Proceedings of the University of Otago

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Te Wānaka Rakahau - Ākoka 2021

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Student Research Symposium - Te Wānaka Rakahau - Ākoka 2021

This booklet contains:

- the Symposium Programme (page 7) and
- the abstracts of student presenters (alphabetically ordered as per family name)

Thanks are due to:

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- the Events team, especially Jerome Cousins for logistical support including the move to online during a Lockdown because of the COVID-19 pandemic
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- the Symposium Planning Committee consisting of Noor Nazahiah Bakri, Priyanthi Chandravarnan, Judy Ann Cocadiz, Louise Croizat-Viallet, Shishir Dahal, Natalie Germann, Violina Gunawan, Disney Kariyawasam, Rakibul Khan, Sze Leong, Keran Li, Chang Liu, Duong Le, Farzana Kousar, Yann Huey Ng, Yen Nguyen, Pradeesh Parameswaran, Anupa Pathak, Saadia Qureshi, Hizkia Respatiadi, Sharon Richard, Joy Sim, Martha Thay, and Tanh Tran
- The Student Panel for the opening address consisting of Sophie Barham (Master's candidate, Health Sciences & OUSA Postgrad Representative) Nuzla Ismail (PhD candidate, Commerce) Ruth Warren (PhD candidate, Humanities) and Kavindra (Kavi) Wijenayake (PhD candidate, Sciences) and chaired by Dr Yasmin Abdul-Aziz
- Professor Rachel Spronken-Smith (Dean, Graduate Research School and Symposium Convener)

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List of Abstracts

Medication Adherence in Inflammatory Bowel Disease Patients: A New Zealand-wide Inter-Disciplinary Investigation

Obreniokibo Amiesimaka

Inflammatory Bowel Disease (IBD) is a chronic gastrointestinal disorder comprising Crohn's Disease, Ulcerative Colitis and IBD-unclassified, with symptoms including frequent (bloody) stooling, anal inflammation and abdominal pain. The main therapy includes a life-long medication regimen and constant monitoring, but studies have shown that up to a third of IBD sufferers have insufficient adherence to their medication regimens. Poor medication adherence (MA) in IBD patients could lead to worse treatment outcomes besides higher morbidity, deaths and health costs. As New Zealand's IBD cases are among the highest globally and are projected to double by 2028, with about 21,000 IBD patients presently, good MA is particularly important. This PhD assesses the levels of medication adherence (MA) in New Zealand IBD patients, the factors associated with MA, patients' experiences with MA and how existing MA improvement policies might be bettered.

Ministry of Health/PHARMAC national (big) data on prescription refills (PHARMS) and hospitalisations (National Minimum Dataset, NMDS) will be analysed to evaluate the patients' MA levels and associated factors e.g. hospitalisations, gender, geographical location, socio-economic status, DHB, ethnicity, amongst others. Similar Southern DHB data will be curated and these evaluations repeated for the region. Quantitative descriptive and regression analyses will be conducted of these data. Focus group discussions involving IBD patients will be conducted to explore their experiences with MA and their opinions on strategies to aid their adherence. Lastly, policies on medication adherence support will be analysed to assess their suitability to the needs of IBD patients, with recommendations made for optimisation. Thematic (documentation) analysis will be conducted of these qualitative data.

Study findings will highlight IBD patients' medication adherence (MA) levels, associated (socio-economic/cultural) factors, patients' perspectives and ways public health policies might help surmount challenges to adherence. These will advance PHARMAC's goals in "Achieving medicine access equity in Aotearoa New Zealand".

Effects of Pregnancy on Sensory Fingerprints and Eating Behaviour

Miss. Hannah Browne, Andee Kok, Dr. Mei Peng

Pregnancy can be a life-changing and enhancing experience, however, it can also cause major biological and behavioural changes for the mother. It is well known that pregnancy can lead to a range of immediate physiological changes, including weight gain, increased blood volume, endocrine system alterations, and immune tolerance. While these changes are meant to support fetal developments, they can lead to major alterations in an individual's sensory systems. Emerging research also suggests the brain changes permanently during pregnancy. While much research has been conducted to investigate sensory perception, diet and food choice changes during pregnancy, there has been little research to date surrounding changes after pregnancy and the long-lasting effects these changes may have on women. The aim of this study is to test for the effects of pregnancy on sensory function, food choice, and dietary intake. In this project, we hypothesise that these reproduction-associated hormonal changes can shift an individual's sensory functions, and their eating behaviour, including food preferences and dietary choices. These sensory alterations may be the key to explaining weight problems many women face associated with pregnancy. The first part of the study involves comparing dietary intake, attitude towards food, influences on food choice, and eating behaviours between women who have been pregnant and those that have not. This was accomplished through 4-day diet diaries and food questionnaires. This second part of the study compares sensory perception and food liking between the same two groups and is currently being designed. It will encompass testing of the human sensory fingerprint, including taste, smell, texture, and vision through portion size. In this talk I will share preliminary findings relating to the dietary intake and food choice study and the differences between women who have and have not been pregnant.

Characterization of Candidate Genes Associated with Onion (Allium cepa L.) Bulb Formation

Danna Camiring

Onion (Allium cepa L.) is the most important Allium vegetable crop grown globally. Photoperiod requirement to initiate bulbing varies widely among different onion cultivars. This environmental cue is critical in the development of good-marketable sized onion bulbs. However, the mechanism by which onion bulb formation occurs has not been elucidated yet. Through transcriptome analysis, genes involved in the responses to photoperiod, such as the circadian-clock output gene FLAVIN-BINDING, KELCH REPEAT, F-BOX1 (FKF1) and the floral signal gene, FLOWERING LOCUS T (FT) have been identified.

Experiments to identify the genetic basis for the differing photoperiod requirement of short-day (SD) and long-day (LD) onion varieties suggests that allelic variation in the gene FKF1 might be involved. Further gene sequence analysis of FKF1 from 29 SD and 31 LD onion varieties showed that there are five regions of the gene which are highly variable and constitute changes in the sequence of the FKF1 protein. A more prominent haplotype was also found in the SDs compared to the LD onions. These allelic variations may be indicative of the difference by which the accessions perceive light and/or initiate bulb formation. However, further functional genomics experiments must be conducted to test the correlation of these polymorphisms to the bulbing phenotype of the varieties. Onion genetic transformation strategies are also currently being developed in the study to enable the functional characterization of bulb formation genes.

Overall, this study will help to identify bulb formation genes, the day length-dependent regulatory mechanism involved in this process, and their role in the adaptation of onions at different latitudes. This knowledge will be useful to ongoing molecular research and breeding strategies aimed at improving onion cultivars to be better adaptive, resilient, and productive in this changing world.

Weather and Work-related Fatal Injury: What is the Link?

Nicola Campbell, Associate Prof. Gabrielle Davie, Dr. Rebecca Lilley

Work-related fatal injury (WRFI) accounts for 7.3% of all external causes of death in working age adults in New Zealand. Environmental conditions substantively contribute to the causes and circumstances of WRFI. The aim of this study was to examine the contribution of weather events to the burden of WRFI to inform injury prevention strategies.

This study utilised data on WRFI occurring in NZ workers aged 15-84 years, injured between 2005 and 2014. Cases with an underlying external cause of death were selected from the Mortality Collection and linked to Coronial records; from this, work-related cases were identified and coded. Weather-relatedness was assigned, via manual review, using definitions from the US National Oceanic and Atmospheric Administration. Descriptive analysis was conducted and frequencies, proportions, and rates per 100,000 worker-years calculated.

Of the 840 WRFI, 145 (17.2% [95% CI 14.8, 20.0]) were weather-related. Rain and wind accounted for 63.5% of all weather-related WRFI. The majority of deaths occurred in Autumn (32.4%). Weather-related WRFI rates were highest among individuals aged 70 to 84 years, and those identifying as Māori. Males had a rate 13 times higher than females (1.3 per 100,000 workers [95% CI 1.1, 1.5] vs 0.1 per 100,000 workers [95% CI 0.04, 0.2], respectively). The Mining, 'Transport, Postal, and Warehouse', and 'Agriculture, Forestry, and Fishing' industries experienced the highest burden of weather-related WRFI.

This study establishes that weather events make a substantive contribution to the burden of WRFI in New Zealand. It has been established that climate change will change weather patterns, increasing the frequency of extreme weather events and subsequently the contribution of weather to fatal injury in workers. These findings highlight the importance of identifying weather-related hazards in the workplace to address the injury risks posed to workers now and in the future.

Catalytic Activities of Cineole and its Derivatives on Major Drug Metabolising Enzymes in Possum and Mouse Liver Microsomes

Mr. Ravneel Chand, Prof. Rhonda Rosengren, Dr. Belinda Cridge

Folivore marsupials, such as brushtail possum (Trichosurus Vulpecula) and koala (Phascolarctos cinereus), can metabolise higher levels of dietary terpenes, such as cineole, that are toxic to eutherian mammals. While the highly efficient drug metabolising enzymes, cytochrome P450 3A (CYP3A) and phase II conjugating enzymes (UDP-glucuronosyltransferase, UGT), are involved in the metabolism of high levels of dietary terpenes, evidence for inhibitory actions by these terpenes are very scant. Thus, this study investigated the effect of cineole and its derivatives on catalytic activities of hepatic CYP3A and UGT in possums and mice. Results showed that cineole and its derivatives (up to 25 µM) did not significantly inhibit CYP3A and UGT activities. However, increased concentration of cineole by 2-fold yielded significant inhibition in mice CYP3A catalytic activities by 85% of the control activity level. Similar percent control activity level was observed at 25 µM but without statistical significance. Overall, the present findings confirmed that cineole and its derivatives did not have significant inhibition to CYP3A and UGT activities up to 25 µM, except for the significant inhibition observed with cineole at 50 µM.

Phantom Validation of Water and Lipid Material Measurement for the Detection of Bone Marrow Edema in Acute Injury Patients

Krishna Chapagain, Dr. Maya Rajeswari, Mrs. Jenn Clark, Dr. Chiara Lowe, Dr. Tracy Kirkbride, Associate Prof. Steven Gieseg, Prof. Anthony Butler, MARS collaborations

This research aims to evaluate the water and lipid measurement in images of MARS spectral photon-counting CT (system having very high spatial and spectral resolution) for the detection of bone marrow edema in acute injury patients.

Physical phantoms were developed to mimic bone marrow for the validation of water and lipid measurements in human subjects (n=6) with an acute injury (<7 days). The phantoms contained a two-material mixture (water gel, oil) and a three-material mixture (water gel, oil, and hydroxyapatite nanopowder). Phantoms and human subjects were imaged, and material maps were generated. For the human images, 20 regions of interest in (ROIs) were drawn in each participant in the fractured bone region and an unaffected bone. Water mass densities and lipid concentrations were compared for each region. For the phantom study, estimated values from the system were compared with reference values to determine linearity and accuracy. The hypothesis (no difference in estimated values and reference values) was tested using an independent sample t-test from 10 ROIs of each 9 concentrations (0-100% V/V). The agreement between the reference and estimated values were analysed with the Bland-Altman plot.

Estimated values had a linear correlation with reference values (linearity = 0.98, 0.99). The measurements were not significantly different from reference values (p= 0.63, 0.91) with average quantification errors (-1.9% and -0.4%), upper limit of agreement (11.5%, 8.7%), and lower limit of agreement (-14.7%, -7.9%) for the water and lipid component estimation, respectively. In human images, the edema region was observed as an increase in water mass density.

In conclusion, bone marrow edema provides an important diagnostic marker for the detection of occult fractures in acute injury. This study has now indicated the potential of MARS to accurately measure the lipid and water component variation for the detection of bone marrow edema.

"We are definitely not a priority": Experiences of ethnic Chinese with Aotearoa's mental health services

Mr. Denzel Chung, Dr. Katherine Hall, Prof. Jing-Bao Nie, Associate Prof. Chrys Jaye

Despite being Aotearoa's fourth-largest ethnic group, the experiences of ethnic Chinese in our mental health system have been under-researched. Research conducted in Aotearoa and internationally consistently show ethnic Chinese immigrants under-utilise mental health services. Some attribute this to cultural differences in recognising mental illness, while others point to more practical factors such as language barriers or cost. This uncertainty makes it vital to further explore key factors contributing to these inequities in Aotearoa, as any efforts to address these factors would require very different responses.

This project thus aims to investigate the lived experience of ethnic Chinese accessing and experiencing Aotearoa's mental health system from providers' and patients' perspectives. This abstract refers to the first part of the project: providers' perspectives.

This project involved interviews with 12 health service providers with relevant experience with ethnic Chinese patients, and their access to, and utilisation of, mental health services. These interviews, predominantly located in Auckland, covered a broad range of perspectives: from clinicians and GPs to acupuncturists and managerial staff. Qualitative thematic analysis of the interviews was then performed.

Results show a lack of language and culturally-appropriate services are key barriers to access of mental health services by Chinese in Aotearoa. As a result, they often access these services very late, if at all. Despite significant enthusiasm and energy to tackle inequities, there is widespread frustration among service providers, who frequently struggle with resource constraints and health bureaucracy. Significant health needs are not currently being adequately appreciated or addressed by DHBs and central Government.

Our results indicate that substantial potential exists for the improvement in health delivery and care in this area in Aotearoa. This research may serve as an impetus for further work, and ultimately help formulate changes to improve mental health services for ethnic Chinese in Aotearoa.

The Coloniality of Whiteness: Countering Narratives of Oppression within 'Wai262: Ko Aotearoa Tenei'

Ms. Nadine Connock

This Master's research study had three primary objectives: to examine the ways in which Settler Colonial violence has led to the erosion of te ao Māori (the Māori world view) and mātauranga Māori (Māori knowledge, wisdom, ways of knowing) in Aotearoa New Zealand; the correlation of structural racism and systemic assimilation of Māori to this erosion; and the relationships to the role of power; authority; and partnership between the Crown, 'The Treaty of Waitangi' and tangata whenua Māori (indigenous peoples of the land).

To investigate this proposition, the thesis employed Critical Indigenous Theory; Decolonising Methodologies; and Content Analysis methodology to conduct a thematic, comparative analysis of Waitangi Tribunal claim 'Wai262: Ko Aotearoa Tēnei', in order to examine processes of systemic oppression and structural domination between the claimants (Māori) and the Crown.
The study sought to strengthen the objectives of claim Wai262 by providing a Content Analysis of the text; language; inferences; and underlying themes within the report that undermined or opposed te ao Māori; mana Māori; tino rangatiratanga and kāwanatanga (Māori power, authority, self-determination).

Several theoretical frameworks with supporting literature underpinned the Content Analysis:

- Strategic racial domination (Whiteness) as a relational force of Settler Colonial Violence.
- Systematic racism by the Crown through institutionalised, structural legislation, assimilation and appropriation.
- Indigenous dispossession and possession as a modality of White Sovereignty.
- The Treaty of Waitangi as a mechanism for the Crown to operationalise biopower (power over partnership) in the form of White Sovereignty.

The study concluded, 'The Treaty of Waitangi', constitutive of Settler Colonial White Sovereignty, functions as a Crown power structure to enable and enforce prejudicial, rights-based structural legislation in order to retain full and absolute power and control over principles of partnership (biopower); rejection of power sharing; and the theft of cultural and intellectual property rights.

Image Denoising Using Fully Convolutional DenseNets for Spectral CT Imaging

Mr. Theodorus Dapamede, Dr. James Atlas, Dr. Mahdieh Moghiseh, Prof. Phil Butler, Prof. Anthony Butler

Noise in spectral CT scans can affect x-ray spectral information of materials which could lead to material misidentification. A Fully Convolutional DenseNet (FC-DenseNet) based architecture neural network was implemented to perform image denoising on a spectral CT virtual phantom. Phantoms are specially designed objects used in medical imaging for calibration and testing purposes. In this study, a virtual phantom was created from 5-energy bin spectral information of hydroxyapatite (HA), water, and lipid, taken from scanning standard physical phantoms using a human-scale spectral photon counting CT (MARS 14 scanner, MARS Bioimaging Ltd). Images of air were also taken from running the spectral CT without any objects, also using 5 energy bins. Noise randomly sampled from the air images were then added to the virtual phantom, creating 1000 images for the training dataset. These air images not only contained linear attenuations of the air itself, but also ring and helical artefacts from the scanner. Virtual phantom images without noise were used as the target images. Training was performed on an AMD Ryzen 7 2700 8-core 32GB RAM CPU with a 16GB Quadro P5000 NVIDIA GPU for 800 epochs with a batch size of 4. RMSProp was used as the optimiser and a custom loss function containing a reconstruction loss and a material decomposition loss was used. Visual inspection of the output images showed that the network was able to reconstruct the images with high spatial resolution. Noise reduction, along with helical artefact reduction, were also visually noticed. This study has shown the potential use of an FC-DenseNet based neural network to perform image denoising on a spectral CT virtual phantom dataset. Further study is currently underway to look at the generalisation ability of the network to denoise other spectral CT datasets.

Why the Solar Wind is More Like a Solar Ocean: A Study of Fluidisation in a Collisionless Astrophysical Plasma

Mr. Ryan Davis

In the modelling of astrophysical plasmas, severe simplifications must be applied to make the incredibly complex systems, spanning decades of spatial and temporal scales, numerically tractable. A common strategy is to apply the magnetohydrodynamic (MHD) equations. Abundant simulations and observations have shown this approach to be useful and accurate for the description of heliospheric phenomena. Interestingly, MHD assumes a high collisionality of the plasma's constituent particles to enforce a Maxwellian velocity distribution through the application of fluid-like equations. These collisions are not present in the solar wind, which has a mean free path of approximately 1 astronomical unit, placing it firmly in a "kinetic" regime where the plasma's velocity profile is free to evolve. As currently understood, these kinetic effects should lead to quantitatively and qualitatively different behaviour than that observed in the solar wind.

There is not yet consensus in the community regarding the causes leading to the solar wind's "fluidization" however, recent studies have suggested that turbulent motion of the plasma itself may be a significant contributor due to the creation of a "stochastic echo". This echo can halt the damping of waves by the purely kinetic process known as "Landau Damping", enforcing an essentially fluid Kolmogorov-like cascade. By considering how the competition between these two processes changes through phase space, this study is focusing on developing measurable predictions of the energy spectra of a turbulent Reduced Kinetic MHD (RKMHD) plasma, a model that closely reproduces several important aspects of solar wind dynamics. This will then be followed by the running and analysis of a suite of simulations, allowing direct comparisons between theoretical predictions, in silico, and previous in situ measurements.

Life Satisfaction Among People Experiencing Spinal Cord Injuries: A Scoping Review

Miss. Ruby Dixon, Prof. Sarah Derrett, Dr Helen Harcombe, Associate Prof. Emma Wyeth,
Dr. Ari Samaranayaka

The research aims to describe longitudinal life satisfaction and identify its associated predictors and influencing factors on life satisfaction for New Zealand (NZ) individuals experiencing spinal cord injury (SCI). This research is part of a larger NZ longitudinal study where one of the main aims was "to explore the interrelationships of body, self and society for people with SCI and how these have shaped life chances, life choices and subjectivity".[1] Long-term life satisfaction has previously been identified as a strong predictor for survival post-SCI indicating the importance of identifying factors which contribute to high levels of life satisfaction among SCI populations.[2]

This presentation will present findings from a scoping review of the literature on life satisfaction among individuals with SCI globally to inform the quantitative analyses for this NZ research. The scoping review aims to identify what is currently known in the literature about life satisfaction, and to identify its determinants, predictors and long-term outcomes, among people with SCI.

The initial search in four databases revealed 808 potentially eligible papers. Title and abstract review has reduced the number of eligible papers to 110. These papers are now being reviewed to identify and describe research that measures life satisfaction as a whole, as the primary outcome, among people experiencing SCI; and to identify any predictors or associated factors on long-term life satisfaction, in people experiencing SCI.

This scoping review is currently in progress; however, it will be completed by August and findings will be discussed during this presentation.

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Experiences of Autistic Secondary School Students Participating in a Weekly Sports Programme: A Proposed Study

Ms. Elizabeth Dovenberg, Prof. Liz Franz, Dr. Motohide Miyahara

Autistic individuals are generally less physically active and participate in fewer sports compared to nonautistic individuals. This is due to various factors, including availability of sports programmes and enjoyment of physical activity (PA). As a consequence, autistic individuals may not experience well-known benefits of PA. This research area lacks qualitative investigations, which provide detailed descriptions of personal experiences in naturalistic settings and extend understanding beyond quantifiable outcomes. This proposed study will qualitatively explore the unique contextualised experiences of autistic students attending Wednesday Sport, a weekly sports programme in Dunedin.

This case study will utilise ethnographic methods to obtain in-depth information about PA experiences. More specifically, the researcher will observe Wednesday Sport and write fieldnotes describing participants' engagement, behaviour, contextual details, and researcher interpretations. Semi-structured interviews will be conducted following observation, with fieldnotes informing interview questions. This allows participants to offer feedback, corroborate, and provide elaboration of observational findings. Interviews will offer participants (and optionally parents) the opportunity to share personal stories about Wednesday Sport and physical activity. Interviews will be recorded, transcribed, and shared with participants for corrections and comments.

Analysis will be guided by a case study framework in which fieldnotes analysis occurs prior to conducting interviews. Interviews will be analysed using content analysis. Study rigour will be assessed according to trustworthiness, auditability, credibility, and transferability.

This proposed study will explore autistic students' Wednesday Sport experiences. Results may describe contributions to their positive or negative PA experiences. Findings may also generalise to broader theoretical models of PA, like the Environmental Stress Hypothesis (ESH), which suggests physical inactivity may lead to decreased self-worth and increased internalising symptoms in young people with impaired motor coordination; similarly, increased PA may protectively buffer against such outcomes. Deeper qualitative understanding of PA and autism may facilitate sustained PA involvement, possibly leading to PA-related benefits.

Evaluation of DNA Extraction Kits for Examining Skin Microbial Composition of New Zealand Native Frog *Leiopelma hochstetteri*

Ms. Adria Rae Abigail Eda, Dr. Fernanda Centeno, Prof. Phil Bishop, Dr. Stephanie Godfrey, Dr. Ludovic Dutoit, Christy Rand, Dr. Luke Easton, Dr. Jo Stanton

The choice of DNA extraction kit potentially impacts the description of ecosystem microbiomes. In this study, we compared four extraction protocols to describe the cutaneous microbial composition of Leiopelma hochstetteri, a New Zealand native frog. The ventral surface of each frog (n = 6) was partitioned into four equal quadrants and each quadrant swabbed. Each swab was processed using four commercial kits: Qiagen DNeasy Blood and Tissue kit, MoBio PowerSoil Extraction kit, Thermo Fisher PrepMan Ultra Sample Preparation Reagent, and MicroGEM PrepGEM DNA extraction kit. These were then assessed based on DNA yield, number of sequences generated, diversity of microbes identified, and ability to detect Gram-positive bacteria. PrepGEM had the highest DNA yield and sequence count, while PrepMan was the most efficient in capturing microbial diversity, but was not statistically different from the three other kits. Further analysis showed each frog was a unique individual and hosts a unique microbiome and the choice of DNA extraction kit or ventral location of sample acquisition had limited impact on the measured microbiome. Overall, both PrepGem and PrepMan offer a straightforward and cost-efficient protocol for DNA extraction of microbiome swab samples, comparable to more commonly used kits.

Mechanical and Biological Validation of Sintered Bovine Bone Block Grafts

Mr. Asrar Elahi, Prof. Warwick Duncan, Associate Prof. Dawn Coates, Prof. Neil Waddell, Associate Prof. Carla Meledandri

Oral bone defects require bone grafts that are physically robust, biocompatible and osteoconductive. Bovine bone is accepted as a source of suitable grafting material (xenografting), however, the manufacturing process may reduce its mechanical and biological properties. Therefore, the aim of our study was to assess bovine bone blocks for the effects of different sintering temperatures on its mechanical properties and biocompatibility. Bone blocks cut into 5 x 5 x 5 mm and 20 x 20 x 2 mm samples were divided into four groups: (Gp1) Control (Untreated), (Gp2) Initial boil for 6 hours, (Gp3) Sintered at >500°C for 6 hours, (Gp4) Sintered at >1000°C for 6 hours. Samples were tested for purity (thermogravimetric analysis), crystallinity (X-ray diffraction), mechanical strength (compression testing), surface morphology and chemical composition (SEM/EDS). Biocompatibility was tested with human calvarial osteoblasts in vitro and measuring cellular adhesion (phalloidin staining) and viability (PrestoBlue™). Clinical handling was tested by placing a 10 x 1.5 mm diameter cross-head bone-block screw into blocks drilled at 800 RPM. Statistical analysis was performed using GraphPad PRISM software. Tukey's multiple comparison test based on one-way ANOVA was used. P value < 0.05 was considered as significant. Higher temperature sintering (Gp4) removed all organic components but increased crystallinity (95.33%). All groups (Gp2-4) showed decreased mechanical strength (MPa: 4.21 ± 1.97, 3.07 ± 1.21, 5.14 ± 1.86, respectively) compared with raw bone (Gp1) (MPa: 23.22 ± 5.24, $p < 0.05$), with micro-cracks seen under SEM. However, Gp4 had highest biocompatibility ($p < 0.05$). Clinically-relevant testing showed that Gp4 samples could better withstand drilling and screw placement, but demonstrated high brittleness compared to Gp1. Bovine bone blocks sintered at higher temperatures resulted in highly pure bone with better biocompatibility but also with compromised mechanical strength and handling. Further animal model studies will demonstrate the suitability of this construct for bone grafting applications.

Investigating the Role of Unfolded Protein Response in Megakaryocyte Maturation

Ms. Mifra Faiz, Dr. Maggie Kalev-Zylinska, Associate Prof. Elizabeth Ledgerwood

Endoplasmic reticulum (ER) stress triggers the unfolded protein response (UPR) to promote cell survival or apoptosis (cell death) via the activation of three key UPR signal activators: IRE1α (inositol requiring enzyme one alpha), PERK (protein kinase R-like ER kinase), and ATF6 (activating transcription factor 6). Recent evidence confirmed that UPR-specific gene expression is significantly elevated in calreticulin (CALR)-mutated megakaryocyte progenitors, leading to their proliferation in chronic blood cancers known as myeloproliferative neoplasms (MPNs). We hypothesize that CALR mutations may alter megakaryocyte ER homeostasis resulting in enhanced activation of UPR target genes to cause overproduction of megakaryocytes. This study aims to determine the involvement of UPR during megakaryocyte maturation and examine the consequences of UPR inhibitors and ER stress activators on PMA-induced megakaryocyte maturation.

Our initial work revealed a significant increase in the transcription of IRE1α or ATF6 pathway-specific UPR genes CHOP, XBP-1t, HERPUD1, and ERDJ4 during PMA-induced megakaryocyte maturation of K-562, and MEG-01 cells at day 3 compared to day 0. We next determined whether UPR activators or inhibitors affected in vitro megakaryocyte maturation. The IRE1α endonuclease inhibitor (SN34221) showed a significant reduction in megakaryocyte maturation on day 3, independently of the effect on cell viability. On the contrary, neither ATF6 nor PERK inhibitors showed a decline in K-562 maturation. These results indicate that IRE1α signaling but not PERK or ATF6 may play a regulatory role in PMA-induced megakaryocyte maturation. Moreover, activation of UPR by thapsigargin (Tg) but not dithiothreitol (DTT) showed a significant reduction in PMA-induced megakaryocyte maturation.

Our findings indicate UPR is enhanced during in vitro MK maturation, and IRE1α signaling may contribute to PMA-induced in vitro maturation of megakaryocytes. However, inhibition by Tg, which induces the UPR via abnormal Ca^{2+} homeostasis, suggests changes in the UPR may be secondary to effects on Ca^{2+} handling during differentiation.

A Life Worth Living: Evaluating the Effectiveness of Residential Dialectical Behavioural Therapy

Miss. Natalie Germann

Dialectical behaviour therapy (DBT) is a type of psychological therapy which aims to teach individuals how to live in the present moment, cope with stress, regulate emotions, and improve interpersonal relationships. Whilst there is widespread evidence supporting outpatient DBT, there is limited evidence-based research on either the general efficacy of residential DBT treatment programmes or on the characteristics of clients and/or programme components associated with positive outcomes.

This PhD project is in its early stages and is focused on evaluating residential DBT programmes for individuals with complex mental health conditions. Supervised by the Department of Psychological Medicine (Wellington campus), this research is being conducted in collaboration with Te Whare Mahana (TWM) - New Zealand's only residential Dialectical Behavioural Treatment programme, based in Golden Bay.

Research questions include: (1) what is the experience of treatment at TWM and how does this inform the theory and application of residential DBT?, (2) what helps people who attend TWM's residential programme to get 'better', and what constitutes 'better'?, and (3) what are the clinical outcomes of TWM graduates, and are the predictors of these outcomes? To answer these questions, this research has adopted a mixed-method methodology involving both quantitative and qualitative data. Specifically, it is comprised of four studies (1) a quantitative systematic review of the current international DBT residential treatment programmes, (2) a retrospective cohort study incorporating quantitative analysis of existing demographic and clinical data obtained from TWM records, (3) qualitative interviews with TWM patients using grounded theory methodology, and (4) qualitative interviews with TWM staff members using qualitative description methodology. In the presentation I will discuss the protocol in more depth as well as the development of the research to date.

Government Reforms and its Implications on Fijian National Unity

Ms. Sandhiya Gounder

In 2006, Frank Bainimarama executed Fiji's fourth coup. As the then commander of the Republic of Fiji Military Forces (RFMF), Bainimarama believed that the military had a role to unify Fijians, many of whom have experienced ethnic discrimination, inequality and corrupt practices. Bainimarama went on to become the democratically elected Prime Minister in 2014. He was re-elected in 2018 and claims that his government is continuing the process of dismantling discriminatory and ethnic based policies through major political and socio-economic reforms in the name of achieving national unity. This qualitative study focusses on the constitutional, institutional and electoral reforms in Fiji since 2006 and their implications on national unity in Fiji. The study explores if these reforms have yielded positive changes and contribute to facilitating national unity amongst Fijians. Online interviews were used to collect data from respondents who are politicians, constitutional lawyers, academics, community leaders and ordinary citizens. Letters to the editor and opinion pieces from the two major newspapers from 2015 to 2021 were also utilized to collect secondary data sources for the study.

Source Trust and Belief in Misinformation about Covid-19 and Abortion

Ms. Emma Harcourt, Senior Lec. Joanna Gullam, Associate Prof. Jesse Bering

Motivated reasoning – our ability to see what we want to see – determines our willingness to accept information that supports or contradicts our personal beliefs. Misbeliefs about stigmatised or controversial areas of health can be particularly hard to debunk as these misbeliefs are informed by our personal, cultural, and political values.

Under experimental conditions we presented participants with three abstracts for a peer-reviewed study. One abstract was taken verbatim from a 2012 study comparing the mortality rates associated with pregnancy and childbirth (8.8 deaths per 100,000) in comparison with induced abortion (0.6 deaths per 100,000). The other two abstracts were manipulated; one presented the original abstract with the conditions reversed; the other abstract substituted two fictional conditions for pregnancy and abortion. Participants were asked to rate the credibility of the abstract they read.

Participants with anti-abortion views perceived the original abstract (which showed that pregnancy has a higher mortality rate than abortion) as less credible than the two manipulated abstracts. This effect was most pronounced in participants with the strongest opposition to abortion.

When communicating science to the public we must be aware that there is an emotional component to belief.

Assessment of Novel Wool Keratin Derived Protein (KDP) as a Dietary Antioxidant

Mrs. Thilanka Haththotuwa, Prof. Jayantha Dias, Associate Prof. Alaa El-Din Bekhit

A dietary antioxidant is a food substance that significantly reduces the adverse effects of reactive oxygen and nitrogen species, or both on normal physiological function. Antioxidants are frequently used to treat heart disease, arthritis and cancer and are found in anti-aging products. Extraction of keratin from wool via novel patented high pressure microwave technology resulted in three fractions; supernatant, precipitate (emulsified fraction) and plug. The precipitate and plug fractions combined (50:50 ratio) to produce wool keratin derived protein (KDP). The bioactive peptides released via in vivo proteolytic hydrolysis of protein play a vital role in physiological activities such as antioxidant, anticancer and anti-hypertensive. Therefore, this study investigated the antioxidant capacity of wool keratin fractions via in vitro assays: oxygen radical absorbance capacity (ORAC); 2,2-diphenyl-1-picrylhydrazyl (DPPH); and ferric reducing antioxidant power (FRAP) after proteolytic digestion with pepsin and trypsin. Results indicate significantly higher antioxidant capacity in the mixture of plug and precipitate, compared to supernatant. Both plug and precipitate digested better with pepsin compared to trypsin. Highest antioxidant activity of DPPH (53%), FRAP (12.01 Fe (II) µmol /mL) and ORAC assays (2517 µM Trolox/g) were observed in precipitate after 24h digestion, with pepsin followed by trypsin. Further, antioxidant activity both plug and precipitate increased with increase in digestion time. Overall, results indicate in vitro proteolytic digestion of wool keratin fractions release the bioactive peptides with antioxidant properties suggesting potential use of KDP as a dietary antioxidant. However, further studies are necessary to investigate the in vivo antioxidant properties of KDP.

Cognitive Functioning in Opioid Substitution Treatment and the Potential for Cognitive Remediation

Ms. Tara Hayward, Associate Prof. Simon Adamson, Associate Prof. Jennifer Jordan, Dr. Katie Douglas

Opioid use disorder (OUD) is a chronic condition that carries significant morbidity and mortality. One of the most effective treatments for OUD is opioid substitution treatment (OST). Participation in OST is associated with reduced frequency of illicit opioid use and wider benefits, including reduction of HIV-risk behaviours and involvement in crime. The positive outcomes of OST may not extend to all areas of functioning, however, such as to cognitive functioning. Many factors may contribute to cognitive functioning in this population, as well as the OST drug itself. This talk will present findings from a literature review on cognitive functioning in people receiving OST, where papers were identified through database and reference list searches. In general, those receiving OST tended to demonstrate worse performance than healthy controls over a range of cognitive domains. The quality and generalisability of the evidence will be discussed, and areas requiring further investigation will be identified. Factors that may influence cognitive functioning for people receiving OST will also be discussed. Improved cognitive functioning is associated with better substance use disorder treatment outcomes and improved academic, occupational, and social functioning. Interventions targeting cognitive functioning, however, have not been widely explored for people receiving OST, and the potential of cognitive remediation for this population will be considered.

Environmental Influences of the Isotopes and Trace Elemental Composition of Japanese Rice

Po-Jui (Zeki) Huang, Dr. Kiri McComb, Dr. Matthew Schofield, Prof. Russell Frew

Rice (*Oryza sativa* L.) has long been a staple food and is one of the primary sources of calories for over half of the world's population. However, with the current expansion of global trade, it has become a potential target for food fraud, with unscrupulous traders mixing quilted rice with low-grade rice to fetch profits with less effort. For example, in the 2008 Osenmai Scandal in Japan, tainted rice containing pesticides and mould from China and Vietnam were mixed with Japanese rice and sent into the market.

Stable isotopes can be used as a tool to determine rice origin and authentication. However, very little research on rice $\delta^{34}S$ has been reported, especially for food traceability. They are also few publications using a combination of stable isotopes and trace element compositions to determine and predict rice geographic origin. This project aims to leverage the understanding of the relationships between isotopes ($\delta^{2}H$, $\delta^{13}C$, $\delta^{15}N$, $\delta^{18}O$ and $\delta^{34}S$, $^{87}Sr/^{86}Sr$) and trace element compositions and environmental factors. Ultimately, this research will bring together findings into models for the prediction of rice isotopes and trace element compositions. Currently, $\delta^{2}H$, $\delta^{18}O$, $\delta^{13}C$, $\delta^{15}N$, $\delta^{34}S$ and trace element concentrations of bulk rice have been measured with TC/EA –IRMS, EA IsoLink- IRMS and Q-ICP-MS. Results show mild linear relationships between $\delta^{2}H$ and $\delta^{18}O$ ($r^2 = 0.47$), and between $\delta^{2}H$ and air temperature, latitude with r^2 of 0.58 and 0.42, respectively.

Further spatial modelling on the relationships between environmental factors and isotopic and trace elemental results reserve in rice is required to improve the current approach for rice origin verification.

Therapeutic Scaffolding (TS) for Underachieving English as a Second Language (ESL) Students

Ms. Anushika Kariyawasam

In the Sri Lankan context, a considerable number of students who have completed their primary and secondary studies in their mother tongue, and with limited English proficiency, struggle at the university level where the medium of instruction is in English. These students have to face difficulties in learning a new language and new content simultaneously at the university, and they encounter different types of learning problems including cognitive, behavioural, language, and pedagogical problems. Literature on learning problems among students for whom English is a second language indicates that there is a dearth of empirical research investigating learning problems of these students in-depth with limited intervention strategies to support them. This research aims to introduce a novel intervention approach called 'Therapeutic Scaffolding' (TS) to support ESL students to mitigate their learning problems and enhance academic proficiency. Therapeutic Scaffolding primarily integrates 'Cognitive Behavioural Therapy (CBT)', 'Theory of Scaffolding', and 'Content and Language Integrated Learning (CLIL)' to develop students' cognition, behaviour, and skills.

The methodology comprises an action research study with a qualitative approach. The participants include the researcher functioning as the language teacher and the therapist, a content teacher, and 10 - 20 volunteer underachieving ESL students from an English-Medium Instructional degree programme at a public university in Sri Lanka. These students are exposed to TS for one academic semester, and subsequently, the impact of TS on learning problems and academic proficiency, and students' perceptions on TS are evaluated and analysed thematically.

The research conceptualizes and evaluates TS as a transdisciplinary intervention approach and a collaborative platform to support underachieving ESL students to overcome learning problems and enhance their academic proficiency, and redefines the role of language teachers at the university, across disciplinary boundaries.

Application of Management Control System (MCS) in Waste Management Practices: Structured Literature Review

Ms. Disney Kariyawasam

This presentation reviews the literature on applications of management control systems (MCS) in waste management (WM) practices. A structured literature review approach was used to analyse 261 papers in subjects including business, management, and accounting published between 2000-2020 based on criteria such as: year; journal title; research locations; research industry; research method; theory; and research theme. The analysis highlights the scarcity of waste management research in the field of accounting, especially on management control systems. The existing literature mainly dominated by management (article title), focuses on the manufacturing industry in rest of the Europe (Industry and location) and the Australasia continent (New Zealand). The key themes mainly focus about the sustainable consumption and production, consumers behaviour, supply chain actors and circular economy. The presentation provides insights on how waste management research in management control systems has developed and identifies future research opportunities.

The Role of Silence in Peace and Conflict Studies Journals

Ms. Kalika Kastein

Silences are not dichotomous, they can be in one moment harmony-seeking and perhaps in the very same moment, deeply violent. Peace and conflict studies has in some ways silenced itself, reproducing silences through the things missed, overlooked, or not accepted. The space of higher education itself contains multitudes of silences through its systems and structures. Recent scholarship within the field of peace and conflict studies suggests a new critical approach to silence and reflection on what some have termed the field's dialogue fetish. I conducted frequency searches within thirteen peace and conflict studies journals, chosen for their topical alignment with either field of peace and conflict studies or concepts within it (i.e. negotiation, human rights, peacekeeping, peace education) to examine the concept of silence and compare it with its traditional binary of speech. Findings indicated a higher frequency of terms referring to speech over silence and when examining articles associated with silence and dialogue versus articles that featured speech and dialogue, there were a higher frequency of articles that focused on speech and dialogue. These findings suggest a need for further study to determine if the field truly frames silence in a binary against speech, in which dialogue-centric speech becomes the only recourse to solving the issue of violence.

Diving Deeper: Comparing Genomes and Microbiomes Across Three Pest Weevils

Dr. Mandira Katuwal Bhattarai, Prof. Neil Gemmell, Dr. Eddy Dowle, Dr. Craig Phillips

There are over 1400 invasive exotic insects reported in New Zealand. Among them, clover root weevil, lucerne weevil, and Argentine stem weevil are the most significant pasture pests causing an estimated annual loss of up to $600 million. Introduced biological control agents, notably parasitoid wasps from the genus Microctonus have achieved varying levels of control. Variable parasitism rates across the weevil species is leading to serious concerns about the stability and sustainability of pasture weevil control. Further studies on Argentine stem weevil have gathered evidence of genetic basis of resistance to its control agent. However, the absence of the reference genomes for the other two weevils has hindered our understanding regarding variation in parasitism rates between weevil species and locations. across the country. Therefore, the genomes of clover root weevil and lucerne weevil have been sequenced using three sequencing platforms; Illumina (short reads), Nanopore (long reads), and 10X genomics (linked reads). The primary assembly for clover root weevil is 71.29 percent complete based on its busco score with an assembly of 1.64 Gb size with an N50 of 86356 bp. For lucerne weevil, a genome assembly from long reads resulted in a 93 percent complete genome with a size of 1.94 Gb and N50 of 78538 bp. The genome for Argentine stem weevil is available via our collaborator. This will be followed by genome annotation and comparative genomic analysis across the weevil species which will enable us to identify the important genomic loci for understanding of the genes closely related to weevils' immune responses to their respective wasps. Creating a genome is a valuable resource for understanding the population genetics, phylogenetics, dispersal patterns, and reproductive behaviour of the weevil species. Altogether, a comprehensive genomic understanding of these destructive pests further allows us to develop new tools of control.

A Histological Investigation of Childhood Stress in Early Otago Settlers

Mrs. Lucy Kavale Henderson

In 2018, archaeological excavations were carried out at the 'new' Gabriel Street cemetery in Lawrence, part of a joint project by the University of Otago departments of anatomy and archaeology. This project aimed to elucidate the lived experience of nineteenth century non-Māori settlers of Otago, in particular marginalised individuals. Preliminary bioarchaeological evidence has indicated a more nuanced picture of health than the established historical narrative. Here, I present results of histological analysis of dental enamel disruption that provides evidence for childhood ill-health experiences in origin communities. Dental samples were sectioned and prepared according to established methods, and light microscopy was used to create composite digital images. These images were analysed using FIJI™ software to identify potential 'Wilson bands', internal indicators of disruption to enamel secretion during formation of the teeth during early childhood. As teeth develop in a predictable and well established sequential pattern, this allows the establishment of a chronology of non-specific developmental stress events prior to immigration. Although they are frequently marginalised or excluded from the historic record, children are a valuable and widely used indicator of population health as they are more sensitive to stress events due to the demands of growth.

Testing the Attractiveness of Biofouled Marine Plastic Debris on Yellowtail Kingfish (*Seriola lalandi*)

Ms. Eleanor Kelly, Mr. José Trujillo, Dr. Bridie Allan

Marine microplastics, an invasive and persistent anthropogenic form of pollution, can acquire a microbial biofilm that has been determined to be of unique composition to the community of the surrounding seawater, and therefore, termed the 'plastisphere'. Components of these biofilms excrete infochemicals that organisms commonly associate with a food source; their presence on plastics may increase the probability of plastic being mistakenly ingested. To determine whether microbial biofilms make microplastics appear more palatable and if a fitness cost is incurred with consuming microbially colonised microplastics, we exposed polyethylene microbeads (300 µm) to unfiltered seawater for three weeks to create the biofouled plastic treatment. Using juvenile yellowtail kingfish (*Seriola lalandi*) as a model organism, olfactory preference to the microplastic biofilm was tested by creating an odour solution in filtered seawater of clean plastic, biofouled plastics, biofilm alone, or nothing (control). Fish were video-recorded in an arena for two minutes before and after being exposed to 10 ml of an odour solution in order to compare behaviour (distance travelled and swimming speed) in response to the different treatments. A separate experiment involved super-dosing fish with either 200 clean or biofouled microbeads then recording the number of beads in their gut 5 h after exposure to determine ingestion preference. The results to be presented of these experiments will give insight to the attractive properties of the plastisphere, and whether biofouled or clean microplastic consumption has an effect on metabolic potential.

Authentication of Mānuka Honey by using Compound-Specific Isotope Techniques

Mrs. Kaushila Kodikara, Prof. Russell Frew, Dr. Alan Hayman

Mānuka honey is an internationally renowned, very expensive honey produced in New Zealand from the nectar of *Leptospermum scoparium*. The unique properties such as non-peroxide activity (NPA) and numerous reputed health benefits in mānuka, make it a much sought-after product in the medicinal and cosmetic industries. In mānuka, Dihydroxyacetone (DHA) and Methylglyoxal (MGO) are key chemical markers, playing a vital role in contributing uniqueness of this product. Among those compounds, MGO is recognized as the main compound responsible for the NPA activity and mānuka honey is well known to have a significant amount of MGO. DHA, a precursor of MGO, is largely present in fresh mānuka honey. It is non-enzymatically converted to MGO during the storage period of months to years. The value of mānuka honey increases with its MGO content, which gives rise to NPA activity. Due to the availability of MGO and DHA in synthetic industries, recently fraudsters initiated a new way of trading weak mānuka honey by adding synthetic MGO and DHAs. Even though New Zealand Authorities (MPI) have developed standards for the mono-floral and multi-floral mānuka honey products for five attributes (4 chemical markers and 1 DNA marker from mānuka pollen), there is an absence of a solution to this problem.

This research aims to develop methods to verify the origin of MGO and DHA in mānuka honey using isotope values. It has been shown that synthetic MGO is isotopically distinct from natural MGO, offering a means of detection of the addition of exogenous MGO. Establishing the isotopic relationships amongst MGO, DHA, and sugars from genuine honey will authenticate mānuka honey by distinguishing adulterated from natural honey. Ultimately this will assist in securing the honey industry by building consumers' trust and its continuity in the growth of the export market.

Do you Speak Hindi? The Experiences of Indian Adolescent Students in New Zealand

Mrs. Supriya Koipurathu Rajappan

New Zealand's migrant population has increased rapidly in the past decade. When the migrant adolescents acculturate to the new society, issues, challenges and conflicts will emerge as they are racially and culturally different from the dominant group. Bullying and discrimination are the major challenges that children from migrant and ethnic minority students experience in schools. The major aim of the study is to explore the experiences of Indian diaspora high school adolescents regarding bullying and discrimination. The study also aims to learn about migrant adolescents' knowledge and involvement in school bullying interventions. The study draws on a socio-ecological model and adopts a mixed methods approach, consisting of a survey and focus group to explore the experiences of migrant students. The preliminary results will be discussed and it is intended that the findings will help to understand how the young migrants navigate their school environment, and how the school, family and community is supporting in the acculturation and well-being of young migrants.

Anti-fouling Poly(ethylene glycol)-Containing Polymer Layers for Stainless Steel

Miss. Farzana Kousar

Stainless steel exhibits good corrosion resistance in aquatic environments. Nevertheless, stainless steel is susceptible to fouling by a variety of micro- and macro-organisms. The development of biofilms on stainless steel surfaces poses a great threat to the quality of milk and other dairy products as the biofilm-embedded bacteria can survive thermal processing. Established biofilms offer cleaning challenges because they are resistant to most of the regular cleaning protocols. The intended purpose of this work is to develop methods to maintain pristine, foulant-resistant stainless steel surfaces in aqueous, proteinaceous, or microbial environments such as those found in food and dairy industries. In the present study, we synthesized copolymers which consist of alternating poly(ethylene glycol) chains and phosphonic acid grafted at the same backbone. Quartz Crystal Microbalance with dissipation was used to monitor polymer adsorption kinetics and evaluate the resistance to protein adsorption. The results showed that the polymer layers using phosphonic acid as linkers showed close to 100% antifouling efficacy against bovine serum albumin BSA, and milk as compared to bare stainless steel, which is an excellent result. In contrast, layers prepared with carboxylic acid as the grafting agent exhibit mitigated protein response. We also studied the inhibition of Escherichia coli and Bacillus cereus bacterial adhesion and growth on bare and polymer functionalized SS. Fluorescent microscopy was used to examine the bacterial attachment and the results are in great agreement with the findings of QCMD. It appears that it might be possible to use them in food or medical applications to prevent biofouling. This could lead to significant savings in terms of cleaning costs, and lower contamination

Potentials of Using High Pressure Homogenisation to Improve the Functionality of Microalgal Suspension

Ms. Johannes Magpusao, Prof. Indrawati Oey, Dr. Biniam Kebede

High pressure homogenisation (HPH) is a mechanical processing technology that has potential to modify the functionality of different food systems. Microalge biomass is one such promising food ingredient due to its rich nutritional profile. This study used HPH as a structure-enabling process to modify the rheological properties of microalgal biomass and improve the release of intracellular components, such as antioxidants and pigments. HPH was applied at 300, 600, and 900 bar to aqueous suspensions of Arthospira platensis and Nannochloropsis sp. Results show that HPH clearly disrupted the cells of A. platensis leading to an increase in viscosity and exhibited possible network formation based on particle size distribution and microscopy analysis. In contrast, Nannochloropsis sp. displayed minimal response to the HPH. Nevertheless, disruption by HPH led to increased pigment release, specifically chlorophyll a, for the treated microalgal suspensions. The total phenolic contents of ethyl acetate fractions of HPH-treated Nannochloropsis sp. showed significant increase. This demonstrated the potential of HPH to alter the structural properties of microalgal suspensions while improving the availability of valuable intracellular component.

The Professional Identity Formation and Growth of Academic Developers in Two Higher Education Institutes in New Zealand and Japan

Ms. Yoko Mori

Many people may find that if we have a strong common identity, it is easier to work together. Harari (2018) argues that we, "humans are social animals through and through, with group loyalty imprinted in our genes" (p. 129).[1] In most universities across the world, there are groups of people who have particular interest in teaching, and have chosen to change their career to support other academics learn and develop as teachers. These staff are called 'academic developers' and, unlike regular academics who share a discipline, they come from diverse subject backgrounds and enter the profession through different pathways. This situation results in a fragmented profession, and academic developers have been referred to as a "family of strangers". The aim of my research is to explore how academic developers in higher education build and develop their professional identity.

The study takes place in two cultures: New Zealand and Japan. My research is important to find how a professional identity might affect motivation for work, or at times, provide moments of supreme happiness and meaning in life in Japanese, 'ikigai'. I interviewed 19 academic developers with a life history research approach where I listened to each participant's story. In this way, I have been able to trace why and how respondents 'think, act, and feel' like academic developers. So far, the study has revealed that compassion and empathy are vital shared attributes for academic developers in both countries. As one respondent said, "It is the emotions that we remember after we forget everything else, we learned" which resonates with the idea that our strongest memories stem from our most emotional experiences.

The experiences imply 'collegiality' to be the key concept for the art of academic development.

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Control of Immune Cell Function by IL-10 Proteins Derived from Viruses

Miss. Amreen Naqash, Prof. Roslyn Kemp, Prof. Michelle Glass, Dr. Lyn Wise

Viruses produce their own versions of interleukin-10, a multi-functional human cytokine that plays a crucial role in the maintenance of the immune system. We have identified four viral IL-10s, namely those from Bovine papular stomatitis virus, Pseudocowpox virus, Red deer parapoxvirus and Seal parapoxvirus, that we predict will exert suppressive and stimulatory effects on immune cells to a similar extent as human IL-10. The virus IL-10 proteins were recombinantly expressed in human cells and then purified using an affinity tag. The biological effects of the virus IL-10s on pro-inflammatory cytokine production and the activation/maturation of innate immune cells were then investigated. Cells were exposed to stimuli and various doses of IL-10, then the production of cytokines was examined using ELISA, proliferation using a metabolic assay. The ability of the virus IL-10s to bind the IL-10 receptor was also examined in a competitive displacement assay. The virus IL-10s inhibited the production of different cytokines by monocytes. They also differed in their abilities to regulate mast cell proliferation and to bind the human IL-10 receptor. Homology modelling revealed that changes in a structural domain and individual residues may relate to the functional differences between the virus IL-10 and human IL-10 proteins. These findings suggest that during infection, the IL-10s produced by these viruses may interfere with their host immune response. But further investigations are required to determine how changes in IL-10 protein structure have altered receptor signalling and function in different immune cells.

Childbearing Behind Bars: The Experience of Filipino Pregnant Prisoners

Romulo Jr Nieva

Many women who enter prison usually come from the margins of society and socioeconomically disadvantaged background. They are mostly of childbearing age and mothers. Thus, they have complex and unique reproductive health needs. The prison reproductive health care in many countries is not a priority policy area; and is often constrained with limited resources particularly in low-income countries such as the Philippines. Despite an extensive literature on the sociology of reproductive wellbeing and pregnancy of marginalised women, the experience of pregnant prisoners is under-researched. This article presents a qualitative, phenomenological interpretation of the pregnancy experience behind bars in the largest Philippine prison for women. The study was conducted in 2020 and involved semi-structured interviews with 18 female prisoners who were pregnant or had given birth in prison. Using sociological and criminological concepts, this study builds upon existing knowledge and highlights the institutional context of pregnancy experience of women in prison. Through thematic analysis, the key findings of the study are clustered into three overarching themes, namely: (a) dislocation of identity b) sense of scarcity, c) and feeling of disempowerment. These themes embody the women's narratives of how their pregnancy and motherhood status appeared secondary to their 'prisoner identity', exacerbated by their experience of systemic scarcity and sense of powerlessness in prison. Imprisonment was the fulcrum on which the women's experiences of pregnancy were negotiated and balanced. The study also unpacks new data about how the women navigate the system to negotiate entitlements and address their reproductive health and pregnancy needs. This research highlights the gaps in existing policy guidelines and structure to support their reproductive wellbeing needs. In this sense, the study aims to facilitate future inquiry and to be a vehicle for positive reform for incarcerated women with myriad of reproductive health needs.

Detecting the Target of Sarcasm is Hard: Really??

Mr. Pradeesh Parameswaran, Dr. Andrew Trotman, Dr. Veronica Liesaputra, Dr. David Eyers

Sarcasm target detection (identifying the target of mockery in a sarcastic sentence) is an emerging field in computational linguistics. Although there has been some research in this field, accurately identifying the target still remains problematic especially when the target of mockery is not presented in the text. In this presentation, we propose a combination of a machine learning classifier and a deep learning model to extract the target of sarcasm from the text. First, we classify sarcastic sentences using machine learning, to determine whether a sarcastic sentence contains a target. Then we use a deep learning model from Aspect-Based Sentiment Analysis to extract the target. Our proposed system is evaluated on three publicly available data sets: sarcastic book snippets, sarcastic tweets, and sarcastic Reddit comments. Our evaluation results show that our approach achieves equal or better performance compared to the current state-of-the-art system, with an 18% improvement on the Reddit data set and similar scores on the Books and Tweets data sets. This is because our method is able to accurately identify when the target of sarcasm is not present. The primary challenge we identify, that is hindering the creation of a high accuracy classifier, is the lack of consistency among human annotators in identifying the target of sarcasm within standard ground-truth data sets.

A New Questionnaire Measuring Quality of Life in Heart Valve Disease

Ariel Pons, Prof. Gillian Whalley, Dr. Kate Sneddon, Dr. Sean Coffey

As mortality in heart valve disease/replacement (HVD) improves, quality of life (QOL) becomes a key outcome when comparing treatments. However, QOL in HVD is currently measured by generic questionnaires – which compare between diseases, not within them – or questionnaires tailored to other diseases. This project aims to generate a questionnaire measuring QOL specifically in HVD. Questionnaire generation consists of developing questions ('items') that cover all aspects of the outcome then removing all save the strongest indicators, over four phases: item generation, pilot testing, item selection, and testing the final questionnaire.

Participants underwent semi-structured interviews about QOL in context of HVD, generating a questionnaire tested in participants with HVD for phase two. Items that were shown to be problematic were altered or dropped, generating a questionnaire for deployment in phase three. The first two phases have been completed. Forty-two participants were interviewed for phase one: 34 people with HVD (mean age 67, 56% female), three participant family members, and five clinical experts. Fifty-eight questionnaires were returned in phase 2 (mean age 77, 55% female). Themes identified in phase one include: physical limitations/ability, resilience, emotions, disease perception, expectations, healthcare pathways, treatment effects, social support, HVD symptoms, holistic 'wellness', and fatigue. Physical limitation and fatigue were often the most important to participants; one participant defined QOL as "doing what you used to…doing your own thing". Fatigue was emotionally devastating, with one participant saying it had "cheated" them of their future. However, clinicians ignored fatigue, prompting a secondary questionnaire aim: to have a descriptive function to report fatigue.

In conclusion, this project is developing a questionnaire that covers a wide range of aspects of QOL in HVD, including things patients value but clinicians may not notice. As such, the third phase will not only statistically improve the questionnaire but also retain descriptive function.

An exploration of resilience and wellbeing in stroke survivor carers - a qualitative study

Ms. Ayesha Qureshi, Associate Prof. Nicola Swain, Dr. Daniela Aldabe, Prof. Leigh Hale

The burden of stroke continues to rise worldwide. In New Zealand, stroke is the leading cause of serious adult disability. Stroke survivors who return to live in the community rely on informal carers to meet their needs of care and support. The unexpected and traumatic nature of stroke forces family members into a caring role that often leads them to experience an overwhelming sense of burden, depression, and isolation. The cumulative effects of carer emotional, financial, and psychological burden call for psychological programmes to enable resilience and wellbeing of stroke survivor carers. To inform the development of a resilience intervention, a qualitative study using semi-structured interviews was carried out in Dunedin. Twenty-six carers were recruited with the help of Otago branch of the Stroke Foundation. The aims of the study were to explore the issues impacting resilience of carers and to identify the nature and design of the resilience programme that carers think would help in coping and wellbeing. Interviews were audio-recorded, and the subsequent transcripts analysed using the General Inductive Approach. Four broad themes were constructed: (1) carer outcomes; (2) financial stressors; (3) stroke survivor factors; and (4) exclusion of carers in care planning. The main theme 'carer outcomes', described as changes in social and emotional functioning of the carer, encompassed five subthemes of "grieving for the loss", "uncertain future", "suffering in silence", "social isolation", and "adapting to a sudden change". Carers suggested that a resilience programme comprising of "coping strategies", "positive communication skills", and an opportunity to "learn from shared experiences of carers" might help in maintaining their wellbeing during the care continuum. We have used these findings alongside those from a systematic review of pertinent literature to develop a resilience programme for stroke survivor carers which is being evaluated in a feasibility randomized controlled trial.

Are Parents' Choices Between Higher and Lower Decile Schools in New Zealand Based on Delusions? - A Quantitative Analysis

Mrs. Saadia Qureshi

New Zealand is challenged by a significant 'tail' of low achievement among some groups of students aged 15 shown by an analysis of recent PISA (Programme for International Student Assessment) tests. New Zealand has seen a widened gap between rich and poor suburbs. However, when ministers like Parata talked of a 'failing tail' or "bottom 20 per cent" everyone automatically, and wrongly, assumed this was all decile 1 and 2 schools.

This study explored and compared factors like socio economic status, social factors like moral and learning support from home and self-efficacy allied with secondary science performance in higher decile and lower decile schools of Southland.

Data was collected through a survey consisting of interval and ordinal scales, which were constructed through responses of students collected through prior surveys from five schools, to measure learning and moral support from home, and socioeconomic status assessed by average incomes of student's parents through their stated professions. Subject specific self-efficacy was calculated using the different levels of Bloom's Taxonomy. Performance of students was obtained on items of difficulty levels ranging from 1 - 4.

Self-efficacy and support from home had small positive correlations ranging from 0.1 - 0.2 with the performance in both the deciles. Correlation values were mildly higher for lower deciles describing self-efficacy and support from home, with more impact on performance than in higher deciles. Parental income was weakly negatively correlated (-0.07) in higher deciles and weakly positively correlated (0.09) with performance in lower deciles.

No statistically significant difference was found between self-efficacy, support from home and performance from either end of the decile rankings using t-test at 0.05 significance level. Results showed that decile rating has become a stigma for society leading to choices based on non-statistical data, while higher and lower deciles can perform equally well if teaching remains equivalent.

Network Identity as Part of What Matters in Survival

Mr. Andrew Rutherford

Derek Parfit maintains in Reasons and Persons that personal identity consists in two things. Person A and person B are the same person only if:

1. A and B are psychologically very similar, that is, in their psychological states including memory and desire, and also personality traits and tastes.

And:

2. A and B are connected by the “right kind of cause" that is, they have the same body over time.

Parfit also maintains, however, that personal identity does not matter, in the sense that what I care about when I have special concern for my future states does not depend on identity. Person B, really matters to Person A, on Parfit's view, only if:

1. A and B are psychologically very similar.

And:

2. A and B are connected by "any cause", that is, I may still care about a person who does not have the same body as me so long as we are very similar and connected in some other fashion. For example, a teleportation machine that destroys my body while reproducing the relevant psychological traits in another body is a cause that connects me to the other person in such a way that I will have special concern for that person.

I introduce and defend different second criterion that emphasises social connectedness. I maintain that A has justified special concern for B only if 1 obtains and:

2. Relevant social connections recognise A and B as the same person and that person is in some way at least potentially accessible to them.

My talk will detail the ways in which it can be proven that ability to connect socially is essential to what matters in survival.

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Primary School Physical Education: Why Practice Matters

Mrs. Emily Scott

Physical education has been caught up in a wide range of purposes ever since a space was reserved for it in the school day. These purposes are generally underpinned by ideas and assumptions about what is good for the individual and what is good for society. What is planned for and envisaged however, ultimately takes shape in the practicing of physical education – the temporal, spatial and relational dimensions in which teachers and students encounter one another when it is 'happening.' Physical education practices are never neutral, but always underpinned by prior experiences of those involved, as well as ideologies, knowledges and particular traditions of the field. Practices have consequences for those involved, for good and not so good. Practice, it seems, matters. Drawing on the theory of practice architectures,[1] and utilising data from a series of observations, interviews and focus group discussions, the aim of this ethnographic case study, is to explore what happens in the name of physical education in a local primary school. That is, how is it taken up and 'practiced' by teachers and students? In what ways do students become 'stirred in' to physical education practices? How do various 'architectures' existing in and brought to the site, enable and constrain what is possible in this variously understood and enacted area of the New Zealand Curriculum (2007)?

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Normative Reasoning Based On Emotions In Multiagent Systems To Solve The Social Dilemmas

Abira Sengupta

Norms in human societies are socially constructed rules of individuals' behaviour. Many norms emerge through observation of others' behaviour. Furthermore, some of them emerge from interaction with others. In this work, we use computational modelling and simulation to study how agents reason about action in the presence of norms, and how norms are created and spread. We assume that agents have mental attitudes such as beliefs, goals and emotions about other agents that will fulfil the future expected goal. Prior work has found that emotions can help the satisfaction of the fulfilment of norms, or generic behaviours that complain about norms. We are developing a computational simulation based on the theories of Castelfranchi et al.,[1] to demonstrate how norms can arise from emotions, such as fear and hope. We aim to provide a new understanding of how social norms can emerge and lead to greater cooperation between agents using the Collective Action Simulation Platform (CASP).

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Can you Research with Unicorns and Magic Boxes?

Ms. Fathimath Shiraani

Existing tourism scholarship represents both disabled adults and children who do not have a disability. However, disabled children and young people (here onwards disabled children) who are both disabled people and children are ignored. Disabled children are typically discussed in a superficial way. As such, research dialogues about disabled children's tourism experiences take place without them. Instead, parents or other adults are consulted. Thus, contemporary tourism research treats disabled children as passive objects without a voice and ignores their status as social actors. Such an ableist approach is surprising given the global commitment to provide equal rights to disabled children. For example, see the United Nations Convention on the Rights of Persons with Disabilities (2006) and initiatives of other organisations like UNICEF to promote disabled children's participation and voice.

In addressing the neglect of disabled children's right to voice and participation in tourism research, this study collects disabled children's self-reported narratives of their leisure holiday experiences. A total of nine disabled children with different disability experiences were consulted to understand their holiday stories. Participant-friendly methods were utilised as such consent procedures, and research tools were tailored to match individual participant's strength. This included using unique props such as unicorns and magic boxes. Based on the field experiences, it became apparent that researchers working with disabled children should be open to unexpected ethical and practical challenges. Likewise, researchers should be more willing to embrace nonconventional research methods and tools. Overall, the participants revealed that holidays could be fun, and pleasurable when spent with family/friends. In contrast, holidays can become less pleasurable based on others discriminatory attitudes and treatment. The originality of this research lies in its demonstration to position disabled children within the nexus of tourism, disability and childhood by including the missing voices of disabled children.

Origin Traceability of Coffee and its Flavours: Vibrational Spectroscopy as a Non-destructive Technique

Miss. Joy Sim, Prof. Russell Frew, Prof. Indrawati Oey, Dr. Biniam Kebede

The popularity of coffee around the world continues to grow rapidly, especially in Asia and China. Accompanying the rise in coffee consumption is the increasing number of fraud cases such as mislabelling and adulteration of coffee as pure Arabica species. To protect coffee producers and consumers, efficient analytical methods are needed to evaluate the authenticity and quality of coffee. Traditional geochemical, stable isotope and trace element methods have been used for the determination of coffee origin.[1] Even though these are well established and accurate methods, they tend to be expensive and complex tools that involve a lot of time, destructive sample preparation steps, and environmentally harmful chemicals. Vibrational spectroscopy has been suggested as a cheap, sustainable, non-destructive, and rapid tool to perform routine analysis on coffee.[2] The aim of this research is to develop a rapid method to verify the origin of coffee using vibrational spectroscopy, and to link origin terroir with coffee aroma and taste through chemometrics and data fusion. This would facilitate the select breeding of special coffee bean cultivars with unique sensory properties and protect the market from adulteration. Furthermore, the outcome of this work will support producers of high-quality coffee to obtain legal protection through designated geographical indicators.

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Purchase and Consumption of Snack Foods and Soft Drinks during School Journeys among Adolescents in the Otago Region, New Zealand

Ms. Margaretha Situmorang

Although active transport to school (ATS) increases physical activity in adolescents, it may increase opportunities to purchase/consume unhealthy foods. Consumption of snack food and soft drinks high in sugar, salt, or fat, is associated with the unhealthy weight development in adolescents. This study examined the odds of adolescents' purchasing/consuming snack foods and soft drinks during their school journey by transport modes, neighbourhood-level deprivation, and weight status.

Adolescents (n = 731; 53.5% females; 15.3 ± 1.4 years) from 11 Otago secondary schools were surveyed about transport modes and frequency of purchasing/consuming snack foods and soft drinks during their school journey. Data were analysed by school transport mode (active/motorised/mixed), neighbourhood-level deprivation (New Zealand Deprivation Index; low- (Quintiles 1+2), medium- (Quintile 3) and high-deprivation (Quintiles 4+5) and weight status category (healthy weight vs. overweight/obese).

Overall, 36.5% of adolescents purchased/consumed snack foods and 26% purchased/consumed soft drinks during ≥1 weekly school trip. Controlling for neighbourhood deprivation, mixed transport users had a higher odds of purchasing/consuming snack foods than motorised transport users (odds ratio (OR), 95% CI: 1.37, 1.06 - 1.78) whereas odds of soft drinks purchase/consumption did not differ significantly by school transport modes. Controlling for school transport mode, adolescents from the least deprived neighbourhoods were less likely to purchase/consume snack foods (Quintiles 1+2: 0.53, 0.43 - 0.66; Quintile 3: 0.57, 0.44 - 0.75) and soft drinks (Quintiles 1+2: 0.37, 0.29 - 0.47; Quintile 3: 0.49, 0.37 - 0.65) compared to those from the most deprived neighbourhoods (Quintiles 4+5). Healthy weight adolescents had a lower odds of purchasing/consuming snack foods (0.73, 0.61 - 0.87) and soft drinks (0.65, 0.53 - 0.80) compared to overweight/obese adolescents.

The relationship between adolescents' school transport modes and snacking behaviour was found only in purchasing/consuming soft drinks, but not snack food. Lower odds of purchasing/consuming snack food and soft drinks were found among healthy weight adolescents and those from less deprived neighbourhoods, respectively, compared to their counterparts.

Genetics to Inform Conservation Management of Kea (Nestor notabilis) in New Zealand

Aimee Stubbs, Dr. Ludovic Dutoit, Yasmin Foster, Fiona Robertson, Tracey Van Stijn, Prof. Bruce Robertson

Genetic management is required in captive breeding programs to maintain species genetic diversity and maximise the long-term viability of the population. However, captive populations are generally small and have been established with only a few-wild born founders where relationships are unknown. To prevent the loss of genetic diversity, it is important to understand the population genetic structure and relatedness between founders before commencing a captive breeding program. Kea (Nestor notabilis) are a declining species of alpine parrot found throughout the South Island of New Zealand. Currently, the relationships and genetic structure of captive kea in New Zealand are unknown, which undermines their suitability as a potential insurance population for future management. We use a molecular genetic method (Genotyping-by-Sequencing; GBS) to examine the genetic structure of the captive and wild kea populations to inform genetic management. We will examine the levels of genetic diversity and inbreeding present in the captive population and compare that to the known wild kea population structure. This comparison will help determine if the captive flock is representative of the wild identify or has any unique diversity. We will also use this to find out the genetic origin of the captive individuals. Additionally, we will determine the relatedness and resolve the unknown relationships of the captive population by reconstructing the pedigree. Our overall aim is to help achieve the long-term and sustainable management of kea by i) determining if the current captive population is feasible as an insurance population and ii) informing genetic management of captive kea to optimise genetic diversity retention and minimise inbreeding. These results will provide a foundation for captive breeding and pedigree management moving forward. Preliminary results from the GBS data analyses will be discussed.

I ahatia taku reo Māori? What Happened to My Language? Tracking Intergenerational Transmission of Te Reo Māori.

Paia Taani

As a second language learner of te reo Māori (Māori language), I have often reflected on the use of te reo Māori within my own whānau (family) and began to wonder, what happened to my language? When did te reo Māori cease to be a living part of my whānau? Was it a conscious decision or did it 'just happen'? This presentation offers an overview of my doctoral studies thus far, including the research methodologies I intend to apply to my research. The purpose of my research is to contribute to the existing research and literature about the use of te reo Māori within the context of whānau. Whānau narratives of their experiences and perspectives of te reo Māori will form the foundation of my thesis. It is anticipated that the key themes emerging from these accounts will inform robust recommendations with the aim of supporting, influencing and informing current and future inter-generational transmission of te reo Māori. The overarching research question I aim to address is:
How can whānau experiences of te reo Māori loss and, where applicable, reclamation, influence future inter-generational transmission of te reo Māori?

My PhD project will be grounded in and informed by mātauranga Māori (Māori knowledge) and kaupapa Māori (Māori approach) research theory, principles, methodology and methods. Tikanga Māori (Māori customs) principles will guide the research methods which will include pūrākau (stories), hui (meetings), wānanga (dialogue) and kōrero (discussion), through an integrated model called Te Tuamaka which was developed for my Masters of Indigenous Studies research. Furthermore, as whakapapa (geneaology) is at the core of my research, a whakapapa-based methodological approach will be applied to this study. Maintaining this approach throughout my PhD research is both organic, given the topic and my whakapapa, but also privileges our ways of knowing, being and doing.

No Woman Is An Island: A Review Of The Impacts Of Disasters For Women

Miss. Heather Tribe

The global literature shows a large weight of managing crises falls upon women, low socio-economic groups, and other marginalised groups. Additionally, much of the social fallout of disasters is felt most keenly by these same groups. The literature concludes an ongoing need for a gendered analysis to understanding the societal impacts of natural disasters; yet here in Aotearoa, there is a significant gap in our knowledge. This Ph.D. topic explores the experiences and perspectives of women through an intersectional, feminist, political ecology lens. My methodology is primarily anti-oppressive, open-ended interviews which prioritised the sacred expertise, emotional time and energy of my research participants. I am conducting a comparative case study of the Canterbury Earthquakes (2010 - 2011) and the impacts of COVID-19 and the relevant restrictions on the community of Waitākere in Tamaki Mākaurau (March 2020 - present). I will be presenting preliminary findings at this time. This research explores experiences of disasters, both as direct physical outputs and societal outputs in a gendered analysis. It is critical that this work is undertaken as we move into a climate change era, defined by increased frequency and potency of natural disasters.

Getting to Know Our Patients and What Matters: How Clinicians Elicit Patient Values, Preferences, and Circumstances in Rehabilitation

Catherine Vingerhoets, Prof. Jean Hay-Smith, Fiona Graham

Patient-centred care and evidence-based practice are two well-established models of healthcare with one common link. Patient values, preferences, and circumstances are key contributors to decision making and care planning. They are vital to understanding the essence of who the patient is and what is important to them; however, it is not clear how health professionals elicit this information to integrate into care planning.

Our purpose was to explore how health professionals elicit patients' values, preferences, and circumstances, then share this information within the inter-professional team in inpatient neurological rehabilitation. We also explored what health professionals understand by the terms 'values', 'preferences', and 'circumstances'.

This exploratory qualitative descriptive study used interviews with 13 health professionals (7 professions) from inpatient neurological inter-professional teams at three organisations in Christchurch. Data were analysed using a general inductive approach.

Participants understood values to mean what is important and meaningful to the person, preferences as likes and dislikes, and circumstances as the social, physical, and socioeconomic environment surrounding the person. Formal (e.g., family meetings) and informal (e.g., conversations during care) strategies were used to gather information directly from patients or indirectly from other sources (e.g., family/whānau and other health professionals). The processes of eliciting and communicating this information were influenced by relationships and relied on contribution from many people. Elicitation required a flexible and adaptable approach that was tailored to the unique patient and considered each individual context.

The strategies used and the approach applied are both essential to the effective elicitation of patient values, preferences, and circumstances in neurological rehabilitation. A shared understanding of these concepts and processes, and recognition of the value of this information can improve the provision of holistic, empowering, and truly patient-centred rehabilitation.

Converting Carbon Dioxide to Biofuels using Copper Nanoparticles

Mr. Geoffrey Weal

Atmospheric carbon dioxide (CO_2) has increased by 50% since the start of the industrial era.[1] This increase in atmospheric CO_2 is changing our climate that if left unchecked will devastate our way of life. A key source of anthropogenic CO_2 comes from our demand for energy, in particular our use of fossil fuels for transportation. Moving away from fossil fuels to other carbon neutral fuel sources is currently a hot research topic in the academic and commercial community.

One topic of interest is the conversion of CO_2 to biofuels, such as methanol. Copper surfaces have been shown to catalyse this reaction under an applied potential. However, these copper surfaces currently do not catalyse this reaction fast enough to be commercially viable and often produce a mixture of different biofuels that can be hard to separate.[2,3] A potential avenue for improving the catalysis of CO_2 to biofuels is using copper nanoparticles. Nanoparticles offer unique properties due to their increased surface area and various surface features, including defects. These surface features have shown to be beneficial for catalysis in many other types of metallic nanoparticles.[4,5]

In this presentation, we show computational results from a preliminary study for the catalysis of a variety of small copper nanoparticles. A global optimisation procedure is used to obtain models of copper nanoparticles that are then evaluated for their catalytic activity towards converting CO_2 to biofuels. We show that defects in copper nanoparticles may facilitate the catalysis of CO_2 to biofuels beyond what can be achieved upon copper surfaces alone.

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Dunedin in Ecstasy: MDMA Use, User Experience, and Knowledge

Mr. Jai Whelan, Mr. Nick Fellows, Mr. Geoff Noller, Mr. Ryan Ward

3,4-Methylenedioxymethamphetamine (MDMA) is an illicit stimulant drug that produces euphoria and enhanced sociability and empathy. Despite its illegal status, MDMA use is common at electronic music parties and festivals throughout the world and is predominantly used by young adults. MDMA has recently been granted breakthrough status by the FDA for the treatment of post-traumatic stress disorder, indicative of pronounced therapeutic potential. Despite common misconceptions, MDMA is relatively safe, and many harms associated with use arise due to the illegal status of the drug, including harm from adulterants, misuse due to lack of education, and harm associated with stigma. MDMA use has recently increased in NZ, yet little research has investigated parameters surrounding use and users in the local context. The aims of the research project are to highlight the nuances of MDMA use in NZ, in addition to elucidating the motivations and experiences associated with use, and how these factors are associated with the knowledge of users with regard to potential harms and benefits. Several semi-structured and exploratory focus groups were carried out to collect data on various aspects of interest concerning MDMA use in NZ, and data were analysed via reflexive thematic analysis methodology. The results of this research will help to inform future harm reduction practices of individuals, and the work of drug education and harm reduction organizations. Furthermore, by elucidating details about MDMA use and users in NZ, this research aims to reduce stigma surrounding drug use, and provide insights for future drug policy change, aligning with the evidence-based, harm reduction approach that is a central feature of NZ's National Drug Policy.

Exploring the Role of Cognitive Flexibility in Mind Wandering

Mr. Yi-Sheng Wong, Dr. Adrian Willoughby, Dr. Liana Machado

Mind wandering is a highly common phenomenon involving the diversion of attention away from the task at hand toward task-unrelated thoughts. Although previous studies have investigated mind wandering using task-switching paradigms, the association between cognitive flexibility and the tendency to mind wander remains largely unexplored. The present study investigated the relationship between self-reported spontaneous mind-wandering tendencies and task-switching performance in young adults. Seventy-nine university students performed two task-switching paradigms, one involving forced random task switches and the other involving optional self-initiated random task switches, and completed a battery of questionnaires assessing mind wandering and attentional control. The results showed that despite indicating poorer attentional control and more task-unrelated thoughts during performance of the switching tasks, participants with higher self-reported spontaneous mind-wandering tendencies demonstrated smaller switch costs in the forced task-switching paradigm than participants with lower self-reported spontaneous mind-wandering tendencies. No significant difference was revealed between the two groups in the voluntary task-switching paradigm. These findings indicate that cognitive flexibility could be a key determinant of mind-wandering tendencies.

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