs for destruction of antibiotic resistant bacteria in future investigations. Eventual application could be by intravenous injection, by topical application (for wounds/burns) or in slow release surgical implants after joint replacement surgery. However, for this to be possible we would need to be sure these compounds were not toxic to human, so within this project each CAMP will also be tested on selected human cell lines to determine this.
**ACADEMIC PROJECT SUBMISSION DETAILS:**

<table>
<thead>
<tr>
<th>Supervisors</th>
<th>Leigh Honnor (Wild for Taranaki), Professor Bruce Clarkson (UoW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title</td>
<td>Egmont Ecological District Vegetation Plan</td>
</tr>
<tr>
<td>Faculty:</td>
<td>Biological Science</td>
</tr>
<tr>
<td>Field:</td>
<td>Restoration Ecology</td>
</tr>
</tbody>
</table>

**EXPECTED OUTCOMES:**

1. Vegetation Plan for Egmont Ecological District
2. GIS map

**STUDENT TASKS:**

1. Mapping of current indigenous cover.
3. Investigation into opportunities for future restoration planting (available land, willing participants).
4. Liaison with members of Wild for Taranaki e.g. TRC, QEII, Federated Farmers, District Councils, Iwi, Enviroschools, Community Groups.
5. Creation of a Vegetation Plan for Egmont Ecological District to 2050 i.e. priority ecosystems and locations, timeline, species to be planted, numbers, cost, community involvement etc.
6. Mapping of opportunities for restoration planting to 2050.

**REQUIRED SKILLS:**

1. Investigation, data collection and analysis.
2. IT, including GIS
3. Communication, including report writing
4. Problem solving
5. Botanical knowledge preferred but not essential
### PROJECT ABSTRACT:

Clearance of indigenous vegetation, primarily forest, and development of land throughout the Taranaki region has led to the depletion and fragmentation of coastal and lowland ecosystems and a reduction in flora and fauna populations. The level of cover in many instances is not sufficient for healthy functioning ecosystems.

Protecting, enhancing and creating new areas of indigenous vegetation will ensure the long term sustainability of Taranaki’s biodiversity.

Wild for Taranaki have published a region-wide plan to Restore Taranaki [www.restoretaranaki.nz](http://www.restoretaranaki.nz). Goal 4 is to Restore the Cloak of Taranaki. There are three strands to this work 1) Restoration Planting 2) Habitat protection 3) Managing pest plants.

This research project will focus on Strand 1 to create a Plan for revegetation of Egmont Ecological District (270,300ha) which includes the mountain and its ring plain. This will sit alongside the existing Restoration Planting Guide for Egmont Ecological District [www.wildfortaranaki.nz/discover/resources/](http://www.wildfortaranaki.nz/discover/resources/) and inform the community and funders of what needs to be done to help achieve Goal 4 by 2050.

The plan developed will be used as a model for the four other ecological districts in Taranaki.
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<tr>
<th>ACADEMIC PROJECT SUBMISSION DETAILS:</th>
<th>PROJECT #: 56d</th>
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<tbody>
<tr>
<td><strong>Supervisor/s:</strong></td>
<td>Leigh Honnor (Wild for Taranaki), Professor Bruce Clarkson (UoW)</td>
</tr>
<tr>
<td><strong>Project Title:</strong></td>
<td>Engage the Taranaki Community to take Restoration Action</td>
</tr>
<tr>
<td><strong>Faculty:</strong></td>
<td>Biological Science</td>
</tr>
<tr>
<td><strong>Field:</strong></td>
<td>Restoration Ecology</td>
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</table>

**EXPECTED OUTCOMES:**

1. A Guide to establishing a Restored Community in Taranaki

**STUDENT TASKS:**

1. Review of existing community models, guides and toolkits e.g. Landcare Groups, Living Neighbourhoods, Care Groups (District Councils), Weedbusters, Friends of (groups), Huatoki Conservation Group, Predator Free Miramar, Key Native Ecosystem Plans on public reserves (Taranaki Regional Council), Neighbourhood Support NZ (non-environmental), Neighbourly (online tool).
2. Liaison with the organisations who developed these resources.
4. Test this Guide by applying to a local community e.g. Inglewood, Oakura.

**REQUIRED SKILLS:**

1. Investigation, information collection and analysis.
2. IT, including GIS
3. Communication, including report writing
4. Innovation
5. Problem solving

**PROJECT ABSTRACT:**

Wild for Taranaki have published a region-wide plan to Restore Taranaki [www.restoretaranaki.nz](http://www.restoretaranaki.nz). This is reliant on a high level of support and participation from the community. To ensure success we must mainstream the value of protecting our natural environment so everyone does their part. Goal 1 of the Plan is to Engage the Taranaki Community to take action.

We want to make it easy for people to be involved and do the work required without significant disruption to their daily lives, in a way that is meaningful to them. One of the main ways to achieve this is to support the development of Restored Communities.
PROJECT ABSTRACT:

These are similar in theory to landcare groups and will include actions to help achieve the three goals of the Restore Taranaki initiative; Restoring the Sound and Movement of our Taranaki wildlife, Restoring the Cloak of Taranaki, Restoring the Freshwater of Taranaki. Experience has shown the group approach achieves better results than working alone. Sharing information leads to improved understanding of both problems and solutions. Groups often have access to a wider range of advice and financial support making them more effective than individuals working in isolation.

This research project will focus on developing a Guide for Restored Communities.

This Guide will provide an easy way for communities to get started when there is an interest in collective action to protect local biodiversity. It will also support consistent best practice across the region while allowing communities the freedom to decide on their own focus, activities and solutions.

This Guide will also support the Taranaki Regional Council initiative “Towards a Predator Free 2050” as trapping and monitoring is currently being rolled out in local communities.
**ACADEMIC PROJECT SUBMISSION DETAILS:**

| **Supervisor/s:** | Kim King & Graeme Taylor (DOC) |
| **Project Title:** | Analysis of trail camera images of endangered seabird colonies |
| **Faculty:** | FSEN |
| **Field:** | Marine |

**QUESTION:**

To develop protocols and techniques to quantify nest site activity behaviour, incubation shifts, breeding success and evidence of intra- and interspecific interactions that might impact breeding outcomes in surface nesting seabirds.

**DESCRIPTION:**

Trail cameras are being deployed on various seabird colonies to enable us to obtain new information about the breeding cycle, breeding ecology and biology of seabirds and causes and timing of nest failure. The New Zealand king shag is nationally endangered seabird and has almost no information known about its annual cycle or breeding activity due to sensitivity to human disturbance.

Trail cameras will be deployed in 2018 to start monitoring nesting colonies. We also will test the use of these cameras on a more common species (spotted shag) to compare behaviour of surface nesting shags and ensure we have sufficient images to develop the techniques for image analysis. This information will then help guide the analysis of trail camera datasets that are already deployed on a white-capped albatross colony in Jan 2018 and will be used on other surface nesting seabird species later this year. Images for analysis will be available from November 2018 onwards.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Nick Ling &amp; Emma Williams (DOC)</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Prey Availability for Australasian bitterns: A review</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FSEN</td>
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<tr>
<td>Field:</td>
<td>Freshwater</td>
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</table>

QUESTION:

What factors affect the availability of fish prey for Australasian bitterns?

DESCRIPTION:

Starvation is emerging as a common threat of bitterns (Nationally Critical) within New Zealand and overseas (E. Williams; White et. al. 2006). Currently, starvation is the most common reason bitterns are brought into captive care and has been the cause of death for most radio-tagged bitterns to date. Bitterns are known to have very few foraging strategies and require specific water levels and clear waters within or immediately adjacent to reedbeds to access their prey, making them one of the least adaptable species in the Ardea family (Kushlan, 1976; Williams and Cheyne, 2017).

Several artificial water level control schemes exist at sites of importance for bitterns and appear to be in conflict with the needs of the species. On top of this, very little is known about preferred food sources of bitterns and factors that may affect prey life cycles, abundance and prey availability. It is therefore important to identify which species are likely to be preferred prey items for bitterns and examine factors that may affect the abundance and availability of these species as food sources.

We propose a literature review to: 1) determine which prey species are likely to be available to bitterns given the restrictive foraging requirements of the species, 2) what factors may affect the availability and abundance of these prey species, and 3) how this knowledge could be used to inform current wetland management practices to reduce the chances of bitterns dying of starvation. This project would be led by Emma Williams on behalf of DOC.
## ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Gay Morgan</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Legal Status of Advanced Artificial Intelligence</td>
</tr>
<tr>
<td>Faculty:</td>
<td>LAW</td>
</tr>
<tr>
<td>Field:</td>
<td>Philosophy of Law/Public Law</td>
</tr>
</tbody>
</table>

## EXPECTED OUTCOMES:

1. This work will go to help develop a Marsden (tried this year, think it's important, want to give it another, more thorough go) and/or Borrin Foundation grant application,
2. Three, possibly four, law or philosophy journal articles
3. Book proposal

## STUDENT TASKS:

1. Research on the history and reasoning behind granting moral and/or legal status to entities other than humans
2. Research on the history of, reasoning behind, and current legal protections granted to & duties assigned to humans who reason differently than the 'normal' human
3. Research on the protections around dissolving the legal status/existence of artificial legal 'persons', duties (or not) imposed on those entities
4. Writing up the research findings for task 1, briefly, with annotated bibliography
5. Writing up the research findings for task 2, briefly, with annotated bibliography
6. Writing up the research findings for task 3, briefly, with annotated bibliography
7. Collating the research from 1, 2, & 3 into a framework identifying cross cutting issues and analysis

## REQUIRED SKILLS:

1. Good research skills, preferably in law, but could be a good researcher from philosophy, history or social sciences
2. Good analytical skills, to recognise what research findings are relevant to overall project and to what issues that research might apply (it might apply to several)
3. Good organisational skills to manage and categorise/cross categorise the research findings
4. Good writing skills
5. Excellent referencing skills
6. Ability to think independently and deep sense of curiosity
7. Time management
As Artificial Intelligence systems become more sophisticated and capable of independent learning (and now use the similar mechanisms for learning as those used by the human brain), engage in cooperative teamwork and independent strategic planning, questions as to the legal status attached to such entities will arise. These may be questions of duties/liabilities and/or rights.

Once an entity becomes rationally independent, who is responsible for its decisions and what protections attach to it? That boils down to the questions of the legal relevance of rationality or sentience, as rights have already been granted to nonhuman entities, as well as duties imposed. The question of the intelligence being artificial thus becomes irrelevant to the analysis, rather it becomes one of policy and legal morality, at what level/type of independent intelligence does moral considerateness arise?

Law recognises various levels of moral considerateness, and gives a varying set of rights & protections to a spectrum of sentient entities. For such entities, these decisions are based levels of rationality and/or an ability to suffer. The overall research project is to explore these prior legal decisions, the reasoning behind them, and whether/how/at what point those reasons might apply to AI.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Michael Cameron</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Is New Zealand ageing out of drinking? Alcohol consumption by age and cohort</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FMGT</td>
</tr>
<tr>
<td>Field:</td>
<td>Economics/Public Health</td>
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</table>

EXPECTED OUTCOMES:

1. The research project will significantly increase the successful applicant's applied research capability, especially in data manipulation and analysis, working with secondary data sources, and report writing.
2. The project will ultimately lead to an international journal publication, jointly between the student and supervisor.

STUDENT TASKS:

1. Review the international literature on alcohol consumption by age group, with a particular focus on Australian and New Zealand studies and on studies that track the changes in age-specific consumption over time.
2. Familiarise themselves with the HPA's Attitudes and Behaviours towards Alcohol Survey (ABAS).
3. Re-format the ABAS data to enable cohort analysis of changes over time.
4. Use the re-formatted ABAS data to evaluate the changes in cohort-specific alcohol consumption patterns.
5. Write a report that reviews relevant literature, and describes the methods and results.
6. Prepare a poster summarising the research to be displayed at the Summer Research Scholarship end function.

REQUIRED SKILLS:

1. Statistical analysis skills (e.g. STAT221, ECON204, ECONS205), including proficiency in using Excel (REQUIRED).
2. Familiarity with a statistical package, eg R or Stata (DESIRABLE).
3. Good written communication skills (DESIRABLE).
4. Student will be required to fly to Australia (costs covered by supervisor).

PROJECT ABSTRACT:

Despite population growth, in recent years the total quantity of alcohol consumed in New Zealand has remained relatively stable. This implies that, per capita, the amount of alcohol consumed has been falling. Survey evidence also suggests that rates of abstention have increased, particularly among young people.
However, these stylised facts are consistent with three contributing causes: (1) that successive age cohorts are drinking less than previous cohorts; (2) that each age cohort is reducing its drinking; and/or (3) that the distribution of the population is increasingly concentrated in age cohorts that drink less.

In this project, the student will use primary data from the Health Promotion Agency's Attitudes and Behaviours towards Alcohol Survey to try and unpack the contributions of the different causes to the reduction in the average consumption of alcohol at the national level.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>John Gibson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Labour Market Impacts of Unexpected Policy Changes: Using Synthetic Controls to Estimate Regional Effects of the Ban on Off-Shore Oil and Gas Exploration</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FMGT</td>
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<tr>
<td>Field:</td>
<td>Economics</td>
</tr>
</tbody>
</table>

### EXPECTED OUTCOMES:

1. A working paper in the online IDEAS series: https://ideas.repec.org/s/wai/econwp.html
2. A research poster to display findings of the research
3. A possible conference submission
4. A possible journal article (depending on the outcome of the analysis)
5. Media coverage, given the topicality of the research

### STUDENT TASKS:

1. Collection of job vacancy data from internet-sources (involves web-scraping)
2. Collection and manipulation of Household Labour Force Survey data (involves excel)
3. Reviewing media articles related to regional employment effects of the ban on future offshore oil and gas exploration
4. Limited qualitative data collection from one fieldtrip to Taranaki to interview key employers
5. Depending on level of econometric skills, assisting with the synthetic control modelling

### REQUIRED SKILLS:

1. Expertise in excel to obtain and manipulate Statistics NZ regional labour market data
2. Expertise in web-scraping to obtain data from internet job search engines
3. Statistical and econometric skills to assist with the synthetic control modelling
4. Drivers licence and ability to conduct qualitative interviews with employers

### PROJECT ABSTRACT:

When governments make decisions that have effects in the future, the impacts may be observed in current transactions, to the extent that market prices aggregate all available information, including information about the future. A good test of this proposition is available from a recent, and unanticipated, policy change in New Zealand, to ban future offshore oil and gas exploration. The proponents of this policy change suggest that there will be no immediate labour market effects because existing oil and gas exploration licences will not be revoked.
According to the Minister of Regional Economic Development, Shane Jones, "the block offer does not affect any jobs that are already there". In contrast, opponents of the policy change argue that there will be immediate labour market effects because the oil and gas exploration industry, and the related industries that use offshore oil and gas, will react to the changed future circumstances by reducing investment and hiring. With this forward-looking response, effects on the labour market should be apparent almost immediately.

Detailed empirical research can help to adjudicate between these two views of whether markets are forward-looking, and can also help to inform debate about a controversial recent policy change in New Zealand. In the proposed research, the synthetic control method (Abadie et al, 2010) will be used to examine effects on employment vacancies in the Taranaki region, which is the area most intensely affected by the ban on off-shore exploration. The synthetic control method allows causal effects to be obtained from non-experimental data, and is especially well-suited to one-off events that lack a natural control group. A weighted average of non-treated units evolving most closely to how the treated unit evolved over time, prior to the treatment, is formed. The impact of the treatment is estimated as a simple post-treatment difference between the treated unit and the synthetic control.

Thus, by using the synthetic control method, it will be possible to show what the job vacancies from April 2018 onwards would have looked like in Taranaki if there was no ban on future offshore oil and gas exploration. A comparison with how these job vacancies actually evolve gives a measure of the labour impacts of the policy change.

In order to implement this research design, monthly data on job vacancies for each New Zealand region would be obtained from internet sources. These would be supplemented with indicators of regional labour market activity (participation rates, employment rates, and unemployment rates) from the Household Labour Force Survey.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Gazi Hassan</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Understanding multinational migrations: The Case of South Asian migration from Singapore to New Zealand</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FMGT</td>
</tr>
<tr>
<td>Field:</td>
<td>Economics, Social Science</td>
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</table>

PROJECT #:  60

EXPECTED OUTCOMES:

1. Publication in international journal
2. Conference presentation
3. External funding application

STUDENT TASKS:

1. Sample selection
2. Interviewing respondents
3. Data collection
4. Preliminary data analysis
5. Write a summary report on key findings using descriptive charts & statistics.

REQUIRED SKILLS:

1. ECON204, STAT160
2. ECON304, ECON543

PROJECT ABSTRACT:

An increasing number of people has been migrating for work in Asia since the 1980s. Over time, these migrants have acquired new skills and experiences that are in high demand globally, giving sufficient reason for many to move further for better opportunity intra-regionally or inter-regionally, and thus generating a new form of migration explained first in internal migration literature as 'step migration' and international migration as 'twice migration' and most recently 'multinational migration'. The research on this group of migrants who move beyond the first country of destination is often biased towards skilled and professional migrants because of their apparent marketable credentials and favorable immigration policy for foreign skilled and professional migrants in most countries globally.
However, we also find such migration patterns among low-skilled migrant groups in Asia. For instance, South Asian low-skilled migrants, who are working as temporary migrants in construction sector in Singapore for several years, get a chance to earn internationally comparable working experience as well as internationally recognized credentials from local institutions like the Institute of Technical Education (ITE). While many of these migrants continue to work in Singapore because of their higher economic returns and proximity to origin country, some of them also choose to move other country where their skills allow them to work and settle permanently. For instance, many South Asian immigrants who settle in New Zealand in recent years, actually worked in Singapore as construction workers first, and later moved to New Zealand for permanent settlement. Drawing on the experiences of selected South Asian migrants in New Zealand, this study explores how these migrants first came to Singapore, what type of work they engaged in and how they upgraded their skills in Singapore, how they came to know about the possibility of migration to New Zealand and finally availed the opportunity to emigrate to New Zealand via an Asian corridor, and eventually how they are settling in New Zealand with a case study of South Asian migrants (i.e from Bangladesh, India, Pakistan, Sri Lanka) who migrated from Singapore to New Zealand. In short, this study shows how low-skilled, temporary migrants become permanent settlers in the migration process within the broader framework of multinational migration. This study will involve data collection with semi-structured interviews of a number of such South Asian migrants in New Zealand.
### Academic Project Submission Details:

<table>
<thead>
<tr>
<th><strong>Supervisor/s:</strong></th>
<th>Mark Harcourt and Margaret Wilson</th>
</tr>
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<tbody>
<tr>
<td><strong>Project Title:</strong></td>
<td>A Union Default Policy to Reduce Inequality: How Effective and How Acceptable?</td>
</tr>
<tr>
<td><strong>Faculty:</strong></td>
<td>FMGT</td>
</tr>
<tr>
<td><strong>Field:</strong></td>
<td>Employment relations and law</td>
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</tbody>
</table>

### Expected Outcomes:

1. Findings for the Fair Pay Agreements Working Group (e.g., Steve Blumenfeld and Richard Wagstaff)
2. Findings relevant to the viability of a union default, being considered by the Labour Government
3. Media articles on the viability of a union default, being considered by the Labour Government
4. Industrial Law Journal article (A journal that has published our previous article on union defaults)
5. British Journal of Industrial Relations article (A* journal interested in this ground-breaking reform)

### Student Tasks:

1. Helping with the design of interview questions for judges, law academics, and prominent lawyers
2. Assisting with the interviews above
3. Transcribing the interviews
4. Assisting with the qualitative analysis of the interview transcripts
5. Assisting with the presentation of the findings to the Fair Pay Agreements Working Group and other interested parties
6. Assisting with the writing of a report for the select committee
7. Assisting with the writing up of the findings for the media
8. Assisting with conference presentations for Labour Employment and Work and other conferences

### Required Skills:

1. Knowledge of the Employment Relations Act and law, generally
2. Excellent writing skills
3. Excellent listening skills
4. Knowledge of qualitative research methods desirable
5. Experience with transcription desirable
6. Excellent presentation skills
PROJECT ABSTRACT:

This research project has much to offer a student:

1. A major opportunity to affect law and public policy in the employment area
2. A major opportunity to develop a social network with key decision-makers: judges, law academics, lawyers, politicians, and others
3. An opportunity to learn/hone research skills, in preparation for thesis writing
4. An opportunity to write for, and liaise with, the media

A default is the option that automatically occurs when a decision-maker has not actively exercised a choice. For instance, an employee is automatically defaulted to non-union, unless he or she actively chooses to join a union. Non-union is the current default under the Employment Relations Act: workers who want union representation must ‘opt in’ to union membership.

The Labour Government and newly appointed Fair Pay Agreements Working Group are prepared to consider options, including a union default, to increase union membership and extend collective bargaining to address high income inequality and attendant social ills - e.g., crime, poverty, substandard housing etc. Both Professors Margaret Wilson and Mark Harcourt have contacted the Working Group and Labour Government leaders, and there is receptivity to a union default.

Our study has three principal aims. The first is to determine, via consultations with prominent lawyers, judges, and law academics, what union defaults would work and be enforceable. This will be the focus of the summer research scholarship. The second is to determine, via experiments, the extent to which various union defaults are likely to raise union membership levels. The third is to determine, via surveys, the extent to which the public is likely to support various union defaults.

A union default is likely to have a significant, positive impact on union membership via the default effect. The default effect (from Behavioural Economics) refers to the increased probability an option will occur simply by being specified as the default. The default effect is an empirically substantiated finding across many studies - e.g., charitable donations, car insurance purchases, consumer product selections, medical decisions, green electricity choices, internet privacy settings, organ donations, healthcare plans, and savings plans.

The researchers have recently published an article in the Industrial Law Journal that explains why a union default is likely to raise union membership, how such a default would improve the freedom to associate while preserving the freedom not to associate, and how it might be incorporated into law.

### ACADEMIC PROJECT SUBMISSION DETAILS:

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<th></th>
<th>PROJECT #: 62</th>
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<tbody>
<tr>
<td><strong>Supervisor/s:</strong></td>
<td>Stuart Locke and Nirosha Hewa Wellalage</td>
</tr>
<tr>
<td><strong>Project Title:</strong></td>
<td>Financial services and products suitable for refugees</td>
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<tr>
<td><strong>Faculty:</strong></td>
<td>FMGT</td>
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<tr>
<td><strong>Field:</strong></td>
<td>Finance</td>
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### EXPECTED OUTCOMES:

1. Tabulated synthesised responses
2. Poster explaining the project
3. Draft paper discussing the project
4. A cohort of refugees who feel they have contributed to a project that will have impact
5. Supervisors will write and submit joint article with student to an academic journal

### STUDENT TASKS:

1. Prepare a list, from websites of 7 banks, the person banking products and services available
2. Catalogue the items in Task 1 into several representative groups
3. Prepare schedule of likely questions to ask refugees
4. Submit Ethics Committee proposal
5. Meet with Refugee Centre coordinators and discuss logistics
6. Undertake interviews
7. Tabulate results
8. Prepare poster
9. Discuss very regularly with supervisors the work being undertaken

### REQUIRED SKILLS:

1. Collecting and synthesising information
2. Communication skills necessary to talk with folk who have limited English language skills
3. Excel
4. Communication skills to convey clearly ideas facts to peers, e.g. a poster.
5. Ability and willingness to listen carefully to interviewees patiently going over the same thing several times
6. Willingness to accept detailed guidance from supervisors and implement the approach requires
PROJECT ABSTRACT:

Financial inclusion, the extent to which people are access mainstream financial services, occurs among refugees arriving in New Zealand is examined in this study. The foci of the investigation is the refugees’ perception of the fitness for purpose of financial products provided through financial institutions falling under the purview of the Reserve Bank of New Zealand. Mainstream banks do not provided Halal financial products and services. Kiwi saver and other superannuation funds do not provide Islamic financial products and services.

In the absence of mainstream financial options sections of the refugee community are not experience the lower risk higher returns available through pooling of resources. The implication is that these financial non-inclusive people need to find alternative ways to financially transact and build wealth. As banks and mainstream economic financial institutions are part of the social and economic fabric on New Zealand those who are excluded need necessarily to develop a shadow structure. There are direct cost and longer term indirect costs in terms of expanding a parallel no in formal financial service sector. The growth of the loan shark type financial provider is a direct cost and the social division through polarising of the refugee community by exclusion form halal finance is longer-term indirect cost.

The lack of financial inclusion consequently, i.e. financial exclusion, spawns social inclusion. This is dangerous for an egalitarian and inclusive social structure as religious beliefs now constitute the basis for a social divide.

The research question addresses what services and products are necessary to encourage refugees to engage transactionally with formal sector financial institutions?

Method:

Semi-structured interviews to be conducted with volunteering refugees at refugee community centres is proposed. The form of the questions will be non-threatening, not invasive of privacy and will require any specific gift or payment. Past experience has indicated that a donation to the refugee centre of money or in kind such as paying for morning tea, does help in securing the support of Centre staff in encouraging and supporting interviewees.

The questions relate to the type of financial services or products they would like to have available. There will be recurring suggestions and these can be scored. Simple statistical analysis of the data will provide indications of combined preferences which may be divided into various groups based on control variables such as gender, age, profession, etc. The taxonomy of control variables will emerge from the interviews rather than be defined ex ante.

Wording the questions so that they are clear and have meaning across various national and community boundaries will require careful crafting. The questions asking about services and products needed to sufficiently grounded to be meaningful to the interviewee. If they are abstract or do not relate to the prior experiences of the interviewee the responses will be biased toward ‘yes, I would certainly like to have that available’ and revealed preferences will be distorted.

To effectively financially integrate refugees into New Zealand, it is necessary to coordinate legal, financial, and other direct services that are offered to support this community. In this facilitated small group session, participants will learn from one another as they explore best practices for improving collaboration and communication among service providers, discuss ways to engage refugee communities through culturally appropriate vehicles, especially where religious precludes paying or receiving interests, and identify other community partners to include in a coordinated effort.
ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
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<tr>
<th>Supervisor/s:</th>
<th>Geeta Duppati</th>
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<tr>
<td>Project Title:</td>
<td>The Business Case for Environmental Responsibility through Innovation: Does going green pay?</td>
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<tr>
<td>Faculty:</td>
<td>FMGT</td>
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<tr>
<td>Field:</td>
<td>Finance and Innovation</td>
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PROJECT #: 63

EXPECTED OUTCOMES:

1. Student gains insights into analysing the data
2. Student gains insights about the databases and techniques in downloading the data
3. Students will gain insights into the recent trends pertaining to automobile sector
4. Student will contribute towards for publishing a paper

STUDENT TASKS:

1. Student will collect firm specific data on environment performance and country-level data on regulations
2. Student will learn to work on basic econometrics
3. Student will work on review of the literature towards expanding this research

REQUIRED SKILLS:

1. Basic econometrics
2. Finance and Economics background

PROJECT ABSTRACT:

This study examines whether enhanced corporate environmental performance improves financial performance in the automotive sector. It measures environmental performance using compliance with ISO standards and its impact on financial performance measured using Tobin's Q. Numerous empirical and conceptual studies describe waste minimisation as a key environmental performance indicator for industry. The firms that take ISO 14000 certificate and/or issue environmental reports are increasing recent years. So, using ISO 14001 certification as a proxy for environmental performance the study examines the relation between environmental performance and corporate financial performance.
From a natural-resource-based perspective, firms in developed countries implement voluntary environmental initiatives for developing capabilities and resources that allows them to a sustainable competitive advantage (Hart, 1995). Although innovation in the environmental production process and/or green products involves high investments, it also enhances resource efficiency, reduces production costs (Hart, 1995). These innovative strategies will also enable the firms to recover in the medium- and long-term (Albertini, 2013) This approach also meets the expectations and claims of firms key stakeholders, which helps in building a good relationship. This provides firms with legitimacy, improves their reputation, which reduces the cost of capital from green banks and investors while attracting environmentally conscious consumers, who are willing to pay more for green products (Aguilera & Ortiz, 2013), and also improves corporate financial performance from an instrumental stakeholder theory (Surroca, Triba & Waddock, 2010).

Innovation is crucial to automotive sector as the technological development is taking place at an unprecedented rate (Jimenez and Sanz-Valle, 2011; Bell, 2005). Likewise, research & development are the activities chosen by companies to discover new knowledge about new or existing products, processes and services. It is critical for growth, survival and success of the firm and also a key determinant of the productivity (Jones & Williams, 2008).

Research and development efforts have long been recognized as the driving forces of progress and innovation and the world’s economies have embarked policies reforms on market-oriented liberalization aimed at promoting economic performance. The existing literature on R&D provides evidence that R&D efforts influence firms’ financial performances (Lin et al., 2006; Jaffe, 1986). Hagedoorn and Cloodt (2003) stated that R&D efforts can demonstrate the innovative competences of firms and that these efforts have been found to affect firm performance, particularly in high-tech industries.

Unlike most of the studies in the literature, that considers a wide variety of industrial corporations, this study is sector specific. By concentrating on the automotive sector, it examines the relationship between environmental and financial performance. This approach is justified for three reasons. First, firms in the automotive sector, produce substantial amounts of pollution. Second, the automotive sector is mostly subject to regulations. Lastly, studying a single industry responds to criticism by Reed (1998) that many studies of the relationship between environmental and financial performance examine a cross section of forms from many different industries thereby ignoring the likelihood that the degree to which a more proactive approach to environmental management will vary from one industry to another (Filbeck et al, 2004).
ACADEMIC PROJECT SUBMISSION DETAILS:  

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<tr>
<th><strong>Supervisor/s:</strong></th>
<th>Nirosha Hewa Wellalage</th>
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<tr>
<td><strong>Project Title:</strong></td>
<td>Impact of ICT on financial inclusion for women refugees</td>
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<tr>
<td><strong>Faculty:</strong></td>
<td>FMGT</td>
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<tr>
<td><strong>Field:</strong></td>
<td>Finance/ Management</td>
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PROJECT #: 64

EXPECTED OUTCOMES:

1. The research project will significantly increase the successful applicant's applied research capability, especially in data collection techniques, statistical methods and analysis, working with external stakeholders, report writing and presentation.
2. Research paper suitable for a conference publication will be drafted.

STUDENT TASKS:

1. 1. Develop survey questionnaire and successfully obtain ethics approval for the research.
2. 2. Communicate with Refuge Orientation Centre-Hamilton and distribute Survey questionnaire.
3. 3. Student will have to develop research methods for analysing the collected data (qualitative and quantitative)
4. 4. Conduct a literature review on financial inclusion, ICT and women refugees
5. 5. Prepare a poster summarising the research to be displayed at the Summer Research Scholarship end function.
6. 6. Prepare a report summarising the results of the study and present the study findings to Department of Finance monthly seminar series.

REQUIRED SKILLS:

1. Familiarity with qualitative research methods and analysis.
2. Familiarity with Microsoft Excel, and statistical analysis skills.
3. Good interpersonal and communication skills

PROJECT ABSTRACT:

The aim of this research is to examine the impact of Information Communication Technology (ICT) services on financial inclusion of New Zealand women refugees. Financial inclusion facilitates day-to-day living, and help families and individuals to plan for everything from long-term goal to unexpected emergencies. ICT and mobile money usage are becoming increasingly popular, making it worthwhile investigating what ICT and these schemes can bring to financial inclusion and economic growth for New Zealand women refugees.
Financial inclusion, describes the use of formal financial services and has become a subject of growing interest for policy makers, and other financial sector stakeholders in recently. Financial inclusion of refugee women increases savings (Aportela, 1999), female empowerment (Ashraf et al., 2010), and consumption and productive investment of female entrepreneurs.

This study has two research questions:

1. Do refugee women are possess enough level of financial inclusion?
2. Does ICT and mobile communication technology are associated with the financial inclusion of women refugees in New Zealand?

This project is significant, as it will joins the dot between related issues in a means that will create transparency providing stakeholders, policy makers and researchers with a clear picture. Further, this project expands the financial inclusion literature in several ways.

First, to our knowledge, this is the first study that investigates financial inclusion of women refugees. Second, using the data collected from questionnaire surveys will allows us to develop a proxy for financial inclusion that can capture true picture of financial inclusion of refugee women. Finally, this project has several policy directions.

**Methodology**

This research project will adopt a sequential mixed methods approach to examine the linkage between the financial inclusion and wellbeing of New Zealand women.

Criterion sampling method will be employed in this study. In the statistical analysis, the following dataset will be used: Female individual categorized as a "refugee" visa status and living in Hamilton, Waikato

Phase 1: Questionnaire Survey: The initial phase of the study attempts to answer the first research question. Pilot questionnaire survey already conducted using 12 refugees (both male and female) in Hamilton, New Zealand and seek individual feedback or a joint "debriefing". The findings of the first phase and its discussion will be developed in phase 2 using an open-ended interview approach.

Phase 2: In-depth Interviews: In the second phase, we will undertake 50 in-depth interviews to understand the reasons behind high financial inclusion of women refugees.

Dependent variables: The dependent variable for the study is level of financial inclusion.

To effectively financially integrate refugees into New Zealand, it is necessary to coordinate legal, financial, and other direct services that are offered to support this community. In this facilitated small group session, participants will learn from one another as they explore best practices for improving collaboration and communication among service providers, discuss ways to engage refugee communities through culturally appropriate vehicles, especially where religious precludes paying or receiving interests, and identify other community partners to include in a coordinated effort.
ACADEMIC PROJECT SUBMISSION DETAILS:

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<tr>
<th>Supervisor/s:</th>
<th>Mary Simpson and Sohpie Nock</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>Pūrākau o ngā kaumātua: Impact of native schools on wellbeing in later life</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FMGT</td>
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<tr>
<td>Field:</td>
<td>Health Communication and Māori Studies</td>
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EXPECTED OUTCOMES:

1. Audio or Video or Visual collation of stories for participants
2. Written report (2000 words) on key relationships between kaumātua experiences of native schools and positive ageing/wellbeing in later life.
3. Presentation to Rauawaawa

STUDENT TASKS:

1. Meet Supervisors and Rauawaawa to determine roles and working relationships
2. Develop project plan, meeting schedule and ethics, with supervisor support
3. Develop schedule of questions/statements for interviews and/or focus hui with supervisor support
4. Complete ethics application with support of supervisors and Rauawaawa.
5. Invite kaumatua to take part; carry out interviews and/or focus hui with support of supervisors and Rauawaawa.
6. Collate kaumātua information in one or more of the following: video, photographic, audio, or written formats.
7. Present findings to participants, Rauawaawa and supervisors,
8. Write report and create poster for Summer Research Scholarship
9. Participate and contribute to Summer Research Scholarship events

REQUIRED SKILLS:

1. Understanding of Te Ao Maori
2. Writing (need to write a report)
3. Ability to listen to, and talk with people
4. Some understanding of te reo Maori would be a plus
5. Some video recording or graphics design skills would be a plus
PROJECT ABSTRACT:

Who remembers native schools? Kaumātua—koroua and kuia—alive today who attended a native school. Native schools were established with the Native School Act in 1867 and by 1969, the last of them had been transferred to regional education boards. The native schools’ original priority was to teach English, with Māori being used to facilitate learning; later, speaking Māori became forbidden. Native schools were mostly village primary schools, with secondary schools being created as needed. By the 1950s and 1960s increasingly more Māori were enrolling in mainstream schools than native schools, and there was a push to transfer them to education board administration. However some people advocated for native schools to remain because native schools better served the needs of Māori than mainstream schools (Calman, 2012). Such needs included learning, culture, whānau, and the Māori community.

The purpose of this summer scholarship research is to find out how kaumātua experiences of native schools have influenced their well-being (holistically defined) over time, and particularly in later life. The project uses pārākau (stories and story-telling) as a strengths-based method for bringing kaumātua knowledge and experience to the next generations. Kaumātua knowledge and experience, is valued within whānau, hapu and iwi (Durie, 2003). Yet, the ‘distal effects of colonisation’ (Dulin et al. 2011, p. 1420) mean kaumātua are less like to age positively than their non-Māori counterparts (Baker et al. 2016). New Zealand’s Positive Ageing Strategy (Office for Seniors, 2014) and more recently the Ageing Well National Science Challenge have identified the need to value elders and their contribution to society. Kaumātua telling their own stories of well-being is self-determination in action. Kaumātua need to tell their own stories of their experiences of native schools and the relationship to well-being, particularly in later life and their capacity to positively age.

This project will seek to hear kaumātua stories that honours their lived experience of native schools, and enables them and new generations to learn from that past for their own future.

The Summer Research Project will be run in partnership with the Rauawaawa Kaumātua Charitable Trust involve the collection of individual and group stories of kaumātua experiences of native schools. The student, with the support of kaumātua appointed by Rauawaawa, will talk with koroua and kuia about their experiences with native schools, and the impact on their well-being in later life. This may include audio and video, and individual interviews and group hui. The project may also offer the opportunity for international collaboration with Canadian students researching native schools in Canada.
### ACADEMIC PROJECT SUBMISSION DETAILS:

<table>
<thead>
<tr>
<th>Supervisor/s:</th>
<th>Chris Ryan</th>
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<tbody>
<tr>
<td>Project Title:</td>
<td>The implications of the demand for summer rentals in Raglan and housing stress</td>
</tr>
<tr>
<td>Faculty:</td>
<td>FMGT</td>
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<tr>
<td><strong>Field</strong>:</td>
<td>Tourism and communities</td>
</tr>
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| PROJECT #:         | 66                  |

### EXPECTED OUTCOMES:

1. Data that indicates sources of housing stress and the role of tourism
2. Data helpful to the Community Board to shape policies on housing and tourism

### STUDENT TASKS:

1. Data design
2. Data collection
3. Data analysis
4. Report writing
5. Liaison with local community members

### REQUIRED SKILLS:

1. Social skills pertaining to conducting interviews
2. Quantitative skills (support in statistics will be provided if necessary)
3. Textual analysis skills (support in use of software will be provided if necessary)

### PROJECT ABSTRACT:

During the summer the population of Raglan can double due to an influx of tourists, many of who seek accommodation through sites such as Airbnb and Bookabach. Anecdotal evidence points to the following consequences:

a) those renting properties find that their landlords give notice to terminate rental agreements as the summer approaches;
b) those renting accommodation then seeking new accommodation find that rents have significantly increased; and
c) employers are finding it difficult to recruit employees due to a lack of accommodation.
The research has the following objectives:

a) to try to quantify the nature of the problem and provide hard data on the levels of housing stress that is resulting for members of the Raglan community;

b) to utilise such data to provide advice on issues such as the feasibility of rent to own schemes to Raglan Community organisations and pertinent stakeholders such as the Waikato District Council

The students will be required to:

a) conduct a survey of residents of Raglan;

b) surveys will be conducted in cafes in Raglan (this technique has proven successful in the past), prior to which information will be provided to the Raglan community via the Raglan Chronicle and local blogs and web pages;

c) input the data,

d) undertake an initial analysis of the data

e) write a report

The contents of the survey will be determined in consultation with the local Community Board.

The work draws on two streams of academic literature:

a) That relating to the impacts of tourism on local communities and social change; and

b) Concepts relating to place attachment, place meaning, place identity and place efficacy.

The supervisor is Professor Chris Ryan who has published on both of the contacts and who has been working with the Raglan community for a number of years, and hence students can feel confident that a support structure will exist including, if required, accommodation in Raglan.
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<th>ACADEMIC PROJECT SUBMISSION DETAILS:</th>
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<tr>
<td>Supervisor/s:</td>
<td>Chris Ryan, Mark Beardsley (DOC) and Don Bogie (DOC)</td>
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<tr>
<td>Project Title:</td>
<td>How do visitors self-assess their skill experience and fitness levels?</td>
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<tr>
<td>Faculty:</td>
<td>FMGT</td>
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<tr>
<td>Field:</td>
<td>Recreation, Tourism, Historic</td>
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**QUESTION:**

How well do visitors self-assess their skill, experience and fitness levels?

**DESCRIPTION:**

A questionnaire that first asks them to (qualitatively) rank themselves in these three areas, then poses a series of quantitative questions to test the accuracy of their initial self-assessment.