ACUR | Australasian Conference of Undergraduate Research 2017

27-28 September

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THE UNIVERSITY of ADELAIDE

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Welcome from Professor Philippa Levy, Pro Vice-Chancellor (Student Learning)

On behalf of The University of Adelaide, I would like to welcome you to the 2017 Australasian Conference of Undergraduate Research (ACUR). ACUR is hosted by a different university each year, and this year we are proud to be hosting it in Adelaide, at our prestigious North Terrace campus, located in the heart of the city.

This is the sixth year in which ACUR has run. The Conference continues to thrive as an important and engaging platform for Australasian undergraduate students to showcase their work and network with peers in a friendly and professional atmosphere.

During this year's conference, there will be 100 research presentations over 2 days and we will hear from keynote speakers, including two former undergraduate students and the Deputy Vice-Chancellor (Academic) of the Australian National University (ANU), Professor Marnie Hughes-Warrington, who is a member of the ACUR Steering Group. There also will be a panel discussion focusing on the trans-disciplinary theme of 'Global Sustainability'.

We welcome you very warmly to ACUR at Adelaide, for what I know will be a stimulating and exciting event.

Welcome to Country

The University of Adelaide wishes to acknowledge the Kaurna people, the original custodians of the Adelaide Plains and the land on which the University of Adelaide's campuses at North Terrace, Waite, Thebarton and Roseworthy are built. A formal Welcome to Country will be performed by Elder Uncle Rod O'Brien on the morning of Wednesday 27 September.

Thank you's

Thank you to the following:

- ACUR Steering Committee
- ACUR Abstract Review Committee
- ACUR Organising Committee
- ACUR keynotes
- ACUR volunteers

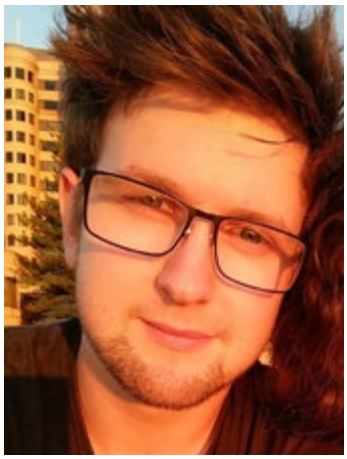
Keynotes

Caitlyn Georgeson

BA LLB Student - The University of Adelaide

Caitlyn Georgeson is a 5th year undergraduate Bachelor of Laws and Bachelor of Arts (Politics and International Studies) student at the University of Adelaide. Caitlyn is a Research Assistant for the Research Unit on Military Law and Ethics (RUMLAE), as well as the Manual on International Law Applicable to Military Uses of Outer Space (MILAMOS) Project, for which she received a 2017 Young Australian Space Leaders Award. Caitlyn has completed a three-month internship with the United Nations Assistance to the Khmer Rouge Trials in Cambodia.

At the conclusion of her internship, Caitlyn produced a research paper on the practical challenges the Tribunal faces in protecting fair trial rights. Caitlyn has also completed a four-month internship with the Survivors of Torture and Trauma Assistance and Rehabilitation Service, examining potential benefits of collaboration between Aboriginal and refugee communities in South Australia. Caitlyn was awarded a 2015/16 University of Adelaide Summer Research Scholarship to examine legal obstacles faced by transgender people in South Australia when attempting to change their legal gender. Caitlyn was also awarded the SBS Student & Rising Star of the Year award at the 2017 Australian LGBTI Awards.



James Keal

PhD Student and 2016 ACUR presenter - The University of Adelaide

James Keal is an honours graduate of physics and holds an undergraduate degree in High Performance Computational Physics from the University of Adelaide. James presented his honours research on dosimetry in medical physics at the Beacon Conference for Undergraduate Research in 2016 and was awarded the prize for best abstract and oral presentation.

He was sponsored to attend and present at the 2016 Australasian Conference for Undergraduate Research. James is currently undertaking his PhD, for which he is working on the application of artificial intelligence and machine learning to cancer treatment by radiotherapy.

Professor Marnie Hughes-Warrington

Deputy Vice-Chancellor (Academic), Australian National University

Professor Hughes-Warrington is the strategic and operational leader across education activities and academic performance at the ANU. Her responsibilities range from elearning and large-scale education innovation to education philanthropy and student fees, accommodation and realising the potential of students and staff alike.

She is an active researcher, with six books and $18 million in grants to her name. She was a key driver with the head of Philanthropy in developing the $106 million Tuckwell program and has a particular interest in providing support for outstanding students and citizens from any background to reach their full potential.

In 2016 she was awarded a Principal Fellowship of the Higher Education Academy, recognising her sustained record of effective strategic leadership in academic practice. She is also the fifth and first woman to be secretary of the Rhodes Scholarships Australia in 114 years.

ACUR program

Wednesday 27 September

Time	Mins						
08:30	30	**Registration opens** , *Ingkarni Wardli Atrium*					
09:00	10	**Welcome to ACUR and The University of Adelaide** Professor Philippa Levy, Pro Vice-Chancellor (Student Learning) *Horace Lamb 1022 Lecture Theatre, Horace Lamb*					
09:10	10	**Welcome to Country** Uncle Rod O'Brien *Horace Lamb 1022 Lecture Theatre, Horace Lamb*					
09:20	30	**Double keynote** **(Re)searching for your future**, Caitlyn Georgeson BA LLB student (The University of Adelaide) **The art of becoming a researcher in science**, James Keal, PhD student and 2016 ACUR presenter (The University of Adelaide) *Horace Lamb 1022 Lecture Theatre, Horace Lamb*					
09:50	10	**Move to Parallel Sessions**					
		Room 1 *B17, Basement, Ingkarni Wardli*	**Room 2** *B18, Basement, Ingkarni Wardli*	**Room 3** *Conference room 715, level 7, Ingkarni Wardli*	**Room 4** *2051, level 2, Barr Smith South*	**Room 5** *2052, level 2, Barr Smith South*	**Room 6** *2060, level 2, Barr Smith South*
10:00	20	**Abnormal genetic changes in blood stem cells of pre-leukemic mice** Timothy An	**Rose-tinted filters can mitigate the visual challenges of using pink cricket balls at sunset** Joshua Adie	**BLOOD, THE INK AND THE GUN: The contemporary work of tattoo artists** Anna Emsley	**Embodied Learning of Scientific Knowledge: An fMRI Study** Mariam Chendeb	**Support portal for improving pass rates for 'The literacy and numeracy test for initial teacher education students'** Nicholas Gibson	**Identifying the risk of injury from a device used to treat depression in adolescents** Wen Liang Loh and Shayara Perera
10:20	20	**The Timecourse of Body Perception Aftereffects** Syed Jafar	**Trialling a prototype non-invasive technique to determine mango ripeness** Tiffany Brown	**Old worlds, new histories: engaging with the past through video games** Hugh Hudson	**Exploring the relationships between brain iron and the nerve insulating substance Myelin** Seak Lin Ly	**Literacy and numeracy test for initial teacher education: can a digital portal improve student results for the literacy section of the test?** Nicholas Lovett	**Orthodontic retainers: how thin is too thin?** David Chubb
10:40	20	**The importance of HSC70 cell surface exposure in Mesenchymal precursor cells** Kirsten Smith	**How at-risk are you at work? Understanding the relationship between risk perceptions, organisational commitment and employee Information Security Awareness** Andrew Reeves	**Social identity in the twenty first century: The relationship between membership type, social identity and individual self-esteem across members of a web-based group, The Perth Pinup Community** Kelly Jackson	**Mechanism of *neuroprotection* by mechano-growth factor, a muscle specific isoform of insulin-like growth factor 1** Courtney Subramaniam	**Graduate teachers' experiences in rural and remote Queensland: A literature review** Monica Erba	**The Acceptability, Utility and Impact of a High-Flow Room Air Pump and Pursed Lip Simulator on the Relief of Shortness of Breath for People with Chronic Obstructive Pulmonary Disease** Kylie McMahon
11:00	20	**Decomposing the origin of Hofmeister Effects** Kasimir Gregory	**Bringing the Suzuki-Miyaura Reaction into the teaching laboratory** Angus Olding	**The literacy ability of Torres Strait Islanders and the Great Separation** Nicholas Sailor	**MEC-17 overexpression leads to synaptic defects and activation of the DLK-1 neuronal remodelling program in C. elegans** Hanadi Hoblos	**Retention rates of beginning teachers in rural and regional Queensland** Tayla Shanks	**Red/Near Infrared Light Therapy – protection of retinal pigment epithelial cells from oxidative damage** Prajay Patel
11:20	20	**Morning Tea and Poster Display** – *Ingkarni Wardli Atrium*					

ACUR program

11:40	20	**Azithromycin, an antibiotic with potential to reduce bone loss associated with chronic gum disease** Alen Rahulan	**Purification of carbon nanotubes for lithium sulfur battery application** Dea Rusly	**Do grapevines have ecological memory of drought stress?** Matthew Howard and Michelle Huckel	**Changes in Brainstem Cytokines in normal ageing and Motor Neuron Disease** Anuradha Tennakoon	**Education in Astronomy: Computer-based resources and undergraduate learning** Kristina Kopychynski	**Speeding in School Zones: Prospective Memory Failures on an Interrupted Driving Task in High ADHD Proclivity Individuals** Lauren Ehrenfeld
12:00	20	**Which self-peptides contribute to transplantation tolerance?** Eric Taeyoung Son	**Speed and size illusion - the effect of orientation and mode of presentation** Padma Raghunathan	**Green energy from bacteria: A synthetic answer to a global issue** India Boyton and Ali Asgher Ali	**Evaluation of regional changes in phosphorylation of tau, a key protein that accumulates in neurodegenerative disease, following single severe versus repeated mild traumatic brain injury** Daniel Gutschmidt	**Evaluation and integration of simulation technologies for teaching and learning physics** Raymart Walker	**Losing control of how we perceive the world: What can attention tell us about addiction?** Jenny Le
12:20	20	**Higher Dimensional Venn Diagram Analogues** Vanessa Thompkins	**Design and build a continuous Hydrothermal Liquefaction system** Samantha Scott, Adrian Hoffman, Nien Yee Too and Stuart Smith	**Climate change is boring: Insight and conceptualisation into climate change marketing strategies** Thanh Du	**Are motor neuron abnormalities correlated with impaired motor function in a zebrafish model of ALS?** Katherine Robinson	**The research-teaching nexus: students' perceptions and experience of research-led education** Amanda Ling	**Quantum Chaos in Lattice Models Using the Wigner Function** Ryan Kidd
12:40	30	**Lunch and Poster Display** – *Ingkarni Wardli Atrium*					
13:10	50	**Panel Session: Global Sustainability** Panel chair: Professor Philippa Levy, Pro Vice-Chancellor (Student Learning) *Horace Lamb 1022 Lecture Theatre, Horace Lamb*					
14:00	10	**Move to Parallel Sessions**					
14:10	20	**Anti-inflammatory effects of Colchicine on Lipoprotein and Cholesterol-crystal induced Macrophage Activation in vitro** Sanuja Fernando	**Police powers to compel access to encrypted devices and computer records** Esther Phipps and Gerald Manning	**White Egalitarianism in 18th Century Jamaica** Calvin Oppy	**The thin white line: Does race influence body size misperception?** Lewis Gould-Fensom	**The closed-end fund discount and its determinants in the Australian Equity Market** Brooke Peel	**Neural regulation of vaginal contraction** Sam Kelsey
14:30	20	**An evaluation of the chest pain pathway** Abdus Salam Raju	**Resolving the human-rights paradox: The pole for Australian Climate Law on Psychological Health** Kimberley Voss	**Lessons from a tragedy: Quantifying environmental drivers of Athrotaxis mortality and survival during an extreme bushfire event** Aimee Bliss	**Inside the Chinese Keyword *sajiao*: The art of feminine persuasion** Jessy Wu	**Illegal Phoenix activity within Australia: An analysis of legal and ethical issues** Julia Grigonis-Gore and Georgia Brazenall	**Australian men's experiences of support following pregnancy loss** Kate Obst
14:50	20	**The impact and prevalence of pancreatic enzyme deficiency in type 2 diabetes** Michael Riceman	**A review of the effectiveness of Indigenous land use agreements** Soraya Pradhan	**Ant abundance increases with grazing exclusion: response of Formicidae (Hymenoptera) to 90 years of non-native herbivore removal in a semi-arid rangeland system** Joel Driver	**Studying my Facebook feed? Australians' attitudes towards researchers' use of social media data** Kate Lyall	**Investigating the role of violent music in activating aggressive cognitions** Merrick Powell	**Male gaze or female shade: the roles of intra- and intersexual selection in body dissatisfaction** Zoe Powell
15:10	20		**Using genome-wide variants to determine the historical migration of chickens through South East Asia to the Islands of the Pacific** Pei Qin (Sabrina) Ng	**Understanding the progression of blindness in koalas caused by the bacteria, *Chlamydia pecorum*** Danielle Madden	**12-Month outcomes of patients discharged on different antiplatelet medications (Ticagrelor versus Clopidogrel) after elective stent insertion** Dione Jones	**Coarse particle recovery in Froth Flotation** Natasha Grobbelaar	**How do Carbon Nanotubes and Graphene grow? Insights from computational chemistry** Gareth Elliott
16:30		**Day 1 of conference concludes**					
17:30		**Walk to St Marks College** Please meet us at the Barr Smith Lawns if you would like to walk to St Marks College for the dinner.					
18:00		**Dinner at St Marks College** – *46 Pennington Terrace, North Adelaide SA 5006*					

Thursday 28 September

Time	Mins						
08:30	30	**Registration opens**, *Ingkarni Wardli Atrium*					
09:00	10	**Introduction** Professor Philippa Levy, Pro Vice-Chancellor (Student Learning) *Horace Lamb 1022 Lecture Theatre, Horace Lamb*					
09:10	10	**Move to Parallel Sessions**					
		Room 1 *B17, Basement, Ingkarni Wardli*	**Room 2** *B18, Basement, Ingkarni Wardli*	**Room 3** *Conference room 715, level 7, Ingkarni Wardli*	**Room 4** *2051, level 2, Barr Smith South*	**Room 5** *2052, level 2, Barr Smith South*	**Room 6** *2060, level 2, Barr Smith South*
09:20	20	**Perioperative Chemotherapy for Gastric Carcinoma: Not so 'MAGIC'?** Raghav Goel	**Is butter a villain? A systematic literature review on the associated health risks of butter in comparison to margarine** Ali Asgher Ali	**The Armed Forces Special Powers Acts and the institutionalisation of rape in India** Ashwina Krishnan	**Crouzon, Syndrome, Facing Reality** Alexander Khominsky	**Public transport passengers' fear of crime, and willingness to walk home from bus stops at night – a predictive spatial analysis conducted in Canberra, ACT** Matthew Flower	**Witnessing the Unpresentable: Accelerationist Aesthetics in Gaspar Noé's *Carne, I Stand Alone and Irreversible*** Luke Beattie
09:40	20	**Overcoming acquired resistance to CX-5461** Lachlan Arthur	**Triage documentation: An examination of the content and patterns of content** Michelle Jory	**'Separate the whore from the pure': Assisted female migration and crime in South Australia, 1856-1859** Tiana Blazevic	**Utilisation of a sugar may dictate disease progression in *Streptococcus pneumoniae*** Vikrant Minhas	**Streamlining public transport intermodal connections to increase ferry ridership: Agent-based simulation study** Roy Zhu	**Tasting Colours: The Existence and Nature of Gustatory-Colour Correspondences** Supreet Saluja
10:00	20	**The relationship between mental health literacy and CAM beliefs in international students** Yunhe Huang	**The new normal: Variability across neuropsychological domains in typically developing children** Ellaina Andersson	**Identifying opportunities to support residents in a women's shelter by improving their oral health status through dental screening and ongoing referrals to support services** Ahmed Hassan, Dhanya Jacob and Shivani Kashyap		**A conceptual framework of Building Information Modelling (BIM) application for rail transit construction** Gillian Angliss	**The Epidemiology of Bullying and Sexual Assault in South Australia** Sebastian Rositano
10:20	20	**Morning Tea and Poster Display** – *Ingkarni Wardli Atrium*					
10:40	20	**Response of opportunistic predatory birds to land-use change on roads and implications for avian prey species** Matthew Fielding	**Looking deeper – using deep-learning to identify internet communications traffic** Clinton Page	**Experience and perception of gender in the music industry in Australia** Hannah Fairlamb	**Oral health education and interventions for adolescent mothers and their children: a collaborative partnership with the Christies Beach Young Mums program** Courtney Brown, Deanna Efstathiadis, Amber Jones and Bianca Stott		**The relationship of resilience and self-compassion with psychological wellbeing** Shobhna Bag
11:00	20	**Shaping urban resilience: An analysis of post-earthquake recovery in Christchurch** Mark Poskitt	**Using community structures to improve recommendation systems** Tim Chard	**Sport, Spectacle and Politics in Queensland Aboriginal Settlements** Catherine Sherwood	**Contemporary teaching: A peer based reflection of the flipped classroom for oral health students** Ruby Edmonds, Jenny Ngu and Joanne Weissgerber		**Body image disturbance and the role of gender in fat and muscle aftereffects** Edwina Keen
11:20	10	**Move to Keynote**					
11:30	40	**Keynote – When do you become a researcher?** *Horace Lamb 1022 Lecture Theatre, Horace Lamb* Professor Marnie Hughes-Warrington, Deputy Vice-Chancellor (Academic), Australian National University				**Judges deliberations** *2052, level 2, Barr Smith South*	
12:10	10	**Second day closing address and prize giving** – *Horace Lamb 1022 Lecture Theatre, Horace Lamb* Professor Philippa Levy, Pro Vice-Chancellor (Student Learning)					
12:20	5	**ACUR 2018 Announcement**					
12:25		**Conference Concludes**					
13:30	90	**Workshop *** *(for academics and supervisors)* **Implementing undergraduate research** – Emeritus Professor Angela Brew, Macquarie University *Conference room 715, level 7, Ingkarni Wardli* * Pre-registration for this workshop is required. Registrations close 11.59pm on Thursday 21 September. For more information, and to register: https://acurworkshop.eventbrite.com.au					

Campus map

1 Entrance to Ingkarni Wardli

2 Entrance to Barr Smith South (via Horace Lamb)

Summary of Abstracts

Summary of Abstracts

Summary of Abstracts

Summary of Poster Abstracts

Presentation Abstracts

Rose-tinted filters can mitigate the visual challenges of using pink cricket balls at sunset

Joshua Adie
The University of Queensland

Cricket is one of the world's most popular sports, followed by hundreds of millions of people. It can be dangerous, played with a hard ball flying at great velocities, and accidents have occasionally been fatal. Traditionally, cricket has been played during the day, using a dark red ball. Since the late 1970s, a shorter form of one-day cricket has been played both during the day and at night under floodlights.

To overcome visibility issues, one-day cricket uses a white ball, and players wear coloured clothing. There is now a desire to play a traditional form of cricket during the day and at night, using a 'pink' ball while players wear white clothing. Concerns regarding visibility, and player and umpire safety, have been raised in this context. Here, we report that these concerns have a sound basis in psychophysics.

We performed two experiments in which participants engaged in an interceptive timing task where we mimicked physical luminance contrasts prevailing at different times of day (an hour before sunset, and at sunset), based on luminance readings collected during a Day-Night Sheffield Shield match at The Gabba in Brisbane.

In Experiment 2, participants completed the task both with and without a rose-tinted filter. In Experiment 1 we found that participants performed significantly worse in the simulated-sunset condition. In Experiment 2 we replicated the findings of Experiment 1, and also found that this effect was mitigated when a rose-tinted filter was used. We assert that players and umpires should wear rose-tinted glasses when using a pink cricket ball to overcome the safety issues raised in this context.

Is butter a villain? A systematic literature review on the associated health risks of butter in comparison to margarine

Ali Asgher Ali
Macquarie University

Butter was once part of the staple diet up until the early to mid-20th Century, at a time when health research was a pioneering field of study. The developing sugar industry funded such studies against the declining fats industry, establishing associations between fats and diseases with little or biased evidence. This resulted in governments, the US Department of Agriculture (USDA) among others, formulating guidelines that villainised (saturated) fats.

Foods such as butter were deemed hazardous and replaced by margarine, while cases of cardiovascular and other diseases continued to increase, becoming a priority of the National Health and Medical Research Council of Australia and the call for the links to be re-evaluated. Thus, this study aims to review literature on butter to determine any direct correlation to disease, and to compare with margarine any significant differences in risk or detrimental effect.

This study will not limiting itself to just one disease, but in fact a range of disease. To fulfil these aims, a preliminary search was conducted on databases to formulate inclusion and exclusion protocols to select journal articles based on relevance.

The articles were selected separately by different authors to reduce selection bias. The papers will be assessed using the PEDro scale and a Cochrane Analysis of Bias and statistical results will be collated. The research is ongoing, and preliminary results show little correlation between butter consumption and diseases such as asthma cardiovascular disease. Risks of hearing loss and heart attacks, among others, also show little to no correlation with butter consumption, and certain papers do allude to sugar as being a significant risk factor.

Abnormal genetic changes in blood stem cells of pre-leukemic mice

Timothy An
The University of Queensland

Background

Blood malignancies, such as leukaemia, are often a result of accumulated mutations to the hematopoietic stem cells in the bone marrow. The stem cells have close interactions with the dynamic bone marrow environment, which is disrupted and dysregulated in the leukemic diseased state. Changes to the bone marrow niche are in part driven by the altered gene and protein expression in the pre-leukemic stem cells to create and maintain survival advantage over healthy stem cells.

Aim

We aim to identify the difference in individual gene expression between normal and myelodysplastic stem cells, thereby identifying potential genes that contribute to pre-leukaemia and leukaemia pathogenesis.

Method

Previous microarray analysis was done on haematopoietic progenitor cells from NHD13 myelodysplastic (pre-leukemic) mice to generate candidate genes for testing. Select candidates were subjected to mRNA expression analysis by real-time PCR in different populations of hematopoietic stem cells in pre-leukemic and wild-type mice.

Results

Clec4e, Tjp3 and Pcdh7 genes had notable increased expression in pre-leukemic stem cells. Past literatures demonstrated Clec4e effects in macrophage proliferation, highlighting its potential as hematopoietic regulator. TJP3 is a junction protein and is hypothesised to be upregulated in countering the degradation of healthy bone marrow niche in leukaemia. Although Pcdh7 has no known functions, its expression mimics an on-off switch nature in protein expression in leukaemia.

Conclusion

Expression changes in Clec4e, Tjp3, Pcdh7 and Pcdh17 are good candidates for further experimentation as they are overexpressed in the disease state. Gene deletion mice model have been proposed in using shRNA in silencing the candidate genes to observe the consequences with respect to leukaemia progression.

Clinical implication

The NHD13 mice mimics myelodysplastic syndrome (MDS) in vivo. MDS can progress into acute myeloid leukaemia (AML). Therefore, it is imperative to explore MDS and its pathogenesis, in the interest of avoiding full-blown leukaemia and its associated burden and healthcare costs.

Presentation Abstracts

The new normal: Variability across neuropsychological domains in typically developing children

Ellaina Andersson,
Macquarie University

Inconsistent performance across neuropsychological tests is associated with cognitive dysfunction in a number of clinical populations. However, within-person cognitive variability in healthy individuals is poorly understood, dismissed as sources of random error. However, the presence of performance fluctuations that are not due to measurement unreliability; and often share a negative association with cognitive performance has lead to a renewed interested in intra-individual difference (IID) as both outcome and predictor of cognitive functioning. In children, this is even more relevant, as the expectation of linear development is used by clinicians to predict a child's long-term outcomes. As IIDs are observable within an individual across a battery of neuropsychological measures; from a clinical perspective, the multivariate information obtainable in across-test variability has been suggested to be a more sensitive indicator of cognitive status than measures from any single domain.

Therefore, the aim of this thesis is to investigate the extent of IIDs observable across the neuropsychological abilities of typically developing (TD) children; using a battery of nine neuropsychological assessments in a sample (N=90) of TD children aged between two and eight. Preliminary findings suggest that there is variance in a participant's scatter range (highest – lowest scaled-score) across cognitive domains (motor, language, social, Visuo-spacial, adaptive, executive function, (pre) academic), as defined by a standard deviation of two or more. The question of whether IIDs are a sign of pathology or only a reflection of normal variation remains undetermined and sorely under researched. Recent adult research has begun to suggest that elevated IID's are an indicator of cognitive decline, yet within a paediatric population little is known about what constitutes the normal range of intra-individual domain variation. A better understanding of IIDs in nonclinical populations will inform diagnosis, and highlight the need for caution when making clinical inferences based solely on psychometric variability.

A conceptual framework of Building Information Modelling (BIM) application for rail transit construction

Gillian Angliss
The University of Queensland

Recent advances in Building Information Modelling (BIM) have propagated the utilisation of multidimensional (nD) computer-aided design and information modelling, and data management techniques in the construction industry. With the key objectives of reducing capital cost and the carbon burden from the built environment, and working more efficiently and effectively at all stages of the project life-cycle, BIM adoption and implementation such as UK Government's BIM Mandate initiated in April 2016 are expanding worldwide. Additionally, construction industries in countries where BIM is not mandated by any government agency, such as Australia, are increasing their use of BIM.

However, the extent of practical effectiveness of BIM utilisation is yet difficult to assess across all construction industry sectors. Each construction project and industry sector is unique and runs with different stakeholders and relevant sets of information. It is thus timely to review the information requirements of each construction industry to better facilitate nD information stored in the BIM environment.

This paper thus aims to propose a conceptual framework of BIM application for a construction industry focusing on rail transit construction where the demand of construction for both freight and passenger transport is steadily expanding worldwide. This paper extends the research into the use of BIM-nD modelling by proposing a systematic approach to establishing customisable metrics for a rail transit construction project. The proposed framework is to improve the ability to monitor crucial project management information such as quality and schedule, as well as to allow all stakeholders to acquire and generate necessary information from the same BIM model. This paper also presents a case study in which it shows how the proposed framework can assist project information control with BIM adoption and implementation in railroad and rail transit construction industry.

Overcoming acquired resistance to CX-5461

Lachlan Arthur
Australian National University

Proteins are essential to cellular growth, repair and division. In cancerous cells which proliferate rapidly, the roles of certain proteins are critical. Proteins are synthesised by the ribosome, a complex made of proteins and RNA. In eukaryotic cells, the enzyme RNA Polymerase I (Pol I) transcribes the 47S pre-ribosomal RNA which is required for ribosome biogenesis. The upregulation of ribosomal RNA (rRNA) transcription is an established indicator of malignant cancer cells, and recently the inhibition of rRNA transcription has been studied as a potential cancer treatment. The drug CX-5461 is a selective inhibitor of Pol I transcription, and acts by suppressing transcription in the initiation stage. Recent studies have shown that CX-5461 has anti-tumour activity in mouse cancer models, and the drug has now progressed to clinical trials.

However, the emergence of tumours resistant to CX-5461 in mouse models has also been observed, thus effective CX-5461 treatment may require combination with other drugs. RNA sequencing (RNA-seq) of CX-5461 resistant tumour cells extracted from the lymph node of a lymphoma mouse model identified the genes SLC12A2, MLL1 and CIITA as potential targets involved in resistance to CX-5461. This study aimed to verify that the in vivo expression of SLC12A2, MLL1 or CIITA (or the MHCII genes under the control of CIITA) could be re-capitulated in vitro. Real-time PCR and western blotting were used to identify mRNA and protein abundance, respectively. If verified, dose-response proliferation assays would be used to determine if SL12A2, MLL1 or CIITA can be targeted therapeutically to resensitise cells to CX-5461. Preliminary results indicate the SL12A2-inhibitor furosemide may be a potential candidate for use in combination with CX-5461 to overcome acquired resistance.

Presentation Abstracts

The relationship of resilience and self-compassion with psychological wellbeing

Shobhna Bag
Macquarie University

Background

Resilience is a construct in which positive adaptation occurs in response to adversity, and benefits one's wellbeing. Conversely, self-compassion involves perceiving oneself in a kind and understanding manner during adversity, and is associated with many of the same benefits for wellbeing as resilience. Given the parallels of the definitions and the similar effects of resilience and self-compassion on wellbeing, there is a need to delineate the relationship between these two variables more clearly. This clarification will assist future research within positive psychology by determining the importance of these two constructs on wellbeing. Further, this research will contribute to the improvement of wellbeing interventions by identifying key constructs involved in promoting wellbeing in adversity.

Research Question

This study aims to simultaneously investigate the relationship of resilience and self-compassion with psychological wellbeing. Both resilience and self-compassion are expected to be associated with psychological wellbeing.

Methodology

In this ongoing study, participants (N=166) are recruited from voluntary community members and first-year Psychology students from Macquarie University. All participants completed a series of questionnaires assessing resilience, self-compassion, demographics, and wellbeing measures including affectivity, optimism, satisfaction with life, depression, anxiety, stress, and a covariate measure of social support.

Preliminary Results

Pearson's correlations suggest resilience and self-compassion are both positively correlated with optimism, life satisfaction, and positive affect, and negatively correlated with depression, anxiety, stress, and negative affect. Resilience presented stronger correlations with positive affect compared to self-compassion. Conversely, self-compassion had strongly correlations with anxiety, stress, optimism, and negative affect compared to resilience.

Conclusions

These findings imply resilience and self-compassion are important in understanding wellbeing when faced with life struggles. However, given that these constructs are associated with wellbeing to differing degrees, clinicians and future research should be mindful that resilience may benefit some wellbeing domains more so than self-compassion, while self-compassion may benefit others.

Witnessing the unpresentable: Accelerationist aesthetics in Gaspar Noé's *Carne, I Stand Alone and Irreversible*

Luke Beattie
University of Notre Dame Australia

This paper suggests that notorious French filmmaker Gaspar Noé's first three films, Carne (1991), I Stand Alone (1998) and Irreversible (2002), render the viewer politically silent through shock and awe aesthetic tactics. His films, while prompting a potential resource of negativity in the viewer, simultaneously negate this critical (and therefore political) dimension through their nihilistic narrative content. From this position, the paper locates Noé's early cinema in dialogue with one of the foundational texts of accelerationism avant la lettre, Jean-Francois Lyotard's Libidinal Economy (1974).

Lyotard portrays capitalism as exploiting, inciting and directing humanity's primary processes of uncontained desire and libidinal energy for its own economic ends, only dampening this libidinal energy when it is deemed economically unproductive. Through their extreme violence, Noé's films similarly generate surplus affects and energies – horror, repulsion, boredom, disgust – that reject recuperation into a mainstream cinema aesthetic. However, by presenting apparently unassimilable affects but in the same stroke fully exploiting these for economic profit – his films have been, after all, remarkably successful – Noé offers the viewer a map of the kind of libidinal economy diagnosed by Lyotard. In accelerationist fashion, Noé seems to suggest that co-opting the machine is out of the question, since everything – even perversity – is already a functional part of it. All that is left to do is to run the machine into overdrive – and malfunction. This ethic of overdrive, arguably, transforms Noé's films from "post-political" to sites of political resistance.

Presentation Abstracts

'Separate the whore from the pure': Assisted female migration and Crime in South Australia, 1854-1859

Tiana Blazevic
The University of Adelaide

In 1856, the Legislative Government of South Australia claimed that too many assisted female migrants were entering the colony, and would increase crime and 'immorality' within the colony. Historians of Australia's colonial period have often made the unsubstantiated claim that female assisted migrants from poor backgrounds were more susceptible to crime. My research makes extensive use of prison records, Supreme Court records, parliamentary volumes and newspaper articles, and seeks to establish how many women who immigrated into SA during the period 1854-1857 were involved in crime.

From 1854 to 1857, the colony of South Australia had received a total of 11,320 single assisted female migrants arrive into the colony. This number exceeded that requested by the colony by 5,563. The average immigration rate per year for single women was 1,200. Many of the women were ill-equipped for the colony's demands and caused a drain on colony funds. Additionally, the colony had suffered a bad harvest in 1854 and wages were incredibly low, with destitution on the rise.

The Adelaide Gaol Register records showed that crime had increased between 1854-1859. However, only 58 assisted female migrants from the period of 1854-1857 had committed a crime between 1856-1859. The total female prisoner population of Adelaide Gaol was 401. The female population of the colony from 1855-1859 was 122,735, of which there were only 15, 557 assisted women migrants. Therefore, assisted women migrants from 1854-1857 who committed an offense represented 0.05% of the entire female population. This would not have been enough to cause an increase in crime or make a sufficient impact on the 'morality' of the colony. I conclude that the increase in crime can be more accurately attributed to causes other than immigration; namely, low wages, bad harvest, saturation of the employment market and poor government infrastructure.

Lessons from a tragedy: Quantifying environmental drivers of Athrotaxis mortality and survival during an extreme bushfire event

Aimee Bliss
University of Tasmania

Fire, an integral part of the earth's system, appears in the geological record soon after the appearance of terrestrial plants 420 million years ago. However, fire activity on Earth varies in size, intensity, severity and seasonality. The repeated pattern of fire at a location in space, encompassing these fire characteristics, is known as a fire regime. Flora and fire regimes are inextricably linked, whereby flora exhibits a range of fire adaptive strategies best suited to local fire regimes. Thus, changes in fire regimes can lead to changes in flora. Globally, anthropogenic climate change is leading to extreme fire events (fires of unprecedented intensity and size) as well as fire occurrence within historically fire free regions. Such events are causing social and economic damage and threatening species persistence, especially fire-sensitive species. During summer 2016 a dry-lightning storm started multiple fires in Tasmania's World Heritage area, which contains many historically fire-free regions and fire-sensitive species. One species that was significantly impacted was Athrotaxis cupressoides (Pencil Pine). This 'paleoendemic' species is biologically important, providing a living link to Gondwanan biota, and is culturally significant, as it is an outstanding universal value of the Tasmanian World Heritage Area. It is imperative to learn from the summer 2016 events, precisely because fires in this region are predicted to increase, threatening the long term persistence of this species and ecosystem. Hence, I will conduct a landscape survey to investigate the impact of this fire on A. cupressoides. Specifically I aim to quantify relationships between biological damage, mortality and survival with environmental variables including landscape type, ground cover, shrub presence and previous fire damage. Importantly, improved understanding of A. cupressoides resilience and vulnerability to fire in the landscape may help to manage and protect A. cupressoides populations from future fires.

Green energy from bacteria: A synthetic answer to a global issue

India Boyton and Ali Asgher Ali
Macquarie University

The hydrogen generation industry produces over 50 million tons of hydrogen per year, sourcing over 95% of its product from fossil fuels. Our overall goal was to engineer photosynthesis into Escherichia coli to produce hydrogen from sunlight. Our first goal was to engineer the chlorophyll biosynthesis pathway into E. coli. Production of chlorophyll in non-photosynthetic organisms has not yet been successful. Secondly, we synthetically constructed 17 genes of Photosystem II into E. coli to generate oxygen and electrons via the oxidation of water molecules. Lastly, the electrons generated from Photosystem II were converted to hydrogen gas using hydrogenase. This will enable the production of hydrogen gas in a clean and sustainable way which could be used as a future energy source. Our modelling and human practice approaches will allow an assessment on the viability of the production of hydrogen on an industrial scale.

Presentation Abstracts

Oral health education and interventions for adolescent mothers and their children: a collaborative partnership with the Christies Beach Young Mums program

Courtney Brown, Deanna Efstathiadis, Amber Jones, Bianca Stott
The University of Adelaide

Objective

There are a number of studies that support the importance of oral health intervention among mothers. However there is little documentation investigating or supporting the efficacy of oral health intervention for adolescent mothers. Furthermore, there are insufficient studies that document the prevalence of dental concerns among adolescent mothers in South Australia. The partnership between the students of the University of Adelaide and the Christies Beach Young Mum's program in Adelaide serves an important purpose; through motivational interviewing and anticipatory guidance, information will be provided and a referral system will be established to address gaps in knowledge. Access and management of services the mother's and their children are eligible for will also be addressed for this otherwise isolated group.

Methods

Anticipatory guidance and motivational interviewing techniques will be incorporated into various learning activities for both the participants of the Young Mum's program and their children aged 0-4. Question and answer sessions and feedback from the students will be addressed. Resource material developed based on reviews of the current literature, including oral health information regarding diet and oral hygiene will be included. Oral hygiene packs, accompanied with appropriate instruction from oral Health students will be provided.

Conclusion

The intervention anticipates a sustainable project in the future, that will continue to address the needs of the participants of Young Mum's program and their children, through collaborative partnership with students from the Bachelor of Oral Health second year program.

Trialling a prototype non-invasive technique to determine mango ripeness

Tiffany Brown
Central Queensland University

The ripeness of a fruit is significant in determining subsequent characteristics such as taste, texture, smell and colour which are key elements searched for by a consumer. There are various methods of determining a fruits' maturity that fall under two main categories, invasive and non-invasive, each with their advantages and disadvantages for the agricultural industry. Invasive methods are currently the most common practices in agriculture and destroy many fruit in the process that are no longer viable to sell and result as wastage. Experimentation completed at Central Queensland Innovation and Research Precinct. (CQIRP) investigated a non-invasive method of ascertaining the maturity of a fruit using an instrument specially developed by CQUIRP that records displacement under load with use of an inbuilt Linear Variable Differential Transformer (LVDT). The candidate technology was tested against a penetrometer, which was the selected invasive instrument for comparison purposes, and the experiment was performed with Mangoes. The instrument created by CQIRP was found to be unreliable and varying in accuracy. The experiment included a weight test to determine the pressure applied from the non-invasive instrument upon structure. The tester was a spherical object that had an unvarying displacement. However, upon each attempt, the pressure applied and recorded was differing – generally significantly. The results of the experiment are therefore scientifically unreliable as the specially developed CQUIRP fruit maturity determining instrument is itself considered unreliable. The candidate technology for a non-invasive method of testing fruit ripeness, based upon the results of this experiment, was not a viable candidate.

Using community structures to improve recommendation systems

Tim Chard
Macquarie University

Recommendation systems are machine learning tools for recommending new content to a user, such as which movie they might enjoy watching next. Collaborative filtering is one approach which tries to learn from the preferences of other users. For example, if we know user X likes movies {A, B, C} and user Y likes movies {A, B} then we might suggest that Y might like C, because the users have similar taste. These systems have widespread applications from advertising to social media; Netflix uses these systems extensively to recommend new content to its users.

Many types of recommendation systems augment their models with other information about their users and items. For instance, it has been shown that representing movies and users by a graph and using properties of that graph can increase the performance of recommendations.

In this work, a new graph structure is proposed which facilitates clustering of ratings into communities of users who like or dislike similar movies, to address two issues with existing models. First, it reduces the frequency of low information ratings. Second, we can create a model for each cluster, which allows more efficient use of model parameters because not all possible aspects are relevant for every cluster; consider a cluster of users who like horror movies, who will consider very different aspects of movies from a cluster of user who enjoy children's movies.

The key method in this work draws on community detection algorithms to identify clusters of similar users, and ensemble learning techniques to produce a classifier to predict unknown ratings, which are ultimately used to make recommendations.

We evaluate the methodology on a very large dataset produced by Yelp as part of the Yelp Dataset Challenge, and find that the use of community detection algorithms over this kind of graph structure is promising.

Presentation Abstracts

Embodied learning of scientific knowledge: An fMRI study

Mariam Chendeb
Macquarie University

Studies have highlighted the importance of motor-sensory mechanisms in memory formation and language processing. Brain imaging experiments have demonstrated that language acquisition is coded for in the motor and somatosensory regions of the brain. It was also found that foreign language acquisition is improved with the aid of a motor or sensory task (enrichment). The use of enrichments resulted in better memorisation and faster word retrieval. The multisensory learning theory is a hypothesis that accredits the advantage of enrichments to the recruitment of specialised visual and sensorimotor areas of the brain. However, there is limited understanding of the role of motor-sensory mechanisms in the processing of scientific concepts.

The study aims to investigate the role of motor and sensory experiences in the storage and retrieval of scientific knowledge. The study also examines how coding of information obtained using different learning techniques affects memory retention and academic performance. During the study participants were taught scientific terminology and concepts using an enrichment (auditory, drawing or gesturing). Once the training was completed participants underwent a true/false task in an fMRI machine. Our study found that the motor tasks improved memory retention and retrieval the most. The results also indicate that words taught through motor tasks activated the voluntary motor function area, and words taught through auditory enrichment activated the auditory area in the temporal lobe. In conclusion, our results indicate that sensory and motor regions are activated during language processing and acquisition.

Orthodontic retainers: how thin is too thin?

David Chubb
The University of Adelaide

Retainers prevent teeth from shifting back to their crooked positions at the end of orthodontic treatment. Worldwide, thermoformed retainers (TRs) are the most popularly prescribed type of removable retainer, with orthodontists recommending they be worn indefinitely. To date, no study has investigated the final thickness of TRs, which likely influences where fractures and wear occur, thus necessitating their intermittent replacement.

The aim of this study was to determine the effect of the type of material, its original thickness, and the thermoforming process used, on the final thickness of different TRs.

The study was a controlled, prospective laboratory-based study comprising 12 experimental groups. Sample size determination, assuming a significance level of 5% ($\alpha = 0.05$) and 80% power, gave a sample size of four per group. Dental casts of upper and lower sets of teeth were produced from simulation phantom heads. TRs were made on the casts from either 1mm polypropylene (P), or 1.0/1.5mm polyethylenterepthalat-glycol copolyester (PET-G) blanks, using either vacuum or pressure-thermoforming.

Each TR was measured with a digital thickness gauge at nine different locations (four on the right central incisor, five on the right first molar) by an examiner who was blinded to the TR's original thickness, material and manufacture method. The results showed thinning of TRs between 21.0-68.25% at different locations, dependent on the material, original thickness and manufacturing method used. All TRs were thinnest in the mid-labial incisor region, as well as mid-buccal molar in the upper and mid-lingual gingival margin in the lower. TRs are thinner when vacuum-formed ($P<0.05$), with PET-G TRs being thinnest. There was no statistically significant difference in the final thickness of TRs made from P or PET-G when both were either vacuum-formed or pressure-formed. These results are expected to impact the discussions between patients and orthodontists when choosing TRs after orthodontic treatment.

Presentation Abstracts

Ant abundance increases with grazing exclusion: response of Formicidae (Hymenoptera) to 90 years of non-native herbivore removal in a semi-arid rangeland system

Joel Driver
The University of Adelaide

Koonamore Vegetation Reserve is a 90-year-old experimental herbivore exclosure (390ha) located in a semi-arid, chenopod-dominated rangeland. The removal of non-native mammalian grazers has had a significant effect upon the vegetation community within the reserve, however the effect on native fauna is unknown. We predicted that the restorative effect of grazing exclusion has also extended to one of the dominant groups of invertebrates in this system; ants (Hymenoptera: Formicidae).

We investigated: (1) how significant is the influence of grazing upon ant abundance; and (2) how much influence do other environmental covariates contribute to the grazing impacts?

We used a paired pitfall sampling approach across 10 ha of the exclosure, with ten 'stations' located at randomly selected distances along the boundary fence. Each station featured a cluster of five pitfalls at a randomly selected distance (20–100m) inside (n = 50) and outside (n = 50) the exclosure. Pitfalls remained in place for 3 days/nights in December 2016. Specimens were collected, counted and identified to order (and family for Formicidae). The following environmental covariates were also surveyed at each pitfall site using 1x1m quadrats: ground cover, ground cover density, soil texture, ant nest presence, ant trail length and trail traffic.

A total of 18,130 invertebrates were collected and identified; 98% (17,801) of which were ants. Ant abundance was 3.02 times higher within the grazing exclosure ($p = 0.00236$). This suggests that grazing has a significant impact upon ant abundance in semi-arid rangeland systems, however, further analysis of the relative influence of environmental and ant-associated covariates is being explored and will be presented. These preliminary findings may be significant as precursors to long-term studies into the unforeseen effects of grazing. We recommend that future study investigates the impact of grazing upon overall system productivity and how ants may be used as bioindicators to predict this.

Climate change is boring: Insight and conceptualisation into climate change marketing strategies

Thanh Du
Monash University

Public engagement with climate change has been the core strategy for policy makers and environmental organisations alike. Despite the general understanding of the economic and social implications of climate change among the public, therein still persists a disconnection between awareness and action. As a result, the lack of strong support has limited the ability for climate change initiatives and policies to have far reaching and significant impacts. This paper argues the way climate change is marketed by these initiatives is 'boring' and, as a result, causing people to disengage with the issue. The paper analyses current climate change marketing strategies and utilises marketing theory and research in its discussions.

In addition, several case studies are examined to illustrate effective marketing strategies and how it can be used to promote climate change in an engaging way. Results from this research indicate difficulties with marketing climate change arises from the broad framing of the issue, fear tactics used and the resulting cognitive dissonance and inactions it causes. Further research into this will aid policy makers to modify their marketing strategies on climate change in order to potentially increase effective public engagement and by extension support.

Presentation Abstracts

Contemporary teaching: A peer based reflection of the flipped classroom for oral health students

Ruby Edmonds, Jenny Ngu and Joanne Weissgerber
The University of Adelaide

Flipped Classroom is emerging as a contemporary student centred pedagogy that helps to foster life long learning skills as well as assist students with the understanding of difficult concepts through the management of cognitive load. Prior to class, pre-class activities introduce new information through learning modules and interactive content. Key concepts are then revisited at face-to-face sessions, encouraging students to engage in collaborative activities to clarify and conceptualise new knowledge. Despite the Flipped Classroom's popularity, it is becoming increasingly obvious that the biggest challenge for teachers is to design pre-class activities that engage all students in completing the pre-class activities, which is core to the success of this style of learning.

This popular method of learning and teaching has been implemented in the Bachelor of Oral Health program at the University of Adelaide. However, as there is limited research available for the effectiveness of Flipped Classrooms in Oral Health education, final year Oral Health students conducted a peer-based reflection of this contemporary method of teaching. Primarily, as educational literature suggests, difficult concepts are best delivered in a Flipped Classroom approach through segmenting content into cognitively manageable areas. This peer lead capstone project targeted the periodontal pathogenesis topic in the second year Oral Health programme, as it was an area that students have commonly found very difficult to master. This paper will demonstrate how peer-instructional pre-class interactive videos engaged students in completing pre-class activities that prepared them for active learning in the linked classroom to increase their understanding of the topic. Pre-production learning preference surveys were implemented to guide and inform the design of the peer lead pre-class videos. Emerging data from post class surveys indicates that these 'shorter bursts' of information and visual peer based explanations, improved the students' learning and engaged students in the completion of pre-class activities.

How do Carbon Nanotubes and Graphene Grow? Insights from Computational Chemistry

Gareth Elliott
The University of Newcastle

As part of the larger, fascinating area of nanoscience, quantum computational chemistry is a discipline where physics and chemistry meet head on. The work presented here involves quantum chemical simulations of 1D and 2D carbon nanomaterials, such as graphene and carbon nanotubes. These simulations were run to characterise how these materials nucleate and "grow" during chemical vapour deposition (CVD), a modern technique for nanomaterial fabrication. Graphene and carbon nanotube growth begins with the precipitation/aggregation of carbon atoms on a transition metal surface to form extended carbon chains, which quickly combine and oligomerise to form "islands" of sp2-hybridized carbon. Larger nanostructures then form via the coalescence of these structures on the catalyst surface, which are stabilised through strong carbon-catalyst σ-bonding. Traditionally, pure transition metals such as iron, nickel and copper have been used for this process.

Recently however, "bimetallic" alloys of transition metals have shown promising performance in producing carbon nanostructures. Here we present simulations of carbon nanotube growth on bimetallic alloy catalysts, and demonstrate how the choice of catalyst influences the chemical mechanism of nucleation. It was found that alloying the metals produced a catalyst that could not be described as a simple extrapolation of the properties of the pure metals, and that the order of different metal layers also had a significant impact on the reactivity of the surface and the density of states of the catalyst. By performing a thermochemical analysis of the adsorption of different carbon fragments, we have characterised the mechanism by which graphene and or carbon nanotubes might form on these catalytic surfaces.

Presentation Abstracts

BLOOD, THE INK AND THE GUN: The contemporary work of tattoo artists

Anna Emsley
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Since tattooing emerged in Western societies as a stigmatised, blue-collar subculture, its growing acceptance as both a consumable cultural artefact and an increasingly legitimised artistic practice invites critical analysis. While much of the existing literature has concentrated on the now mainstream tattoo industry within a Euro-American context, academic attention on tattooing within an Australian context fails to recognise tattooing as a contemporary cultural practice subject to the rhythms of a broader contextual sphere, and devalues its roots as a primal aspect of body modification. Consequently, analysis of the tattoo industry is largely peripheralised, as are its workers and the subjective complexities underpinning their engagement with the practice. In spite of this analytic void, this study aims to de-naturalise the configuration of the tattoo industry whilst exploring the tensions between Euro-American literature and the current state of tattooing in Australia.

Given the interpretivist framework necessary for such a task (and its emphasis on context, the multi-vocality of informants and the social construction of their lived experience), this research will entail a broader examination of the mercurial character that tattooing adopts in a contemporary era. Informed by a three-month period of ethnographic data from tattoo parlours in Sydney, this study adds nuance to a broader body of work by situating it within an under-examined context, both geographically and temporally. Yet more importantly, its interpretivist basis reveals the multi-dimensionality of a practice anchored by commercialism and increasingly transformed by artistry, yet ultimately affording a complementarity between the two, one seldom possible in other creative industries.

Speeding in school zones: Prospective memory failures on an interrupted driving task in high ADHD proclivity individuals

Lauren Ehrenfeld
Macquarie University

The present study examined whether individuals with higher ADHD symptomology have greater prospective memory lapses, and greater subsequent driving errors on an interrupted simulation driving task. Interruptions to driving can result in prospective memory failures, whereby drivers forget to resume at 40km/h in a school zone after stopping at a signalized traffic intersection (Gregory, Irwin, Faulks, & Chekaluk, 2014). This research examined whether there are individual differences in propensity to making such errors. One group found to have greater impairment in their prospective memory compared to controls is individuals with Attention Deficit Hyperactivity Disorder (ADHD) (Altgassen, Kretschmer, & Kliegel, 2012). Inattention and distractibility, both of which are higher in ADHD groups compared to controls, are cognitive factors directly related to risky driving, accounting for one in four motor vehicle collision (Treat et al., 1979). In this study, participants completed a practice drive followed by a test drive on the Forum8 high-fidelity driving simulator.

In the test drive, participants passed through two school zones containing signalized traffic intersections. Participants in the red light condition were forced to stop at the second intersection for 30 seconds before continuing. Participants in the green light condition were not required to stop.

Top recorded speed was measured between the traffic intersection and end of the school zone. Participants completed a demographics and driving history questionnaire as well as an index of ADHD proclivity based on the WMH-CIDI Adult Self-Report Scale (ASRS) (Kessler et al., 2005). Preliminary conclusions demonstrate that the main effect for interruption was significant, i.e. interrupted individuals forced to stop at the red signalized traffic intersection recorded higher speeds when resuming to drive compared to controls. This indicates a prospective memory failure supporting the findings of Gregory et al. (2014). Moderating effects of ADHD proclivity are not yet determined from preliminary results.

Graduate teachers' experiences in rural and remote Queensland: A literature review

Monica Erba
Central Queensland University

It is common for graduate teachers to be appointed to rural and remote locations within Queensland, however high staff turnover in rural and remote locations is a concern. With a more comprehensive understanding of this issue and relevant professional support, pre-service teachers may remain in a rural or remote school and community for an extended period. This research explores the current scholarship relating to graduate teachers' preparation, support, recruitment and retention in rural and remote school contexts. A key question addressed was 'how can the issues of this context be better understood in order to prepare pre-service teachers for the profession, and to attract and retain graduate teachers in rural communities?'

This paper focuses on the Queensland teaching context, while also reporting on a national and international studies about teacher preparation and transition to teaching. Research about pre-service teacher training approaches relating to rural practicums were reviewed with results indicating factors that contributed to retention and attrition. They also highlighted the limitations of current teacher education in terms of a specific focus on preparation for teaching in rural and remote communities. Conclusions drawn from this body of research show that universities must better prepare pre-service teachers for rural service if they are to achieve a smooth transition to teaching and to thrive in the new school community.

Presentation Abstracts

Experience and perception of gender in the music industry in Australia

Hannah Fairlamb
The University of Adelaide

This paper reports the results of a recent survey (n=207) conducted as part of the author's current honours thesis in which respondents were asked about their experience and perception of gender in the Australian music industry. This data will contribute to the limited literature on gender and the music industry in Australia by providing analysis of quantitative and qualitative self-reported data from a representative cohort.

The project took a feminist approach, that is one that views gender as "a distinct organizing principle of social relations" (Ridgeway & Corell 2004). In particular, Connell's work on masculinities is drawn on (1995, 2015, 2016) to discuss masculinities in Western culture and the male-dominated nature of the music industry as a workplace; and academic literature on the gender binary (Lloyd 1983, 1984; Prokhovnik 1999) to explore the ways in which power is produced, reproduced and exerted to maintain the masculine culture of this industry.

Research on gender and the music industry in Australia is sparse. Of notable exception is Mayhew's (1999) study of patriarchal constructions of authenticity in relation to female popular music performers. More recently Strong (2011) has written about the neglecting of women in historical accounts of music, and similarly of the lack of women in Australian rock music cultural memory despite their substantial contributions (Strong 2014).

Initial findings from my survey show correlations between the Australian music industry and other male dominated industries, evidenced by literature in the field (Leonard 2007, Mayhew 2001, Stepulevage 2001). My data extends the literature on the Australian music industry in new and important ways, including findings that women have to work harder to be taken seriously, experience negative assumptions from men about their level of ability/proficiency, and report higher levels of sexual harassment and sexual violence than men.

Anti-inflammatory effects of Colchicine on Lipoprotein and Cholesterol-crystal induced Macrophage Activation in vitro

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Background

Cardiovascular diseases such as myocardial infarction and stroke are responsible for nearly 30% of global mortalities. The main cause of this is atherosclerosis, which is an inflammatory disease of the blood vessels. It is characterised by increased accumulation of lipids and inflammatory cells in the inner lining of arteries. Macrophages are a major player in these inflammatory processes that underpin atherosclerosis. Colchicine is a natural, inexpensive drug with broad anti-inflammatory activity and suspected benefits in coronary artery disease. Although colchicine's anti-atherosclerotic potential has been speculated, direct evidence for this is lacking. It is also unclear how colchicine influences inflammatory responses to atherogenic stimuli. Here we studied the in vitro effects of colchicine on macrophage biology with novel focus on macrophage responses to oxidised low-density lipoproteins (oxLDL) and cholesterol crystals (CC).

Methods and Results

Based on initial dose titration studies and published literature, we used 10nM colchicine to treat primary murine bone marrow-derived macrophages (BMDMs). At this concentration, colchicine did not affect BMDM viability, proliferation, differentiation or polarisation into M1 or M2 phenotypes. However, it reduced formation of Oil-Red-O+ foam cells by 30%, when BMDMs were incubated for 48h with either oxLDL ($p<0.0002$) or CC ($p<0.01$). Interestingly, this inhibition of foam cell formation was not associated with down-regulation of scavenger receptor expression. Rather, colchicine reduced the phagocytic capacity of BMDMs by 2-fold, as determined by ingestion of PE-conjugated phagocytic beads ($p<0.002$), and increased total cholesterol efflux capacity by 3-fold ($p<0.05$), without altering efflux receptor expression. Finally, colchicine attenuated CC-induced upregulation of genes and proteins associated with the NLRP3 inflammasome (Nlrp3, Caspase-1, Il1ß).

Conclusion

These novel results indicate that colchicine inhibits oxLDL and CC-induced foam cell formation, most likely via effects on phagocytosis and cholesterol efflux. In addition, it effectively inhibits both priming and activation of the NLRP3 inflammasome.

Presentation Abstracts

Response of opportunistic predatory birds to land-use change on roads and implications for avian prey species

Matthew Fielding
University of Tasmania

A synanthrope is a member of a wild species that benefits from interactions with humans and the artificial environments that people create. This study aimed to examine the effect that medium-sized synanthropic avian predators, such as the forest raven (Corvus tasmanicus) and black currawong (Strepera fuliginosa), have on other Tasmanian avian fauna. Increased land-use change and future climatic shifts could supplement populations of these opportunistic predatory birds, resulting in amplified predation pressure and subsequent knock-on effects on the productivity and abundance of avian species. I investigated whether forest ravens are more likely to be observed in areas of higher roadkill density by recording the location of roadkill and forest ravens along roadsides. Bird community surveys were completed on roadside areas of high and low raven density to investigate the effects that elevated raven populations may have on avian prey species.

Surveys were also completed along gradients of human disturbance on roads and walking tracks to examine associated deviations in bird community composition. Modelling techniques, such as generalised linear models and species distribution models, were used to understand the population dynamics of these synanthropic species and forecast their effects on prey species under future land-use and climate change scenarios. Preliminary results found that the occurrence of roadkill influenced the presence of forest ravens along roadsides, and flocks of ravens were more often associated with modified farmland habitat. Insights resulting from this study could be used to reduce the negative effect of predatory birds on other native animals and underpin the design and management of programs for managing human-wildlife interactions under global change.

Public transport passengers' fear of crime, and willingness to walk home from bus stops at night – a predictive spatial analysis conducted in Canberra, ACT

Matthew Flower
Australian National University

Increasingly, public transport networks are being designed for ridership and efficiency, requiring many passengers to walk further from homes to access points. Fear of crime, affected by factors such as lighting and physical environmental characteristics, is heightened during hours of darkness. Do, or would, passengers feel safe walking the final-leg from stop-to-home during nighttime? Is their willingness to use public transport affected? The responsiveness of passenger behaviour to changes in their nighttime reassurance of safety, between the public transport stop and their final destination (or vice versa), has hitherto been uninvestigated. This paper proposes a GIS-based and spatially-motivated approach to answering these questions, framing future research directions on this important issue.

Support portal for improving numeracy pass rates for 'The Literacy and Numeracy Test for Initial Teacher Education Students'

Nicholas Gibson
Central Queensland University

The Literacy and Numeracy Test for Initial Teacher Education Students has been introduced as a step to teacher certification; as of the July 1, 2016, all students who want to become a teacher must pass this test to receive certification (ACER, 2017). The Literacy and Numeracy Test for Initial Teacher Education Students has been created to ensure graduating teachers are well equipped to meet the demands of teaching. There is currently limited support preparing students for this test because it is so new. The goal of this study is to create and analyse an online, self-paced Portal in Moodle. The portal includes both a literacy and numeracy curriculum that will prepare students to pass The Literacy and Numeracy Test for Initial Teacher Education Students. This research study will be focused on the numeracy aspect of the portal.

The methodology of the study is quantitative and is of pretest posttest design. The portals pretest and posttest have the same questions but arranged differently. Following the collection of quantitative data, we will use an ANOVA (analysis of variance). An ANOVA is a collection of statistical models used to analyse the differences among group means. Having the tests and portal setup this way is so we can see if the portal's curriculum is producing significant improvement in student's numeracy results. The strength of the Portal is the Curriculum. The Portal uses a curriculum with a range of video tutorials, step by step math instructions, sample questions, sample tests, and mathematical testing strategies to help students study and prepare. Another strength of the curriculum is that it is self-paced, students can access and complete sections at their own pace. There are question and answer forums on the portal; however, the portal is mostly self-maintained. Preliminary results have revealed some improvement in results. However, more data is needed to show the portal is successful in a significant improvemnt. The prediction is that students will demonstrate a significant improvement on the posttest over the pretest.

References

Australian Council for Educational Research – ACER, official partner of UNESCO. (2017). Literacy and Numeracy Test for Initial Teacher Education Students. Retrieved from teachered test: https://teacheredtest.acer.edu.au/

Presentation Abstracts

Perioperative Chemotherapy for Gastric Carcinoma: Not so 'MAGIC'?

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The University of Adelaide

Aim

A retrospective study of patients with gastric cancer was undertaken to assess the survival rate and lymph node status after pre-operative chemotherapy (POCT) in comparison to those who did not receive POCT.

Background

Gastric carcinoma remains the leading cause of cancer related deaths [1]. In 2006, the MAGIC trial [2] showed a 13% improvement in 5-year survival rate with POCT (36% vs 23%) for patients with gastric cancer and since then, this approach has been adopted for treatment. However, the advantages seen in a trial setting may not be evident in the wider community based clinical practice, especially if the treatment cannot be provided to all patients. Thus, this retrospective study analyses the clinical outcomes of POCT protocol in South Australia for the past 10 years at tertiary medical centers.

Methodology

Medical and pathology records of all gastric carcinoma procedures were reviewed from 2006-2016 after obtaining approval from the Central Adelaide Human Research Ethics Committee. Pathological details, number of lymph-nodes resected, reasons for non-administration of POCT, complications, recurrence and survival data were analysed using paired T-test, Chi2test and Fischer's exact test where applicable.

Results

There were 74 patients who underwent surgical resection of gastric carcinoma where 28 patients received POCT and 46 patients were not deemed eligible after comprehensive multidisciplinary evaluation. In majority, POCT was declined due to comorbidities (32.4%). Survival was better in patients undergoing POCT but did not reach statistical significance (20.8 months v 19.0 months P=0.06). Furthermore, it was found that median survival was poorer in patients whose cancer had metastasised to lymph nodes than those without (17.1 months vs 24.3 months).

Conclusion

The study found slight improvement in the survival rate of POCT group as compared to the non POCT group. However, lymph node metastasis had a major impact on survival rate has been noted. Radical removal of the cancer and lymph nodes is advocated for prognostic and treatment purposes.

The thin white line: Does race influence body size misperception?

Lewis Gould-Fensom
Macquarie University

Modern humans are exposed to more images of bodies than ever before. This exposure has been accompanied by a notable increase in body dissatisfaction: an increase that has been attributed to unrealistic beauty standards promoted by the media, in the form of the slender Caucasian female. Interestingly, Caucasian women appear to be disproportionately affected by these images. This study investigates the link between visual exposure to bodies of varying sizes and the individual's perceptual experience of their own and other bodies in an experimental setting.

It has long been established that extended viewing of one image causes visual aftereffects. For example, observing a stimulus moving downwards (e.g. a waterfall) will cause an observer to see upwards motion in a stationary stimulus (e.g. the surrounding rocks). This is known as perceptual adaptation. Previous studies have demonstrated a similar effect in body perception. The body size aftereffect (BSA) occurs after extended viewing of thin bodies, causing subsequently viewed bodies to appear fatter, and vice versa. This study aims to replicate the BSA and establish the extent to which it will transfer across racial categories.

Both Caucasian and Asian participants were exposed to same or other race bodies, following which we measured the magnitude of the BSA on 'test' bodies belonging to each racial category. It was hypothesised that adaptation to thin (fat) bodies will cause normal bodies to appear fatter (thinner). Additionally, we expected this effect to be larger when race was consistent between adaptation and test bodies. If true, this may explain why Caucasian women, exposed to Caucasian bodies might experience greater body size misperception than Asian women, whose own race is incongruent with bodies typically idealised in western media. If the hypothesis proves to be false, this suggests that other influences may underlie the heightened body dissatisfaction in Caucasian populations.

Presentation Abstracts

Decomposing the origin of Hofmeister Effects

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The University of Newcastle

The Hofmeister series, established in 1888, is a specific ordering of ions in terms of their effects on various biological, polymer, and electrochemical systems. It characterises cations and anions as either kosmotropic (which bring order to the solution) or chaotropic (which disrupt order in the solution). Though there has been substantial research into the effects of these salts on various protein and polymer systems, no quantitative explanation of the Hofmeister series has been proposed to date. Here, we combine quantum chemical methods including a stochastic search algorithm (Kick), DFTB3/DFT calculations and energy decomposition analysis (EDA) to investigate the energetic origins of the Hofmeister series. We show, for the first time, that Hofmeister effects arise in the absence of a solvent. The interaction strength between unsolvated cations/anions and substrates, including poly(N-isopropylacrylamide) and amino acids, correlates precisely with the "reverse" Hofmeister series. Accounting for the energy penalty of partially desolvating the ion and the substrate gives rise to the Hofmeister series itself. While it has been suggested that dispersion interactions between the ion and substrate underpin the Hofmeister effect, our results show that dispersion interactions are secondary to other interactions, including polarisation.

[1] Hofmeister, F., *Arch.* Pharmacol. **1888**, 24, 247.[2] Mazzini, V., *Curr. Opin. Colloid Interface Sci.* **2016**, 23, 82-93. [3] Addicoat, M. A., *Comput. Chem.* **2013**, 34, 2591-2600. [4] Gaus, M., *Chem. Theory Comput.* **2012**, 7, 931-948. [5] Su, P., *Chem. Phys.* **2009**, 131,014102. [6] Ninham, B. W., *Langmuir* **1997**, 13, 2097-2108.

Illegal phoenix activity within Australia: An analysis of legal and ethical issues

Julia Gringonis-Gore and Georgia Brazenall
The University of Adelaide

Illegal phoenixing is a company practice that occurs when assets from an 'old company' are transferred to a 'new company' in order to avoid paying company debts owed to creditors, so that a company effectively 'rises out of the ashes' without meeting obligations imposed by law. This company practice costs the Australian economy up to $3.19 billion a year and is thus a major issue. In our paper we consulted the literature to determine specific legal and ethical issues relating to illegal phoenixing and researched approaches employed to address illegal phoenixing in other countries. Through this research, we conclude that reforming aspects of the Australian Securities and Investments Commission (ASIC) and analysing and adopting the approaches of Ireland and the U.K., in particular adopting 'Similar Names' legislation, has the potential to greatly reduce the prevalence of illegal phoenixing within Australia.

Coarse particle recovery in froth flotation

Natasha Grobbelaar
The University of Queensland

The recovery of coarse value-bearing particulates remains a challenge in flotation. Although new devices have been developed to improve their beneficiation, minimal research has been done in terms of froth modification. In this study, the recovery of +150 µm pure chalcopyrite from quartz (-125 +90 µm) was investigated by modifying the structure of a conventional froth bed as well as the method of solids introduction. Although poor selectivity was achieved for the modified froth structure, significant improvements were achieved in the recovery of coarse (up to +600 -850 µm) chalcopyrite by introducing the feed directly into the froth bed. The results provided confirmation for the concept that a specially designed froth bed can retain coarse hydrophobic particles. In addition, it highlighted additional aspects of the novel froth which need to be considered to ensure adequate selectivity is restored. These outcomes are significant as it provides further direction for improving coarse particle recoveries that offer the possibility of lower energy expenditures during grinding, greater reuse potential of waste, and ongoing environmental benefits.

Presentation Abstracts

Evaluation of regional changes in phosphorylation of tau, a key protein that accumulates in neurodegenerative disease, following single severe versus repeated mild traumatic brain injury

Daniel Gutschmidt
The University of Adelaide

Traumatic brain injury (TBI) increases the risk of later developing dementia. The type of dementia may differ depending on the nature of the initial TBI. Single severe TBI (ssTBI) is correlated with Alzheimer's disease (AD) whilst repeated mild TBI (rmTBI) is linked to chronic traumatic encephalopathy (CTE). These are both associated with accumulation of an abnormal protein known as hyperphosphorylated tau, although the pattern of tau deposition differs: diffuse accumulation in AD compared to more focal accumulation in CTE. As TBI may be a potential trigger that facilitates excess phosphorylation (adding of phosphate tags) and thus aggregation of this protein, greater understanding of this process may allow for appropriate intervention. To investigate, male Sprague-Dawley rats underwent a diffuse model of TBI. One subset received a ssTBI, by releasing a 450g weight from 2M, another to three rmTBIs spaced 5 days apart, with the weight dropped from 1M. Sham animals received surgery only. At 24 hrs, 7 days or 1 month following injury the injured cortex and hippocampus were excised and frozen. Western blot analysis investigated levels of phosphorylated tau (ptau), by comparing levels of tau phosphorylated at 231 to total levels of tau. Within the hippocampus, ssTBI and rmTBI significantly increased ptau at 24 hrs post-injury ($p<0.05$) when compared to shams. This returned to baseline by 7 days, with a further significant increase at 1 month in rmTBI, but not ssTBI animals.

Within the cortex, a similar increase in ptau was seen at 24hrs post-injury in rmTBI and ssTBI animals ($p<0.05$), which returned to sham level at 7 days and 1 month post-injury. This study demonstrates that the time-course of tau phosphorylation following TBI can be influenced by the region studied and the type of TBI, providing further insight into the link between TBI and later neurodegenerative disease.

Identifying opportunities to support residents in a women's shelter by improving their oral health status through dental screening and ongoing referrals to support services

Ahmed Hassan
The University of Adelaide

Oral diseases are a major contemporary public health issue, especially in marginalised sections of the community. This includes victims of domestic violence, those with mental health issues, drug users, some Indigenous groups and the homeless. Numerous studies have found that domestic violence is one of the many factors associated with women being homeless in Australia. The standard of oral health and perceived oral health has been found to be poor amongst these people. Catherine House is a non-profit organisation in Adelaide, which provides emergency accommodation services for up to 48 women who have suffered from domestic violence. The aim of this study is to provide oral health and nutritional education and resources to assist the residents of Catherine House.

This assistance will include dental screening, preventive interventions and referrals for immediate treatment to the Common Ground dental clinic run by volunteers. All residents will be invited to participate in the clinic. The activities will be conducted by final year oral health students and supervised by a registered oral health practitioner. Frequency data on the referral uptake to the dental clinic will be recorded. An anticipated and possible finding of this study is that the intervention will need to be expanded to include additional screening visits. Indeed, as the number of referrals grow and more residents complete courses of dental care, further data will need to be collected and analysed. This service model of care will assist in the women's self-recovery and is likely to be adopted by other organisations providing safe havens for victims of domestic violence.

Presentation Abstracts

MEC-17 overexpression leads to synaptic defects and activation of the DLK-1 neuronal remodeling program in C. elegans

Hanadi Hoblos
Monash University

The proper formation and long-term maintenance of neural connectivity are critically important for normal brain function. Two main intracellular processes critical for maintaining neuronal structural integrity and neuronal function are microtubule stabilisation and synapse remodelling. Microtubules are intrinsically liable to depolymerisation and exhibit dynamic instability in vivo and in vitro. Dynamic instability of microtubules is a feature of cells that undergo rapid morphological changes, typically during early development and regeneration. However, microtubules within a mature axon are highly regulated to remain stabilised. How long-lived microtubules acquire mechanical stability, and how alterations in microtubule organisation underlie synapse formation and elimination, remains poorly understood. One mechanism identified to increase microtubule resilience in the face of mechanical stress is the acetylation of α-tubulin by MEC-17. Following axonal injury, microtubules are transformed into dynamic structures capable of axon regrowth with the support of DLK-1 mediated regeneration.

This study investigates the role of MEC-17 on microtubule stabilisation within the six touch receptor neurons (TRNs) of C. elegans, and how it may interact with the DLK-1 Mitogen-Activated Protein (MAP) kinase pathway to modulate synapse formation. Using fluorescence microscopy to visualise and morphologically examine the TRNs, overexpression of MEC-17 was found to induce a significant and progressive loss of the synaptic branch. This phenotype was partly suppressed when coupled with a dlk-1 loss of function mutation. We suggest MEC-17 overexpression disrupts microtubule organisation and activates DLK-1 mediated remodelling, which increases microtubule dynamics and therefore increases susceptibility to synaptic loss. This study provides novel evidence on the interaction between MEC-17 and DLK-1 on the regulation of microtubule dynamics and synaptic architecture. Our findings contribute to understanding how cytoskeletal processes underlie synaptic maintenance and synaptic plasticity, and how disruption of these processes such as in neurodegenerative diseases result in synaptic defects.

Do grapevines have ecological memory of drought stress?

Matthew Howard and Michelle Huckel
The University of Adelaide

Drought stress in perennial crops can lead to reductions in growth, productivity and crop quality. The intensity and duration of drought is predicted to increase with the progression of climate change. Preliminary studies suggest that species such as nettle (Urtica dioica L.) show characteristics suggestive of being able to remember historic episodes of drought, referred to as 'Ecological memory'. A relatively unresearched field, ecological memory is postured to occur due to changing epigenetics and protein metabolites.

In this study, we investigated whether Vitis vinifera cv. Thompson Seedless grapevines had ecological memory of drought stress. The experiment was conducted using varying periods of induced drought stress on several 2 year-old vines with no history of such stress. Measurements included stomatal conductance, stem water potential and shoot growth for the vines exposed to drought stress as well as those vines which remained well-watered. Once the vines reached a pre-determined value of water loss, indicative of water stress, the plants were maintained at this level for increasing periods of time (from 2 to 8 weeks). The readings used to determine daily water use showed that the vines exposed to stress for 6 weeks or more reduced their daily water uptake by more than 10%, compared to the control vines, when returned to field capacity. The data indicates that post-drought stress vines are capable of making more efficient use of available water. This suggests that grapevines may have ecological memory of drought stress.

While results presented here appear encouraging, this presentation will also critically analyse the findings, specifically addressing the possibility of plant hormone control over water loss. Implications of our results for growers include the potential to improve crop water use efficiency and vine tolerance to drought through management practices that carefully induce water stress.

Presentation Abstracts

The relationship between mental health literacy and CAM beliefs in international students

Yunhe Huang
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Background

Mental health literacy (MHL) refers to a person's knowledge and beliefs that helps identify, prevent and manage mental disorders. MHL studies involving people from non-Western countries found differences in causal beliefs and preferred interventions across cultures. Research has shown that the public often favours self-help and complementary and alternative treatments (CAM) over conventional interventions such as psychotherapy and medication. CAM use for mental disorders is linked with severity of symptoms, awareness and access to conventional treatment in several countries. There is evidence of ethnocultural differences in beliefs and uses of CAM, though not explicitly linked with mental health. In relation to migrants, acculturation may also influence their beliefs towards mental health and CAM. The present project aims to explore whether the relationship between MHL and CAM beliefs differ in international versus domestic university students in Australia.

Method

An online questionnaire was advertised to university students through social media. Participants were asked to read vignettes describing a person with mental illness, identify the problem, then rate potential causes and interventions on their appropriateness. Participants were also asked to complete the Complementary and Alternative Medicine Beliefs Inventory and Stephenson Multigroup Acculturation Scale.

Results

The survey received 113 completed responses from domestic and international students. Participant recruitment is still in progress.

Discussion

The study could provide further understanding into factors affecting mental health beliefs in international students. This would allow universities and service providers to better implement strategies to improve international student mental health help-seeking outcomes.

Old worlds, new histories: Engaging with the past through video games

Hugh Hudson
University of the Sunshine Coast

Video games have the power to re-create historical spaces and events in ways impossible in other media such as film or text. This capacity for recreation allows the gaming medium to destabilise traditional views and approaches to history, and enables players to create their own narratives in historical spaces. Video games by their nature are interactive, and provide a sense of agency that is well suited to the exploration of historical counterfactuals. Players of history games engage not only with what happened in history, but also with what could have happened (counterfactuals). In doing so, the illusion of an inevitable and monolithic historical narrative is broken. Through these means, games can also implicate players in historical situations, causing them to question their morality and ethics in ways that neither history nor gaming alone could.

The complex rules and mechanics that underpin these experiences allow games to abstract and simulate historical processes and frameworks, such as the political tension leading to the Second World War, or the impact of fortified castles on medieval European warfare. Through this abstraction of history, players are themselves able to be impacted by historical forces rather than simply being told about them, as would occur with text. This paper will utilise ideas from prominent historical thinkers of the postmodern era who seek to put forth a new kind of history, that breaks from 'facts,' in favour of exploring the consciousness of history, that is the understanding of history as a meaningful nexus of past, present and future. It will then argue that video games present the greatest opportunity for the creation and exploration of this new approach to history. This will be grounded in ideas of game theory, as well as a semiotic and textual analysis of historical games themselves, primarily *Hearts of Iron IV* (2016) and *Age of Empires II: Age of Kings* (1999).

Social identity in the twenty first century: The relationship between membership type, social identity and individual self-esteem across members of a web-based group, The Perth Pinup Community

Kelly Jackson
Edith Cowan University

This study explores the relationship of group membership, social identity and self-esteem among members of an internet-based group, thereby expanding upon research investigating the validity, applicability and benefits of Social Identity Theory (SIT). SIT proposes that part of one's concept of self is derived from their social identity, which is in turn the product of an emotional attachment to a given group membership. SIT is a widely supported psychological theory; however, its applicability to internet based social groups is currently under researched. Given the rapid evolution social practices have undergone following the development of the internet, academic research must be informed about the nature of mixed online-offline group interaction. The Facebook group Perth Pinup Community (PPC) is one such mixed group, as interaction is based online yet offline interaction is offered in the form of organised meetings.

Members of the PPC will be invited to complete an online questionnaire which determines membership type, the strength of their identification with the PPC, and their level of self-esteem. Two research questions are posed. One, will the strength of social identification differ across members whom engage in online interaction only (online members) and members who interact with other members both online and offline (mixed members). Two, will the strength of individual self-esteem differ across online and mixed members. It is anticipated that the proposed study will further validate SIT by finding all members of the PPC strongly identify with the PPC and report high levels of self-esteem. It is also anticipated that, as a result of increased interaction with the PPC, mixed members will report stronger feelings of social identity and higher levels of self-esteem than online members. Overall, this study will explore the continued applicability of an evidenced psychological theory and add to the limited body of academic literature regarding internet-based social practices.

Presentation Abstracts

The timecourse of body perception aftereffects

Syed Jafar
Macquarie University

A distorted perception of one's own body is a key diagnostic criterion in eating disorders, and a common phenomenon amongst the general public. The distortions are believed to be influenced by the media's portrayal of an 'ideal' body size. Furthermore, repeated exposure to this 'ideal' is thought to shift the perception of what is considered a normal size, resulting in an altered perception of individuals' own bodies. These effects can be replicated in experimental studies, with research reporting that prolonged exposure to contracted (expanded) bodies can result in normal bodies appearing more expanded (contracted). This phenomenon is referred to as a perceptual aftereffect and is elicited through a technique called visual adaptation. Visual adaptation may be a useful model of body size misperception if it can account for the long-lasting perceptual effects observed in eating disorder sufferers.

The current research aimed to establish the timecourse of body perception aftereffects by testing the impact of varying adaptation durations, with the hypothesis that longer adaptation durations would result in longer lasting aftereffects. Participants were allocated to one of four adaptation duration conditions (30/60/120/240seconds), and one of two adaptation directions (expanded/contracted). An in-house 'app' was used to manipulate the apparent levels of body fat in photos of individuals unfamiliar to the participant. Using this app, participants were asked to set their point of subjective normality (PSN) – the body size perceived as normal – both before and after exposure to adaptation stimuli. The difference between the participant's pre-adaptation and post-adaptation PSN was taken as a measure of aftereffect magnitude. The results will be discussed in the context of current models of body perception, and the possibility that visual adaptation is an underlying cause of body image distortion in clinical populations and in members of the public who misperceive their shape and size.

Ticagrelor versus Clopidogrel in stable coronary artery disease patients undergoing elective Percutaneous Coronary Intervention

Dione Jones
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Background

In acute coronary syndrome, treatment with ticagrelor as compared to clopidogrel reduces the rate of adverse events. Whether this benefit extends to stable coronary artery disease (CAD) patients undergoing elective percutaneous coronary intervention (PCI) is unknown.

Methods

The 12-month outcomes of stable CAD patients discharged with either clopidogrel or ticagrelor after elective PCI were compared using the Coronary Angiogram Database of South Australia (CADOSA), a registry of consecutive patients undergoing angiography/PCI in South Australian public hospitals. Patients between January 2012 and December 2015 were included. Unplanned hospital readmissions and all-cause mortality were captured via administrative datasets. Quality of life at baseline and 12-months was compared in 43 eligible patients using the Seattle Angina Questionnaire (SAQ).

Results

The study cohort included 755 patients comprising of 83% discharged on aspirin + clopidogrel and 17% on aspirin + ticagrelor. Clopidogrel patients were older (67y±0.4 vs 65y±1.1 years, $p<0.05$), and more likely to receive a bare metal stent (24% vs 12%, $p<0.01$). Adverse outcomes at 12 months were adjusted for age and stent type. All-cause mortality was similar between clopidogrel and ticagrelor patients (1.1% vs 0.8%, $p=0.97$). Hospital readmissions for chest pain (18% vs 22%, $p=0.27$) or other cardiac diagnoses (11% vs 13%, $p>0.05$) were also similar between clopidogrel and ticagrelor patients. Myocardial infarction occurred in 1.8% and 1.5% ($p=0.84$), and major bleeding events in 1.1% and 1.5% ($p=0.67$), of clopidogrel and ticagrelor patients respectively. SAQ scores were similar between the two groups.

Conclusion

In real-world practice, one-fifth of elective PCI patients are prescribed ticagrelor. Readmissions for chest pain post-PCI are frequent. Ticagrelor appears equally safe as clopidogrel in terms of clinical outcomes and bleeding risk; however, whether ticagrelor provides additional benefits in this population requires a randomised trial.

Presentation Abstracts

Triage documentation: An examination of the content and patterns of content

Michelle Jory
The University of Queensland

Background

The accurate triaging of patients who present to the Emergency Department is vital for ensuring patients are seen according to a priority attributable to their presenting symptoms. In Australia, nurses assign patients a triage score from 1 to 5 determining time-to-treatment, accompanied by a free-text description of their presenting condition, guided by the ACEM guidelines which are replicated in the Emergency Triage Education Kit. Consistency is required when recording free-text descriptions to ensure safe and quality care.

Methods

A qualitative content analysis of 250 randomised free-text descriptions from the Emergency Department electronic medical record of a public metropolitan adult tertiary referral hospital.

Results

Variation in both frequency and order of citation of documented pieces of triage information was evident among the 250 free-text descriptions. The documented information differed among certain presenting problems such as pain presentations and physical injury presentations. Pain presentations were the most commonly documented presenting problem, however documentation of the onset (24.4%), location (65.9%) and description (54.9%) of pain occurred in less than three-quarters of all pain presentations. Documentation of the onset, location and description of pain is essential in providing safe and quality nursing care and in minimising the risk of oligoanalgesia.

Conclusion

Findings indicated different levels of compliance and significant variation in the content and patterns of content of free-text documentation. Recommendations identify opportunities to create clinical change through revisions for both the ACEM and ETEK documents, and renewed triage education and training practices in Australian emergency departments.

Body image disturbance and the role of gender in fat and muscle aftereffects

Edwina Keen
Macquarie University

Body image disturbance induces substantial distress, particularly amongst sufferers of eating disorders and muscle dysmorphia. Misperception of body shape and size – a significant component of body image disturbance – is thought to be driven, in part, by exposure to media dictating unrealistic body standards. In recent decades, such standards have been largely gendered, with female-directed content primarily focusing on thin (i.e. low fat) ideals, while male-directed content emphasizes muscularity. Recent research indicates that perceptual aftereffects may play a fundamental role in misperception of body fat and muscle mass. Just as prolonged viewing of red stimuli can generate the perception of green afterimages, viewing bodies low in fat (or high in muscle) can lead to other bodies appearing high in fat (or low in muscle). The present investigation sought to explore the potential moderating role of gender on the magnitude of body size and shape aftereffects.

Participants manipulated standardized body stimuli to produce average, or 'normal', bodies both before and after exposure to one of four randomly assigned stimulus sets (high muscle, low muscle, high fat, and low fat bodies). Settings were completed twice, once with stimuli matching participants' gender and once with opposite gender stimuli. It was expected that female participants would demonstrate larger aftereffects along the fat dimension, while males would demonstrate larger aftereffects along the muscle dimension. While these hypotheses were not supported, results showed significantly larger misperceptions along both fat and muscle dimensions when participants viewed gender-matched stimuli compared to opposite gender stimuli. As such, while neither fat nor muscle holds special salience for either gender, bodies matching participant sex may demonstrate greater salience than opposite sex stimuli, attracting more attention and, hence, producing stronger adaptation effects.

Presentation Abstracts

Neural regulation of vaginal contraction

Sam Kelsey
University of Newcastle

Research question

Neural control of vaginal contraction is important for healthy functions such as sexual arousal, movement of sperm into the uterus and childbirth, as well as in certain abnormal pathological conditions such as Vaginismus (muscle spasm of the vagina) and prolapse (collapse) of abdominal organs through the pelvic floor. However there has been surprisingly little research in this area. In the present study, we investigated nerve-induced contractile responses of mouse vaginal smooth muscle in order to gain insights into what occurs in the human vagina.

Methodology

Vaginal nerve-induced contractile responses were investigated by electric field stimulation and the use of pharmacologic agents that preferentially stimulate different types of excitatory nerve cell responses, specifically rapid rhythmic nerve contractions related to the neurotransmitter adrenalin ('adrenergic' responses) and slower, stronger rhythmic nerve contractions related to another neurotransmitter called choline ('cholinergic' responses).

Results

Bursts of stimuli were usually required to elicit contraction, with a single stimulus usually being ineffective. Vaginal contractions in response to electric field stimulation were not affected by application of phentolamine, which blocks the action of adrenalin. This suggests that nerve-induced vaginal contraction does not primarily involve adrenergic responses.

In contrast, the drug atropine blocks cholinergic responses and was found to abolish vaginal contractions within 10 mins of application. Conversely, increased vaginal contraction was observed following application of another drug neostigmine, which is known to reduce breakdown of the choline neurotransmitter and enhance cholinergic stimulation.

These results provide evidence that nerve-induced contractile responses of vaginal tissue are mediated primarily by nerves that use choline ('cholinergic') rather than nerves that use adrenalin ('adrenergic').

Conclusion

This study provides the first detailed information on the responses of vaginal muscle to excitatory nerve stimulation and may provide insights into novel therapeutic strategies for conditions involving abnormal vaginal contractions.

Crouzon Syndrome, Facing Reality

Alexander Khominsky
The University of Adelaide

Crouzon syndrome is a common genetic craniofacial disorder, characterised by craniosynostosis (premature cranial suture fusion) and midfacial hypoplasia (short midface) in children. The condition can lead to life-threatening neural, respiratory and feeding complications. Management of Crouzon syndrome generally involves invasive surgical intervention that can have a debilitating effect on patients and their family. Mutations in the FGFR2 gene are a known cause of Crouzon syndrome. As future treatment modalities shift towards molecular based intervention, in depth understanding of the phenotypic presentation (observable characteristics) due to the underlying mutation is critical. This study utilised a genetically-engineered mouse model to investigate the role of FGFR2 mutations in the development of the orofacial and dental phenotype. Forty mouse skulls, representing two genotypes (Crouzon syndrome and wild-type) and two sexes (males and females) (n = 10 in each group) were used. Maxillary, mandibular and dental morphology were compared between groups by analysing relevant landmark-based linear dimensions from micro-CT reconstructions. Compared to wild-type, Crouzon maxillae were generally smaller.

Mandibular parameters showed greater variation, although the Crouzon mandible was generally smaller, except for increased width between the angles of the mandible. Teeth were significantly shorter in length, however taller in height. Novel finding of bilateral bifid condyles were found in all mutant mice. Expansive bone lesions, resembling tumour-like growths, around the lower incisors presented in 25% of Crouzon mice. Our findings suggest complex site specific actions of FGFR2. This research has the potential to improve clinical management of Crouzon syndrome, as the relationships between the maxilla, mandible and teeth, are critical in achieving successful functional and psychological outcomes. Establishing baseline orofacial and dental features will also assist in the development of more predictable and targeted molecular-based therapies in the future.

Presentation Abstracts

Quantum chaos in lattice models using the Wigner Function

Ryan Kidd
The University of Queensland

The Bose-Hubbard model of lattice-bound weakly-interacting bosons can exhibit chaotic behaviour in the classical limit. 'Quantum chaos', the aspects of chaos that are observed in the quantum dynamics, is a continuing topic of research. The truncated Wigner method, which allows for a quantum state to be simulated as a stochastically-sampled distribution of classical trajectories, is valid to long times and offers a computationally efficient, parallel method of simulating many-particle, many-site lattices. In my project, the reconstructed Wigner distribution and the number distribution are used to characterise quantum chaos in the driven Bose-Hubbard dimer in correlation with classical Lyapunov exponents and Poincaré sections. The truncated Wigner method is benchmarked against the exact dynam-ics, demonstrating its utility to analysing quantum dynamics in chaotic regimes.

Education in astronomy: Computer-based resources and undergraduate learning

Kristina Kopychynski
Macquarie University

Little research has been conducted regarding undergraduate astronomy students and their learning. Many astronomy courses employ a large variety of computer-based projects for students to work through, though there is little to no guidance to determine what may be the best way to create and deliver these resources. This paper examines survey data obtained from two cohorts of undergraduate astronomy students in order to create a scaffold for a computer based distance-learning module, in partnership with the CSIRO PULSE@Parkes Program. Undergraduate astronomy students were surveyed and provided feedback on the development of the module, in order to improve the resources and provide information on how they best learn when given a computer-based task.

Three main results were drawn from the research: (1) the development of teacher resources is integral to creating a good computer-based resource; (2) obtaining feedback from more undergraduate astronomy students is required to further enhance the development of computer-based resources; (3) resources being created for undergraduate astronomy students should have an 'easy-to-read' format with plenty of text and accompanying images. From this research, there are implications for other undergraduate Schools within the science and engineering faculties. As laboratory and computer work is an integral part to most undergraduate science degrees, it is important to research effective ways to deliver these tasks to undergraduate students, for them to engage in deep learning.

The Armed Forces Special Powers Acts and the institutionalisation of rape in India

Ashwina Krishnan
The University of Adelaide

The Armed Forces Special Powers Acts (AFSPA) which are implemented in Kashmir and the North Eastern states of India have often been condemned for infringing on civil liberties, with many calling for it revocation. The inclusion of immunity clauses within the Acts which protect members of the armed forces against any legal action within civilian court processes further perpetuates a climate of impunity, wherein barely any cases of abuse by the security forces have been prosecuted; including cases of sexual abuse. While sexual violence is a common occurrence in conflict zones, the cases reported in Kashmir and North Eastern India are particularly deplorable due to lack of accountability and the recalcitrant way in which the Indian government has dealt with allegations of sexual abuse. Nonetheless, the institutionalisation of rape in Kashmir and the North East cannot solely be attributed to the implementation of AFSPA. Rather, it is the longstanding pattern of "Othering" that exists; wherein the majority Hindu-Indian population distinguishes itself from ethnic-minorities in the North-East and the predominantly Muslim Kashmiris; that has led to a widespread level of tacit acceptance of sexual abuse in these regions. This is exemplified by the lack of public outrage towards such cases. This paper thus seeks to argue that both these factors that have resulted in the institutionalisation of rape in Kashmir and the North Eastern states and will do so by dissecting the Acts, exploring the judiciary's interpretations of the Acts, addressing specific cases of sexual abuse in both the North Eastern and Kashmiri contexts and by examining public opinion on cases of sexual abuse in these regions in comparison to incidents that have occurred in other parts of India.

Presentation Abstracts

Losing control of how we perceive the world: What can attention tell us about addiction?

Jenny Le
University of New South Wales

It is natural to think our senses provide an objective record of the world around us. However, recent research shows that perception is critically shaped by our previous experiences. Notably, learning that an object is paired with reward increases its salience, making it more likely to 'leap out' at us and capture our attention (much as we are more likely to notice a $20 note on the ground than a piece of rubbish). This phenomenon is termed value-modulated attentional capture (VMAC).

It has been argued that VMAC contributes to several clinical symptoms, including addiction, psychosis, and over-eating; e.g., Bob may be more likely than Fred to develop addictions because Bob is more susceptible to VMAC. This argument requires that individual differences in VMAC are stable: Bob will show higher VMAC than Fred consistently across time. Our study measured, for the first time, the stability of VMAC.

To assess VMAC, we used a search task in which participants had to locate a diamond among circles. On each trial, the array included a coloured distractor circle; the colour of this distractor signalled either a high- or low-value reward available. Participants completed two sessions of this task, one week apart.

In each session, participants were slower to locate the diamond when the array contained a distractor signalling a high-value reward versus a low-value reward: a VMAC effect. However, individual differences in this effect were uncorrelated in the two sessions: the size of someone's VMAC in session one did not predict their VMAC in session two.

Clinical traits like addiction are highly stable over time. Our finding that VMAC was not stable over a week therefore suggests VMAC may not underlie such traits. This study demonstrates the critical need for foundational work, before further claims are made about how VMAC relates to clinical symptomatology.

The research-teaching nexus: students' perceptions and experience of research-led education

Amanda Ling
Australian National University

Research-led education, broadly defined as the integration of research into teaching, is increasingly seen as the answer to calls for improvement in science education.1 It can include research projects, inquiry-based learning activities, research taught in courses and having researchers as lecturers. While research-led education can integrate students into the research community and encourage a critical approach to learning, offering it to all students is challenging, suggesting the need for a more evidence-based approach to implementation.

This study investigated science undergraduates' perceptions and experiences of research-led education at a research-intensive university. Science undergraduates were surveyed on their enrolment decisions, engagement with research-led activities, research skill development and the impacts of having researchers as lecturers, using a modified existing questionnaire.2 The survey had a 16.4% response rate after online dissemination to half of all students enrolled in all years of all undergraduate science degrees (n=1078) at the Australian National University. The questionnaire included Likert-scale and short response questions, allowing us to employ a mixed-methods approach to broaden and deepen our understanding of student experiences.

Most survey respondents engaged in research-led activities throughout their degrees, reported improvements in their research skills and valued these experiences. More complex research-led activities, such as writing literature reviews, evaluating scientific papers and writing research proposals, were more likely to be experienced by later year students. Staff involvement in research was mostly perceived positively, although there was also a concern that some staff prioritised research over teaching. Students saw a need for more support for some research-led activities such as communication and statistics, and particularly valued opportunities for authentic research and experimental design.

References

1. Healey, M. & Jenkins, A. (2009). Developing undergraduate research and inquiry.
Heslington: The Higher Education Academy.
2. Turner, N., Wuetherick, B. & Healey, M. (2008). International Journal for Academic
Development, 13: 199-211

Presentation Abstracts

Identifying the risk of injury from a device used to treat depression in adolescents

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Transcranial direct current stimulation (tDCS) involves applying a weak current across the scalp and is used as a therapeutic approach to many neurological disorders including depression in adolescents. Whilst its short-term effects have been evidenced, there are few longitudinal studies that assess its long-term effects and overall safety. Several reports of electrical burns after using tDCS called for the need to establish proper safety protocols. Sensationalised media reporting, along with the advent of Internet technology, have downplayed its safety and made it easier for the use and misuse of tDCS. For instance, the device can be commercially purchased online, and YouTube videos guide individuals to making their own 'do-it-yourself' (DIY) tDCS. With such accessibility, the technology could serve as an attractive solution to adolescents who engage in risk-taking behaviours without understanding the risks behind tDCS devices.

Available tDCS research is currently limited to isolated disciplines like electrical engineering, electrophysiology and psychology, thus making it difficult for laypeople to access. A Google search for tDCS device resulted in 181,000 results and the first 100 contained tDCS purchasing options or instructions for DIY kits (59%), instructions on how to use tDCS (38%) and explicit safety warnings (3%). A NCBI search for adolescent depression, tDCS and safety returned eight results including a general safety report, two clinical trials on efficacy, a meta-analysis of adverse events from experimental studies, and four case studies of skin burns or lesions resulting from tDCS use. As there is insufficient research of tDCS from a multidisciplinary approach, the aim of this current study is to merge prevailing scholarship from our individual disciplines to establish a multidisciplinary literature review of tDCS. Our work also aims to highlight and educate the urgent need for responsible production and consumption of tDCS amongst researchers, policymakers and its users.

Literacy and numeracy test for initial teacher education: Can a digital portal improve student results for the literacy section of the test?

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On the 1st of July, 2016, it became mandatory for all pre-service teachers to pass The Literacy and Numeracy Test for Initial Teacher Education Students (LANTITE) to demonstrate their competence (ACER, 2017). Many Australian students were not previously prepared for The Literacy and Numeracy Test because many Universities were unable to provide specific support in time. We developed a project to provide literacy and a numeracy curriculum consisting of a self-paced, interactive curriculum including instructional videos, practice quizzes, interactive activities, step by step tutorials, and literacy testing strategies. Upon enrolment to the Portal, students are to complete the pretest that assigns them to a skill level group based on their results. After working through the interactive Portal, students can take the posttest when they feel ready. The project produced two studies in which one part is looking at numeracy and the other part is addressing literacy. This paper is only addressing the literacy aspect. The purpose of this study is to analyse if a literacy curriculum in a digital format will prepare university students for the literacy part of the LANTITE.

The methodological composition used to demonstrate the success of this portal is a pretest posttest design of the quantitative nature. The objective is to run an ANOVA on the data received from the pretest and posttest to show a significant improvement in the results. If there is significant improvement, our program can be deemed successful. An ANOVA is an Analysis of variance (ANOVA) which can be defined as a collection of statistical models that can be used to analyse the differences within means among groups and the procedures associated with these groups. We are finding some preliminary success. However, not enough data has been received to prove a significant increase. We predict that the students' abilities and competency will significantly improve throughout the course of the program. This would then directly impact the outcome of the test, thus improving overall pass rates.

Australian Council for Educational Research — ACER, official partner of UNESCO. (2017). *Literacy and Numeracy Test for Initial Teacher Education Students.* Retrieved from Teachered Test: https://teacheredtest.acer.edu.au/

Presentation Abstracts

Exploring the relationships between brain iron and the nerve insulating substance Myelin

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Iron in the brain is stored primarily in the nerve insulating substance called myelin and in the cells that generate myelin, called oligodendrocytes. Myelin is a substance made out of cholesterol and other fats that composes the white matter of the brain. Our group has previously reported on the relationship between iron and oligodendrocytes, and demonstrated that storing iron in myelin is an important way of protecting the brain against damage when iron levels are high.

We therefore hypothesise that disturbing the balance between iron and myelin may contribute to various brain diseases such as multiple sclerosis and Alzheimer's disease, both of which involve white matter destruction.

For a century, it has been assumed that all oligodendrocytes are essentially identical but a recently published Science paper[1] has now used a highly sophisticated new technology called next generation RNA sequencing to demonstrate the existence of different types of oligodendrocytes.

My study has investigated the relationships of myelin and these different types of oligodendrocytes with genes involved in regulating iron. Advanced computational and statistical methods utilizing the programming language R were used to analyze RNA sequencing data on the activity of 82 brain genes with iron-related functions. The activity of these 82 iron-related genes was compared between different oligodendrocyte cell types. In particular, myelin-making oligodendrocyte cells were compared to non-myelin making cells.

The results demonstrated that the activity of iron-regulating genes was different in myelinating oligodendrocytes compared to non-myelinating oligodendrocytes. Notably, myelinating oligodendrocytes had higher activity of genes encoding iron transport and iron storage proteins.

These results provide new evidence for the importance of iron in normal myelin formation and help improve our understanding of how iron abnormalities may contribute to a variety of brain diseases.

[1]Marques et al. Oligodendrocyte heterogeneity in the mouse juvenile and adult central nervous system. Science, 2016;352:1326-1329.

Studying my Facebook feed? Australians' attitudes towards researchers' use of social media data

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Social Media (SM) facilitates rapid collection of mass data. The theoretical and practical applications are extensive, attracting qualitative and quantitative researchers alike. Under the rule-of-thumb that public data collection is ethical data collection, businesses, governments and universities are among the numerous institutions using SM data in their research. The centrality of SM to how Australians' interact, potential for privacy risks, and offline repercussions, demands that the application of existing ethical research guidelines be reconsidered. Consequently, this study explores privacy concerns and online behaviour, with the aim to understand users' attitudes towards SM data use in research. To evaluate the use of public SM data, this study differentiates users' social and institutional privacy concerns, and the extent to which they may motivate the use of SM privacy settings. Social privacy concerns are epitomised in users' vigilant maintenance of online identities and control over who accesses their personal information. In contrast, institutional privacy concerns are orientated to collection and use of personal information by organisations.

Data will be collected from 250 adult Australian Facebook users, through an online questionnaire administered by Qualtrics. It is hypothesised that users' attitudes towards SM data use in research will differ based on the research institution (i.e., businesses, universities or governments) and broad project aims (i.e., marketing and service improvement, medical research or terrorism research). Furthermore, it is hypothesised that the use of SM privacy settings is motivated by users' social privacy concerns and weakly related to users' institutional privacy concerns. This study will help understand Australians' attitudes about Facebook data being used for research purposes. Furthermore, this project has implications across disciplines. Results have the potential to provide an empirical platform for the affirmation or modification of current online data collection practices, and the applicability of existing research ethics guidelines to online social contexts.

Presentation Abstracts

Understanding the progression of blindness in koalas caused by the bacteria, *Chlamydia pecorum*

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Chlamydia pecorum is a bacteria that continues to be a major contributing factor to the decline of the koala (Phascolarctos cinereus). Similar to Chlamydia trachomatis infections in humans, infections in the eyes of koalas can lead to debilitating blindness. While the disease itself looks similar between these two hosts, there remains a significant lack of understanding of the factors that influence that influence the progression of chlamydial ocular disease in the koala.

In the present study, a range of microbiological and immunological factors were assessed in cohorts of koalas with different stages of chlamydial ocular disease. The relationship between C. pecorum infectious load and ocular disease progression was assessed using a newly developed C. pecorum-specific quantitative polymerase chain reaction (qPCR) assay to measure C. pecorum DNA levels in koalas. Koalas were also screened for two strains of koala retrovirus (KoRV-A & B) using conventional PCR. In the absence of any information on the mucosal response to koala chlamydial infection, RNA Sequencing (RNA-Seq) was performed on a subset of healthy and diseased koalas to compare the expression of genes in koalas that previously been shown to influence the outcome of human ocular chlamydial infections.

While not found to be statistically significant, chlamydial loads accumulated in koalas with acute to chronic inflammatory ocular disease were higher than in animals with late-stage scarring pathology. All animals were found to be KoRV-A positive but KoRV-B positivity was more sporadic with no obvious association found with chlamydial disease outcome in the koalas sampled. Compatible with previous research, RNA-Seq analysis revealed many genes and immunoregulatory pathways were significantly differentially expressed between healthy and diseased koalas. Crucial for the development of a koala-specific Chlamydia vaccine, this work will help us understand why some koala's are able to overcome disease while others go on to develop the most advanced ocular scarring pathology.

The Acceptability, Utility and Impact of a High-Flow Room Air Pump and Pursed Lip Simulator on the Relief of Shortness of Breath for People with Chronic Obstructive Pulmonary Disease

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Topic

Chronic obstructive pulmonary disease (COPD) is a progressive condition (Huntley, 2014). The sensation of breathlessness associated with COPD is known as dyspnoea. COPD increases the effort involved in breathing, leaving people with COPD little energy to engage in daily activities. (Thomas, Decramer, & O'Donnell, 2012).

Aim

The aim of this study is to evaluate the impact of two prototype devices, a portable highflow roomair pump and pursedlip simulator, on dyspnoea and the related functional outcomes for people with COPD.

Method

A randomised controlled crossover study will be conducted with three conditions; control,portable highflow room air pump, and pursedlip breathing simulator. The highflow roomair pump is lightweight and carried on the hip, supplying highflow room air through nasal cannulae. The pursedlip breathing simulator is a 3D-printed mouthpiece with small aperture to simulate pursed-lip breathing. Assessments will be conducted at community health centres, with at least two days between each condition to allow for recovery.

Background

The two prototype devices have been previously tested for useability, safety and comfort in case studies, healthy volunteer feasibility trial, and pilot study with 13 people with COPD or emphysema. The purpose of these devices is to minimise feelings of dyspnoea by providing air flow within the nasal passages or enabling an effective pursed lip breathing technique.

Preliminary Conclusions

Reviewed literature investigating air-flow interventions indicate that room-air may reduce the sensation of breathlessness. Whilst oxygen is widely prescribed for the treatment of dyspnoea, barriers to use such as poor mobility and portability indicate that a portable air-flow pump may be an effective alternative to oxygen as they would be affordable, lightweight and safe. Preliminary results of the trial will be presented at the conference.

References

Huntley, N. (2014). Cardiac and Pulmonary Diseases. In M. Radomski, & C. Trombly Latham (Eds.), *Occupational therapy for physical dysfunction* (7th ed., pp. 1300-1326). Baltimore, MD: Lippincott Williams & Wilkins.

Thomas, M., Decramer, M., & O'Donnell, D. E. (2012). No room to breathe: The importance of lung hyperinflation in COPD. *Primary Care Respiratory Journal, 22*, 101. doi:10.4104/pcrj.2013.00025

Presentation Abstracts

Utilisation of a sugar may dictate disease progression in *Streptococcus pneumoniae*

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Streptococcus pneumoniae is a bacterium responsible for more deaths worldwide than any other single pathogen. Despite this S. pneumoniae is part of the human nasopharyngeal microbiota where it sits asymptomatically, though it can invade deeper into the body to cause disease. The mechanisms underlying pneumococcal transition from commensal to pathogen are poorly understood, largely due to its vast genetic diversity. S. pneumoniae is subdivided into >90 serotypes based on the capsular polysaccharide they produce, which is further divided into >5000 clonal lineages/sequence types (ST). As current pneumococcal vaccines only protect against 13 serotypes, and S. pneumoniae develops antibiotic resistance at rapid rates, new drug and vaccine targets are urgently needed.

Previous studies showed strains of the same clonal lineage infect different sites within the body, depending on their site of isolation. Serotype 14 (ST15) clinical isolates derived from the blood (including strain 4559) infected the lungs, while ear isolates (including strain 947) infected the ear and brain. Genomic comparisons performed between 4559 and 947 identified a single nucleotide mutation in the gene rafR, which encodes a protein involved in the uptake and metabolism of the sugar raffinose. Growth assays with raffinose as the sole carbon source in chemically defined media indicated that 4559 grew better than 947. We subsequently swapped rafR between 4559 and 947 to generate 4559947rafR and 9474559rafR, these mutants as well their respective wild types were then used to infect mice intranasally. At 24 hours post-infection a switch in these strains infection routes was seen, 4559947rafR had spread to the ear and brain, while 9474559rafR infected the lungs. These results suggest the ability to utilise raffinose plays a significant role in dictating pneumococcal disease progression. This elucidation of the mechanisms allowing S. pneumoniae to cause disease is critical for discovering novel drug or vaccine targets.

Using genome-wide variants to determine the historical migration of chickens through South East Asia to the Islands of the Pacific

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Chickens were domesticated from wild jungle fowls and were among the commensals transported during human migration eastwards across the Pacific Ocean (Liu et al. 2006; Sawai et al. 2010; Storey et al. 2012). However, there is no detailed documentation of the exact origin of domesticated chickens, although several domestication centres have been suggested, based on archaeological and biomolecular evidence (Storey et al. 2008).

A previous study by Thomson et al. (2014) on chicken mitochondrial DNA (mtDNA) suggested the possible origin and ancestry of modern Pacific chickens to be from the South East Asia jungle fowl. As mtDNA is maternally inherited as a single locus, this study could not consider complex evolutionary events such as introgression. To confirm previous findings and identify possible gene flow, three wild and five domestic samples of four different Gallus spp. were sequenced using whole genome sequencing and analysed using a bioinformatics workflow.

We confirm the hypothesis that the modern Pacific chickens originated from the Philippines Gallus gallus (red jungle fowl). Our results confirm the phylogeny of the wild species, with Gallus varius (green jungle fowl) basal to both G. lafayettii (Ceylon jungle fowl) and G. sonneratii (grey jungle fowl), consistent with findings of previous studies (Nishibori et al. 2005; Sawai et al. 2010). Gene flow observed within the domestic chicken samples suggests a pattern of dispersal eastwards across the Pacific. Our analysis also suggests putative introgression of G. sonneratii into domestic chickens. This could be explained through a recent common ancestor before the Pacific Island radiation that is not identified in this study.

Our findings elucidate a possible migration pathway of the chickens, which can be used to infer the potential route of human dispersal to the Pacific Islands and its impact on the genetic diversity of chickens as a commensal. Understanding of the phylogenetic relation and further investigation on the underlying genetic variations between the wild and domesticated samples can provide information on improving the commercial chicken breeds.

Presentation Abstracts

Australian men's experiences of support following pregnancy loss

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An unexpected pregnancy loss is a potentially overwhelming and distressing experience for expecting parents, and unfortunately, it is not uncommon. In Australia, approximately 1 in every 177 babies are stillborn, and up to 15-20% of all recognised pregnancies will end in miscarriage. High levels of emotional distress immediately following a pregnancy loss are common, with enduring levels of distress and grief occurring for one in five parents. A number of guidelines for support providers have been produced to inform the quality of care practices and improve psychological outcomes for families. However, the majority of the literature and subsequent care guidelines focuses largely on women's experiences, given that the physical loss requires more obvious healthcare and support for recovery. Due to this, research pertaining solely to men's experiences and psychological outcomes is significantly limited, especially in the Australian context. Using thematic analysis of qualitative interviews with both bereaved fathers and pregnancy loss support providers, this study aims to explore Australian men's experiences of both formal and informal supports received following a female partner's pregnancy loss.

This paper will present preliminary findings, including an outline of the barriers and facilitators to accessing services. Analysis conducted thus far indicates that fathers do have a need for emotional support following a loss, however the specific structure varies, suggesting that support providers need to be flexible in the services offered. Moreover, many male participants who accessed available support services reported that they were largely satisfied, while others were largely unaware of services, perceiving an unavailability of appropriate support options. The paper concludes by noting that although some men may find support groups and individual counselling helpful, others may benefit more from informal support options, such as having another trusted male to confide in, or the opportunity to 'give back' and help others in their situation.

Bringing the Suzuki-Miyaura Reaction into the Teaching Laboratory

Angus Olding
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The Suzuki–Miyaura reaction is an important example of a class of fundamental metal-catalysed chemical reactions. Specifically, this process enables the direct coupling of benzene rings under mild conditions, providing unprecedented accesses to valuable molecules and materials. Traditionally, these transformations were very difficult to effect using classical chemical reactions. In this way, the development of the Suzuki–Miyaura reaction and metal-catalysed reactions more generally, represented a new paradigm in synthetic chemistry. This has contributed to the current sophistication of scientific research and the ability for the chemical industry to address ongoing challenges that the world faces in the 21st century. For this reason, the 2010 Nobel Prize in Chemistry was awarded for this discovery.

In order to introduce undergraduate students to this important reaction, an experiment has been designed. The first part of this experiment simulates common strategies employed in research laboratories that utilise high-throughput experimentation techniques to investigate reactivity trends. In contrast, the second part of this experiment challenges students to design, set-up, and perform a preparative-scale Suzuki–Miyaura reaction and suggest isolation protocols. By design, this exercise, which represents one of the final experiments performed by third-year students, serves as the pinnacle of the undergraduate laboratory program. This experiment has been successfully trialled on several classes of students.

White Egalitarianism in 18th Century Jamaica

Calvin Oppy
Monash University

During the 18th century, after the British had seized control from the Spanish, Jamaica developed a unique white camaraderie that coexisted with a very brutal and barbaric form of slavery. In comparison, the Chesapeake and Southern colonies did not develop this white fraternity; poor and rich whites in the mainland colonies developed relationships, based on wealth and reputation, that entrenched class differences. Scholarship on this era has often exaggerated the extent of this difference; scholars have glossed over underlying class tensions and over stated white solidarity. This paper examines these omissions; the issues of inter-race relationships and inheritance laws generated underlying tensions. The primary source I use is the diary of Thomas Thistlewood, a common white Jamaican who was an overseer and slave owner of little note, but left a 14,000 page diary that offers valuable insight into the social dynamics of Jamaica, to examine the ubiquity of white supremacy and fraternity on the island. Thistlewood's diary highlights power dynamics between white employers and their subordinates; however race trumped class and the fear of black slave revolt prevented poorer whites from rallying against the upper plantocracy. I will additionally use newspapers such as the Royal Gazette, and the works of the contemporary historian Edward Long, to examine the climate of fear of the island and how this influenced white class dynamics. Based on this, I argue that while there were intrinsic class issues, the very real threat of slave rebellion prevented these issues from amounting to anything.

Presentation Abstracts

Looking deeper – using deep-learning to identify internet communications traffic

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Recent years have shown an unprecedented reliance on the Internet to provide services essential for business, education, and personal use. Due to this reliance, coupled with the exponential growth of network traffic data being generated, there has never been a greater necessity for effective network management techniques. As the diversification and volume of traffic being generated increases, network management is becoming exceedingly difficult. One key component of network management is the ability to identify the types and quantity of traffic flowing through a network, termed network traffic classification. For example, what are the different types and how much web, email, video streaming, online gaming, etc application traffic flow between two network end-points.

Traffic classification assists in maintaining and improving the quality of service and detecting security threats throughout the network. Previous traffic classification techniques are limited by the use of non-standardised port numbers (e.g. growth of mobile apps) and the encryption of traffic contents (e.g. secure VPN communications or net-banking). To tackle these challenges, we propose using Deep-Learning techniques for network traffic classification.

Deep-learning is a machine learning technique that draws inspiration from the anatomy of the human brain. Deep learning has excelled in many feature and pattern recognition tasks. This paper investigates the viability of using these techniques for traffic classification with a focus on both network management applications and detecting malicious traffic in a cyber-security context. The parameters of our deep learning models are selected based on literature studies and empirical modelling. Our investigations employed the UNSW-NB15 synthetically generated traffic dataset in various input formats. Our results thus far show that a highly accurate classifier can be created using the first 50 bytes of a TCP/UDP flow as inputs into a deep neural network. This compares favourably to the first 1000 bytes employed in similar research.

Red/Near Infrared Light Therapy – protection of retinal pigment epithelial cells from oxidative damage

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Objectives

Age-related macular degeneration (AMD) is an irreversible blinding condition affecting 20-25 million people worldwide. Although not completely understood, it is believed to be related to oxidative stress of retinal pigment epithelium (RPE) cells in the macula. Red/near-infrared light therapy (R/NIR) has shown beneficial effects to tissues, particularly after oxidative insults. Our primary objective was to assess whether R/NIR was beneficial to RPE cells subjected to oxidative stress. Positive data could lead to R/NIR being utilized in AMD therapy.

Methods

Primary rat RPE cultures were first exposed to R/NIR via laser (wavelength 670nm, 90s, 100mW/cm2; range of energy settings), to determine possible cytotoxicity. RPE cells were assessed for integrity and induction of stress proteins by double-labelling fluorescent immunocytochemistry. In subsequent investigations, cells were treated with the laser and left for either 1 or 24 hours before being subjected to different concentrations of the oxidative agent, tert-butyl hydroperoxide (tbH), for 3 hours. Cell viability after all treatments was determined via methylthiazol tetrazolium (MTT) assay.

Results

RPE cells maintained structural integrity and displayed no change in expression of cellular stress markers after exposure to R/NIR, defining that the laser was not cytotoxic. When comparing cells subjected to oxidative stress with or without R/NIR laser, there was a tendency for the former-treated cells to have a greater survival rate. For example, at tbH concentrations of 10ÂµM, more cells were alive, however, comparison of the two did not reveal statistical significance (P =0.55).

Discussion

Our study found no significant difference in survival from oxidative stress between RPE cells treated with or without R/NIR laser. However, we did reveal a tendency for R/NIR-treated cells to be less affected; ongoing studies will investigate this further. Importantly, the laser was found to be safe to use on RPE cells, perhaps opening the way for clinical R/NIR therapy.

Presentation Abstracts

The closed-endfund discount and its determinants in the Australian equity market

Brooke Peel
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Closed-end funds are investment vehicles with a fixed number of shares that trade on securities markets, including the Australian Securities Exchange. A puzzle for finance researchers and practitioners is that the prices of these funds typically trade at a discount to the value of assets they own, a result known as the closed-end fund discount. For example, as at 30 May 2017 the price of the Milton Corporation Australian fund was $4.48 per share, while the assets owned were valued at $4.67 per share.

The closed-end fund discount is inconsistent with standard pricing behaviour observed across a wide range of securities. Prima facie, it represents a riskless investment opportunity. Standard finance models predict that wealthy investors will exploit apparent under-pricing by buying shares in the closed-end fund and simultaneously selling the underlying assets. This process will continue until the closed-end fund price is equal to its asset value.

The discount is anomalous to the dominant finance research paradigm. Explaining its existence is important in a wider context as choosing to invest in closed-end funds is part of the investment decision of individuals and superannuation funds. Given that Australians have over $2.6 trillion in superannuation assets, the ability of asset managers to understand phenomena such as this discount has a direct impact on the wealth of Australians.

This paper demonstrates the prevalence of the discount in the Australian equity market and using regression analysis tests three competing explanations for its existence. These explanations are first that it is due to investor sentiment; second, that it is due to transaction costs that are involved in trading shares; and third, that it relates to prices of both closed-end fund shares and those of the assets they own being affected by illiquidity in their trading. Results suggests that transaction costs provide the dominant explanation.

Police powers to compel access to encrypted devices and computer records

Esther Phipps and Gerald Manning
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The purpose of this presentation is to investigate the consequences of the recent legislative proposal to introduce a criminal offence for failing to comply with a data access order. This offence would criminalize individuals that refuse to provide the password used to access encrypted devices suspected of containing illicit material. The key justification is to prevent individuals possessing child exploitation material from using encryption to conceal evidence and escape prosecution.

Our research includes examining the rapid growth of encryption, scrutinizing analogous offences in domestic and international jurisdictions, and identifying legal and practical implications. Our sources include legislation, judicial decisions, legal journals, international and domestic reports, and parliamentary materials. Our methodology involves an analysis of these materials to assess problems encountered by inter-state and international law enforcement agencies, and potential legal or non-legal solutions.

The findings demonstrate that encryption is capable of defeating police investigation, however also reveal issues surrounding introduction of the proposed offence. Introduction would abrogate the common law privilege against self-incrimination, infringe upon individual's privacy, allow police to make opportunistic finds unrelated to the investigation, and imprison individuals based upon mere suspicion.

Furthermore the offence has the potential to be abused. The scope of its application is not limited to child exploitation offences, and it merely requires the 'rubber stamp' of a judicial member to be binding. Our research is limited in its scope, because ascertaining the exact extent to which encryption hinders police investigation is incredibly difficult as police are unlikely to identify increased search powers as unnecessary. Other practical issues include deniable encryption, how to apply the defence of reasonable excuse to the offence, and prioritizing disclosure to facilitate victim identification.

Ultimately, we find that a decision must be made as to whether the sacrifice of fundamental legal privileges is justified by increased community safety.

Shaping urban resilience: An analysis of post-earthquake recovery in Christchurch

Mark Poskitt
University of Canterbury

This paper asks the question: how is resilience shaped at the city scale, and does 'co-creation' offer a more effective approach than conventional top-down alternatives? It explores this question in the context of the post-earthquake recovery process in Christchurch since 2011, with a specific focus on the processes and approaches of two organisations: the Canterbury Earthquake Recovery Authority (CERA), and Regenerate Christchurch. For the first five years, Christchurch's recovery was primarily shaped and coordinated by the top-down authority of CERA – a post-disaster organisation driven and funded by central government. However, with growing concerns over the legitimacy and effectiveness of a top-down approach to urban design and planning, a fresh approach known as 'co-creation' has emerged. In Christchurch, this approach has been mandated and championed by CERA's successor: Regenerate Christchurch; a joint crown and city council organisation tasked with engaging communities in the city.

This paper aims to assess the relative strengths and weaknesses of co-creation and top-down approaches to urban resilience, first in theory, and then in practice through an analysis of post-earthquake Christchurch. This research is based on both an analysis of existing literature relating to urban resilience; and an empirical investigation of Christchurch's ongoing recovery, comprised of an assessment of relevant legislation, newspaper articles, interviews with key players, and participant observation. A preliminary conclusion is that different approaches to urban resilience have suited different stages in the city's post-earthquake journey. As little has been done to record or actively analyse the approaches taken towards urban resilience in the wake of the Canterbury earthquakes, this research has also tasked itself with documenting and reflecting on an important time of rapid and significant change in Christchurch's history.

Presentation Abstracts

The effects of violent music on aggressive cognitions

Merrick Powell
Macquarie University

Violent media research has primarily focussed on television and video games, with findings suggesting strong links between violent media and an increased capacity to access aggressive thoughts, feelings, and emotions, here defined as 'aggressive cognitions'. However, research investigating these links in the context of violent music is in its infancy, with most studies resorting to subjective self-report measures of aggression and musical stimuli that lack sufficient control over important musical features such as the lyrical content and the style or tone of a song. Therefore, the present study asked: do aggressive lyrics and/or aggressive musical style causally affect an increase in listeners' aggressive cognitions?

A 2x2 between-subjects experiment was designed with two levels of lyrics (aggressive and non-aggressive) and two levels of musical style (aggressive 'heavy metal' and non-aggressive 'pop').

In an initial exposure phase, participants were presented with one of four self-composed musical excerpts that corresponded to one of the four lyric x style conditions. Immediately after exposure, participants completed a lexical decision task where letter strings were flashed on a computer screen, one string per trial, and participants were required to respond as quickly and accurately as possible whether the letter strings were a word or non-word. Three types of letter strings were presented – aggressive, non-aggressive, and non-words.

If music with violent and aggressive lyrics/style activate a listener's aggressive cognitions, then participants who were presented with the aggressive lyrics or aggressive style during the exposure phase will have faster and more accurate responses to aggressive words in the lexical decision task, relative to participants who heard the non-aggressive lyrics or style. Although testing is ongoing, we expect that results will shed further light on the important relationship between violent media and human perception and cognition.

Male gaze or female shade: the roles of intra- and intersexual selection in body dissatisfaction

Zoe Powell
Macquarie University

Body dissatisfaction refers to negative feelings and thoughts about one's body, and is associated with negative health outcomes including disordered eating, anabolic steroid use, reduced quality of life and poor mental health. Social comparison mediates the link between visual exposure to idealised thin female/muscular male bodies and dissatisfaction with one's own body. From an evolutionary perspective, social comparison on appearance allows individuals to assess their attractiveness and status relative to potential mates (intersexual choice) and competitors (intrasexual competition). However, it is not known whether one or other of these comparisons is more salient in the development of body dissatisfaction. The morphological traits associated with intrasexual status (e.g. 'dominance signals' such as muscularity in males; very low weight in females) are not consistently related to opposite-sex ratings of attractiveness, suggesting that there may be separate morphology for intra- and intersexual selection.

Geometric morphometric methodology allows for the objective measurement and visualisation of relevant dimensions of shape, providing advantages over commonly used measures such as body mass index. The present research aims to 1) determine whether same-sex ratings of dominance (intrasexual competition) or opposite-sex ratings of attractiveness (intersexual selection) are more strongly associated with body dissatisfaction, and 2) use geometric morphometric methodology to identify body shape correlates of perceived dominance and attractiveness. It is predicted that same-sex ratings of dominance will predict more of the variance in body dissatisfaction than opposite-sex ratings of attractiveness. This has implications for both theories of sexual selection in humans and current models of body dissatisfaction.

Presentation Abstracts

A review of the effectiveness of Indigenous Land Use Agreements*

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Indigenous land use agreements (ILUAs) are an important mechanism under the Native Title Act 1993 (Cth) by which Indigenous people may enter voluntary negotiations with other entities to receive significant economic and cultural benefits.

Despite this potential, the economic benefits ILUAs have brought to Indigenous communities have been limited. The extent of effectiveness of ILUAs will be evaluated, specifically in relation to economic benefits.

To the extent that ILUAs have not been effective, the structural issues in the negotiation process that weaken the position of Indigenous communities will be discussed. This includes identifying the systemic advantages proponents may have in the negotiation process, and the effect of this disparity on economic outcomes.

The legislative changes that may be made to the ILUA regime to increase the leverage of Indigenous communities will be explored. This involves a consideration of the existing negotiation rights of Indigenous people, and discussion of how ILUA regime can be improved. The specific research question will be "How can the ILUA negotiation process be reformed to improve economic development in Indigenous communities?". Fundamentally, the ILUA regime will be considered as a conceptually sound mechanism for economic development, which requires legislative reform to create more consistent economically beneficial outcomes.

*Note: this abstract is part of a written paper

Speed and size illusion – the effect of orientation and mode of presentation

Padma Raghunathan
Macquarie University

The speed size illusion refers to the misperception of speed that is dependent on object size: larger objects' speeds are underestimated. It has been used, for example, to explain crashes at level crossings where a fast moving large object (train) is perceived as moving relatively slowly and thus rails are safe to cross. This study aimed to explore the nature of the illusion with respect to the mode of presentation of the objects (simultaneous or sequential) and the orientation of the objects (horizontal or vertical). Participants were required to view two objects apparently moving across a computer screen. One of the objects used in this study was a square, which was the standard, and the other was a rectangle. The rectangles were either horizontally or vertically oriented. The shorter side of each rectangle was the same length as the side of the square. Each participant was required to complete four blocks of trials in a fully repeated measures experiment, making relative speed judgments. The stimuli were presented at differing speeds and participants were required to judge which object was moving faster. Four interleaved staircases were used to identify the point of subjective speed equality for the four conditions. Most past experiments in speed detection have used a sequential presentation format so the use of simultaneous presentation may redefine the illusion in a different context.

In addition, the role that the orientation of the larger object plays has never before been considered in the context of the illusion. The results of the study will be discussed in the context of how they may be applied to situations where size/speed judgments need to be made such as pedestrian and traffic safety.

Presentation Abstracts

Azithromycin, an antibiotic with potential to reduce bone loss associated with chronic gum disease

Alan Rahulan
The University of Adelaide

Periodontal disease, commonly known as gum disease, is a chronic condition where inflammation is altered by complex interactions between bacteria and cells that lead to the destruction of the tissues that support the teeth, including bone. Azithromycin is an antibiotic that inhibits bacterial growth and changes immune system responses to infection. Clinically, azithromycin may be a novel treatment option in cases where standard periodontal treatment is inadequate. Previous studies in healthy conditions indicate that azithromycin reduces bone cell formation and activity. Since periodontitis is a chronic inflammatory condition, the aim of this study was to determine the effect of azithromycin on the formation and activity of the cells that break down bone (osteoclasts), in an in vitro inflammatory environment.

Peripheral blood mononuclear cells were isolated from whole blood of healthy volunteers. The cells were stimulated with Porphyromonas gingivalis (P. gingivalis) endotoxin for 24 hours, inducing an inflammatory state. The cells were then differentiated into bone cells by exposure to macrophage colony stimulating factor (M-CSF) and receptor activator of nuclear factor kappa B (RANK) ligand. The effects of azithromycin at two concentrations were tested. Formation of osteoclasts was determined by measuring the expression of tartrate-resistant acid phosphatase (TRAP) protein. Osteoclast activity was determined by their ability to breakdown bone, visualized by scanning electron microscopy.

The results demonstrated that P. gingivalis LPS induced an "inflammation-like" milieu with significant increases in key inflammatory protein (monocyte chemoattractant protein-1 (MCP-1), interleukin-1 beta (IL-1ß) and interleukin-6 (IL-6)) concentrations compared to unstimulated control cells ($p<0.05$). Preliminary analyses suggest that azithromycin may modulate osteoclast formation and activity as evidenced by decreased TRAP staining and bone breakdown.

This study expands our current understanding of azithromycin's effect on bone cell formation and activity which may provide a basis for future targeted and clinically appropriate use of antibiotics in cases of periodontitis where standard treatment has failed.

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An evaluation of the chest pain pathway

Abdus Salam Raju
Western Sydney University

Background

There was a considerable variation in different chest pain pathways used in hospitals across New South Wales. The inconsistency lead to adverse patient outcome and thorough investigation revealed a demand for safeguard. In 2011, the New South Wales Ministry of Health introduced the Chest Pain Pathway in all Emergency Departments (ED) to ensure a minimum standard of care for patients presenting with chest pain.

Aim

To evaluate the chest pain pathway and provide the best standard of care to patients presenting with symptoms of acute coronary syndromes by development of a clinicians tailored audit tool.

Methods

Poor compliance is often not due to the complexity of the existing pathways, but implementation into clinical practice is. Ongoing monitoring of the safety and quality is key to guide implementation. Since 2013, 4 x quarterly quality audits followed by a yearly audit were conducted on the utilisation of the Chest Pain Pathway, using a locally designed tool developed by senior staff from the ED, Cardiology Department and Administration. Five performance indicators were used to measure the essential elements of the Chest Pain Evaluation Policy including Patients Presentation, History Taking, Physical Examination, Risk Stratification and Management.

Result

Five hundred files were audited across 5 facilities. Patient Presentation which includes appropriate triage category, triage to vital signs and ECG within 10 minutes showed improved compliance improved by 74%. Compliance also improved in Physical Examination by 44%, and Management by 104%. These improvements continued a year after audits were undertaken and processes were introduced specific to each facility.

Conclusion

The development of a clinicians tailored audit tool on the utilisation of the Chest Pain Pathway has provided a local solution to ensure the mandated Chest Pain Evaluation Policy is compliant.

Presentation Abstracts

How at-risk are you at work? Understanding the relationship between risk perceptions, organisational commitment and employee information security awareness

Andrew Reeves
The University of Adelaide

Cyber security incidents pose a significant threat to the information technology systems that allow businesses to run effectively. Ninety-five percent of security incidents involve human error, leading businesses to invest greater resources into training their staff to be aware of, and avoid, these risks. Businesses are increasingly looking to information security awareness (ISA) as a way to gauge the current proficiency of their staff in information security contexts.

This study captures ISA by examining an employee's knowledge of, and attitude towards, best-practice information security behaviours, as well as their commitment to these behaviours. The purpose of this research is to investigate how employees' ISA relates to how personally at-risk they feel from cyber threats, how they perceive these threats, as well as how committed they are to their organisation. The project involves administering an online questionnaire consisting of measures for ISA, Organisational Commitment, Perceived Personal Risk, and other risk perceptions, over the web-based survey platform Qualtrics, to 250 working Australians. Information security awareness is measured by the Human Aspects of Information Security Questionnaire (HAIS-Q). To date, the relationship between the HAIS-Q, risk perception and organisational commitment is yet to be examined. Findings supported the hypothesis that organisational commitment and risk perception predicted ISA.

However, this differed based on the risks examined. Demographic variables (e.g., age, gender, and information security training) also significantly predicted variance in ISA across all risks examined. By identifying the contexts in which perceived personal risk and organisational commitment become significant predictors of information security awareness, this research has the potential to inform the development of information security training, aiming to enhance employee ISA. Furthermore, this research can enable businesses greater insight into the areas of their workforce that may require further information security training.

The impact and prevalence of pancreatic enzyme deficiency in Type 2 Diabetes

Michael Riceman
The University of Adelaide

Type 2 diabetes (T2D) is a common condition, affecting approximately 1.2 million Australians. A key aspect of management is controlling blood glucose levels, with an important target being glucose levels after a meal (postprandial glycaemia). Two major determinants of postprandial glycaemia are the "incretin" hormones, GLP-1 and GIP, and gastric (stomach) emptying. The incretin hormones are secreted from the gut in response to a meal and stimulate insulin release, while GLP-1 also slows gastric emptying; both actions reduce blood glucose levels after a meal. Importantly, incretin hormones are only secreted in response to nutrients that have first been digested by enzymes released by the pancreas. As such, a deficiency in pancreatic enzymes, termed pancreatic exocrine insufficiency (PEI), reduces incretin hormone secretion, leading to rapid gastric emptying and an increase in postprandial glycaemia.

Recent literature has demonstrated a hitherto under-recognised prevalence of PEI in T2D. Pancreatic enzyme replacement therapy (PERT) may therefore improve blood glucose control in these patients.

We aim (i) to determine the prevalence of PEI in T2D, as determined by low faecal elastase-1 (FE-1) levels, and (ii) to evaluate the impact of PERT on postprandial glycaemia, incretin responses and gastric emptying in this cohort.

We are screening T2D patients recruited from outpatient clinics and the community and selecting those with FE-1 ≤200µg/g to undergo a double-blind, randomised, crossover study to examine the acute effects of PERT vs placebo on gastric emptying of a high fat, high carbohydrate meal, as measured by scintigraphy (a nuclear medicine scan). We will evaluate concurrent blood glucose, GLP-1 and GIP levels at frequent intervals for 6 hours after the meal.

We hypothesise, based on the literature, that ~25% volunteers with T2D will have FE-1 ≤200µg/g, and that PERT in this cohort will reduce postprandial glycaemia, restore incretin hormone secretion, and slow gastric emptying.

Presentation Abstracts

Are motor neuron abnormalities correlated with impaired motor function in a zebrafish model of ALS?

Katherine Robinson
Macquarie University

Amyotrophic lateral sclerosis (ALS) is a fatal neurodegenerative disease characterised by progressive loss of motor neurons in the central nervous system.

ALS is caused by mutation to several genes; the first identified ALS-causing gene was SOD1. Characteristics of human ALS can be modelled in zebrafish (Danio rerio) via expression of mutated ALS-causing genes. Expression of mutated human SOD1 in zebrafish causes shortening and aberrant branching of motor axons, however the impact of mutant SOD1 on motor function remains elusive. Therefore, our aim was to determine if shortened axon length was correlated with impaired movement in SOD1 expressing zebrafish.

Transgenic zebrafish embryos expressing blue fluorescent protein in motor axons were injected with either human wild type (WT) SOD1 or mutant (MT) SOD1 mRNA during the single cell stage of fertilisation. At 48 hours post fertilisation, motor function was tested using a light stimulus. Movement in response to light was recorded as distance swum. Larvae were then anaesthetised and imaged under fluorescent microscopy. Axon length was measured using the ImageJ. Statistical analysis of axon length and motor function was performed using one-way ANOVA and Bonferri's post hoc analysis. The relationship between axon length and motor function was determined using Pearson's correlation analysis.

Our results showed MT SOD1 injected larvae had significantly shorter axons ($p = 0.002$) and swum a significantly shorter distance ($p < 0.001$) when compared with WT SOD1 injected and non-injected larvae. Furthermore, there was a significant correlation between motor output and axon length ($R2 = 0.357$, $p < 0.001$) albeit weak.

These data present the first correlative investigation of axonal length and motor function in zebrafish expressing SOD1. We conclude examination of ALS in zebrafish models should not be restricted to axon morphology as this may provide little insight; further measures of disease should also be examined, including motor function.

Lifetime prevalence and determinants of antidepressant usage in a 2015 cross-sectional South Australian sample

Sebastian Rositano
The University of Adelaide

The demographic risk factors for Major Depressive Disorder (MDD) have been researched to guide interventions. However, there is still some disagreement on their relations and there has been renewed interest in the effects of bullying and sexual abuse on MDD. Using data from the 3005 participants of the 2015 Health Omnibus Survey, these factors were investigated as predictors of depression.

Predictors for MDD were hypothesised to include: being of Indigenous origin, being female, having an experience of bullying, having an experience of sexual abuse, being aged under 25 and living in a rural area. It was also hypothesised that likelihood of depression would decrease at increasing levels of household income (HHI). Lifetime experience of depression was inferred via any previous use of antidepressants. Crude odds ratios for these factors were calculated and factors significantly related to depression were then entered into a binary logistic regression to calculate the adjusted odds ratios.

Results showed that Indigenous origin, rural living and a young age were not significantly related to use of antidepressants. In the adjusted calculations, female gender, exposure to bullying or sexual abuse, age and HHI were significantly related to depression. These results have implications for targeted Government policies. Future research should investigate the interactions between these factors to better understand the development of depression in these groups for more informed Government interventions.

Purification of carbon nanotubes for lithium-sulfur battery application

Dea Rusly
University of Queensland

Carbon nanotubes (CNTs) of high purity are often required in many applications, such as in Lithium-Sulfur batteries (LSBs). To date, no commonly used synthesis techniques can produce pure CNTs, thus purification is essential. Acid-based purification is the most commonly used post-synthesis purification techniques. This research aims to compare the ability of two acids: HNO3 and HCl to remove impurities. The quality of the purification was assessed through LSB battery characterisation and Transmission Electron Microscopy (TEM) imaging. The study found that batteries prepared using the HCl washed CNTs performed slightly better than those prepared with HNO3 washed CNTs. TEM images also demonstrate that while minimal impurities remained on both CNT samples, more side wall defects were observed on HNO3 washed CNTs than the HCl washed CNTs. From these observations, it is concluded that HCl is more suitable to purify CNTs for this application.

Presentation Abstracts

The literacy ability of Torres Strait Islanders and the Great Separation

Nicholas Sailor
Central Queensland University

One of Australia's main educational issues is the disparity between Aboriginal and Torres Strait Islanders' literacy abilities and the rest of Australia (National Report on Schooling in Australia, 2014). There have been many studies in Education discussing the differences between Indigenous people and Australians' literacy ability (Dept PM&C). However, there seems to be a lack of focus on specific Indigenous groups in Australia. Currently, Aboriginal and Torres Strait Islanders are grouped together. Tagai State College (situated on Thursday Island) happens to have above average literacy results compared to other statistical socio-economic educational backgrounds according to the NAPLAN results (ACARA, 2017).

The aim of this research is to use qualitative methods to collect descriptive data validating the success of Tagai State College is because they have embedded more of the Torres Strait Culture into the curriculum content used in classrooms. The qualitative methods used in this study are making observations and note taking of teaching scenarios, and interviewing teachers and administration staff. This research is pertinent because current research argues that Indigenous students are not doing as well as other Australian groups. This research would disaggregate that data to demonstrate that some Indigenous groups are performing well in literacy. This could break down some of the negative stereotypes Indigenous people face and, possibly, provide strategies for other Indigenous groups to use.

References

Australian Curriculum, Assessment and Reporting Authority. (ACARA, 2017). *Tagai State College, Thursday Island, Qld.* Retrieved from My School: https://www.myschool.edu.au/ResultsInNumbers/Index/68749/TagaiStateCollege/40788/2012

Australian Government Department of the Prime Minister and the Cabinet. (Dept PM&C, 2014). 2.04 *Literacy and numeracy.* Retrieved from Aboriginal and Torres Strait Islander Health Performance Framework: https://www.dpmc.gov.au/sites/default/files/publications/Indigenous/Health-Performance-Framework-2014/tier-2-determinants-health/204-literacy-and-numeracy.html

National Report on Schooling in Australia. (2014). Retrieved from ACARA: http://www.acara.edu.au/reporting/national-report-on-schooling-in-australia-2011/aboriginal-and-torres-strait-islander-education/literacy-and-numeracy

Tasting Colours: the existence and nature of Gustatory-Colour Correspondences

Supreet Saluja
Macquarie University

Gustatory-colour cross-modal correspondences (CCs) are the consistent matches non-synaesthetes make between the primary tastes and colours. Cross-modal literature has previously shown that people regularly pair pink/red with sweet, blue with salty, yellow with sour and green with bitter. To date however, only taste names and colour swatches, have examined these pairings. As such, it remains unclear whether people would choose aforementioned colours when given all possible hues and real tastants. Further, no general consensus has been reached on umami colour taste pairings. Thus, the primary research question is, do consistent pairings between the primary tastes and hues exist, across and within individuals, when real tastants and all possible colours are given.

Participants received 10ml samples of sucrose, citric acid, sodium chloride, monosodium glutamate and quinine, in weak, medium and high concentrations, and three water samples. Solutions were randomised within and across participants. After tasting, participants selected the colour they best associated with the taste, on a standard RGB-colour-wheel. Taste ratings (liking, intensity, irritancy, quality) were made on a series of line scales. The experiment was repeated after a 5-minute interval. At the end of tasting, participants verbally indicated the colour they best associated with each taste name. Preliminary results show pink/red is consistently paired with sweet (76%), blue with salt (38%) yellow with sour (50%) and green with bitter (32%). Further analyses are yet to be run on umami pairings, and reliability within individuals. Nonetheless, preliminary results across the sample validate gustatory-colour CCs.

Presentation Abstracts

Design and build a continuous Hydrothermal Liquefaction system

Samantha Scott, Adrian Hoffman, Nien Yee Too and Stuart Smith
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Purpose/Rationale

The need to transition from fossil fuels to alternative renewable energy sources and to reduce their impact on our environment is becoming crucial. Hydrothermal liquefaction has a promising future as it converts biomass feedstocks into biocrude, which can be further refined into liquid fuels. A major hurdle is to design a system to make the process continuous, allowing it to be performed at the industrial scale needed to become a viable substitute for fossil fuels.

Research Question/Focus

1. Based on the results acquired from the constructed prototype, how much potential is there for an industrial scale continuous system?
2. What will be the effect on the biocrude oil yield if the system is subjected to changes in biomass input, residence time, reaction temperatures and pressures?

Research Methodology/Approach

The Hydrothermal Liquefaction (HTL) process involves heating a biomass slurry at subcritical conditions, under temperatures of 250-375° and pressures of 200-300 bar. Continuous and batch systems were previously tested successfully by several research institutions, which inspired the preliminary design of the system. Heat transfer within the reactor is modeled using Computational Fluid Dynamics (CFD) software and estimation of various feedstock properties performed using MATLAB. From the research conducted, it is expected that high heating rates and low residence times will favour biocrude production, hence these will form the basis for testing.

Significance and Originality of Findings

The results from the CFD model indicate that there is potential to predict the heat transfer rates achieved in the reactor, and the optimal flow rate to provide an ideal residence time. Construction of the system is currently underway, with testing of the system to occur once it is complete. Testing will reveal how capable the system is, and the impact varying operating conditions will have.

Retention rates of beginning teachers in rural and regional Queensland

Tayla Shanks
Central Queensland University

As alarming retention rates of beginning teachers in the regional and remote Queensland continue, it is important to examine all factors influencing teachers to leave the profession in their first five years of teaching. The purpose of this paper is to review current literature that explores the reasons why beginning teachers are remaining in the profession or leaving the profession. The key focus is on inductions and mentoring support which beginning teachers receive during their transition to teaching, particularly through programs currently conducted in Queensland schools. Additional focus is on pedagogical competence and confidence that is acquired during pre-service teacher education and particularly the unique challenges faced by male teachers.

The literature reviewed shows that factors such as quality inductions, ongoing support from mentors and overall support culture of the school impacts on the early career experiences and overall retention patterns for beginning teachers. Key findings in the literature were that beginning teachers' prior pedagogical knowledge and experience, their pedagogical strengths and weaknesses and their personal background and geographical location were key influences on personal and professional growth in the early years of teaching. Findings from this literature review are being used to inform research planning for two studies of beginning teachers in Queensland schools. The first study focuses on male teachers' early teaching experiences; the second on early childhood teacher recruitment and retention in regional and remote schools and early learning centres.

Presentation Abstracts

Sport, spectacle and politics in Queensland Aboriginal Settlements

Catherine Sherwood
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From the late 1920's onwards, sport and spectacle became a huge commodity in Queensland Aboriginal settlements. During this time, the Queensland Government and settlement officials poured copious amounts of money, time and effort into staging football matches between Aborigines and Anglo-Australians that cannot be justified by the meagre profit they produced. Evidently, more complex and powerful forces were at work. This project investigates the relationship between sport, Aboriginal representation and institutional Queensland. Specifically, it analyses the use of football as an assimilating agent between members of the Cherbourg, Woorabinda, and Palm Island settlements and the Anglo population of Queensland, through both the matches themselves and their media portrayal to the broad public. Archival, digital and qualitative research methods were used to conceptualise a range of sources, including newspaper articles from the Australian online library database Trove, annual reports by the Chief Protector of Aborigines, and settlement documents from the Queensland State Archives.

The sources reveal that football matches provided a stage on which a deliberate, strategic, constructed Aboriginal representation was presented to the Anglo-Australian public. This representation held several purposes: to confirm the 'right' and 'productive' work of the settlements, to create a 'mechanism of assurance' for Anglo people, and to promote a national narrative of 'continuing progress'. The research reveals much about Aborigines as spectacle, sport as a tool of racial integration, and the 'hidden' motivations behind the Queensland Government's promoting of these sporting events during a time when Aborigines were being purposefully and strategically assimilated into Anglo-Australian society.

The importance of HSC70 cell surface exposure in Mesenchymal stem cells

Kirsten Smith
The University of Adelaide

Mesenchymal Stem Cells (MSCs) are adult stem cells that can be isolated from a variety of tissues including the bone marrow. MSCs self-renew and give rise to multiple cell types including bone, cartilage and fat cells. In addition, MSCs are unique as they can move to sites of injury where they secrete growth factors and other hormones to create an environment that stimulates tissue repair. Recent research has also found that MSCs can suppress the immune system and inflammation. This has enabled the development of MSC-based therapies to treat conditions where tissue degradation and immune responses play a significant role such as chronic heart disease and rheumatoid arthritis.

MSCs with the best clinical potential can be isolated from bone marrow based on the binding of STRO-1, an antibody that binds to a protein called heat shock cognate 70 (HSC70). Interestingly, HSC70 is normally found inside the cell, however, in MSCs and also human embryonic stem cells it is found on the cell surface. This suggests that HSC70 expression on the cell surface may have a function important to stem cell biology. HSC70 does not have a classical protein domain to direct it to the cell surface leaving a crucial gap in knowledge as to mechanism by which HSC70 is surface expressed. This project explores the possibility that a post-translational modification alters HSC70 in MSCs leading to its surface expression. To assess this, cell surface HSC70 from MSCs will be labelled and isolated then assessed for post-translational modifications. Additionally, HSC70 will be genetically modified to mimic certain modifications and then investigated to see if these alter surface expression. Identifying the mechanism by which HSC70 is surface expressed may give insight into the importance of cell surface HSC70 in MSCs and this greater understanding may lead to better MSC-based therapies.

Which self-peptides contribute to transplantation tolerance?

Eric Taeyoung Son
The University of Sydney

Transplant recipients must rely on immunosuppressive drugs to ensure that their immune system does not reject the donor's organ which bears foreign MHC (major histocompatibility complex). Immunocompromised patients have a greater risk of developing cancer and they are more susceptible to opportunistic infections. Despite advancements in more potent immunosuppressive drugs, the graft-survival rate has remained quite static over the last 20 years for organ recipients. Thus, we need another way to achieve transplantation tolerance without relying on systemic immunosuppression.

The liver is recognised as the metabolic powerhouse in our body, however, it also plays a paramount role in induction of immune tolerance. Persistent chronic viral infection by hepatitis B and C virus and frequent metastasis of cancer cells to the liver are primary examples whereby diseases have exploited the liver's tolerogenic environment in order to evade the host immunity.

Our lab has previously demonstrated that the tolerogenic property of the liver can be exploited to overcome transplantation rejection by expressing a high level of donor MHC molecules in the donor's liver using adenosine associated virus (AAV2/8) in a mouse model. This is a robust and clinically applicable strategy that has potential to save and improve countless people's lives in the future. The field of inducing transplantation tolerance through MHC gene transfer is at its infancy and the molecular mechanism behind transplantation tolerance is still under investigation.

By utilising a variety of molecular, cellular and immuno-proteomic techniques, we have identified a set of ubiquitous "self" peptides bound to the donor MHC that may play a pivotal role in tolerance induction by subsequently silencing/deleting alloreactive T cells that are responsible for graft rejection. In conclusion, this project opens a promising avenue for investigating the donor MHC – peptide interactions at the cellular surface in the transplantation tolerance model established in our lab.

Presentation Abstracts

Mechanism of neuroprotection by mechano-growth factor, a muscle specific isoform of insulin-like growth factor 1

Courtney Subramaniam
The University of Adelaide

A muscle specific isoform of insulin-like growth factor-1, mechano-growth factor (MGF), is a potent rescue factor for adult neurons and so has great therapeutic potential for neurodegenerative diseases. However, both the receptor and downstream signaling pathways by which MGF act are unknown. Two key signaling pathways activated by neurotrophic factors are the phosphatidylinositol 3-kinase (PI3K) pathway and the extracellular signal-regulated kinase 1 and 2 (ERK 1/2) pathway. These both result in activation of the mammalian target of rapamycin complex 1 (mTORc1). It is possible, therefore, that MGF acts via PI3K, ERK 1/2 and mTORc1. This study aimed to identify (i) the downstream signaling molecules activated by MGF during motoneurone rescue and (ii) the location of the currently unknown MGF receptor.

MGF injection into the stylomastoid foramen following facial nerve avulsion in rats has been shown to rescue adult motoneurones. To test whether blocking signaling molecules in the mTORc1 pathway affects MGFs action in vivo, 10µl of 1µg/µl MGF and 100µg/µl of either rapamycin (mTORc1 inhibitor), LY294002 (PI3K inhibitor) or AZD6244 (ERK 1/2 inhibitor), was injected into the stylomastoid foramen following facial nerve avulsion (n=6 rats/group). The number of motoneurones surviving the insult was than determined stereologically. To study the distribution of the MGF receptor, the pattern of binding of biotin-labelled MGF to sections of muscle- and nervous- tissue was undertaken.

None of the inhibitors blocked MGF-mediated neuroprotection. Surprisingly, rapamycin plus MGF promoted motoneuronal survival over and above that seen with MGF alone. There are no results for MGF binding, as the study is still in progress.

The present findings indicate that MGF may not act via the signaling molecules commonly associated with other neuroprotective factors. In addition, they suggest that rapamycin, either singly or in combination with MGF, promotes significant adult motoneuronal survival.

Changes in Brainstem Cytokines in normal ageing and Motor Neurone Disease

Anuradha Tennakoon
The University of Adelaide

Rationale

Age-related increases in inflammatory status, as measured by elevated levels of pro-inflammatory cytokines, have been implicated in the development of age-related neurodegenerative diseases including Motor Neurone Disease (MND). However, recent studies in rats have revealed that elevated inflammation associated with healthy ageing may promote motoneuronal survival. In order to clarify these apparently contradictory roles of inflammation in MND, changes in 27 cytokines have been compared here in healthy ageing and in MND.

Focus

1. To characterise age-related changes in human brainstem cytokine levels
2. To determine whether ageing and MND brainstem are characterised by different brainstem cytokine profiles
3. To determine the neuroglial cell types that express inflammatory cytokines

Approach

27 cytokines(IL-1α, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-12, IL-13, IL-15, IL-17A, TNF-α, IFN-Ɣ, FGF, G-CSF, GM-CSF, IFN-Ɣ, MCP-1, MIP-1α, MIP-1β, Eotaxin, PDGF-1ß, RANTES and VEGF) were analysed using multiplex technology in fresh frozen post-mortem brainstems of MND patients aged 60-68 years (n=6), and compared with those of ageing controls aged 48-86 years (n=6) and young adult controls aged 20-33 years (n=6). Immunocytochemistry was used to co-localise selected cytokines to neuroglia.

Results

Levels of IL-1β and IP-10 were higher in brainstems of ageing controls compared to young adult controls (p=0.017 and p=0.020 respectively). Moreover, MIP-1β levels were higher in brainstems of ageing controls compared to young adult control brainstems (p=0.006) and decreased in MND brainstems compared to that of ageing controls (p=0.023). Immunocytochemistry showed that astrocytes were the source of MIP-1β.

Significance

There is evidence from animal studies that MIP-1β is neuroprotective. The increased levels of MIP-1β with normal ageing found here may therefore be neuroprotective, whereas lower levels in MND may be associated with age-related motor neuronal degeneration. This suggests that modification of levels of specific cytokines may be a therapeutic strategy in MND.

Presentation Abstracts

Higher Dimensional Venn Diagram Analogues

Vanessa Thompkins
The University of Adelaide

Why do we rarely see Venn diagrams that use circles to compare more than three sets? In fact, any 'Venn diagram' comparing more than three sets in two dimensions using only circles is not a Venn diagram at all, as it cannot contain all possible logical intersections of the sets and their complements. This is a consequence of the way in which circles intersect. Various methods of creating Venn diagrams for four or more sets in two dimensions using shapes other than circles have been devised. However, these generally lack the pleasing symmetry and simplicity of Venn diagrams created from circles. We consider a different approach: constructing Venn diagram analogues by intersecting spheres in higher-dimensional spaces. The resulting objects share many properties of two-dimensional Venn diagrams created using circles, making them an interesting subject of research.

We generalise Venn diagrams created from circles to higher-dimensional spaces by intersecting spheres, and explore the geometry of the resulting objects. In particular, we claim that in k-dimensional space, it is possible to intersect up to k + 1 spheres in such a way that they meet all requirements to be a Venn diagram other than two-dimensionality, and that k + 1 is the maximum number of spheres with which this can be done. In pure mathematics, unlike most disciplines, all research is done exclusively through the use of deductive reasoning. We used accepted methods of proof which use deductive reasoning to derive our results. We have proved new results about higher-dimensional Venn diagram analogues which hold for spaces of arbitrary dimension. We have also found a general formula for the number of regions formed when n spheres are intersected in k-dimensional space, which may be useful for proving further results about these objects. Our results may have some relevance to parts of topology.

Resolving the human-rights paradox: the role for Australian climate law on psychological health

Kimberly Voss
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Climate change poses a critical threat to psychological health and wellbeing across the globe. Poor psychological health may result from two different, albeit inter-related, climate change exposure pathways. Direct exposure to extreme weather events, such as bushfires, or prolonged periods of drought, are associated with post-traumatic stress disorder, major depressive disorder and higher levels of suicide in Australia. Psychological harm may also result indirectly from disruption to economic, social and demographic factors that are crucial to psychosocial wellbeing. A changing climate leads to variations in the frequency and severity of weather, which amplifies existing psychological health risks. As psychological health disorders become increasingly prevalent, negative implications upon the fundamental human-right to health are inevitable. Australia has made a commitment to act upon climate change health threats under the Paris Agreement.

The Agreement stipulates that parties ought to respect and promote their obligations to human-rights in resolving climate change affairs. Yet paradoxically, there is no recognition of the psychological impacts of climate change under Australian law or policy. Consequently, Australian law has an important role in addressing this matter from a human-rights perspective, in a healthcare and policy context. This paper aims to examine the literature, which unequivocally links climate change to poor psychological health in Australia. Next, it will draw on Government healthcare data to discuss the detrimental effects on the mental health sector. It will then critically review the national climate change policy and lack of priority afforded to mental health provisions. Finally, it will propose a unique role for Australian law, to integrate specific legislative protection of the broad human-right to health. It concludes that policy protection is urgently needed at a national level to meet Australia's international human-rights obligations. The solution offered may ultimately provide the missing framework for climate change law and mental healthcare in Australia.

Evaluation and integration of simulation technologies for teaching and learning physics

Raymart Walker
University of the Sunshine Coast

The University of the Sunshine Coast (USC) is the first institution in the world to utilise the CAVE2TM for teaching and learning purposes and also houses a Collaboration Studio which contains a large, high-resolution display wall with 2D and 3D capabilities. However, few theoretical models exist for the integration of these enhanced learning spaces in learning and teaching activities. The primary aim of this project was to investigate the effectiveness of learning using simulation technologies and visualisation facilities in three Physics-related Engineering courses at USC. This project was student-led and undertaken to support curriculum transformation in Engineering courses at USC. The findings demonstrate that teaching with simulation technologies or using visualisation facilities requires careful consideration in order to facilitate a meaningful and deep learning experience.

Key influences in the effective integration of simulation technologies and the visualisation facilities were investigated through a phenomenological study, and were informed through student evaluations and face-to-face targeted interviews with students enrolled in focus courses. As part of the student evaluations, a survey was designed in collaboration with an Academic Developer at USC's Centre for Support and Advancement of Learning and Teaching (C~SALT). The evaluation process proposes that instrumental factors in the delivery of the simulation technology or the use of the visualisation facility on the enhancement of learning include the lecturer's pedagogical strategies, usage of the facilities, the student's learning preference, and the quality of the visualisation artefact. This project proposes recommendations for their integration into the Engineering curriculum to create a more meaningful student learning experience.

Presentation Abstracts

Inside the Chinese keyword *sajiao*: The art of feminine persuasion

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Australian National University

There is a close connection between the life of a society and the lexicon of the language it speaks - through interrogating the meaning and the significance of certain cultural keywords, we can unearth valuable insights about a given speech community. My essay focuses on the Chinese keyword 撒娇 *(sajiao)*, a phrase typically translated into English as "to act like a spoiled child", "to throw a tantrum", or "to act coquettishly".

I suggest these translations are overly narrow and do not accurately represent how Chinese speakers understand and use the phrase. To produce a more nuanced translation, I review Chinese dictionary definitions of sajiao and analyse examples of the phrase being used in conversation and in writing. The examples include excerpts from a mother's interaction with her young child and clippings from Chinese tabloid newspapers.

With reference to this linguistic data, I use Anna Wierzbicka's natural semantic metalanguage (NSM) approach to explicate the phrase. This approach attempts to explain complex, culture-specific concepts in simple, universal terms, using a vocabulary of 64 words (known as semantic primes) whose meanings cannot be decomposed further.

My explication suggests sajiao prototypically involves someone (usually a child or a young woman) projecting a sense of helplessness and dependency to win the affection of someone else, in order to persuade this person to do a favour for them. Importantly, sajiao is a deliberate and calculated action designed to elicit a certain response, as opposed to the uncontrolled outburst of emotion implied by the English gloss "to throw a tantrum".

This explication can help us to better appreciate the significance of the cultural keyword sajiao, and provide a key to understanding how Chinese speakers navigate power relations, persuade others, and construe gender roles.

Streamlining public transport intermodal connections to increase ferry ridership: Agent-based simulation study

Roy Zhu
The University of Queensland

The CityCat ferry system in South East Queensland (SEQ), Australia, offers a unique customer experience over alternative forms of public transportation. Customer satisfaction surveys undertaken in 2011-2015 by TransLink, a public transport operating agency in SEQ, consistently showed that the ferry system produced the highest customer satisfaction level across all public transport modes in SEQ. Nonetheless, patrons in Brisbane are discouraged from using CityCat ferries due to its comparatively longer travel times and poor connection to/from other public transport modes. In order to reduce travel time and enhance intermodal connections, this study designs and tests new integrated public transport scheduling and a passenger information system (PIS) which can streamline Bus/Rail-to-Ferry and Ferry-to-Bus/Rail connections. Their impact is investigated through a case study of the travel corridor from the University of Queensland (UQ) Saint Lucia Campus to major transit hub Toowong Railway Station, focusing on changes in the proportion of passengers travelling to Toowong Station through bus and through ferry.

The proposed system also considers the operation of additional express ferry services between Regatta and UQ during afternoon peak hours while dynamically scheduling the express ferries and providing the optimal transport mode with the fastest path to the transfer passengers via a real-time PIS. An agent-based simulation approach is used to model dynamic intermodal transfer behaviours of heterogeneous passengers at a transfer location based on observations from bus stations and a ferry terminal. The input parameters (e.g., ferry/bus headway, dwell time, etc.) for the simulation model are calibrated with actual data including smart card records, field measurements, and Global Positioning System (GPS) data. Various what-if scenarios representing different express services were constructed and analysed. The findings from the simulation analysis suggest that the proposed express services can convert bus travellers to regular daily ferry riders.

Poster Abstracts

Gastrointestinal mechanisms underlying glucose lowering by metformin in type 2 diabetes

Matthew Borg
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The control of blood glucose levels is fundamental to the treatment of type 2 diabetes (T2D). Despite metformin being the first-line anti-diabetic drug treatment, its antidiabetic action remains poorly understood. Emerging evidence suggests a key role for glucagon-like peptide-1 (GLP-1), a hormone which lowers blood glucose, in part, by slowing gastric (stomach) emptying. Given that GLP-1 releasing cells are located in the distal small intestine (SI), the distal as opposed to the proximal SI is likely to be of greater therapeutic relevance for metformin.

We aim to (i) determine the importance of proximal vs distal SI exposure to metformin on reducing blood glucose and (ii) evaluate the relevance of enhanced GLP-1 secretion and slowing of gastric emptying to metformin's glucose-lowering effects before and after oral glucose in T2D.

12 patients with diet-controlled T2D will be studied over 3 days. On each day, subjects will receive one of three treatments via a tube, inserted via a nostril into the SI. These are (1) 0.9% saline proximally and distally (control), (2) metformin 1000mg proximally and saline distally, and (3) saline proximally and metformin 1000mg distally. Each will be followed in 60 minutes by oral glucose 50g and 13C-acetate 150mg (a marker for assessment of gastric emptying). Blood samples, for measurement of blood glucose and hormones (GLP-1, insulin and glucagon), will be collected prior to and following the oral glucose at regular intervals for 4 hours. Breath samples will be collected to evaluate gastric emptying.

Evidence suggests metformin-enhanced GLP-1 secretion is mediated via metformin's interaction with the distal SI. Hence, we expect distal SI exposure to metformin will enhance its glucose-lowering effect, associated with augmented GLP-1 secretion and slower gastric emptying, when compared with proximal SI exposure. These findings may guide changes to clinical practice that impact 150 million metformin users worldwide.

Radiant Ignition of Single Leaf Particles

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Prediction of bushfire propagation is complicated, involving a series of interrelated aspects and mechanisms which are not fully understood or effectively characterised. This study aims to address research gaps on the factors that affect bushfire propagation, namely radiant ignition of single particles. This is an experimental study, where the test subject is constrained to the leaves of River Red Gum trees (Eucalyptus Camaldulensis) - the most widespread eucalyptus species in Australia. In particular, the effect of leaf conditions: (i) dry, dead or fresh, as well as (ii) radiation intensity on the ignitability of leaves would be studied, using a heat lamp to provide a controlled source of radiant heat. The study is also confined to intact leaves (single particles) as opposed to fine-grounded leaves. While numerous studies have been conducted on the ignitability of vegetation, in particular the ignitability of various species conducted by Gill and Moore (1996), the project identifies the opportunity to improve on the experimentally methodology, employing the use of specialised technology such as heat lamps and thermal camera for a more stringent and robust experimental setup. The main focus of this research is on the temperature variations of the leaf with time, where it was found that leaves experienced four main stages, which are moisture evaporation, devolatilisation, ignition and combustion.

Poster Abstracts

Characterisation of a novel GOLGA4-JAK2 and a reported ATF7/P-JAK2 fusion from patients with B-cell Acute Lymphoblastic Leukaemia

Charlotte Downes
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B-cell Acute Lymphoblastic Leukaemia (B-ALL) is a malignant neoplasm of B-cell precursors in the bone marrow and blood. Next generation sequencing has the potential to improve risk stratification and treatment approaches for B-ALL patients. Using this approach, causative genetic lesions in various kinase and cytokine receptor signalling molecules have been identified, some of which are targetable using rational therapies. Janus kinase 2 (JAK2}-rearrangements in B-ALL have been associated with extremely poor prognosis, and the frequency of these rearrangements tends to increase with age. A novel fusion between JAK2 and 5' partner Golgin subfamily 4 member 4; GOLGA4, has recently been identified in the blood of a patient within our cohort of 122 adult B-ALL patients for whom we have whole transcriptomic data. Preliminary data has shown constitutive STATS phosphorylation and sensitivity to the JAK2 inhibitor, ruxolitinib, in patient cells expressing GOLGA4-JAK2.

To characterise the oncogenic potential of this lesion, the GOLGA4-JAK2 fusion gene will be amplified from patient cDNA and cloned into a retroviral expression vector. Similarly, a fusion between JAK2 and activating transcription factor 7 interacting protein; ATFIIP, was recently reported in a cohort of 1725 BALL patients and cloned into a retroviral expression vector (Roberts et al., 2015). Ex vivo cytotoxicity assays have shown that human leukaemic cells expressing ATF7IP-JAK2 were also sensitive to ruxolitinib but not the tyrosine kinase inhibitor, imatinib (Roberts et al., 2015). My honours project aims to determine the effect of the 5' fusion partner and the breakpoint in JAK2 in JAK2-fusions in high-risk B-ALL. Exploration of such lesions will improve our understanding of the diversity of genomic lesions and the biological mechanisms driven by JAK2-fusions in high-risk B-ALL.

A framework to overcome the challenges and barriers of developing a mobile online health care system in Australia

Tien Phong Duong
Central Queensland University

This research asks, "What are the challenges and barriers of the mobile online health care system? Will it be resolved?" A healthcare system is an organization, whether private or part of a government department, with resources and services which can be provided to a target of people who need healthcare. In turn, the term 'mobile online healthcare system' refers to a healthcare system designed for mobile devices which can be used anywhere and anytime. The research examines how patient access to doctors is a significant social and medical issue, even in a developed country like Australia, where irregular sources of care, language obstacles, low income, difficulties in transportation, and health insurance problems impede the access of patients to basic medical care, in both rural and urban areas. Understanding these access issues plays an important role in terms of improving the level of patient access to doctors.

The research argues that a model can be developed for an appropriate solution which will enhance the current situation. This study initially conducted a comprehensive literature review that helped to present some illustrations, including a six-element proposed research framework and a conceptual user case diagram for a mobile online health system. This research adopted a mix research methodology, using both quantitative (survey technique) and qualitative (interview technique) methods, and focuses on mobile targets used mostly in recent years. The afore-mentioned framework used a platform-independent model, namely, a model-driven architecture approach with multiple platforms demanded by users. The research finds that the framework of the application model can be applied to the current health care system, particularly with regard to improving patient access to doctors via mobile online healthcare systems. Importantly, the mobile online healthcare system must ensure that the interface design is user friendly, and that it is easy to interact with all of the functions.

Poster Abstracts

The establishment of a pre-clinical pipeline for evaluating stromal targets in colorectal cancer

Krystyna Gieniec
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Colorectal cancer (CRC) affects 1 in 13 Australians annually and is the second most deadly cancer in Australia; we are consequently in dire need of more effective therapies for its prevention and treatment. Whilst most research has focused on the epithelial mechanisms of CRC development, recent evidence suggests a role for the tumour microenvironment in carcinogenesis – specifically, the cancer-associated fibroblasts (CAFs). CAFs are a diverse population of cells that help to establish an environment optimal for tumour progression, but the contribution of particular subsets to CRC remains unknown. Candidate tumour-promoting stromal factors await evaluation and are a means to define these subsets. One such factor, Gremlin1 (Grem1), is overexpressed in the stroma of more than 50% of human colorectal tumours and high *GREM1* expression is associated with metastatic subtypes and decreased patient survival. Grem1 has an intimate role in regulating the colonic epithelial stem cell niche during development and regeneration, and directly promotes angiogenesis. An inherited mutational event resulting in increased colonic epithelial *GREM1* expression causes hereditary mixed polyposis syndrome, predisposing individuals to CRC.

Furthermore, the widespread loss of *Grem1* in a murine model of early CRC significantly decreased tumour burden. This study therefore aimed to elucidate the functional role of *Grem1*-expressing CAFs in CRC. A red fluorescent and luciferase-expressing CRC cell line was generated to establish a novel orthotopic CRC mouse model, where tumour growth could be monitored in vivo and from which primary CAFs could be isolated. This line was then orthotopically co-injected with primary CAFs to assess the tumour-promoting role of CAFs. Grem1-deficient colonic fibroblasts were also generated using the *Grem1fl/fl* mouse model and locked nucleic acid oligonucleotides (LNAs). In future, these will be co-injected with the developed reporter line to determine the biological role of Grem1 in CRC, potentially revealing GREM1 as a novel therapeutic target. Consequently, this novel orthotopic model will be validated by using Grem1 as an example and will subsequently be used to screen an unbiased list of candidate stromal CRC-promoting factors. This will identify the most prognostic stromal factors, providing more-informed targets for the prevention and treatment of CRC to ultimately improve patient survival.

Investigation of the CDIB Lipid Antigen Presentation Pathway and its role in Pulmonary Innate Immunity in COPD

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Background

CD1b is a lipid-presenting immune molecule found on antigen-presenting cells, particularly alveolar macrophages. While little is known about CD1b, it has been demonstrated that it requires saposin-C to function, and it is believed that CD1b may present both mycobacteria fragments and self-lipids to specialised T-cells. Chronic obstructive pulmonary disease (COPD) is a chronic degenerative lung disease linked to a high "pack-year" smoking history. Pathogenesis of COPD is poorly understood, but contains a known autoimmune component involving T-cells. COPD is clinically diagnosed, and severity measured, by decline in lung function tests (FEV1 and FEV1/FVC). We believe that CD1b on alveolar macrophages present oxidised self-lipids to T-cells, mediating the autoimmune response of COPD.

Methods

Monocyte-derived macrophages (MDM) and alveolar macrophages (AM) were exposed to 10% cigarette-smoke extract (CSE). CD1b was quantitatively measured by flow cytometry. Cellular expression was examined by fluorescent immunohistochemistry. Co-localisation with saposin-C and Cleaved IL-1β (a selective inducer of CD1 molecules and inflammatory marker) was examined by comparing mean fluorescence intensity (MFI) and particles per cell (PPC). A patient database containing patient demographic data, CD1b expression on alveolar macrophages, pack-year smoking history and current smoking status was examined for any statistically significant correlations.

Results

There was a statistically significant correlation between CD1b expression and current smoking history, as well as pack-year smoking history ($p<0.05$). There was a statistically significant link between increased CD1b expression and decline in FEV1 ($p=0.003$) and statistical trend with declining FEV1/FVC ($p=0.053$). CD1b appears to be upregulated and shows changed intracellular expression and co-localises with cleaved IL-1β ($p<0.05$) in CSE-exposed macrophages.

Conclusions

There appears to be a statistically significant link between increased expression of CD1b and pack-year smoking history, current smoking status, and decline in lung function. CD1b appears to be upregulated in CSE-exposed macrophages, as well as co-localising with saposin-C and cleaved IL-1β.

Poster Abstracts

Academic procrastination: why can't we stop doing it?

Yik Hei Lam
The University of Adelaide

Procrastination in academic-related tasks is linked to unfavourable outcomes such as depression, low academic grades, and poor workplace performance. Self-compassion has been associated with positive outcomes such as increasing well-being. There is emerging evidence that self-compassion is inversely related to procrastination. However, little research has examined the mechanisms that may underlie this relationship. The current study will address this gap by examining the role of cognitive and emotion regulations strategies in this relationship. Findings may provide a new direction for interventions for procrastination, because self-compassion, metacognitive strategies and emotion regulation are not stable traits, but skills that can be learnt.

This study aims to establish the strength of the relationship between self-compassion and academic procrastination in first year university students, and explore potential mechanisms that mediate this relationship. This study examines several factors: 1. metacognition, our beliefs and schemas that guide our thinking; 2. self-handicapping, where we create obstacles to high performance to hinder judgments of our true ability; 3. strategies to regulate emotions under stress; and 4. our automatic thoughts specifically related to procrastination.

It is a survey-based study conducted on SurveyMonkey. Relationships between measures of procrastination, self-compassion, and cognition and emotional regulation will be examined using correlation and multiple regression techniques. The measures have good validity and reliability and are widely used, such as the Self-compassion Scale. Regression analysis will be used to examine which variables make an independent contribution to predicting levels of procrastination and their role in mediating the relationship between self-compassion and procrastination.

Preliminary results suggested that self-compassion is not directly related to procrastination. However, self-compassion was associated with metacognition, emotion regulation and self-handicapping. The strongest predictors of procrastination were self-handicapping and automatic thoughts. This suggests that self-compassion may indirectly influence level of procrastination through these factors.

Integration of ferry systems to encourage travel resilience in Brisbane

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The University of Queensland

Ferry travel is a popular method to connect a city situated near waterways. Compared with other transportation modes such as bus and rail, the ferry has less infrastructure requirements as it mainly relies on the natural waterways. Thus, it interferes with less of the land based infrastructure. Brisbane's ferry system in Queensland, Australia runs parallel with many of its major road corridors whilst connecting key areas of the city such as the central business district (CBD), major tertiary institutions and recreational areas. The system can be used to bypass disruption on land based infrastructure such as road congestion. This study thus aims to investigate the potential of ferry utilisation to improve travel time in Brisbane. This is done by analysing passenger behaviour for those commuting to the Brisbane CBD during March 2016. Origin-destination matrices of bus and ferry passengers are derived from smart card data to investigate the competitiveness of ferry system.

Our results demonstrate that ferry use is significant for river crossings such as the Bulimba to Teneriffe Cross River Ferry and the CityCat Ferry from West End to the University of Queensland, as well as travel into the CBD with Riverside Terminal, located in the CBD having the highest demand. Among the 49,676 journeys alighting at CBD ferry terminals in March 2016, 12.2% of journeys were intermodal, involving use of a bus or train. A small group of passengers have routinely utilised the CityCat along with other modes whilst most commuters occasionally use the system intermodally for reasons such as recreation purposes or as an alternative to their usual route. From this, it could be seen that intermodal ferry travel has been recognised as a potential travel mode by some commuters as part of their routine or an option when their usual route is disrupted. This study is to extend to understand the travel behaviour of commuters as there is opportunity to maximise the potential of integrating ferry transit to optimise travel time into CBD.

Poster Abstracts

Australian perspectives of the Korean War (1950-1953)

Kristina Markopoulos
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Purpose/Rationale

Australian perspectives toward the Korean War (1950-1953), widely known as the 'forgotten war', are under-examined in Australian scholarship. As Australia's ties with Asia continue to deepen throughout the 21st century, critical analysis of the Korean War is essential to better examine the causes of the longstanding Korean division, which is one of the most complex global problems of our time.

Research Focus

This research project analyses various perspectives from prominent journalists and newspapers during the time of the Korean War. This will challenge the current, accepted argument in Australian historical scholarship, which is that non-conservative perspectives, or even opposition toward the war, had little significance in Australia.

Methodology/Approach

This project uses a qualitative inductive approach, based on extensive use of primary and secondary sources. The majority of political opinions held by the Australian public were derived from newspapers. The Sydney Morning Herald is analysed for conservative, anti-communist perspectives, while The Woman's Weekly is analysed for views inclusive of women. The anti-communist referendum was held in in 1950-1951, attempting to ban the Australian Communist Party. The Tribune is featured to analyse the views of the Australian Communist Party. The minority perspective of foreign affairs journalist Peter Russo, in The Argus is crucial, as it emphasised western ignorance toward Korea, calling for deeper cultural engagement with Asia, and predicted the war would bring about long-term devastation to Korea. Utilising The New York Times brings the Australian perspectives into the broader context, of United States' overall plans for establishing democracy throughout Asia.

Significance and Originality of Findings

These findings challenge the widely accepted view, questioning if such a sentiment of anti-communism, which supported the war in Korea, was a necessity to prevent the outbreak of World War III? The various perspectives provides a broader analysis of motivations, and consequences of involvement of the Korean War, which led to the hostile Korean division.

Secondary traumatic stress and empathetic behaviour in Australian social workers and psychologists

Samantha Rayner
University of the Sunshine Coast

Secondary traumatic stress (STS) is an indirect form of trauma affecting the psychological wellbeing of mental health workers (Kanno & Giddings, 2016). STS has been found to be prevalent within social work occupations, with 19.9% of drug and alcohol service workers meeting the criteria for STS (Ewer et al., 2015). Additionally, occupations with higher levels of exposure to trauma are at an increased risk of developing STS (Ewer et al., 2015). Current literature reports higher levels of empathy increases an individual's risk of developing STS; the extent of this relationship however remains unclear (MacRitchie & Leibowitz, 2010).

Research on STS in mental health workers within Australia is limited (Kanno & Giddings, 2016). Therefore, this research examines STS and related factors of empathy and trauma caseload among mental health workers in Australia. This study utilizes an online survey quantitative research design with a purposive sample of mental health workers recruited via professional websites and unofficial social media groups. The sample (N=100 minimum) included participants 18 years or older, English speaking, currently practicing social work or psychology with at least a bachelor's degree.

Participants completed an online questionnaire comprising of demographics, the STS scale and the empathy scale for social workers. A hierarchical multiple regression analysis will be employed to explore the relationship of various demographic factors (e.g., years and type of practice), exposure to trauma, empathetic behaviour, and the development of STS amongst mental health workers. Anticipated findings are that higher levels of empathy, type of practice setting, higher trauma caseloads and personal traumatic experience will be significant predictors of STS. Furthermore, it is anticipated that years in practice, age and gender will not be significant predictors of STS. Practical implications include a focus on developing risk strategies and treatment methods that can effectively prevent the negative effects of STS.\

Poster Abstracts

Chronic pseudomonas aeruginosa infections: The paradox of inhibitory antibodies

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The University of Queensland

Chronic Pseudomonas *aeruginosa* bacterial infections occur in patients suffering from lung diseases such as cystic fibrosis and bronchiectasis. These chronic infections are difficult to resolve and substantially reduce lung function, leading to poor quality of life and reduced life expectancy. Antibodies usually protect against infection, however recently 'inhibitory antibodies' have been described in our lab which are shown to actually protect bacteria from serum-mediated killing of P. *aeruginosa* in chronic lung infections. These 'bad antibodies' were shown to be IgG2, a class of antibody, specific to O-antigen, a component of the outer membrane of the bacteria. Historical literature also describes patients with chronic P. *aeruginosa* lung infections and a factor in their serum which inhibit recognition and capture of the bacteria by immune cells known as macrophages. I propose that these 'inhibitory IgG2 antibodies' are also responsible for the inhibition of bacterial engulfment by lung macrophages. To investigate this, P. *aeruginosa* isolated from infected patients were coated with patient serum containing the specific IgG2 inhibitory antibodies, and then the rate of engulfment by macrophages was measured. Surprisingly, preliminary results suggest that these IgG2 antibodies do not inhibit engulfment of

P. *aeruginosa*. Further experiments revealed that a factor present in the serum of patients without inhibitory IgG2 antibodies mediates inhibition of engulfment, which is in the process of being identified. To model this, I am studying O-antigen-specific inhibitory antibodies induced in mice following immunization with O-antigen. These studies will help to define the mechanisms underlying poor control of

P. *aeruginosa* infections and has clinical utility for patients with diseases such as cystic fibrosis and bronchiectasis.

Cardiac Fibrosis in an animal model of chronic kidney disease

Cindy Sia
Macquarie University

Chronic kidney disease (CKD) is a common and costly condition resulting in 17% of all hospitalisations in Australia. CKD is commonly associated with high blood pressure, change in structure and function of the heart. A medical condition that gives rise to CKD is Polycystic Kidney Disease (PKD). PKD is an inherited kidney disorder, causing fluid-filled cysts to form in the organs. These cysts significantly impair function, eventually causing kidney failure. We tested the hypothesis that cardiac fibrosis, a formation of excess fibrous connective tissue as a reparative response to injury, contributes to the development of heart disease in the Lewis Polycystic Kidney rat (LPK) model of CKD. Left ventricular free wall tissue samples from LPK (n=5) and control Lewis rats (n=5) were used to record the ratio of fibrosis to vascular diameter. Left ventricle tissue samples were fixed in 4% formaldehyde, embedded in paraffin, sectioned into 7-µm-thick slices and mounted onto slides. Following this, the sections were stained with Masson's trichrome solution and imaged using a light microscope (Zen 2.0 Pro) equipped with a computer-based image analyser.

The thickening of the fibrosis was determined from 20x magnification image from each animal. Results indicated the degree of fibrosis in 12-week-old LPK vs. Lewis was a significant difference showing elevation of fibrosis formation was present in LPK by t-test comparison in 95% statistical significance. This data suggests that in the LPK, fibrosis formation in cardiac tissues contributes to the development of heart disease of CKD. In conclusion, we have shown disease progression via elevation of fibrosis formation in a rodent CKD model independent of blood pressure. Further investigation will be necessary to clarify the source of this mechanism responsible for mediating this homeostatic response in this model of CKD

Poster Abstracts

True Absences or Imperfect Detection? Occupancy-Detection Modelling of a Threatened Social Lizard

Adam Toomes
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The management of threatened species holds utmost importance when attempting to mitigate the loss of biodiversity. However, effective management strategies cannot be implemented without detailed knowledge of the distribution of the species in question. Species Distribution Models (SDMs) provide a tool for acquiring this information by regressing presence probability with biologically relevant variables and extrapolating the results over a particular region. The choice of SDM is essential, as particular species have behavioural attributes and life history traits that influence model predictions. Using the threatened South Australian lizard Egernia cunninghami (Cunningham's Skink) as a case study, we aim to illustrate the importance of model choice when predicting species distributions.

Egernia cunninghami is difficult to detect in occupied sites because of its tendency to use rock crevices as shelter from predation and environmental extremes. Issues with low detection probability can lead to false absences and biased predictions when using SDMs. In order to accurately predict the distribution of E. cunninghami, a model is needed that accounts for the effect of covariates on both abundance and detection probability.

Three temporal replicates of E. cunninghami count data were gathered from 87 rocky outcrops in South Australia. This data was analysed using both a Generalized Linear Model (GLM) and N-mixture model, only the latter of which accounts for imperfect detection. Preliminary GLM results suggest that the model performed moderately well, though it is expected that the N-mixture model will predict higher presence probabilities in areas outside of the Mount Lofty Ranges. By contrasting the outputs of both model types, this project aims to emphasise the importance of model selection when dealing with species that have low rates of detection.

Supporting families of children with a diagnosis of Autism Spectrum Disorder in Australia

Miranda Willet
The University of Adelaide

For parents of children and adolescents with autism spectrum disorder (ASD), having access to the necessary supports and services is vital not only for the child but also the family's health and functioning. However, there is a noticeable gap in the literature relating to the factors that increase usage of support services for these parents. This study investigates service utilization in a cross-sectional sample of Australian families of children with ASD with reference to one of the most widely acknowledged frameworks in healthcare: Andersen's Behavioural Model. A combination of predisposing variables (e.g. demographics, social structures, health beliefs), alongside enabling factors (e.g. family income, residence); and perceived need (i.e. ASD severity, parental symptoms of distress) will be examined.

Data will be collated online, via a nation-wide survey. It is anticipated that significant correlations between the forementioned factors, service usage and quality of life will be established. The findings will identify targets for interventions to better support parents and carers of children with ASD.

Poster Abstracts

Contextualising residents' calls for staff assistance: A prototype web-based call-bell system in residential aged care facility

Donald Zhang
The University of Adelaide

Which one of the three caregiving activities, namely, making a cup of tea for Mrs Smith, lifting Mr Light from floor, or attending to a bed-bound resident, Mrs Bailey, with high body temperature, needs to be prioritised if you work as a care staff in an aged care facility? If you think the answer is obvious, imagine making the same decision out of three room numbers shown on your deck phone. What if Mr Light is out of his room, and Mrs Bailey does not know how to use call-bell? Without the aid of specific, individual and contextual information, such as the real-time location, situation (e.g. having fall) and bodily condition (e.g. abnormal body temperature) of the resident, staff prioritising of care tasks and responding to emergencies become a stressful challenge. This study is to address such a challenge by developing a prototype web-based call-bell system capable of collecting, transmitting and displaying the individual and contextual information of the residents with/without the resident activating the call-bell. Staff performance in term of response time to residents' calls and emergencies can be improved when the residents' call-bells are contextualised and the unrecognised needs of residents for staff assistance are detected. Using the eLabtronics Inventor's kit and Wi-Fi chip, the Care on the Go WristBell is at this stage made and tested as a prototype wearable nursing call-bell specially designed for mobile and fragile residents. An alarm can be activated by an accelerometer (fall), a thermometer (detecting high/low body temperature), or a push-button. Staff will be alerted by a buzzer and a flashing dot on the webpage using either desktop/laptop in the nurse station or portable devices such as smartphone or iPad. The next stage objective is to show the real-time location of the resident on the webpage when the alarm is activated.

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