International Conference of Undergraduate Research &
Australasian Conference of Undergraduate Research

The University of Western Australia, 29-30 September 2015

Program and Abstracts

Contents

Conference Host

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The organising committee would also like to thank and acknowledge the following University of Western Australia student volunteers for their efforts with the conferences:

Alex Clifford
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Uma Jha

Social Dinner

St. Catherine's College Dining Hall, 6.30pm, Wednesday 30 September

Join fellow presenters and attending academics for an informal buffet gathering at the dining hall of St Catherine's College! This is a great opportunity to interact and network with individuals across all disciplines so please come along. The Social dinner will commence immediately following the final presentation session.

Welcome

The organising committees of the International Conference of Undergraduate Research (ICUR) and the Australasian Conference of Undergraduate Research (ACUR) welcome you to two days of excellent undergraduate research presentations.

For the first time ever, The University of Western Australia will be hosting these two major conferences co-badged under the theme of undergraduate research. The conferences will be presented as parallel sessions, sharing keynotes and our social dinner. Over the next two days we will have the opportunity to support and celebrate the work that our undergraduate students are doing locally, nationally and internationally.

The **International Conference of Undergraduate Research** is an annual event funded and facilitated by the Monash-Warwick Alliance. ICUR is a multi-disciplinary forum that connects student researchers across the world through video-conferencing technology. The first conference in 2013 brought together over 90 students across both Monash and Warwick and this year we have students from ten universities across 7 time zones over 24 hours which is a fantastic accomplishment.

The first **Australasian Conference of Undergraduate Research** was held at Macquarie University in 2012. ACUR provides the opportunity to meet students from other universities and to share research work. As a multi-disciplinary conference, students will have the opportunity to network with other undergraduate researchers from their own discipline, and also to learn about how other disciplines approach research problems. This year we have 67 student presentations representing 18 different universities which illustrates how undergraduate research is valued in the higher education sector.

We welcome you to our West Australian shores and look forward to hearing about the great work of our undergraduates in a collegial, supportive and celebratory way.

List of Presentations

Tuesday 29 September 2015

Time	Room 1	Room 2	Room 3	Room 4
8am – 8.30am	Registration			
8.30am – 8.45am	Introduction			
8.45am – 10.15am	**Esmeralda Nel** The impact of cochlear implants on cognitive functions of postlingually deafened adults	**Liam Elphick** Time to Transform: Adapting Lectures to Maximise Student Learning and Engagement	**Simone Ferrante** Social Comparison Processes: Contrast and Assimilation Effects	**Amreen Hussain** The importance of language to clinician-patient communication in COPD
	Sarah Pearce Fat replaces muscle in dysferlin-muscular dystrophies - but where did it come from?	**Hannah Rapaport** A novel, paced production paradigm for assessing language lateralisation with functional Transcranial Doppler Ultrasound	**Jichuan Yu and Thomas Harper** "Second Skin"	**Yanni Papadopolous** Investigation of Thermal Comfort and Airflow in a Naturally Ventilated Lightweight House within a Bush Fire Prone Area
	Danelia Kok Hearing Aids as a Means to Improve Cognitive Functions in Postlingually Deafened Older Adults	**Nithin Srinivasan** How transformational is service learning: A study of student perceptions of a service-learning unit at The University of Western Australia	**Ashleigh May McIntyre** Locating the Real: A Study of the Relationship Between Entropy and Prosaic Writing Style in Haruki Murakami's 1Q84, and How it is Used to Employ the Fear of the Real	**Julianne Pascoe** Preparatory Cueing in the Assessment of Language Lateralization: is Non-Verbal Better?
	Bridget Maguire & Kimberley Barker (*Monash) A practical resource to improve the oral health of people with profound and multiple disabilities	**Oliver Rawle** Transformative Outcomes for Computer Science Students at the University of Western Australia	**Jen Liu** Posture Physiology: Optimising Musical Performance	**Lauren Thompson** Rheological Behaviour of Smart Thermo-Responsive Hydrogels in Pharmaceutical Formulation
10.15am – 11am	Morning Tea			

11am – 12.30pm	**Yvy (Karuna) Pham** The Role of Basement Membranes in the establishment of Polarity in Pancreatic β-cells	**Vigneswari A** Self before others or others before self: Is there a right way to serve?	**Caela Welsh** The effect of population size on rate of word loss and gain in the Indo-European language family	**Natasha Parnian** A clash of civilisations or a clash of representations? Rethinking the barbarian in the Greco-Persian Wars
	Vincent Lim Asphaltene Micromechanical Interfacial Force Measurements	**Afira Zulkifli** Flipping the classroom: the extent to which university perceive it as transformative	**Reuel Baptista** The Canary in the Coal Mine – Preserving Information Privacy in Data Mining	**Mariana Hill Cruz** Spatial Variations in the Fish Assemblage Composition of Princess Royal Harbour
	Aidil Zikri (*Monash) Grass activated carbon (GAC): A green alternative adsorbent of Chromium (VI) and Methylene blue.	**Akiko Uchio (*Kyushu)** Free education in public elementary schools in Uganda	**Jarem Edwards** Strategic localization of resident memory T cells in human tissues and their key regulatory cytokines	**Ben Langley** Elephants watching dragons, the changing perceptions of China in India
	Sergio Quach (*Monash) Clinical scales used to measure spasticity	**Hatsune Kaga (*Kyushu)** Future issues about environmental education in Japan	**Emma Lawson** A load of (red) bull: psychological factors accounting for energy drink problems	**Emily Gallagher** Mobilising the Grotesque: The Anti-war Publications of Ernst Friedrich and Frederick A. Barber
12.30pm – 2pm	**Nguyet Duong** Oxidation of thiol proteins: one step closer to tackle Duchenne muscular dystrophy	**Aaron Tuckey** A Green Leader's Dirty Habit: How Failed Emissions Trading Policy Fuelled a Resurgence of Coal in Germany	**Bohao Yao** An algorithm for finding Hamiltonian Cycles in Cubic Planar Graphs	**Jonathan Ben-David** Metallic complexation of carbon nanotubes for photovoltaics
	Monica Leslie An Upward Spiral? Exploring the Role of Obsessionality in Recovery from Anorexia	**Jessica Smith** Incentives and Informed Consent when Encouraging Health Behaviours	**Frank Liu-Fu** High lipid levels in obesity drives adverse outcomes in prostate cancer: an in vitro model	**Thomas Bradshaw** Empirically Analysing the efficacy of parameterized approximation algorithms for finding vertex covers

	Vanja Todorovski The impact of the residual expression of stem cell factors on tumorigenesis differentiation in liver progenitor cells derived from embryonic stem cells and induced potent stem cells	**Aiden Depiazzi** Does Monetary Policy Affect Consumption in Australia?	**Ebony Hutchin** 'Uncovering' the Interviewer: Reflections on Oral Histories and the Hungarian Refugees	**Lucy Coles** Protection from UV-Induced Photoageing by Vitamin D and related compounds
	Eliza Bartsch (*Monash) Health Inequities within Australia's Indigenous Population.	**Soon Leqi (*SMU)** Can Singapore Remain a Leading Maritime Hub? Attracting and retaining international marine trade	**Joanne Rowles** The effects of Amylin and β-Amyloid on bioenergetics in pancreatic β-cells *in vitro*	**Jarem Edwards** T cell receptors involved in T cell migration from primary tumours to draining lymph nodes
2pm – 2.30pm	Lunch			
2.30pm – 4pm	**Chloe Dempsey** Language Immersion as Transformative Learning: The UWA China Field Study	**Supervisor Session** Led by Angela Brew and Elizabeth Ambos	**Nataya Branjerdporn** Individual patient data meta-analysis of intensive upper limb therapy approaches for children with unilateral cerebral palsy	**Laura Wey** Functional Characterisation of cyanobacterial bicarbonate and sodium transporters in E.coli for improved plant photosynthesis
	Nicole Celestine The Influence of National Culture and Intrinsic Motivation in one-on-one Tacit Knowledge Transfer		**Louise Martin** Regulation of adrenal hormone receptors in the liver: potential treatment targets for diabetes	**Tessa Swain** CRISPR-dCas9 With A Repeating SunTag Array, A New Epigenome Editing Tool For Amplified Epimodifer Recruitment
	Hao Zhou (*NTU) Problems, Praxis, and Possibilities in Sinophone and Beyond: Yang Lian's Poetics as a Case Study		**Katherine Botha** The Impact of Primary School Transitions on the Psychological Well-being of Children with Autism Spectrum Disorder	**Peter Hooker** A Change Over Naval Warfare? Reconsidering the Submarine in German and Japanese Naval Strategy, 1935-1943

	Jasmine Alexis Doo (*NTU) Love as Language		**Magdalena Janas** Framing National Interests: How Power Can Elude in International Relations	**Jonathan Ciofani** Facilitating Nanodiamonds for Drug Delivery: A Novel Approach Using a Protein Coating
4pm – 5.30pm	**Elliot Panos** The effect of lane configuration of freeway ramps on capacity and Level of Service		**Anna Zeng** The Immune Phenotype in Pre-eclampsia	**Megan Ivory** The philosophy of Drosophilia melanogaster as a model organism in genetic research; how much like a fruit fly are you?
	Vladmir Arutyunyan (*Warwick) The role of religious diasporas in facilitating global trade across religious boundaries.		**Anthony Westenberg** Fate & Mortality in the Epic of Gilgamesh: Then & Now	**Hoi-Ying Felcia Lai** NDM-1 inhibitors: a weapon against the superbugs
	Connor Woodman (*Warwick) A Tale of Two Insurgencies: Competing Grievances, Government Counterinsurgency Programmes and International Involvement in Two Tactically Allied Philippine Insurgencies		**Jack Klein** Inspiration and Physical Strength	**Chloe Bickersteth** The Role of Attention in Body Size Exposure Aftereffects
	Johan Byttner (*Warwick) Real-time tracking of objects from a flying drone - making robots "see" and think		**Rachael Nielsen** Going Against the Flow: A Contra-flow Bicycle Lane Evaluation within the City of Adelaide	**Maryam Eghtedari** Inhibiting the pro-atherogenic effects of serum amyloid A by pharmaceutical blockade of NFkB

5.30pm – 7pm	**Joseph Steinberg** Of fawnicating and faunlets: mourning and liminal desire in *Lolita* and *Pale Fire*		**Emma Williams** The Immediate Effects of a Short Yoga Class on Stress and Cognitive Performance	**Zsuzsanna Ihar** Ethnic Queers: Border Crossing through Diasporic Desires and Displaced Intimacies
	Luis Arturo Aguilar Lopez "Is Christianity homophobic? Exploring LGBQ university student's perception of religion"		**Albert Chen** Sparse factor representations and operations for probabilistic graphical models	**Sonia Sawant** Chasing the factor that causes angiogenesis in asthmatic airways
	Oliver Hall & Rosanna Hiscock (*Warwick) A photographic and illustrative study into the relationship between the novels of Jorge Amado and the cityscape of Salvador, Brazil.		**Sophia Ackling** Controlling Organic Device Structure Using Light: A Computational Investigation	**Nikita Walz** The role of pigment epithelium derived factor in pancreatic beta cell physiology
	Billy Barrett (*Warwick) Shedding Skins: (Re)claiming Cleopatra in the Post-colonial Context		**Joel Lisk, Rebecca Slimming, Angas Van Balen, Jessica Wakelam** How does the Court, when faced with the extra-judicial appointment of its Justices, ensure that these roles do not undermine the public confidence vested in the Judiciary?	**Katie Ward, Allisa Li, Meaghan Powell, Jonathan Tjandra** Women in STEM at the ANU

*Presentation will be broadcast via live video link

Wednesday 30 September 2015

Time	Room 1	Room 2	Room 3	Room 4
9am – 10.30am	**Deepika Raj** Testing the efficiency of Bharati: A universal script for Indian languages with second generation Indians in Australia	**Zoe Purcell** Friend or Foe: Separate Visual Processing for Ingroup and Outgroup Faces	**Aprill Miles** Pepper spray, neoliberalism and the law: An analysis of civilian self defensive pepper spray use in Australia	**Daniel Morgan** The Battle of Teutoberg Forest and Roman Vulnerability to Ambush
	Lucy Davidson Il prete e il mangia-preti: the unlikely friendship between archaeologist Luigi Pigorini and Bishop Rosendo Salvado (1867-1884)	**Erica Whye** A Spell from the Papyri Graecae Magicae: New perspectives on gender relations and justice systems in late antiquity	**Jonathan McPhail** Delayed release drug delivery from self-assembling peptide hydrogels to treat traumatic brain injury	**Robert Harvey** Dysregulation of Glucose Metabolism in Haemochromatosis Model Mice
	Jodie Langford (*Monash) How are authors of Japanese manga revolutionising the use of loan words in Japanese society?	**Shelby Simpson** The Retention Tracking Devices on Cassiopea Jellyfish	**Laura Williams** How can biomimicry-based computational design support ecosystem-specific innovation in architectural design at Merri Creek?	**Jie Zhu** Investigating the Google Scholar Effect
	Breanna Osborn (*Monash) Multiple Voices, Multiple Selves: A study of the influence of alternative identity performance on Japanese as a second language learners in Australia	**Ronelle Toop** Keeping Managers in the Not for Profit Sector: what kind of passion sustains employment?	**Rakan Al-Omari** Migrant residents and neighbourhood belonging	**Chloe Dawson** Association between popliteal artery wall thickness and early structural knee changes in an asymptomatic cohort of middle-aged women
10.30am– 12pm	Brunch			

12pm – 1.30pm	**Temily Leith** A Review of Cultural Training for Engineers in Western Australia	**Gaelen Perrone** Public Legal Aid in Australia and Canada: The Legacy of Federal Ideas and Institutions	**Rachel Robson** The Neglected Objective: the failure of reintegration with the Dangerous Sexual Offenders Act 2006 (WA)	**Leonie Nahhas and Trudy Green** Perceptual Distortions of Face and Body: Implications for the Neural Processes Underlying Body Image Disturbance
	Julian Coleman Residential University Colleges: Learning Communities and Transformational Aspects of Residential Living	**Zoe Bush** Silent for Fear of Indefinite Incarceration: Reform of the consequences of unfitness to stand trial for Aboriginal youth affected by Foetal Alcohol Spectrum Disorder		**AJ America** "How Good An Historian Shall I Be?": Engendering Ethics and Social Action Through Holocaust Education
	Sarla Hallock (*Monash) The Rise of Third Sector as a Provider for welfare services in Australia: The Third Sector and Social and Affordable Housing.	**Hewen Wang (*NTU)** Rapid Modeling and Analysis of Risks in Complex Supply Chains by Network Theory Approach		
	Ryan Kabat (*Monash) Third Party Securities and the Personal Property Securities Act 2009 (Cth): Are Lenders Better Protected?	**Neo Xuan Hao Edwin (*NTU)** A case for punishment: a hybrid justification with rule-utilitarianism consequentialism and revenge-based retributivism		
1.30pm – 2.30pm	**<u>Poster Presentations</u>** **Callum Burgess** – Design Thinking in Start-up Business **Christopher Lake** – Bio-Degradable Natural Fibre Composites **Emily Soon** – Walking in Consumers' Shoes: reshaping pharmacy student placement curriculum via mystery shopping with feedback **Heath Winning** – Powers of Two Modulo Powers of Three **Kieran Allen** – A Newly Discovered Role for Protein Arginine Methyltransferase 5 (Prmt5) in the Developing Immune System **Kristie McDonald** – Personality, Mood and Emotion Regulation: Implications of Mindfulness-Based Therapy for Functional Gastrointestinal Disorders **Madison Callaghan** – Why hormones may influence positive reactions to infant cues or stimuli **Paul Bardini** – Can a model be created to allow assistive technology for short-term disability to be accessible through open source? **Timothy Evans** – Changes in Iron Regulatory Gene Expression with Age and Presence of Mesothelioma			

2.30pm – 3.30pm	Closing			
3.30pm – 4.30pm	Joint Keynote			
4.30pm – 5pm	Tea Break			
5pm – 6.30pm	**Kazuki Tomioka** Macroeconomic Globalisation: Implications for Inequality in Japan			
	Hanako Frawley Thinking big: How managers' mental models inform organizational sustainability responses			
	Kundai Mapfina (*MSA) Africa's fall into Third World status			
6.30pm – 9.30pm	Social Dinner Event			

*Presentation will be broadcast via live video link

Keynote Speakers

This year's conference welcomes two exciting keynote speakers from ICUR. Representing the Monash-Warwick Alliance: Professor Darrell Evans, Vice-provost (Learning and Teaching) from Monash University and Professor Christina Hughes, pro-Vice Chancellor (Teaching and Learning) from the University of Warwick. Having had successful academic and research orientated careers, they are now responsible for academic leadership in areas relating to strategic teaching and learning activities. Darrell and Christina will share with you their first experiences of research - the impact of those experiences and where they led. They will also talk about leadership and the importance of taking the lead in your own learning and research.

Darrell Evans:

"My interest in research has been shaped by the wonderment I have had for biology since I was a young teenager. In particular I have been fascinated by the way things form and function and therefore specialised as a developmental biologist for my PhD focussing on the musculoskeletal system. I have loved the opportunity of discovering new things, creating new experiments to test ideas and learning from the great people around me. As I became more interested in teaching and learning, I developed a further research theme all around communicating with different audiences. I have become eager to ensure all our students have the opportunity to develop their communication skills whilst at university - what better way than for our students to be involved in ICUR!"

Christina Hughes:

"My first introduction to Undergraduate Research was a research methods course I took in the second year of my Sociology degree. I then had the chance to practice what I had learnt through my final year dissertation. My dissertation was focused on gender and sexuality. Inspired by anthropological research, particularly that undertaken by the Chicago School, the methodology drew on a life history approach. How much I loved this – so much so that it inspired me to continue into a PhD where I carried on my anthropological approach, this time with stepfamilies. It is through these experiences of how powerful undergraduate research is as a strongly formative learning experience that I care so much about it. Research, for me, is always about the passionate engagement that comes from hoping you can change the world through better knowledge. This is not to deny the importance of rigour, validity and reliability in the production of that knowledge. But well-designed research needs to be combined with a commitment to trying to resolve some of the large, and small, issues that confound us. I am so glad that you have the opportunity to experience the thrill, and the challenges, of doing research and I'm looking forward to hearing more during the conference."

Abstracts

The Impact of Cochlear Implants on Cognitive Functions of Postlingually Deafened Adults

Esmeralda Nel
The University of Western Australia

Hearing impairment is a commonly reported problem with 33% of people over the age of 65 affected (Australian Bureau of Statistics, 2009). Hearing impaired individuals find it difficult to communicate effectively and tend to withdraw from social activities (Lin et al., 2013). Cochlear implantation is considered an effective treatment method for individual with severe to profound sensorineural hearing loss (Zeng, 2004). Studies by Lin et al. (2013) reported an accelerated cognitive decline associated with hearing loss. The aim of this study was to explore the association between the treatment of hearing loss and cognitive functions in postlingually deafened cochlear implant (CI) recipients. A battery of computerized tests of memory, attention and executive functions was studied in 20 normal hearing individuals (M = 53.95 years, SD=9.77) and 22 moderately to severely deafened adults (M = 50.8, SD = 10.77) undergoing CI surgery. Participants were tested at 0 and 3 months pre- and 3 and 6 months post CI surgery. To detect stress, anxiety or depression participants were given the DASS-21 questionnaire. Compared to those with normal hearing CI recipients showed a 13% decrease in memory test scores and a 20% increase in errors relating to tests of executive function. DASS-21 scores for anxiety and stress in CI recipients were increased by 22.25% and 14.25%, respectively, than those among individuals with normal hearing.

Time to Transform: Adapting Lectures to Maximise Student Learning and Engagement

Liam Elphick
The University of Western Australia

Dwindling student attendance and engagement at lectures is a significant concern for higher education institutions worldwide, especially in light of an increasing reliance on online recordings as a substitute for face-to-face teaching. This research explores how transformational teaching, where professors take on the role of intellectual coaches and promote student attitudes towards learning and personal growth, can be used to adapt lectures in order to maximise student learning and engagement. In particular, this research focuses on whether active learning, student-centred learning, collaborative learning, experiential learning or problem-

based learning would be most effect in achieving this end. Under a two-phase mixed method design focused on the University of Western Australia Law School, qualitative and quantitative interview data has been collected from Law Faculty professors and relevant university administrators, while Law students have provided quantitative data through an online survey. These results display a strong desire to change the traditional, speech-style lecture to cater for a generation of students with unprecedented connectivity and access to information, and a thirst for constant engagement; such that students are incentivised to attend and engage with lectures. While a range of adaptions and transformational teaching methods were preferred by UWA Law professors, administrators and students respectively, significant overlap has ensured that there are workable long-term solutions. Such findings can equally be applied to other faculties and areas of teaching and other higher education institutions. It is particularly hoped that this research can provide relevant university administrators and professors with the impetus to begin to make real changes to the delivery of lectures, and motivate academics, students and other stakeholders to undertake further research on how such changes should be made.

Social Comparison Processes: Contrast and Assimilation Effects

Simone Ferrante
Macquarie University

Individuals often compare themselves with others to make accurate self-evaluative judgements (Festinger, 1954). As a result of these comparisons individuals may move their self-evaluation towards the comparison target's standing on the attribute or dimension under comparison (assimilation) or displace their evaluation away from the comparison target (contrast). Assimilation effects are a recent and often debated concept. The present research aimed to clarify these effects by replicating Brown et al.'s (1992; study 3) study and rectifying key methodological limitations. Additionally, the research aimed to ensure that the results of Brown et al.'s (1992) well-cited third study are reliable and replicable. Ninety-seven female participants evaluated heir self-perceived physical attractiveness and later viewed an image of either an attractive or unattractive target. Half of the participants were told they shared the same birthday as the target. Follow up ratings of self- rated physical attractiveness were obtained. Self-evaluated physical attractiveness was assessed using absolute and subjective items. Participants whose birthday matched an attractive target were expected to increase their self-evaluated physical attractiveness (assimilation). Participants whose birthday did not match an unattractive target were expected to increase their ratings of physical attractiveness (contrast). Mixed Model ANOVAs were conducted separately for participants in the attractive and unattractive conditions. The change in pre-task to post-task ratings was different for

participants whose birthdays matched and did not match the attractive target for the absolute item assessing physical attractiveness. Participants in the matched-attractive condition tended to increase ratings of physical attractiveness (assimilation) whereas participants in the unmatched-attractive condition tended to decrease ratings of physical attractiveness (contrast). All participants who viewed an attractive target increased ratings of physical attractiveness on subjective items (assimilation). No significant findings were found for participants in the unattractive conditions however the change in pre-task to post-task ratings for both the absolute and subjective items were in the hypothesised direction.

The importance of language to clinician-patient communication in COPD

Amreen Hussain
Monash University

An acute 'exacerbation' of Chronic Obstructive Pulmonary Disease (COPD) is used to describe a serious worsening of COPD symptoms and is associated with lung function decline. However, while the term 'exacerbation' is meaningful to clinicians, it is poorly understood by patients. As complex language presents a barrier to understanding of prognosis, treatment and management in COPD, some researchers have called for the rebranding of 'exacerbation' to 'lung attack' - representing an effort to improve awareness of exacerbations and COPD.
Methodology: A concurrent mixed methods study was undertaken to identify expressions used by patients with COPD and health professionals to describe acute events and to identify clinician-patient communication issues. Recording of actual clinician-patient encounters has proven to be useful in evaluating communication. The study was conducted with a predominantly qualitative phase of in-depth interviews which enabled a greater understanding of participants' unique perspectives. Patients also completed spirometry, the COPD Assessment Test and a Health Literacy Questionnaire, which were used to confirm diagnosis as well as severity. Participants were recruited from one tertiary urban hospital and included 18 patients with moderate to very severe COPD and 15 health professionals. The research design allowed for qualitative and quantitative approaches to better understand the results of the other. Triangulation of qualitative and quantitative data assisted in the development of a more complete understanding of the most appropriate terms to describe exacerbations.
Outcome/Results: Perceptions of severity, orientation with the medical system, social context and health literacy shaped patients' perceptions of their illness and the language used to describe exacerbations. Neither 'lung attack', 'flare-up' nor 'exacerbation' appeared to consistently describe exacerbations and no other appropriate term emerged. This study highlights the need for improved health literacy, greater awareness of depression/anxiety and COPD overall.

Fat replaces muscle in dysferlin-muscular dystrophies – but where did it come from?

Sarah Pearce
The University of Western Australia

The muscular dystrophies are a group of genetic disorders that result in progressive skeletal muscle wasting and loss of function. Limb-girdle muscular dystrophy type 2B (LGMD2B) and Miyoshi myopathy (MM) are collectively known as dysferlinopathies and both are caused by mutations in the dysferlin gene. Dysferlin is involved in membrane repair and calcium homeostasis in skeletal muscle; however, its precise function in vivo (and how this contributes to the disease pathology) remains unknown. A peculiar pathological phenomenon in dysferlinopathies is the abundant accumulation of lipid in muscles, and it is becoming evident that this may be central to the disease pathology (Grounds et al. 2014). Adipocytes replace up to 40% of affected muscles in a mouse model of dysferlinopathy (A/Jdysf-/-), and lipid deposition is evident in both mouse-model and human dysferlinopathies. This study focuses on the synthesis of lipid (lipogenesis), the formation of adipocytes (adipogenesis) and the chemical interactions between muscle cells and adipocytes, using tissue culture and cellular response studies in a mouse dysferlinopathy model. We believe this study will provide a better understanding of the cellular and molecular mechanisms leading to excessive fat accumulation in dysferlin-deficient muscle tissue.

A novel, paced production paradigm for assessing language lateralisation with functional Transcranial Doppler Ultrasound

Hannah Rapaport
Macquarie University

Language is typically a function of the left hemisphere. The gold standard neuroimaging paradigm for assessing language lateralisation is word generation (WG). Participants are shown a letter and asked to silently generate as many words starting with that letter as possible. The words are silently generated so as avoid artefacts in neuroimaging techniques such as functional magnetic resonance imaging (fMRI). While WG provides a reliable assessment of language lateralisation, it is impossible to know what the participant is doing during the silent word generation period. This is problematic when comparing groups that may differ in language skills (e.g., dyslexia), as it is not known whether one group is producing more words and this production, rather than group membership, may underpin neurophysiological differences. This study reports on a new paradigm (paced production; PP) that overcomes this

limitation. In the PP task, participants are asked to produce words in response to a series of presented letters. To assess language lateralisation for the WG and PP tasks, we used functional Transcranial Doppler Ultrasound (fTCD) to measure the blood flow velocity in the left and right middle cerebral arteries. Overt speech does not interfere with the fTCD recording as it does for fMRI. The preliminary results show a significant positive relationship between WG and PP, r =.90, p = .000. Therefore, PP provides a valid overt language production task for the assessment of language lateralisation.

"Second Skin"

Jichuan Yu and Thomas Harper
The University of Melbourne

This paper presents a collaboratively design project titled Second Skin, undertaken as part of the Bachelor of Environments degree at the University of Melbourne. The students from separate faculties; Architecture and Engineering, collaborated on researching personal space through the creation of a "Second Skin" in the subject Digital Design and Fabrication taught by Paul Loh and managed by Annie Walsh.
Research Question: What would a "second skin" need to be able to do in order to influence "personal space"?
Methodology: The project utilized a search methodology (Kalay 2004) where the research question is iteratively tested through digital and physical modelling. Design research involves creative participation as well as the application of creative technique. Responding to the body as context, the initial step was to create a digital model and testing appropriate materials system using section and profile techniques. The collaboration of the two disciplines contributes to the realisation of a digital model as a prototype of a dynamic device, enabling the user to send warning signals to an intruder by adjusting movable spike on the back of the user. The changes shown on the Second Skin are used to show the emotional status of the wearer; potentially leading to the creation of more personal space.
Conclusion: In response to the design brief, the result and final design product of this research display an innovative exploration of both the concepts of personal space, digital design and fabrication. This understanding was enhanced by the collaboration of students from distinct fields and the way in which they utilised their differing perspectives and skill sets to produce a successful outcome.

Lightweight Construction for Passive Residential Building Design within Bushfire Prone Areas

Yanni Papadopoulos
The University of Adelaide

A combination of design parameters for residential building design aims to reduce its impact on the environment whilst protecting occupants from potentially Australia's most dangerous natural disaster, bushfires. This research has been conducted to identify the limitations within combining lightweight construction, passive design, and bushfire resistance.
This study has stemmed from the 2015 Honours Group Research Project which refined the Solar Decathlon 2014 competition brief as the research scope. The competition aims to create a solar powered home that incorporates 10 elements which three of these have been extracted to form the core focus: construction, thermal comfort, and sustainability.

A literature review presents similar residential building designs and reasoning as to why this combination of design parameters has not been pursued before. A proposed building design solution is used to discuss and identify how these design parameters are achieved and the limitations between opposing requirements. Computer-based building performance simulation has been used to reinforce the discussion of this study and plausibility of the proposed design solution.

Passive design becomes difficult in the absence of conventional thermal mass which is relevant in this case due to lightweight construction (non-heavyweight materials such as concrete and masonry). Phase Change Materials offers a solution providing lightweight thermal mass to the building envelope, however bushfire resistance design strategies introduces additional complexity due to the restrictions of openings within the facade. The main objective of this design solution is to provide some form of bushfire protection whilst pursuing every avenue possible to minimise the impact on the environment which includes implementing fundamental passive design strategies to achieve thermal comfort.

The proposed combination of passive design, lightweight construction, and bushfire resistance is recognised to be plausible and distinctively beneficial to residential areas on the outskirts of suburbia within dense Eucalypt forests.

Hearing Aids as a Means to Improve Cognitive Functions in Postlingually Deafened Older Adults

Danelia Kok
Murdoch University

The World Health Organisation estimates that 360 million people worldwide suffer from a disabling hearing loss (WHO, 2012). According to Blue Mountains Hearing Study (n = 2956), 44.5% of participants (M= 67 years) were found to suffer from either bi or unilateral hearing loss (Chia et al., 2007). Reports by Lin et al. (2011, 2013) indicate that untreated HL is independently associated with accelerated cognitive decline and an

increased risk of dementia. The aim of this study was investigate whether hearing rehabilitation using hearing aids would improve cognitive functions in postlingually deafened older adults. Testing was conducted before the participants received their hearing aids, then 3 and 6 months after receiving the hearing aids. Participants completed a questionnaire (DASS 21) on anxiety, stress and depression as a means to obtain the mental state of the participant. In addition, a battery of computerised tests was used to assess cognitive functions. The same tests were completed by a control group of normal hearing participants, and a matching group of participants with similar degree and type of untreated hearing loss. This presentation will highlight the results obtained by hearing aid and control groups in a series of computerised cognitive assessments and DASS questionnaire over a period of time.

How Transformational is Service Learning? A Study of Student Perceptions of a Service-Learning Unit at The University of Western Australia

Nithin Srinivasan
The University of Western Australia

Despite the extensive body of research in the UK and the United States on service learning, there has been little exploration of the transformational nature of service learning in an Australian context. Transformational learning is learning that induces more far-reaching change in the learner than other kinds of learning, resulting in a paradigm shift that affects the learner's subsequent experiences. The existing body of Australian research deals with a wide array of issues relevant to transformative teaching and learning. However, there appears to be a research gap in regards to the transformative aspects of service learning. Through a combination of semi-structured interviews, surveys and reflective blogs, this study examines how students involved in a service-learning unit at an Australian university perceive their experience as a transformational one. By exploring student perceptions, this research focuses on the causes and manifestations of transformational learning felt by students enrolled in the service-learning unit. This research will serve as a stepping-stone for future researchers to better understand the transformative aspects of service learning and can help in improving the service learning experience for future cohorts.

Locating the Real: A Study of the Relationship Between Entropy and Prosaic Writing Style in Haruki Murakami's 1Q84, and How it is Used to Employ the Fear of the Real

Ashleigh May McIntyre
The University of Newcastle

This paper uses distant reading methods and psychoanalytic notions of the Real to offer a new and unique reading of Murakami's fiction, specifically focusing on the English translation of his recent publication 1Q84 (2011). In examining the Lacanian theory of the Three Registers and applying it to Murakami's fiction, it becomes apparent that his simple style of prose emphasises the symbolic nature of perceived reality, especially through the way he depicts fantastical themes and ideas. By employing the fear of the unfathomable Real in fantastical contexts, Murakami uniquely explores the fluidity of reality, challenging our preconceived notions of what is real and possible. Jacques Lacan, and later Slavoj Zizek, present the theory of three primary Registers- The Imaginary, The Symbolic and the Real. The Registers theory dictates that the Imaginary and Symbolic Registers formulate our perceivable reality, and are bound intrinsically to our ultimate system of understanding and classification- language. The Real is other, and is everything beyond what we have the ability to recognise and interpret. This paper seeks to identify the way Murakami's use of language challenges its binding nature, paradoxically embracing a more prosaic, less embellished style of prose. Quantitative distant reading methods of comparative analysis of entropy identify a simpler, lower vocabulary in his texts. This illustrates an attempt to make a departure from the technical binds of language by challenging traditions of symbolic embellishments and literary flourishes. Murakami's prose style s repetitive and raw, depicting scenarios that are uncanny in his real-world setting. He effectively harnesses the fear of the Real to allude to, rather than directly illustrate, the unknowable. In this way, my paper seeks to identify the limits of language to represent something outside itself, and how Murakami attempts to circumnavigate these limitations.

Preparatory Cueing in the Assessment of Language Lateralization: is Non-Verbal Better?

Julianne Pascoe
Macquarie University

Word generation is the gold standard paradigm for the assessment of language lateralization. In this paradigm, as a preparatory cue to participants, an auditory tone and the words ‘clear mind’ are presented prior to each word generation trial. However, ‘clear mind’ is an ambiguous instruction and may increase activity in the language-dominant hemisphere before word generation has commenced. While an auditory tone has been experimentally compared to no cue, the influence of ‘clear mind’ has not been examined. This will be done in the current study. Functional Transcranial Doppler Ultrasound (fTCD) will be used to assess language lateralization during word generation with healthy adults. The preparatory cue will be manipulated in a between-subjects design: tone and 'clear mind' versus tone only. Event-related blood flow velocities in the left and right middle cerebral arteries will be compared

to assess language lateralization: typical left-lateralization for language is indicated by relatively faster event-related blood flow in the left middle cerebral artery. It is expected that lateralization during word generation will be stronger and more reliable when a cue tone is presented without the 'clear mind' instruction.

A practical resource to improve the oral health of people with profound and multiple disabilities

Bridget Maguire & Kimberley Barker
Monash University

People with intellectual disability have more oral health conditions than the general community and Disability Support Workers' (DSWs) face many barriers when promoting oral hygiene with this population. A survey was distributed to DSWs, highlighting the most challenging self-care activities for staff. 139 surveys were returned with a response rate of 69%. Respondents ranked 'brushing teeth' as the most difficult activity to assist residents of group homes with.

Aims
Design and pilot test an oral hygiene training resource for DSWs to increase their capacity to assist with the occupation and improve the oral health care of people with intellectual disabilities.

Method
A resource has been developed to help DSWs assist residents to complete their oral hygiene routine. The resource includes;

- Practical ideas to improve a resident's oral hygiene.
- Oral hygiene profile template to assist DSWs to produce a summary of the resident's chosen strategies.
- Product directory of tools recommended in the practical ideas.

The resource is guided by evidence-based strategies in which DSWs trial a strategy and note any change in the resident's behaviour. If the resident responds positively to a strategy, the staff member continues to use that strategy and adds it to the resident's profile.

Findings
Initial feedback indicates the resource is practical for DSWs to assist residents with their oral hygiene routine.

Conclusion
The resource intends to improve the oral health of residents by minimising the barriers often experienced in accommodation services and provide a template for other activities such as dressing.

Transformative Outcomes for Computer Science Students at the University of Western Australia

Oliver Rawle
The University of Western Australia

The relatively new and actively growing bodies of research covering Transformative Learning and Computer Science education are advancing with little overlap. Because of this, there is scarce guidance for institutions committed to providing a transformative Computer Science course. This study used a mixed method approach consisting of a survey and interviews with a collection of Computer Science students at the University of Western Australia. Participation in the study was limited to Computer Science students who were also participating in the university's extra-curricular program centered on competitive programming. The aim of this purposive sample selection was to compare and contrast student's perceptions of the learning experiences of the Computer Science course and the extra-curricular program. In this way, the study identifies aspects of the courses that contribute to transformative learning experiences. Despite their stark differences in nature, analysis of students' perceptions points to a relatively even distribution of transformative learning experiences across both courses. The findings from the study help to inform the development and refinement of transformative teaching methods for Computer Science.

Posture Physiology: Optimising Musical Performance

Jen Liu
The University of Sydney

Correct posture is critical for the performance longevity of musicians as incorrect posture can altered muscle memory and result in musculoskeletal injury. Correct posture training remains a challenge in music performance education, however, there are potential technological solutions. We hypothesised that motion tracking technology could provide real-time feedback on postural parameters.
This pilot project was a Sydney Medical School summer vacation scholarship in collaboration with the Innovation TechLab and Sydney Conservatorium of Music. The aim was to develop a Kinect-based motion-sensing platform to provide real-time feedback system to improve the musician postural awareness.

The main challenges were to develop appropriate technologies, learn the relevant coding language, understand the limitations of the individual solutions and finally test on violinists as our test subjects.
The first phase was to prove the capability of the device to track subtle changes in posture. Extensive analysis of motion and posture was

performed against a human skeleton and individuals. Refinement of the source code resulted in a comprehensive computational representation of the body motions of a violinist.

The second phase involved working with the Head of Strings at the Conservatorium to define baseline correct posture. This created a clearer definition of the level of accuracy and detail required to nuance feedback. The final phase was preliminary testing of students during master class sessions. The response from both students and instructors was that the platform provided them with a much deeper appreciation of their postural awareness and allowed them to auto-correct in real-time. The Conservatorium has now installed 6 of these units that we developed. Importantly, this technology is being used for woodwind, brass and other instrument disciplines, all of whom see its beneficial potential. The next phase of this study is to do a full evaluation to publish and commercialize the technology.

Rheological behaviour of smart thermo-responsive hydrogels in pharmaceutical formulation

Lauren Thompson
The University of Adelaide

Hydrogels, highly hydrated polymer networks, have been found to be important in pharmaceutical industry applications such as tissue engineering, drug formulation, cosmetics, drug delivery, personal care products, food preservation and many others. The concentrated methylcellulose (MC) solution is a typical biocompatible and biodegradable hydrogel that is thermo-responsive, meaning that it is able to undergo changes in gelation behaviour and mechanical properties by varying external temperature. As temperature is increased to near body temperature, MC is able to transition from a liquid to a gel and thus has been popularly used as a functional biomaterial. This study envisages the influence of the surfactant sodium dodecyl sulphate (SDS) on the gelation behaviours of MC aqueous systems. Various concentrations of SDS were combined with MC solution to alter its gelation properties and were examined through dynamic oscillation rheological studies. The addition of a small amount of SDS is able to enhance the gelation of MC hydrogels, but an excessive amount of SDS will destroy the network structure. The outcome of this study provides new insight into the applicability of MC/surfactant mixtures to biomedical applications, such as tissue engineering and pharmaceutical formulations. In the future, applicable samples may progress to the stage of in vivo testing for tissue engineering, which has not yet been achieved.

The Role of Basement Membranes in the Establishment of Polarity in Mouse Pancreatic β-cells

Yvy (Karuna) Pham
The University of Western Australia

Mature beta-cells isolated from the C57 mouse were used to confirm the presence of polarity determinants and define the relationship between different basement membrane cell cultures and polarity. We have reported that insulin is selectively secreted towards the vasculature where there is an enrichment of a synaptic scaffold protein, RIM2. Herein, we report the presence of two polarity determinants, Par3 and Dlg, where Par3 is located away from the vasculature and Dlg is located around the cells. Different culture conditions (Gelatin, Matrigel, and laminin) affected polarity. Laminin demonstrated the highest protein intensity in the respective localizations of the polarity determinants, followed by Matrigel and Gelatin in this order. These findings provide morphological evidence of beta-cell polarity in situ and validate laminin as the major protein promoting polarity-like effects in Matrigel.

Self before others or others before self: Is there a right way to serve?

Vigneswari A
The University of Western Australia

Overseas community service in lower economically developed countries has been an increasingly common phenomenon, with several advocates (including governments and schools) strongly encouraging youths to undertake such projects. There are two ways in which community service manifests itself overseas, with each model focusing on different deliverables and objectives. This paper aims to compare and discuss how does the two models of overseas community service (international service-learning and community development) offer different transformative experiences for youths who take part in these projects, Using the case-study of Singapore where these two models have been employed in various overseas community service projects, the paper attempts to dissect the primary differences in focus and goals between these two models, which consequently affects the way the youths are impacted.

Furthermore, it is interesting to note that while there is substantial literature about transformative experiences in international service-learning, there is no accessible literature about transformative experiences in community development projects. This paper will thus play a crucial role in contributing to literature in this area. Data collection is done qualitatively through interviews with various students from the National University of Singapore (NUS) who have participated in different projects that adopt either of these model.

This research aspires to show that the community development model, that

focuses on the community at large instead of personal development, has the potential to transform a participant's experience to a greater extent than the international service-learning model.

The effect of population size on the rates of word loss and gain in the Indo-European and Austronesian language families

Caela Welsh
Australian National University

Languages change over time, and the evolution of languages is similar in many ways to biological evolution. But are all patterns predicted by evolutionary theory also seen in language evolution? One well-known biological pattern is that smaller populations tend to lose genetic diversity, but the effect of population size on language evolution is highly debated. Do small populations lose language complexity, or do small populations maintain strict language transmission and prevent the loss of language elements? I test these hypotheses using phylogenetic methods adapted from biological research. Using a database of 210 words of basic vocabulary from 28 Indo-European and 90 Austronesian languages, I compare the rates of gain of new words and loss of shared words in pairs of closely related languages that differ in speaker population size. The findings will not only be important for understanding the forces shaping the rate of language evolution; they may also have practical implications for conserving language diversity.

A clash of civilisations or a clash of representations? Rethinking the barbarian in the Greco-Persian Wars

Natasha Parnian
Macquarie University

The themes of freedom and slavery, democracy and despotism, civilization and barbarism dominate the narrative of the Greco Persian wars of the 5th century BCE. This study will examine these narratives and demonstrate they are a result of the over reliance of Hellenocentric sources. It will primarily challenge an accepted paradigm in modern scholarship that views the opposition of Greeks and Persians as a fundamental conflict between East and West by critiquing the way Greek sources have been used. The study will examine the origins of these narratives through an analysis of the notion of the 'barbarian' in 5th century Greek sources, primarily Herodotus' *The Histories* and Aeschylus' *The Persians.* Whilst these sources differ in purpose, they are both a product of the 5th century and utilize similar definitions of the 'barbarian.' I will be building on the work of many scholars who view the polarization

of Greek culture in relation to Persia was created in specific historical circumstances of the 5th century.

The paper employs a historicist theoretical approach, examining primary literary sources within their broader context. By doing so, the paper reviews the reductive frames of analysis established by historiographic traditions that have found authorisation in Greek sources and thus contributed to a distorted and unbalanced view of the Greco-Persian wars. The study argues the 'clash of civilisation' discourse has been manufactured ahistorically and in order to see there was no such 'clash of civilisations' rather a 'clash of representations', the paradigm must be contested to allow for a more interconnected approach to the study of the Greco-Persian wars.

Asphaltene Micromechanical Interfacial Force Measurements

Vincent Lim
The University of Western Australia

The discipline of flow assurance involves the transportation of oil and gas from reservoir to the processing facilities, with the management of operational challenges that result from multiphase flow and solids formation. One of the major problems encountered is the formation of clathrate hydrates and asphaltenes, which can precipitate and agglomerate in subsea pipelines and eventually lead to blockages in the pipeline. Unlike hydrates, there are no proposed mechanisms on how asphaltenes aggregate and agglomerate in crude oil systems. It is important to understand the cohesive and adhesive forces between the produced solids; these forces can be directly measured through the Micromechanical Force Apparatus (MMF). Asphaltenes from different dead crude oils have been precipitated and the first baseline measurements of their cohesive force have been taken. This work presents the first evidence that asphaltenes cohere through a sold-solid cohesion mechanism. In liquid cyclopentane and at preload force of 1.7 mN/m the asphaltene cohesive force is measured to be 0.2 ± 0.13 mN/m; this measured cohesive force is an order magnitude lower than the cohesive forces for cyclopentane hydrate in cyclopentane and asphaltenes in air. The adhesive force between asphaltene and hydrate particles is found to be 3 ± 2.4 mN/m, which is between the hydrate and asphaltene cohesive force.

Flipping the Classroom: The Extent to which University Students Perceive it as Transformative

Afira Zulkifli
The University of Western Australia

There is a considerable amount of institutional focus given to identifying and developing teaching practices that deliver a transformative learning experience to students, particularly at a tertiary level. The flipped classroom has been described as a novel and effective teaching approach that delivers student-centered curricula in the face of increasing student numbers and funding cuts. There is a minimal amount of academic research on flipped classrooms in tertiary education, particularly in an Australian context. Furthermore, there is a complete lack of research on the ability of flipped classrooms to foster a transformative learning environment for students. This study examined the perspectives of students from four "flipped" units at The University of Western Australia through a survey and semi-structured interviews. The unit coordinators were also interviewed to gain an understanding of their reasoning behind adopting this teaching practice and their expectations of student experiences in the flipped classroom. A greater understanding of these experiences can elucidate the specific aspects of the flipped classrooms can that lead to student transformation. This understanding could also aid future implementations of flipped classrooms across universities to make them more transformative and potentially inform course structures in general.

The Canary in the Coal Mine – Preserving Information Privacy in Data Mining

Reuel Baptista
The University of Auckland

With the unprecedented amount of digital data gathered in our connected world, organisations are turning to data mining in order to utilise this information. For instance, data mining an individual's credit card purchase history might reveal their preference for certain products, facilitating targeted advertising. It is data mining's predictive capability that poses risks to individuals' information privacy. This paper assesses whether New Zealand's privacy law can adequately respond to these risks and protect individuals' information privacy.

The paper commences by identifying the main risks that data mining poses to information privacy. The subsequent analysis reveals that lacunae in the three components of New Zealand's privacy law – statute, tort and contract – render it unable to respond effectively to these risks. The paper discusses how these issues can be resolved using a variety of legal tools sourced from New Zealand and overseas jurisdictions. It also examines how other countries have addressed these information privacy risks. Three solutions are distilled from this discussion:

- Creation of a data mining code of practice by the Privacy Commissioner.
- Introduction of an appropriation tort to complement the existing privacy torts.
- Introduction of basic privacy protections for individuals contracting with businesses.

The paper concludes by exploring ways to incorporate these solutions within New Zealand's privacy law. This will improve the law's response to the identified risks and enable it to better protect individuals' information privacy. On a wider scale, it is hoped that this paper will assist countries that are formulating their response to similar information privacy risks.

Spatial Variations in the Fish Assemblage Composition of Princess Royal Harbour

Mariana Hill Cruz
The University of Western Australia

Ports are associated with negative impacts to the environment such as habitat loss, collisions with whales, noise pollution and chemical and physical pollution. Structures in ports such as jetties are known to attract a high diversity of fish. However, a large amount of recreational fishing pressure is also associated with these structures. The Port of Albany in Western Australia is situated in Princess Royal Harbour. A complete fishing restriction within the port's boundaries was implemented in 2013. We aimed to assess the effect of the fishing restriction by comparing assemblages inside the port to outside. Some of the targeted species in the port are open water species as well. We also looked whether or not distance from the mouth of the harbour affected the abundance of open water species in the assemblage. Baited Remote Underwater Video Systems were used to estimate the relative abundance and richness of fish along two distance gradients: one in the port and the other one in a control site outside the port. Higher total abundance, targeted species and open water species abundance, and species richness were found in the port than in the open area. Open water species presented an abundance gradient in the port, with the highest abundance closer to the mouth of the harbour. Few species, including at least one targeted species, preferred the area outside the port. Habitat inconsistence between the port and the control site limited the interpretation of the results. Despite this problem, the results of this study suggest that the port is likely to have a positive effect on the abundance of fish in the harbour. Distance from the mouth of the harbour also had an effect on the assemblage, which is advised to be considered in future studies carried out in harbours.

Grass activated carbon (GAC): A green alternative adsorbent of Chromium (VI) and Methylene blue.

Aidil Zikri
Monash University

Grass (*Imperata Clyndrica*) has been selected as an environmental source of raw material for producing activated carbon to adsorb methylene blue (MB) dye and heavy metal ion such as chromium ion due to its abundance and ease of growth. This detailed study is carried out to circumvent the global waste water issues riddling most countries whereby most of the heavy metals and dyes are not easily degraded and would remain in the effluent for a long period of time. Initially, moisture in the grass samples was removed by drying, followed by carbonisation and physical activation at 350^{o}C for 5 minutes at a heating rate of 10^{o}C/min while being passed through carbon dioxide to induce pores enlargement. After physical characterisation, grass activated carbon (GAC) adsorbent was tested with different concentrations of chromium ion and methylene blue aqueous solution ranging from 20 to 100 mg/ L through a batch experiment. The equilibrium data for methylene blue (MB) dye and chromium ion were best represented by the Langmuir and Freundlich isotherm models, respectively. The efficiency of adsorption is studied through a comparison of removal efficiency of methylene blue (MB) dye and chromium ion at different concentrations. The highest percentage of methylene blue (MB) dye and chromium removal at 20 ppm were attained at 88/44% and 94.78%, respectively. This study not only suggests that grass could be considered as a potential alternative source to produce activated carbon adsorbent but also paves the way for an economical and environmentally friendly development of activated carbon adsorbent for different dyes and heavy metals.

Free education in public elementary schools in Uganda

Akiko Uchio
Kyushu University

In 1997, free education started in public elementary schools in Uganda. The percentage of children attending school was 76% from 1990 to 1996, but the school attendance rate was rapidly rising in 1997. Now that is 107% in 2013. However there are some problems. For example, the children whose parent or parents died of AIDS. Someone of them cannot go to elementary school because of the uniform fee or the living expenses. There are not also enough teachers in Uganda. At CIUP, I will talk about basic information, education system and the problems in Uganda.

Strategic localization of resident memory T cells in human tissues and their key regulatory cytokines

Jarem Edwards
The University of Sydney

One of the hallmark achievements of modern medicine has been the development of vaccines that provide lasting protection against human disease. Successful vaccines have to date, relied almost solely upon generating circulating antibodies. Recently however, attention has turned to designing cell-mediated vaccines for diseases like Epstein Barr Virus (EBV), HIV and tuberculosis.

One particular immune cell that scientists hope to exploit for this purpose is a newly discovered subset of the T cell repertoire, termed resident memory T cells (Trm). Previously, it was thought that T lymphocyte populations in tissues were largely maintained by the continuous circulation of memory T cells. However, recent studies in mice challenged this concept by showing that a proportion of memory T cells in tissues do not enter circulation. These non-circulatory cells were also superior at protecting against reinfection when compared to their circulating counterparts. There is however, limited information on whether these cells exist in humans. We recently identified resident memory T cells in different human tissues. The purpose of my study was twofold. Firstly, to identify the location of Trm T cells in human lymphoid tissues by immunohistochemistry. Sections from human tonsils and spleens were stained with antibodies to different Trm T cell markers and examined by fluorescence microscopy. This revealed the localization of Trm T cells at sites of possible antigen encounter. Secondly, we examined the effects of cytokines on circulating memory T cells for the development and maintenance of Trm T cell phenotype. To this end, peripheral blood lymphocytes were stimulated with various cytokines and the resulting phenotypes examined using flow cytometry. From these studies we identified a crucial cytokine that could be a key regulator of Trm T cells in human tissues. Ongoing work will determine the potential application of this in vaccine development.

Elephants watching Dragons :The Changing perceptions of China in India from 1947 to the present day.

Ben Langley
Australian National University

India's relationship with China is one of the key issues that will shape the twenty-first century's development. However, little work has been done on the nuances of Indian domestic opinion about China. This thesis seeks to help fill this gap by examining how India's perception of China has

changed from the initial displays of warmth at independence to the ambivalent distrust of the present day. This research primarily consists of an in depth review and subsequent statistical analysis of the coverage of China in four newspapers during five key periods in Indian history: 1954-56 (the Bandung conference), 1961-63 (the Sino-Indian border war), 1974-76 (incorporating both the first Indian nuclear test and the beginning of Emergency Rule), 1990-92 (incorporation India's economic crisis and the beginnings of China's economic rise) and 2011-14 (the 'present day'). This data set was then contextualized with secondary sources published both within and outside India and then compared to how the relationship has been portrayed in the media and academic literature.

The analysis of this contextualised data shows that Indian public's perceptions of China are more complex than it is portrayed by studies focused predominantly on Indian government policy. In particular the data shows that there was a significant undertone of scepticism in the popular discourse about Sino-India friendship during the 1955-1962 'heyday' of cordial relations, and after 1962 there was strong resistance in popular culture to any attempt to recast the Sino-Indian relationship in a positive light. The findings of this study point to a weakness in using Indian government policy and rational actor theory in isolation to explain and extrapolate Sino-Indian relations. Instead this thesis posits that an Andersonian model of an imagined community that feels existentially threatened by Chinese border activity more aptly explains how India's democratically elected government interacts with China

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Clinical scales used to measure spasticity

Sergio Quach
Monash University

Spasticity is one of the components of upper motor neurone syndrome (UMNS) and is a possible symptom following a neurological injury. In multiple sclerosis the prevalence of spasticity has been reported to be as high as 84%. The prevalence of spasticity in an ambulant population of 93 people following TBI was 63%. It remains high. Spasticity has traditionally been considered as an impairment that is associated with poor outcomes in the areas of motor function, pain levels, rehabilitation length of stay and long-term mobility outcomes. It is thus imperative clinicians are able to effectively assess spasticity levels in patients in order for appropriate treatment to commence. However, these clinical scales must be reliable and valid outcome measures in order for them to guide clinical decision making and reflect functional capacity of patients. Currently, there is lacking research evidence to support the validity and reliability of these clinical scales and therefore is a current research issue. There is conflicting evidence across many studies regarding the intra-

rater, inter-rater reliability of these scales as well as the criterion validity. This makes it hard for clinicians to appropriately measure and treat this impairment in a neurological population. More time is needed to invest in developing a new clinical scale (standardised) or teaching clinicians in appropriately using an existing one.

Future issues about environmental education in Japan

Hatsune Kaga
Kyushu University

The environmental education has been getting more attentions all over the world as global warming causes some issues and it is necessarily for us to know and learn how nature and our daily lives relate to each other. The environmental education is still new academic field in japan and its current policy is basically copying other developed countries such as Germany and Sweden. However Japan need to establish its own environmental education style since it has different social system and unique history over pollution nuisances. In order to form a new style of environmental education which fits Japanese society and increase people's awareness of environmental issues, these three points needed to implement: 1) increase interactive programs about nature and current environment issues; 2) increase subsidy to support environmental NGOs; 3) educate teachers , especially teachers at elementary school, because most of teachers do not have any knowledge about environment problems.

A load of (red) bull: psychological factors accounting for energy drink problems

Emma Lawson
Macquarie University

Young people's use of alcohol mixed with energy drinks (AmEDs) has become widespread, with up to 39% of university students reporting AmED consumption at least monthly. There is a growing research consensus that AmED users experience more negative alcohol-related consequences (ARCs) than individuals who consume alcohol only. As such, various Australian, Canadian and American health organisations have released reports warning about caffeine's apparent propensity to enhance alcohol-related risks. However, there is little consensus in the literature regarding the psychological factors influencing this association. Therefore, the current study examines the influence of perceived intoxication and drinking motives in possibly moderating the AmED-ARC relationship, in a sample of undergraduate university students. Participants completed an in-person modified Timeline Followback

interview, which systematically assessed alcohol and AmED use, ARCs, perceived and actual blood alcohol content (BAC), and motives for drinking for each drinking occasion over the 90 days prior to testing. To date, 194 undergraduate students have completed the interview. It is expected that AmED users will report more ARCs than non-AmED users, and that AmED users would experience more ARCs during occasions when they mix alcohol with energy drinks compared to occasions where drank alcohol alone. Additionally, it is expected that perceived BAC and enhancement motives will account for these differences over and above estimated BAC. Lastly, it is expected that perceived BAC will be significantly larger than estimated BAC amongst AmED drinkers compared to non-AmED drinkers. Recruitment will cease after 200 participants have completed the study and analyses will begin shortly thereafter.

The Mobilising Force of the Grotesque: In the anti-war publications of Ernst Friedrich and Frederick A. Barber

Emily Gallagher
University of Notre Dame

Emerging as a prominent area of debate in anthropological, social and historical fields, constructions of victimhood are being discussed as active national frameworks of identity and memory. Within this school of thought, the use of grotesque war photography has been largely neglected. This paper argues that grotesque war photography is not only implicated in constructions of identity, but can be used to institutionalise victimisation rhetoric. Through a comparative case study on Ernst Friedrich's *War against War!* [1924], and Frederick A. Barber's *The Horror of it: Camera Records of War's Gruesome Glories* [1932], this paper will explore the intentional use of the grotesque as a visual tactic to reconstruct the 'subject' of victimhood narratives. It is argued that the attractiveness of the grotesque as a platform to reconstruct victimhood identities is realised in the objective realism of photography and the confronting nature of the grotesque form.

Oxidation of Thiol Proteins: One Step Closer to Tackle Duchenne Muscular Dystrophy

Nguyet Duong
The University of Western Australia

Duchenne muscular dystrophy is a devastating progressive disease that leads to the premature death of 1 in 3500 boys. Unfortunately, there is no current cure or effective treatment for the disease due to a lack of understanding of the exact molecular mechanisms that lead to the

symptoms of the disease. One known important factor is oxidative stress, which may cause irreversible damages or reversible modifications to the cells. There are debates about which of these aspects is mainly responsible for the symptoms of Duchene muscular dystrophy. It is arguable that the reversible oxidation on the protein chemical groups called "thiol groups" may provide the answer to the disease mechanisms. Thiol group oxidation is extensively involved in the signalling network of the cells in our body and has been found to be significantly increased in dystrophic mice and dogs. My research project aims to identify and locate which specific proteins have their thiol groups oxidised in dystrophic dog muscles. I plan to apply the novel two-tag gel technique to label these thiol groups and measure the extent of oxidation via the highly sensitive mass spectrometry technique. The results are expected to provide a more detailed picture of how thiol oxidation plays a role in the disease progress, thereby encouraging more targeted drugs development to treat Duchenne muscular dystrophy.

A Green Leader's Dirty Habit: How Failed Emissions Trading Policy Fuelled a Resurgence of Coal in Germany

Aaron Tuckey
The University of Western Australia

As both a nation with a highly advanced industrial economy and a notably environmentally conscious civil society, Germany is often regarded as one of the key leaders in pursuing a low-carbon future in both the EU and globally. Observers point to its large-scale uptake of renewable energy, which now accounts for over a quarter of energy generation. Yet despite this, Germany continues to have a strong reliance on carbon-intense coal. Lignite, or brown coal, the dirtiest grade of coal, makes up 27% of German energy production, whilst black coal is another 20%. Despite an increase in the use of renewables and a decrease in domestic consumer demand over the same period, emissions relating to coal-fired generation in Germany increased by 7% between 2010 and 2013.

It is widely reported that Germany's coal 'renaissance' is due to the Fukushima nuclear disaster and Chancellor Merkel's subsequent nuclear phase-out; the recent shale gas revolution's effect on world coal prices; or some combination of the two. However, I suggest that these claims overlook the long-term planning involved in plant commissioning. The investment decisions of all of Germany's recent new coal fired plants can be traced to the initial years of emissions trading in Europe (2005-2008). As I explain, this is no mere coincidence. Rather, Europe's emissions trading scheme somewhat paradoxically severely distorted investment incentives in favour of coal due to the generation of windfall profits, especially in Germany. I show that whilst other trends and events have played supplementary roles in supporting coal's survival in Germany, it is the generally neglected role of the failed emissions trading policy that explains coal's expansion.

An algorithm for finding Hamiltonian Cycles in Cubic Planar Graphs

Bohao Yao
The University of Melbourne

A graph is a set of vertices (nodes) joined together by edges (lines). A Hamiltonian cycle is a cycle that passes through every vertex in the graph exactly once. Determining whether a graph has a Hamiltonian cycle is an NP-complete problem. Many approaches to solving the Hamiltonian cycle problem involve brute force methods which have exponential time-complexity. The key challenge is to find algorithms which are efficient. An efficient (polynomial-time) algorithm for solving any NP-complete problem would solve the so-called "P versus NP problem", which is a major unsolved problem in mathematics. In our research, we focus specifically on finding Hamiltonian cycles in cubic planar graphs. A cubic graph is a graph with exactly 3 edges incident to all of its vertices. A planar graph is a graph that can be drawn without any intersecting edges. It has been shown that even in cubic planar graphs, the Hamiltonian cycle problem remains NP-complete. Our approach to this problem is to first start with a cycle and then continuously expand it into a larger cycle. Restrictions on how to expand the cycle, such as preventing a vertex from being used twice, are imposed. We then prove a theorem that relates this method of finding a Hamiltonian cycle to that of finding a certain tree in the dual graph. We use this to design a new algorithm which, although still has exponential complexity, reduces the run-time by a factor of one half over the naive brute force method.

Metallic complexation of carbon nanotubes for photovoltaics

Jonathan Ben-David
Flinders University

Current commercial silicon solar panels cannot meet energy demands due to being limited in terms of usability and electricity production. New solar cells utilising carbon nanotubes (CNTs) address these limitations as they are highly conductive, lighter, transparent and flexible, allowing for use in more versatile applications, and ultimately allow greater energy supply. However there is a compromise between the amount of light transmitted resulting in current formed in the cell and the transportation of this current using CNT films, as they suffer from reduced conductivity due to poor charge transfer between the nanotubes. Enhancing the CNT film to allow more light to penetrate the cell, yet still conduct higher currents, will consequently produce more efficient solar cells. Metals which were shown to bond to CNTs by forming a coordination complex (with the nanotubes bonding as ligands) were used to link the nanotubes together in order to increase conductivity. The resistance and transparency, which

relates to the thickness of the films, was measured and compared to standard unreacted CNTs. CNTs reacted with iron and magnesium resulted in more conductive films yet were also thicker. Lead treated CNTs resulted in more conductive films however a similar film thickness and light transmittance to the unreacted CNTs was observed. Based on these results, the employed technique shows potential for the enhancements of the CNT films as they can be made thinner allowing more light to enter a device and produce more electricity. Solar cells that utilise these films will be able to harness more of the suns energy with reduced loss of electricity resulting in more efficient and versatile solar cells.

An Upward Spiral? Exploring the Role of Obsessionality in Recovery from Anorexia

Monica Leslie
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The cognitive-interpersonal maintenance model of anorexia nervosa (AN) predicts that obsessionality maintains AN. The current study examined this relationship using data collected from the Strong Without Anorexia Nervosa study: a randomised controlled trial comparing the efficacy of three outpatient psychological treatments (Enhanced Cognitive Behavioural Therapy [CBT-E], the Maudsley Anorexia Nervosa Treatment for Adults [MANTRA], and Specialist Supportive Clinical Management [SSCM]). Participants were 120 adult outpatients with AN (95.8% female). Obsessionality was measured using the Vancouver Obsessional Compulsive Inventory (Thordarson et al., 2004). Eating disorder psychopathology was measured using the Eating Disorder Examination (Fairburn & Cooper, 1993). The current findings replicated those of Olatunji et al. (2010), revealing that reductions in obsessionality significantly mediated reductions in eating disorder psychopathology (indirect effect = -0.10, 95% CI [-0.19, -0.03], standardised indirect effect = -0.07). However, there was a greater indirect effect of time on obsessionality, as mediated by symptom remission (indirect effect = -2.26, 95% CI [-3.13, -1.58], standardised indirect effect = -0.21). These findings may reflect the existence of a reciprocal bidirectional relationship between changes in obsessionality and changes in eating disorder psychopathology. These findings have potential clinical implications, suggesting that it may be more effective to target the symptoms of eating disorders directly rather than targeting broad obsessional tendencies. However, future research is required in order to ascertain the nature of directionality between obsessionality and eating disorder psychopathology.

Incentives and Informed Consent when Encouraging Health Behaviours

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The provision of incentives such as Conditional Cash Transfers to encourage participants to pursue health behaviours, such as attending health check-ups or vaccination programs, is an increasingly used technique used in development field research. Proponents of the technique posit that the costs of recommended health behaviours outweigh the potential benefits, and so individuals in least developed countries make a rational choice to not pursue these health behaviours. The provision of incentives can increase the benefits to outweigh the costs, thus improving health behaviours. However, there remains minimal discussion in the literature about the potential ethical considerations of their use with regard to influencing recipient consent. This presentation examines five case studies to discuss two potential sources of undue influence: the size of the financial incentive provided, and the relationship between the funder and recipient. Some incentives may be so large that they preclude individuals from making choices in their own best interest, while others may mask a problematic relationship where the recipient feels unable to decline due to other pressures from the funder. I argue that more attention must be paid to using incentives in encourage health behaviours as it is possible that in these two circumstances the autonomy of the individuals is abused. This not only represents a serious ethical violation but raises concerns about the validity of the ˜success stories" of incentive provision on health outcomes.

High lipid levels in obesity drives adverse outcomes in prostate cancer: an in vitro model

Frank Liu-Fu
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Prostate cancer (PrCa) and obesity are two increasingly common health problems in the developed world. Associated with this is evidence that obese individuals who are diagnosed with PrCa experience significantly worse cancer outcomes such as reduced survival times and more frequent cancer spread compared to non-obese individuals with PrCa. Obese individuals have also been found to possess more metabolically active fat surrounding the prostate, suggesting that lipid contained in this fat may supply PrCa to act as a key source of energy that drives the cancer's malignancy. The present study aimed to assess the effect of high lipid availability on PrCa metabolism and biology in order to model PrCa progression under obese conditions.
The PrCa cell line PC-3 was treated with 0-450μM of the monounsaturated fatty acid (FA) oleate, a common FA in western diets, to simulate lipid concentrations in obese individuals. Biochemical analysis found that higher oleate availability increased lipid storage, in the form of

triglyceride, inside PrCa cells in a concentration dependent manner. The breakdown of intracellular triglyceride into free FA and use of the freed FA for energy production were both higher in cells given obese concentrations of oleate. Assessment of PrCa biology by measuring rates of cell division, migration and survival under serum nutrient starvation, all of which are reflective of cancer malignancy, found that all three parameters were increased in cells treated with obese oleate concentrations.
Taken together, these findings suggest that a lipid rich environment increases the ability of PrCa cells to store and metabolise lipids. This in turn appears to fuel the cancer to become more malignant and spread, likely accounting for the worse PrCa outcomes seen in obese patients. Further research into potential pharmacological modulation of lipid metabolism may thus be explored to inhibit PrCa progression.

Empirically Analysing the efficacy of parameterised approximation algorithms for finding vertex covers

Thomas Bradshaw
The University of Newcastle

Computation, the act of using computing power to process data, is becoming increasingly important. It is used in many disciplines; protein folding simulations in medicine; planetary discovery and cataloguing in astronomy and high fidelity simulations in engineering. Looking to the future, autonomous vehicles must process large amounts of data to adequately analyse the traffic state.

Of the many different computing problems not all are simple or quick to run. A basic desktop computer can perform millions of complicated divisions in a short period of time. However, finding a route through every city in Australia and then back to your point of origin, commonly referred to as the travelling salesperson problem, requires vast amounts of both time and computational power. The first problem has ways of being solved quickly while the second does not.

Two common ways of reducing time and resource cost in these solutions are approximation and parametrisation. Approximation algorithms aim to be very fast at the cost of accuracy. Parametrisation algorithms depend on a parameter that isn't input size as this can become prohibitively large. The input size for a travelling salesperson problem would be the number of cities. An alternative parameter might be the maximum possible tour length. This can, in some cases, improve speed without sacrificing accuracy.

There is a growing field of interest in the hybridisation of these solutions. These 'parametrised-approximation' algorithms balance between the

speed of approximation algorithms and the accuracy of parametrised algorithms.

Such algorithms have been theoretically analysed in the worst case. However, these algorithms could perform very well in practical situations. Thus it is important to empirically test them to understand their efficiency in a non-theoretical environment.

We aim to test two parametrised approximation algorithms proposed by Brankovic and Fernau. These will be compared to two other algorithms which employ only approximation or only parametrisation. It is our expectation that Brankovic and Fernau's algorithm will be faster than the parametrised algorithm and give a more accurate solution than the approximation algorithm.

The Impact of the Residual Expression of Stem Cell Factors on Tumorigenesis and Differentiation in Liver Progenitor Cells Derived from Embryonic Stem Cells and Induced Pluripotent Stem Cells

Vanja Todorovski
The University of Western Australia

The liver is a vital organ, crucial in maintaining homeostasis, plasma protein synthesis and drug detoxification. Following acute liver injury, liver regeneration occurs through hepatocyte proliferation. During chronic or severe liver injury, where there is impairment of hepatocyte proliferation, liver progenitor cells (LPCs) are activated and assist liver regeneration by differentiating into hepatocytes. For patients with end-stage liver disease (ESLD) the only current effective treatment is liver transplantation; the shortage of donor livers focuses attention on cell therapy approaches. Initial attempts involving infusion of primary hepatocytes into patients with ESLD had poor outcomes, including short hepatocyte life span, loss of hepatocyte function and immune rejection. The use of LPCs may extend the period of efficacy; however it is still subject to immune rejection. LPC-like cells have been successfully derived from embryonic stem cells (ESCs) as well as induced pluripotent stem cells (iPSCs) which are generated through expression of the four Yamanaka factors; Oct 3/4, Sox2, Klf4 and C-myc. iPSCs circumvent issues associated with ESCs, including immune rejection and ethical issues, thus are a more favourable alternative. However, several studies have associated high expression of Yamanaka factors, with the development of tumours. The aim of this study is to determine the level of residual expression of Yamanaka factors in LPC-like cells and to compare their differentiation and tumorigenesis with LPCs isolated from mouse liver. It tests the hypothesis that a high residual expression of Yamanaka factors may favour tumour formation and mitigate differentiation.

Does Monetary Policy Affect Consumption in Australia?

Aiden Depiazzi
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The transmission effect of monetary policy on consumption is generally modelled in an intertemporal Euler equation that forms the basis of the New Keynesian IS curve (NKIC). To determine whether and to what degree consumer expectations of the ex-ante real interest rate, in turn affected by monetary policy decisions, impact consumption, the elasticity of intertemporal substitution (EIS) is generally estimated from the NKIC. However, this estimation is plagued by problems of weakly identified parameters and structural breaks in the data. In this paper, the methods of Stock and Wright (2000) and Magnusson and Mavroeidis (2014) are implemented to estimate the EIS using econometric techniques robust to weak instruments and to structural breaks. This methodology is applied to this problem using Australian data for the first time. Robustness to structural breaks is of critical importance; if the EIS is time-variant, it is possible that the transmission effect of monetary policy has been diminished by the unprecedented impacts on the international monetary system resulting from the Global Financial Crisis. Finally, specifications of the NKIC that are extended to a small open economy and that allow habits to contribute to consumption decisions are tested as well.

'Uncovering' the Interviewer: Reflections on Oral Histories and the Hungarian Refugees

Ebony Hutchin
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This presentation will explore the nature and usefulness of oral histories recorded in the form of interview transcripts. Many of the so-called 'Fifty-Sixers', refugees displaced by the 1956 Hungarian Revolution, were interviewed extensively upon exiting Hungary, predominantly through Columbia University's Research Project on Hungary (CURPH). Their oral histories were considered an invaluable source of information on the previously sealed Stalinist Eastern Bloc.
This paper was born of a broader research project which sought to disrupt the dominant discourse on the role of writers in the Hungarian Revolution through an analysis of interviews with Hungarian Refugees from the CURPH Donald and Vera Blinken Collection. During the process of this analysis, the utilities and challenges of oral histories recorded in interview transcripts became increasingly evident.

Having examined 53 interview transcripts from the Donald and Vera Blinken Collection, one particular interview, transcript No. 407, stood out as providing an unusual and unique opportunity to closely analyse the relationship between interviewer and interviewee in the construction of oral historical sources. This transcript contains the interviewer's detailed notes interspersed between, and sometimes within, the respondent's answers. Close analysis was performed by examining sections of text where the interviewer intrudes explicitly or implicitly, and where dialogue between the respondent and interviewer is recorded, in order to uncover details about our anonymous interviewer, and the tensions of the relationship that emerges between the two participants. It transpires that the interviewer was Romanian and the interviewee Hungarian, and in the course of the interview we see played out an interesting case study of inter-ethnic interactions in the wake of the Hungarian Revolution. Thus, this transcript emerges as the written record of an oral history enacted in the very relationship of interviewer and respondent. This small case study is indicative of broader implications, and an impetus for further research, regarding the ways in which interview transcripts and oral histories may prove useful for historical research not as unadulterated testimony, but as dialogic, constructed accounts of the past.

Protection from UV-Induced Photoageing by Vitamin D and related compounds

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Many changes occur in the skin following exposure to ultraviolet radiation (UVR). These include the production of Vitamin D but also damage to the cells and structural tissue of the skin. This damage results in skin cancer (photocarcinogenesis) and photoageing, which is the premature ageing of the skin. Although Vitamin D is best known for its role in calcium absorption, research by this group has shown that the active hormone, 1,25dihydroxyvitamin D3 (1,25(OH)2D3), can reduce DNA damage when applied topically following UV irradiation. However, 1,25(OH)2D3 application causes hypercalcaemia and there is evidence that other Vitamin D metabolites may have similar photoprotective benefits without this notable detriment. Whether 1,25(OH)2D3 or related compounds reduce photoageing is unclear.
Mice were irradiated five times per week for ten weeks with solar-simulated UVR, and 1,25(OH)2D3 and 20hydroxyvitamin D3 (20(OH)D3), a Vitamin D metabolite produced by an alternate pathway, were applied topically to their skin following each irradiation. Skin sections were collected forty weeks after the start of UVR. Previous studies examined the effects of these compounds on photocarcinogenesis. This study investigates their effects on markers of photoageing. Skin was stained for mast cells; elastin fibre degradation; thickening of the outermost layer, the epidermis; and matrix metalloproteinase-1 (MMP-1), which degrades

collagen, a protein important in providing structural support. These markers were quantified with Metamorph image analysis software. Results show that, in addition to reducing DNA damage, the topical application of 1,25(OH)2D3 protects from UVR-induced epidermal thickening and the degradation of elastin fibres, which are responsible for the skin's elasticity. Additionally, 20(OH)D3 protects against these markers of photoageing and does not cause hypercalcaemia at pharmacological doses. These studies indicate that, as well as reducing UV-induced DNA damage, these compounds could be useful to reduce markers of photoageing, if included in sunscreen or after-sun products.

Health Inequities within Australia's Indigenous Population

Eliza Bartsch
Monash University

The prevalence of health inequity for Australia's Aboriginal and Torres Strait Islander (ATSI) population is greater when compared to any other social or cultural group within Australia. The ATSI population are recognised as the most vulnerable population within this nation. The objective of this study was to highlight health inequities, discuss their impact, and explore possible causes for these disparities.

Methods: A literature search was conducted through Medline, PubMed, CINAHL and Google Scholar databases. The search was limited to between 2005 – 2015 as previous literature reviews dated back to 1788 and before European settlement.

Results: Vulnerability for the ATSI population has a number of factors. This population suffer extreme health inequity due to a variety of factors such as isolation, poverty, lifestyle factors, racial discrimination and disconnection from their traditional homeland. Life expectancy of the average Indigenous Australian is 11.5 years less than a non-Indigenous Australian. Over 25% of the ATSI population have insufficient funds to pay for a nutritious daily meal, live in isolated rural settings where limited access to equitable healthcare is apparent. This results in lack of access to both contiguous and culturally appropriate healthcare. Coupled with attempted forced closure of Aboriginal communities, equitable and quality health care for ATSI populations is a major concern.

Conclusions: This literature review demonstrates the profound inequities the ATSI population faces. Findings demonstrate there is a need to raise awareness that building equitable and culturally appropriate healthcare programs is essential for the ATSI community.

Can Singapore Remain a Leading Maritime Hub? Attracting and retaining international marine trade

Soon Leqi

Singapore has the world's 2nd busiest port, with some 120,000 vessels calling on its port annually. The crux of Singapore's success lies in the value added services it provides and high end infrastructure allowing it to manage large ships passing through the region. Within the last decade, ports in the Asia-Pacific region have upscaled their port infrastructures significantly in order to gain a portion of the market pie in maritime trade. Consequently, the development of these ports pose a threat to Singapore as a maritime hub. This paper argues that Singapore's maritime industry can achieve continued success even when faced with the intense competition from China and other regional competitors. For perspective, this paper examines the onshore and offshore talent situation across the main global maritime hubs and reasons why should marine companies continue to relocate or expand into Singapore. I will examine and benchmark Singapore's maritime port infrastructure and services against other regional ports to assess Singapore's maritime trade outlook, and together with industry trends predict and explain the sustainability of Singapore as a maritime hub.

The effects of Amylin and β-Amyloid on bioenergetics in pancreatic β-cells *in vitro*

Joanne Rowles
Curtin University

Introduction: Misfolding, aggregation and deposition of peptides in vital tissues, referred to as Amyloidosis, has been linked to chronic diseases, including Type 2 Diabetes Mellitus (T2DM) and Alzheimer's disease (AD). Research demonstrates that the amyloidogenic peptides (those prone to misfolding) negatively affect cell viability, predominantly via mitochondrial dysfunction. Recent evidence indicates T2DM and AD are related including shared risk factors, demographics and co-localisation of shared amyloidogenic peptides. This investigation analysed the effect of these shared peptides, Islet Amyloid Polypeptide (IAPP) and β-Amyloid (Aβ) peptides on pancreatic β-cell functionality. **Materials/Methods:** The BRIN-BD11 pancreatic β-cell line was treated with soluble aggregations of IAPP or Aβ at low concentrations. An insulin ELISA examined insulin secretion, while the Seahorse XF^{e}96 flux analyser investigated cell bioenergetics. Western blot analysis determined protein expression. **Results:** Cell viability remained unchanged after exposure, and apoptosis was not detected. Insulin secretion showed decreasing trends, but was

not statistically significant. Cellular bioenergetics also showed decreasing trends, but were not statistically significant. Aβ & IAPP exposure correlated with a decrease in expression of COXIV. **Conclusions:** IAPP and Aβ did not cause alterations in β-cell function or bioenergetics at these concentrations and exposure times. Changes in COXIV expression was observed; indicating exposure to amyloidogenic peptides may alter protein expression of key metabolic hubs without impacting significantly on □-cell functionality. These data do not exclude the possibility that exposure to elevated levels, or prolonged exposure to amyloidogenic oligomers could alter □-cell functionality.

T cell receptors involved in T cell migration from primary tumours to draining lymph nodes

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Although much is known about how the immune system responds to "foreigners" such as microbes, viruses and protozoans, relatively little is understood about the interplay between cancer cells and immune cells. Studies in the field have shown that certain immune cells, such as T cells, can have both pro-tumour and anti-tumour functions depending on the tumour microenvironment. The purpose of such studies is to ultimately discover innovative immunotherapies to treat and retard the metastasis of cancer. Our laboratory is interested in characterizing cells that regulate immune responses towards primary tumours. Recently, we have discovered that tumour conditioned T cells are capable of emigrating from primary tumours to the draining lymph node. Preliminary work suggests that they function there to modulate immune responses against the tumour. However, the mechanism by which these T cells emigrate from tumour to draining lymph nodes is yet to be determined. The purpose of my study was to identify the receptors responsible for this migration.
Photoconvertible Kikume transgenic mice were utilized in order to track T cells at the site of tumourgenesis to the draining lymph nodes. These mice ubiquitously express the coral-derived fluorescent protein Kikume, and natively fluoresce green. They can however, be irreversibly converted to red fluorescence by exposure to violet light thus allowing us to label tumour-infiltrating cells. Kikume transgenic mice were challenged by ear injection with tumourigenic cancer cells and then administered with blocking antibodies specific for particular T cells receptors. The tumour site was photoconverted by exposure to white light and the mice were sacrificed 24 hours later. Photoconverted red T cell subsets in the draining lymph nodes were quantified using multi-parameter flow cytometry to determine whether blocking particular receptors inhibited T cell migration from the tumour to the draining lymph node. Pilot experiments show that different receptors are responsible for migration

of different T cell subsets. Further work will help determine the importance of controlling T cell migration to draining lymph nodes in order to modulate the spread and metastasis of cancer.

Language Immersion as Transformative Learning: The UWA China Field Study

Chloe Dempsey
The University of Western Australia

Despite the large amount of research that has been done in the subject of transformative experiences in relation to the two discrete areas of travel and language learning respectively, there remains a dearth of understanding of the student experience when the two are combined. The University of Western Australia (UWA) China Field Study provides students the opportunity to spend two months in China, studying Mandarin, living on campus, and undertaking cultural immersion activities. Through extensive survey of past participants of the Field Study, combined with in-depth semi-structured interviews, this research examines student experiences and associated reflection. The surveys and interviews allow for qualitative understanding of student perceptions, and case study examples. This data looks at students' awareness of the effect of the Field Study on their personal behaviour and observed changes in perspective, exploring areas of transformative learning. Building on research done in the areas of travel and language learning respectively, the study combines the two to understand how students perceive their experiences and whether they were transformational. In an age of tertiary education's greater engagement with transformative learning methods and an emphasis on cultural literacy, the importance of understanding the impact of immersive language learning programs is paramount to the ongoing investment tertiary institutions make in them. The research provides insight into the tangible outcomes students obtain from such programs and can be used to inform future structure and development of this type of program.

Individual patient data meta-analysis of intensive upper limb therapy approaches for children with unilateral cerebral palsy

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For children with unilateral cerebral palsy, impaired upper limb function adversely affects independence in daily activities and quality of life. To improve such outcomes, a range of upper limb therapy models are available. The association between study effect size and patient

characteristics is yet to be investigated. This study aimed to 1) investigate the efficacy of hybrid or modified constraint induced movement therapy (CIMT), compared to bimanual occupational therapy (BIM), to improve upper limb function in children with unilateral cerebral palsy (UCP), and 2) explore subgroup differences on treatment outcomes.

Study Design: Individual patient data from three trials using single-blind randomized comparison designs comparing CIMT to BIM for children with UCP (5-16yrs, n=128). Method: Bimanual performance, unimanual capacity and movement efficiency were compared immediately and 26wks post intervention. Secondary analysis examined influence of age (<9yrs ≥), baseline (BL) bimanual hand-use, dose (hrs) and duration of therapy delivery on outcomes.

Results: Characteristics of participants in CIMT (n=68) and BIM (n=60) were equivalent at BL. There were comparable immediate improvements across both groups on bimanual performance and movement efficiency. At 26 weeks, BIM was favoured for sustained bimanual performance improvements, and both groups retained similar gains for movement efficiency. Regarding subgroup relationships, dose (30-60hrs) and therapy duration did not influence outcomes. Immediately post intervention, CIMT was superior to BIM to improve quality of movement for older children, and participants with poorer BL bimanual hand-use. BIM was superior to CIMT for children with higher BL bimanual hand-use, in influencing significantly improved 26wk bimanual performance outcomes.

Conclusion: The use of either CIMT or BIM is supported to improve bimanual performance and movement efficiency. CIMT was favourable for children with poorer BL bimanual hand-use and older children to improve unimanual capacity. Sustained gains in bimanual performance were associated with higher BL bimanual hand-use and BIM.

Functional Characterisation of cyanobacterial bicarbonate and sodium transporters in E.coli for improved plant photosynthesis

Laura Wey
Australian National University

The United Nations advises that food production must double by 2050 to meet projected population growth. One strategy to contribute to solving

food security aims to improve the photosynthetic CO_2 fixation rate in key C_3 crop plants, such as rice and wheat, to increase crop biomass and yield. This could be achieved by integrating components of the CO_2-concentrating mechanism from photosynthetic cyanobacteria (blue-green algae) into chloroplasts. The first genetic engineering step, towards which my research project contributes, is to integrate cyanobacterial sodium-dependent bicarbonate transporters (SbtA) into the chloroplast inner envelope by genomic expression and chloroplast targeting. Cyanobacterial Na^+/H^+ antiporters (NhaS3) need to accompany SbtA to generate the driving Na^+ gradient. Modelling indicates that a 5-15% improvement in photosynthetic CO_2 fixation rate is feasible from this genetic modification. My research aims to characterise SbtA and NhaS3's function in *Escherichia coli* expression systems using complementation experiments and ^{14}C-bicarbonate uptake assays. In particular, I am investigating the regulation of SbtA by SbtB companion protein using immobilized metal affinity chromatography followed by immunological detection. I have constructed *E. coli* double knock-outs and established these mutants as suitable expression systems. I have conducted initial functional characterisation of SbtA and NhaS3. Preliminary results of SbtA and SbtB interaction suggest a role of phosphorylation and small effector molecules, which will be further elucidated in the rest of my honours year. The end goal is to ready SbtA and NhaS3 candidates for active, functional expression in the chloroplasts of C_3 crop plants. The next stage is to transplant these candidates into tobacco before advancing onto C_3 crop plants, completing the first genetic engineering step towards improving photosynthesis and solving food security.

The Influence of National Culture and Intrinsic Motivation in One-on-One Tacit Knowledge Transfer

Nicole Celestine
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Given the increasing amount of capital being invested by multinational corporations across borders,there is a clear inclination for these firms to engage in practices that facilitate the maintenance of a sustainable competitive advantage in these foreign, competitive environments. In the interest of better understanding how to cultivate such a sustainable advantage, the strategy literature has drawn heavily from the recent surge of knowledge management research, due to the acknowledgement that motivating employees to transfer their unique, inimitable bodies of tacit knowledge – a strong basis for sustainable competitive advantage – is strategically desirable. However in doing this, the western-derived theories of motivation need to be reassessed to determine if they actually hold in non-western contexts when applied in relation to knowledge transfer.This paper aims explore how individually espoused dimensions of national culture serve as key determinants of tacit knowledge transfer,

and also aims to deviate from the extant literature by focusing on the individual unit of analysis, as opposed to the macro-level. A moderated multiple regression technique is used to analyse questionnaire data collected from a sample of knowledge coaches (knowledge providers) and protégés (knowledge recipients) from firms in Australia, UK, Indonesia, Japan, Sweden, Norway and Denmark. It is hypothesised that three dimensions of national culture: Long Term Orientation, Individualism/Collectivism and Power Distance will have moderating effects on the path between intrinsic motivation and perceived skill acquisition. Given that the existing research in this area is still in the exploratory phases, this study has the potential to make a significant contribution and support the findings of prior qualitative studies.

Regulation of adrenal hormone receptors in the liver: potential treatment targets for diabetes

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Diabetes is the fastest growing chronic disease and has been labelled an epidemic. People with diabetes continue to have an increased risk of premature death. The significant health and social burden is not limited to medical expenses, but also the individual and their families. Therefore it is becoming increasingly important to understand the molecular mechanisms in order to help prevent disease progression, engineer more effective treatments or possibly find a cure. Although there is major research focus for preserving function of the pancreas due to its key role in the regulation of blood glucose levels, the liver plays a key role in glycogen metabolism. Adrenal steroid hormones interacting with their receptors, like keys opening a lock, trigger key enzymes for glycogen metabolism. How this interaction is regulated during diabetes is not known. Animal models simulating human disease such as diabetes, allow us to directly identify the molecular mechanisms involved. The aim of the current research project was to determine whether expression levels of the specific adrenal hormone receptors, the mineralocorticoid receptors (MR) differed in an animal model of Type 2 diabetes (T2D), the Zucker diabetic fatty rat, which develops similar features of human T2D. Their heterozygous littermates (Lean Zucker diabetic rat) remain lean and euglycaemic. Using immunohistochemical techniques, we compared expression levels of MR in paraffin-embedded liver sections from diabetic rats to their lean littermates. Preliminary results are very interesting and novel, indicating levels of MR expression are down-regulated in diabetic rats. Further studies are planned to identify the molecular mechanisms involved and how these contribute to disturbed glucose metabolism during diabetes. By taking an integrated approach to research and considering different targets and mechanisms involved, we may gain a

better understanding of the pathophysiology of diabetes and eventually development of targeted treatment strategies for people with diabetes.

CRISPR-dCas9 With A Repeating SunTag Array, A New Epigenome Editing Tool For Amplified Epimodifer Recruitment

Tessa Swain
The University of Western Australia

DNA, the genetic blueprints that guide the creation of every cell in every living creature, has a layer of instructions overlaying it. This layer is called the epigenome. It is in part made up of chemical markers that play a vital role in regulating how our DNA is read. In a number of cases, disruptions to the placement of these chemical markers are associated with various disease states, including cancer. Providing a means to be able to edit the epigenome is thus of critical importance in order to tackle these disruptions. So far, targeting a single modifying molecule to DNA regions of interest has only achieved modest changes to the epigenome. Here, I hope to amplify these effects by recruiting multiple modifying molecules to the same DNA region and thus provide a new tool for amplified epigenome editing. This is being achieved by linking a chain of ten small molecules to a targeting molecule that binds DNA at specified regions. This small chain acts like a docking station, attracting up to ten modifying molecules to the DNA region of interest where they can then have their amplified effect on the epigenome. Functioning in a similar fashion to a train engine (the DNA targeting molecule) having multiple carriages attached (chain of ten small molecules) that can transport up to 10 passengers (the modifying molecules) all to the same destination. Various sequencing techniques are being utilized to determine the effectiveness of this new editing tool. With these measures I aim to show that multiple of the same or different modifiers can be recruited to a DNA target site to attain highly specific epigenome editing and hopefully provide a future means of tackling disease states associated with disruptions to the epigenome.

Problems, Praxis, and Possibilities in Sinophone and Beyond: Yang Lian's Poetics as a Case Study

Hao Zhou
Nanyang Technological University

Over the past decade, the emergence of Sinophone studies has galvanized scholars of various fields into discursive debates and expanding new research grounds. While the term gained rapid prominence across the pacific, it is not without criticisms and problems. Firstly, the inherent ambiguity of the term persists, engendering from different definitions by

various scholars, problematizes what Sinophone essentially embodies and encompasses. Secondly, much discussion has been on Sinophone as a theoretical and analytical framework, but comparatively scant on its application to a specific writer. This paper seeks to first delineate the theory of Sinophone, by drawing insights from three notable scholars in the field: Shih Shu-mei, David Wang Der-wei and Jing Tsu, juxtaposing their rhetoric and perspective in an attempt to shade light on the contours and constrains of Sinophone studies. Applying these understandings, I then scrutinizes the Chinese diasporic poet Yang Lian in the context of Sinophone. Born in Switzerland and raised in Beijing, Yang was associated with "Misty Poets" and "Searching for Roots School". After leaving China in 1986, Yang sojourned in Australia, New Zealand, Europe, and America. His poetry transcends routes and boundaries across geopolitical locations, converging to the enunciation of the human condition and roots in Chinese culture. Yang's "poetic space" encapsulated by a concentric circle, draws Sinophone literature into dialogue, questioning the latter's assertion of a "place-based", anti-centric articulation, and stretches beyond it as a multi / inter-disciplinary inquiry into the literary production and identity politics of Chinese writers in diaspora.

The Impact of Primary School Transitions on the Psychological Well-being of Children with Autism Spectrum Disorder (ASD).

Katherine Botha
The University of Adelaide

Purpose
Autism Spectrum Disorder (ASD) is a developmental disorder resulting in socialisation, communication and learning difficulties. With early diagnosis, support for children with ASD is able to increase psychological well-being, including support offered in the school environment. For example, previous research has shown that positive relationships with teachers in the early years are predictive of adaptive developmental outcomes, including peer relationships in adolescence, and overall levels of well-being. However, transitions into school pose challenges for children with ASD, particularly due to the disruption of existing routines and support systems. As such, this research aimed to examine the impact of primary school transitions on the psychological well-being (defined as a multidimensional construct incorporating emotional regulation, abilities to form social relationships and cognitive development) of children with ASD.

Design/Methodology
A qualitative, interview-based research design was utilised due to the pilot nature of the research, and the context-specific nature of definitions of well-being. Given that the study focussed on levels of well-being within the school environment, participants included teachers and counsellors

currently working in primary schools in South Australia. Interviews were conducted with eight teachers and four counsellors, teaching in Public, Catholic and Independent schools. Interview questions focussed on participants' definitions of psychological well-being and the impact of primary school transitions for children with ASD.

Findings
Preliminary themes include the need for the child's parents to be supportive of their diagnosis, and ensuring that the child's peers understand what ASD is and how they can support their classmate. In addition, the findings indicate that teachers place most importance on social abilities when defining psychological well-being for children with ASD.

Originality/value
Given the lack of previous research in this area, it is hoped that this research will aid the development of appropriate support practices that will maximise psychological well-being for children with ASD when transitioning within the primary years of school.

A Change Over Naval Warfare? Reconsidering the Submarine in German and Japanese Naval Strategy, 1935-1943

Peter Hooker
The University of Newcastle

The submarine has since the First World War become a fundamental element in maritime strategy, with the Second World War involving the largest deployment of submarines in history. In the interwar period, despite its effectiveness during the First World War, the submarine was relegated to a role which augmented surface fleets, the traditional harbingers of maritime power. Since 1935 Germany, and soon to be ally Japan, began to implement respective doctrines to challenge the superior surface fleets of Britain and America. Though innovative, these doctrines were based on the capability of surface fleets and surprisingly failed to appreciate the game changing potential of the submarine to maritime strategy. Only late into the Second World War, in 1943, was this realisation made. Why did both powers ignore the potential of the submarine for so long since 1935, and what were the consequences of this belated realisation? A re-examination of primary material illustrates the formulation and later effectiveness of naval strategy. Official documents and post-war recollections highlight the subservient role of the submarine to the surface fleet, as well as the circumstantial evolution in maritime strategy during the war that re-prioritized the submarine as a war-winning weapon by 1943. The German and Japanese submarine designs further indicate the role the vessels were envisaged to play in the event of war. Pre-war strategy thus accorded the submarine a subservient role and only belatedly was this notion challenged, too late for the

submarine to be effective to the outcome of the war. A broad comparative study can provide unique insights concerning naval development during this time. It emphasises the need for a reconsideration of pre-war strategy, with the conclusion that, ultimately the strategies of the Germans and Japanese suffered from a lack of planning that took into account the potential of the submarine.

Love as Language

Jasmine Alexis Doo
Nanyang Technological University

Love is traditionally thought of as a state of being in which one conceives of more than oneself, entering into the mental, emotional and physical union with another. In doing so, lovers express their desire to know and possess the other. Yet, such knowledge and possession ultimately seems impossible, and lovers are never fully satisfied, always left wanting more. This fundamental inability to truly grasp the other is not an insufficiency of effort or capacity on the part of the lover, but rather, is a condition of the solipsistic nature of existence. This paper therefore posits how love is analogous to language, for both are inherently solipsistic and consist in projecting self-reflexive perceptions that endlessly gesture toward, but never attain the satisfaction of final meaning.

Specifically, this essay looks at Roland Barthes' A Lover's Discourse and T. S. Eliot's "The Love Song of J. Alfred Prufrock" to show the textually structural character of love. By illustrating self-conscious structural analyses of linguistic conventions of love, Barthes' text offers itself as "a discursive site: the site of someone speaking within himself, amorously, confronting the other (the loved object, who does not speak)." Meanwhile, Eliot's poem ruminates on the phenomenological conditions of asking and answering, rather than the questions and answers themselves, thus self-reflexively pondering on indirection and gesture, that which govern both love and writing. This paper therefore demonstrates how both texts simulate the act of loving, thereby revealing love itself to be a simulation of linguistic gestures, inescapably self-contained and self-insisting.

Framing National Interests: How Power Can Elude in International Relations

Magdalena Agnieszka Janas
Monash University

This presentation explores the power balance within business-government relations in social and political institutions, and how they can

shape national interest. This is achieved through a multi-frame analysis, which looks at how power intersects at different levels of government: state, national and international.
The introduction explores notions of power in International Relations, borrowing from Stephen Lukes' frames of analysis, and placing the study of business-government relations in context. It then focuses on government and business relations at a state level in Victoria, in parallel with relations at an Australian level. The second case study explores the evolution of CSR Europe, a former European Union institution, and its experience of business pressures within the EU framework, in contrast to Australian institutions. These case studies address two aims. The first is to question the implications of business-government relations for legitimacy and democracy, within the context of power and privilege in the democratic system. The second aim is to challenge traditional notions of power in the international system by reframing how we think of national interest, given how it can be shaped by democratic, and undemocratic, processes.
In conclusion, an overview is provided of the benefits found in multi-frame analysis, allowing further insight into policy-making, and accounting for the way in which power shapes international relations. The presentation suggests that although the somewhat symbiotic relationship between business and government is well acknowledged, it is far from integrated into the International Relations framework.

Facilitating Nanodiamonds for Drug Delivery: A Novel Approach Using a Protein Coating

Jonathan Ciofani
The University of Sydney

Despite the reliance of the medical world on effective therapeutics, less than 1% of drugs which enter clinical trials are approved for clinical use due to safety concerns and a lack of efficacy. However, recent advances in the field of nanomaterials have now opened the possibility of using many of these previously non-viable drugs. In particular, much interest has surrounded nanodiamonds, which have shown promise for highly regulated and targeted delivery of chemotherapeutics. Much development, however, is still needed, as nanodiamonds have a tendency to aggregate and cause severe immune responses in humans. One proposed solution is to use non-immunogenic proteins to coat and functionalise nanodiamonds. Hydrophobins are fungal proteins which, in nature, spontaneously assemble into a layer that coats fungal spores and can prevent their detection by the immune system. This project aims to investigate the use of hydrophobins to coat nanodiamonds and to improve their dispersion properties in aqueous solutions. Production of hydrophobins was achieved through expression in bacteria, followed by protein refolding and purification. Protein quality control was monitored using gel electrophoresis, mass spectrometry, fluorescence-based assays

and spectroscopic methods (NMR and UV-Vis spectroscopy). The ability to disperse nanodiamonds was assessed using gel electrophoresis and spectroscopic methods. Preliminary results have demonstrated that nanodiamonds can be coated by hydrophobins leading to a reduction in their agglomeration tendency. Thus, with concurrent advances in our understanding of nanomaterials and hydrophobins, hydrophobin-coated nanodiamonds may one day add to the therapeutic armamentarium of medical practitioners.

The Effect of Lane Configuration of Freeway Ramps on Capacity and Level of Service

Elliott Panos
The University of Western Australia

The trap lane and option lane configurations (the intersection between a freeway facility and its connecting on- or off-ramp) are evaluated against various performance measures at a selection of sites along the Mitchell Freeway, located in Perth, Western Australia. To determine the impact that lane configuration has on freeway performance, both a theoretical and an empirical analysis are undertaken to assess the current freeway conditions. Both these analyses show that changes to lane configuration can have an impact on freeway performance, as the vehicle demand is in excess of capacity during peak times and below capacity at other times. Prior research considered ramps only in isolation, and used capacity as a sole measure of performance. Results from a microsimulation model showed that for a high-volume environment, a trap lane configuration offered better average travel times. Changes in lane configuration can provide improvement to the Level of Service of a freeway facility, although other factors exist which can affect the performance of a freeway.

The Immune Phenotype in Pre-eclampsia

Anna Zeng
The University of Adelaide

Pre-eclampsia (PE) is the most common medical complication of pregnancy affecting 2-8% of pregnancies. PE pathogenesis is multifactorial, including alteration of the tolerogenic immune phenotype of normal pregnancy, with a “rejection” type response against the semi-allogeneic fetus. Aim: To determine the immune phenotype and function of women with and without PE in the third trimester and post-partum, using assays targeting key pathways of immune tolerance and activation. Methodology: Patients were recruited from the Women’s and Children’s Hospital (Adelaide, Australia). Flow cytometry was used to quantify

numbers of regulatory T (Treg) cells (CD4+ Foxp3+) and NK cells (CD56+ CD16+) in peripheral blood. NK cell cytotoxicity was determined via Lactate dehydrogenase(LDH) release assay. IFN-gamma release from T cells, which reflects maternal allo-immune responses, was measured by Enzyme-linked ImmunoSpot assay.
Results: Compared to 15 normal pregnant controls, 10 pre-eclamptic patients had increased Treg numbers (21/uL ±11 vs. 16/uL ±11) and NK cells numbers (124.0/uL ±79 vs. 69.5/uL ±26). NK cytotoxicity was higher in PE patients compared to normal pregnant controls (14.31% vs. 12.82% of maximum lysis), however both were lower than non-pregnant controls (53.55%). Higher IFN-gamma release (1106 spots per 3x105 PBMC) was also found in PE patients compared to normal controls (985.5 spots per 3x105 PBMC).
Research implications: This preliminary data suggests that pre-eclamptic patients may have lack of suppression of innate NK cell function and an increased T cell allo-response against the fetus. The increase in Treg cell number may be a compensatory response for deficient immune tolerance in PE.

The philosophy of Drosophilia melanogaster as a model organism in genetic research; how much like a fruit fly are you?

Megan Ivory
The University of Sydney

The bane of kitchen bins everywhere, the tiny fruit fly, *Drosophila melanogaster* (DM), is a big player in genetic research. This presentation explores the philosophical beliefs that underpin the use of organisms such as the fruit fly as model organisms in genetic research. Following the arguments of many famous twentieth century philosophers such as Nancy Cartwright, it explores the epistemic status of such modelling in biology to experiments conducted in physics. DM clearly does not share many of the outward characteristics of *Homo sapiens* yet DM is used to inform scientists about human genetics, and its use in genetic research is standard practice for researching and extrapolating to a range of organisms. Through this exploration of the fruit fly, DM's role in blurring the lines between biology and physics, and its place at the forefront of a new scientific discipline, biophysics, is revealed. Thanks, in part to its manipulability DM has recently found itself on the cutting edge of this field, by providing quantum mechanical explanations for biological functions such as olfaction. DM is now being used to explain how organisms employ quantum mechanics in their sense of smell to differentiate between chemicals that appear identical. The ability of researchers to control and change features of DM, and to do so quickly has been key to the popularity of the DM, but does this high level of manipulation abstract the organism so far away from the wild type that results are so theory laden that they are unable to realistically model for

other organisms? I show how this humble organism is now taking biology and physics into exciting new territory.

The role of religious diasporas in facilitating global trade across religious boundaries.

Vladmir Arutyunyan
The University of Warwick

The role of trade Diasporas can be examined on a global scale through their interactions across religious boundaries. Focusing on several case studies spanning from the trade node of New Julfa, during the 17th Century, (located in modern day Iran) to the migrant diaspora established in Lemberg, Poland near the end of the 16th Century. The aim is to convey the many unique attributes Armenian Diasporic merchants had in order to successfully connect Euro--Asian trade, with an in depth focus on the tight hold they had over Iranian Silk. Attention will also be drawn to the Western Coast of Africa (Cabo Verde Islands) and the Tuscan Diaspora of Jewish merchants, during the 16th and 17th Centuries respectively. A detailed view on the progressive reforms of the Medici in order to attract Jewish merchants to the area, should display their (Jewish Merchants) prestige as gatekeepers to the Middle Eastern markets. Diaspora presence resulted in the development of Governmental control over economic and societal factors. The Civil freedom granted to Diasporas (as well as their civil limits) provides a fascinating study of early modern multiculturalism and the problems that they faced in intolerant societies, the privileges given to Armenian and Jewish nations demonstrate a mixture of capitalism and liberalism during times of persecution. The seemingly natural ability these nomadic merchants had in the field of assimilation was exemplified in the actions of both the Jewish and Armenian merchants, whose trade networks were a testament to their own success.

Fate & Mortality in the Epic of Gilgamesh: Then & Now

Anthony Westenberg
Macquarie University

The ancient Assyrian and Babylonian poem, The Epic of Gilgamesh, is the story of how the king and hero Gilgamesh seeks fame and immortality. Although the epic is not as widely known as other epics, modern authors have retold the epic in a variety of formats, from novels to comics or even operas. In the story, the driving force behind Gilgamesh's quest is his desire for immortality, whether through immortal fame as a hero or through actual immortality. This struggle is against the fate of mortal humans, as decreed by the gods, and leads to ill consequences for Gilgamesh, before he finally learns to accept his fate and his mortality.

Fate was depicted as unchangeable, although humanity still had the choice of whether to accept it or struggle against it. Mortality, and the mortal life, was shown as being good, and acceptance of this mortality was shown to be better than vainly struggling for immortality. This paper argues that the epic was thus, in a sense, a didactic work, seeking to teach the people to accept their mortality and their lives, instead of struggling for what was beyond their reach. The ancient Mesopotamian view will then be contrasted with how fate and mortality are used in two modern interpretations of the epic, Never Grow Old and Gilgamesh II. These modern versions show that, although it is better for Gilgamesh to accept his mortality, the struggle for immortality is a good and heroic goal. Fate, as well, is shown to be mutable, and thus that humanity is not bound by the gods' decrees. This thus highlights the differing mindsets between the ancient Assyrians and the modern day.

NDM-1 inhibitors: a weapon against the superbugs

Hoi-Ying Felcia Lai
The University of Sydney

Emerging multi-drug resistant bacterial infections pose a significant burden to healthcare systems and the public worldwide. Common bacterial pathogens of the *Enterobacteriaceae* family, such as E. coli, *Klebsiella pneumonia* or Salmonella, have efficiently evolved resistance mechanisms against most of the known β-lactam antibiotics (*e.g.* penicillins and cephalosporins), including one of the last resorts, the carbapenems. One of the main causes of this resistance is the production of β-lactamase enzymes, such as New Delhi Metallo-β-lactamase-1 (NDM-1), which efficiently degrade these agents before they can inhibit bacterial growth (by interfering with their cell wall construction). The inhibition of NDM-1 enzymatic activity by novel drugs could help recover the efficacy of existing β-lactam antimicrobials, such as meropenem and ampicillin. In our project we have designed a series of potential NDM-1 inhibitors *via* the structural modification of the known inhibitor captopril (known to cause serious side effects), in order to achieve decreased cytotoxicity and enhanced NDM-1 inhibition. We have employed computer-based drug design and the known 3D structure of the active site of NDM-1 to design captopril analogues (1, 2), which were synthesized and characterized. A cytotoxicity assay in a human cell line suggested that these compounds would have no harmful effects on a mammalian host, while antibiotic synergy tests on NDM-1 producing E. coli in the presence of meropenem showed moderate restoration of the effectiveness of this antibiotic by both inhibitors.

A Tale of Two Insurgencies: Competing Grievances, Government Counterinsurgency Programmes and International Involvement in Two Tactically Allied Philippine Insurgencies

Connor Woodman
The University of Warwick

Partly undertaken with a grant from the URSS, the research examines and compares the differing grievances underlying two long-running insurgent movements in the Philippines: that of the nationwide Maoist insurgency headed by the New People's Army, and the Moro-based independence movement in the south of the country, led once by the Moro National Liberation Front, then by the Moro Islamic Liberation Front. It considers the similarities and differences in their emergence, both in the early 70s, finding that whilst the tactics, military organisation, rhetoric and claims to legitimacy differ between the two insurgencies, the underlying causes of the armed conflict possess striking parallels: repression by the central Philippine state, underdevelopment, and lack of land reform. The ability of the insurgents to sustain their rebellions stems from articulating clear (if fundamentally different) explanations and ideological frameworks for the problems facing the peasant class, and developing military strategies able to resist government counterinsurgency plans, most recently President Arroyo's Oplan Bantay Laya and President Aquino's Oplan Bayanihan. The research included 6 weeks of field work in the Philippines and 6 weeks of academic research in the UK. The bulk of URSS research analysed secondary source material from scholars in the Philippines and Western world, data collected and arguments deployed by campaign groups on the ground in Mindanao, and the literature put out by the insurgent groups (the MNLF and then MILF, and the NPA). The NPA's role as the armed wing of the Communist Party of the Philippines resulted in a wealth of source material for understanding the NPA's grievances and military strategy, since the Party's analysis stems from the writings of a former University of the Philippines Professor and re-founder of the CPP, Jose Maria Sison.'

Inspiration and Physical Strength

Jack Klein
Macquarie University

How many times has a sports team been trailing at half-time, only to hear their coach's inspirational speech and rally for a late win? The present study seeks to experimentally test whether inspiration improves task performance, specifically in the area of physical endurance. Inspiration had only recently become the subject of scientific investigation, with current conceptualisations depicting it as a two-part process (Thrash &

Elliot, 2004). Inspiration's a-process refers to the perception of an object which elicits revelation and new insights, accompanied by a positive emotional state. The b-process refers to the subsequently elicited approach motivation, wherein an individual acts on their inspirational urges. Inspiration hence involves a cognitive and behavioural component, differentiating it from similar emotions, such as awe, which lacks the motivational b-process. To date, there have been almost no experimental attempts to manipulate inspiration. A notable exception is Steele (1977) which found that people exposed to inspirational speeches reported increased levels of power. Similarly, participants in this experiment are exposed to inspirational videos and then complete a handgrip task as an assessment of physical endurance. It is hypothesised that those who are exposed to an inspirational video (versus a neutral video) will be inspired to hold the handgrip for longer. The concept of extension, wherein an object is inspirational in a totally unrelated context, is also tested. In other words, this study examines whether an inspirational video has to be specifically related to the task at hand to have an effect. This will be tested by comparing participants who watched a video specific to physical endurance (athletes training) to those who watched a generic inspirational video (a man overcoming poverty). It is predicted that participants who watch the specific video will perform better at the handgrip task than those that watch the generic video.

The Role of Attention in Body Size Exposure Aftereffects

Chloe Bickersteth
Macquarie University

Concerns about body size affect many individuals and are particularly prevalent in those with eating disorders. Prolonged laboratory exposure (known as "adaptation") to thin bodies causes an aftereffect, altering the perception of body shape such that normal bodies now appear fat. This effect mirrors the real-world body image disturbances that are thought to result from exposure to representations of the "thin ideal" in the mass media. However, it is not known why these media images, to which everyone is exposed, lead to significant body image dissatisfaction in only a minority of observers. This study aims to explore the possibility that increased attention to certain image properties may moderate the magnitude of body misperception aftereffects, and provide a partial explanation for these individual differences. Standardized photographs of subjects were transformed to simulate higher or lower weight using established image manipulation software (PsychoMorph). Baseline measurements of the Point of Subjective Normality (PSN) – the body size perceived to be normal – were taken. Observers were then randomly assigned to an adaptation condition and asked to rate the bodies of males and females based either on their gender typicality or their body size, during exposure to either thin or fat body stimuli. Post-adaptation PSNs were established to measure aftereffect magnitude. If attention to certain

attributes (e.g. size/gender) of body shape is a significant factor in the body size aftereffect, then we expect the adaptation effect to be stronger for those who attended specifically to body size than for those who attended to the masculinity or femininity of the body. However, equal magnitudes of adaptation for these two groups would suggest that the body size adaptation effect is immune from the effects of attention. Results will be discussed in the context of contemporary models of body perception.

Real-time tracking of objects from a flying drone - making robots "see" and think

Johan Byttner
The University of Warwick

Flying drones are very capable units for surveillance and tracking using on-board cameras and sensors. Currently image analysis is done post-flight and drones are manually flown or have a pre-programmed route. Therefore, drones cannot act on what they see. Drone identifying objects, such as people, in real time and locally would allow drones to dynamically make decisions even when outside control range.

This project uses the Doppia pedestrian tracking code library, for surveillance cameras, to identify humans and Michigan VisionLab's Multi-Target tracking algorithm to follow detections through image frames. The system runs at 100 Frames Per Second on a laptop, demonstrating that real-time detection and tracking is accessible and effective. A computer system can run both the tracking and control code whilst being carried by the drone. Along with detection-based control algorithms, the drone can now operate autonomously and change its flight path as needed.

A drone that acts independently can perform tasks such as tracking crime suspects as they are fleeing a scene or deciding how best to avoid obstacles in its path. Further technical development is needed to ensure that this technology can be controlled and regulated. In particular, drones need to communicate their positions to authorities and since autonomous drones can operate far away from controllers, techniques are needed to take over or disable drones that are used for malicious purposes.

Going Against the Flow: A Contra-flow Bicycle Lane Evaluation within the City of Adelaide

Rachael Nielsen
The University of Adelaide

The implementation of effective cycling specific infrastructure has the potential to improve the safety and appeal of cycling in urban areas. This paper evaluates the infrastructure treatment of two 'contra-flow' bicycle lanes implemented within the City of Adelaide by the Adelaide City Council. Roads configured with a contra-flow bicycle lane are designated one-way streets which allow cyclists to travel in both directions. Urban one-way streets serve primarily to channel motor vehicle traffic in a desired direction, for bicycle traffic however, they interrupt what can be direct connections and make the use of low-traffic local streets more difficult. The study engaged with quantitative and qualitative research methods to first observe cyclists and motorists at two contra-flow locations in Adelaide City, and second to conduct cyclist surveys. The findings of this study were very much in line with the international research: Contra-flow bicycle treatments do not pose a safety risk to pedestrians, cyclists or motorists. Contra-flow serves to increase access for cyclists by diverting them from busier, high traffic roads as an efficient infrastructure treatment. Furthermore, the treatment is highly supported and perceived to be extremely safe by the majority of cyclists.

Inhibiting the pro-atherogenic effects of serum amyloid A by pharmaceutical blockade of NFkB

Maryam Eghtedari
The University of Sydney

The acute phase protein serum amyloid A (SAA) is a biomarker of inflammation. Elevated circulating SAA is associated with endothelial dysfunction and the earliest stages of atherosclerosis. SAA stimulates cells through binding the receptor for advanced glycation end-products, formyl peptide receptor-like-1, and toll-like receptors-2/4. Binding of SAA to these receptors leads to increased production of mRNA encoding tumor necrosis factor (TNF), tissue factor (TF), and vascular endothelial growth factor (VEGF); the corresponding proteins produced by these genes display pro-inflammatory, pro-thrombotic and pro-angiogenic activities, respectively. Pharmaceutical blockade of receptors for SAA, either alone or in combination, only partially inhibits SAA-mediated endothelial dysfunction. Activation of NFκB appears to be centrally involved in SAA-mediated endothelial cell dysfunction. Aim: Demonstrate that targeting NFκB with the specific inhibitor BAY11-7082 will effectively inhibit SAA-mediated endothelial dysfunction.
Methods: Human carotid artery endothelial (HCtAE) cells were cultured to high-density and pre-incubated (1.5 h; 37°C) with 0, 1, 10 or 100 μM BAY11-7082 or vehicle (control) followed by 10μg/mL SAA (4.5 h; 37°C).
Results: In the absence of BAY11-7082, both VEGF and TNF protein expression increased following incubation with SAA. In the presence of various dosages of BAY11-7082, this SAA activity was inhibited and VEGF showed greater sensitivity to BAY11-7082 than TNF. In addition, TF mRNA increased markedly in HCtAE cells following SAA stimulation,

whereas pre-treatment of cells with BAY11-7082 mitigated TF mRNA to levels similar to that in HCtAE in the absence of SAA. Conclusion: Our data show that inhibition of NFκB activation with BAY11-7082 decreases production of pro-inflammatory (TNF) and pro-angiogenic (VEGF) proteins in HCtAE cells and inhibits SAA-mediated TF gene expression. Together, these data suggest that inhibition of NFκB activation may protect the endothelium from the action of SAA by inhibiting pro-inflammatory and pro-thrombotic pathways.

Of Fawnicating and Faunlets: Mourning and Liminal Desire in *Lolita* and *Pale Fire*

Joseph Steinberg
The University of Western Australia

Most famous for his novel Lolita, which maintains a popular reputation as subversive, erotic, or even pornographic, questions of sex and seduction have become something of a cliché in Nabokovian scholarship. Readers and critics of Lolita are often so horrified by the paedophilia at the core of the novel, or so seduced by the narratorial flourishes of Humbert Humbert, that they tend to adopt the kind of didactic response Nabokov himself cautioned against. By discussing Lolita alongside another of Nabokov's novels, Pale Fire, I seek to complicate some of the interpretations leveraged against Nabokov's work by feminist and queer scholars, and thereby contribute to the discourse a formulation of desire in Nabokov as, for all its spectacle, an absent presence: the act of yearning inseparably tied to that of mourning. Both texts reconstruct reality as imagined by their narrators: the fantastical realms of kings, knights, and palaces. But these fantasies are repetitively warped by desire that is neither contained by nor exists outside of language. The tragedy of Nabokov's work is that this desire, the state of yearning, is always already dead: memory, rather than a means of immortalising or affixing the past, is petrification. Beneath the provocative spectacle of lust, seduction and erotica Nabokov's fiction mourns the sterility of memory. In short, I discuss how the memory of desire permeates Lolita and Pale Fire, and how the narrators' frustrated attempts to transfix desire between fantasy and reality culminate in petrification: in the frozen language of yearning as an act of perpetual, proleptic mourning.

The Immediate Effects of a Short Yoga Class on Stress and Cognitive Performance

Emma Williams
Macquarie University

Previous research has found marked cognitive and affective changes following yoga classes as short as 20 minutes (Gothe, Pontifex, Hillman, & McAuley, 2013; Kiecolt-Glaser et al., 2010; Subramanya, & Telles, 2009). However, most of this research has involved small samples, non-replicable methods and inappropriate control groups. The reliability and generalisability of much of the existing research to Western populations requires verification. The present study will investigate whether a single video-administered yoga class can improve stress and cognitive performance over and above passive relaxation. We will recruit 40 participants with yoga experience (practiced approximately one or more yoga classes per week over the last 12 months) and 40 age matched yoga novices (practiced less than 5 yoga or meditation classes ever). Participants will complete a 20-minute yoga class or a 20- minute passive relaxation. Watching a David Attenborough nature video was chosen as a passive relaxation familiar to Western cultures. Participants will also complete pre and post-intervention measures of stress and cognitive performance. Stress will be assessed using the Positive and Negative Affect Schedule and State-Trait Anxiety Inventory. Attention and working memory will be assessed using the Digit Span Forwards and Backwards and inhibitory control will be assessed with the Flanker task. We hypothesise that participants in the yoga intervention will show decreased stress and increased scores on cognitive measures following the experimental intervention, compared to the relaxation control group. In addition, we hypothesise that experienced participants will show decreased stress and increased scores on cognitive measures compared to novice participants.

Ethnic Queers: Border Crossing through Diasporic Desires and Displaced Intimacies

Zsuzsanna Ihar
The University of Sydney

From the overcrowded housing quarters of Romanian migrant workers in the UK, where camaraderie and alternate systems of exchange lessen the friction of being exposed to an oft-jarring Anglo-centric landscape, to the narrow domestic parameters of life within a single bedroom Panelák in Beograd co- inhabited by two single, immigrant mothers, intimacy becomes articulated in clandestine and often counter-intuitive ways within the Balkans & its diasporic tendrils. These contextual realities, alongside the psychic and topographical scarring leftover from the Yugoslav Wars, and a history of Soviet and Ottoman colonialism & imperialism, become incompatible with the current wave of transnational feminism, so commonly deployed by Western academics. The homogenisation of the 'European' experience allows an aggressive form of whitewashing and eurocentrism to materialise, erasing the class/race/ethnocultural specifics of the Balkans. The post-colonialist theory, which forms a vital link between critical-race and queer theory in

the West, does not correspond to the Balkan narrative, based upon a post-colonised experience. Thus, any potential queer theoretical engagement or LGBTQI+ activism originating from transnational feminism ends up perpetuating a form of settler homonationalism and maintaining a racialised and sexualised iron curtain over ethnic queers, cultivating contemporary marginalisation within the EU. Through an auto-ethnographic mode, this paper advocates for the use of Diaspora as a framework which provides the tender space needed to examine the Balkan potential for queerness from 'the outside of the outside'. However, this model could be applied to other regionalities attempting to introduce queerness into spaces heavy with historical weight and trauma. Double marginalisation, as both a Balkan ethnic, and a diasporic migrant, has the potential to form a nomadic gender which unsettles and makes porous the rigid borderings around nations, bodies, intimacies and sexualities. Through considering ethnocultural and racial experiences and its effects on gender configuration, this nomadic gender model could function as a fertile site of merging and interlinkage between queer and critical race theory. Ultimately, this paper aims to suggest that the emotional and affective work which goes into building new lives, post- war, post-communism and post-exile, in the Balkans and along its Diasporic capillaries, can also be channelled into the birth of queer communities. The praxis of intimacy, recovery and survival, which lay behind the iron curtain, has the power to melt through historical and political heaviness, and reveal a window of new possibilities.

Is Christianity Homophobic? Exploring LGBQ University Student's Perception of Religion

Luis Arturo Aguilar Lopez
The University of Western Australia

The relation between lesbian, gay, bisexual, transsexual, and queer (LGBTQ) sexual orientations and organised religion in Australia has been mostly characterized in public discourse as fraught. This tension is further reflected in the predominant non-religion affiliation pattern by the LGBTQ population, which strikingly differs from the general Australian population that mostly identifies with the Christian tradition. While research has been done in the area of religious affiliation, there is a gap in knowledge of the reasons behind this difference. In this project I explored LGBQ Australian university students' perception of religion - particularly looking at organized forms of Christianity – to fill the qualitative gaps on the tensions between LGBQ sexualities and Christianity, and how they are being played out at the individual level. To inform this study qualitative research methods were used which included online questionnaires and semi-structured follow up interviews. Research found that most participants did not identify with a specific religious tradition - many having alienated from the faith they grew up with as the

result of its anti-gay stance - and that they perceived many aspects of major Christian traditions as antithetical to LGBQ sexual orientation. However, 'core' Christian values were seen as compatible with LGBQ sexual orientations and many of the participants had developed their own spiritual understanding of the Christian doctrine. This ambivalent relation between organized religion and a personal understanding of faith reflects the complex interaction of religious belief in the 21st century and the current secularisation trend in Australia.

Sparse factor representations and operations for probabilistic graphical models

Albert Chen
The University of Melbourne

Probabilistic graphical models (PGMs) encode large probability distributions without a high cost while capturing the dependencies between large numbers of variables. Such properties make them suitable for modelling problems in a variety of situations involving uncertainty. Examples are bioinformatics (classifying biological samples), natural language processing (part-of-speech tagging) and computer vision (object recognition). One ongoing challenge is to develop efficient algorithms for performing inference (working out the most probable state of the hidden world) and learning (selecting parameters and models). This paper discusses the relationship between the amount of memory used to represent a conditional Markov random field (CRF), which is a type of PGM, and the resulting time needed to perform particular types of algorithms. Coordinate format is used to represent the data in this model to take advantage of sparsity. This reduces space for the Rosetta protein data set by two to three times but results in factor operations running an order of magnitude slower than the existing implementation. Storing the data in a more expressive way and further algorithmic improvements should result in algorithms that make use of these operations running at faster speeds.

Chasing the factor that causes angiogenesis in asthmatic airways

Sonia Sawant
The University of Sydney

Asthma is a chronic inflammatory disease of the airways, pathologically characterised by airway remodelling. This includes: the thickening of the basement membrane, airway smooth muscle (ASM) hypertrophy and/or hyperplasia, changes in the extracellular matrix and angiogenesis. The excessive angiogenesis in asthmatic airways is hypothesised to be due to an imbalance between anti-angiogenic and pro-angiogenic factors.

Connective tissue growth factor (CTGF) is a pro-angiogenic factor that is increased in asthma. Recent preliminary data at the Woolcock Institute of Medical Research suggests that CTGF regulates angiogenesis in concert with another factor. Slit3, a cysteine knot protein, is a recently identified potential co-regulatory partner. This study aims to characterise the role of slit3 in asthmatic angiogenesis. Asthmatic and nonasthmatic primary ASM cells were grown in the presence and absence of transforming growth factor (TGFβ). RNA was extracted over a period of 72 hours. CTGF and slit3 mRNA expression were quantified using reverse transcription Real Time-Polymerase Chain Reaction. CTGF mRNA expression was significantly greater in asthmatic cells, and peaked at 12 hours. Slit3 mRNA expression did not differ between asthmatic and nonasthmatic cells, or change in response to TGFβ over time. It has been established that CTGF protein is overexpressed in asthmatic tissue. Immunohistochemical staining conditions have been optimised to characterise the expression of slit3 protein in asthmatic and nonasthmatic airway tissue, and the potential colocalisation with CTGF. Excessive CTGF levels in asthmatic primary ASM cells, coupled with unchanged levels of slit3 mRNA suggest a dysregulation of the angiogenic regulatory balance which may lead to CTGF activity in asthmatic airways being the predominant pro-angiogenic signal. By defining the role of slit3 in angiogenesis, we will gain a better understanding of the regulation of angiogenesis in airways. This will enable us to develop therapies that target pathways causing excessive angiogenesis in asthma.

A photographic and illustrative study into the relationship between the novels of Jorge Amado and the cityscape of Salvador, Brazil.

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The University of Warwick

The aim of this research is to explore the relationship between the novels of Jorge Amado and the city of Salvador in Brazil, a primary focus within Amado's texts. This study will be undertaken in the city itself, where we will chart the impacts of Salvador's cultural heritage upon its contemporary socio-political situation both internally and within a wider global system. We are particularly interested in how the novels 'Jubiabá' (1935) and 'The Tent of Miracles' (1969), written at key moments in Brazil's contemporary history, comment of the Afro-Brazilian history of the city and its subsequent development. Through our study we hope to contribute to the current debate of how literary criticism can engage with, and react to, the sphere of 'global literature'. Works by authors such as Moretti and, more recently, the Warwick Research Collective suggest that new methods of analysis are required to tackle this issue. In attempting to contribute to this debate we intend to supplement a rigorous academic assessment of our subject with a range of other forms, notably illustration and photography. It is hoped that such an approach will broaden the

contextual placement of our research, allowing us to situate it in a global context, as well as making our results more easily accessible.

Controlling organic device structure using light: a computational investigation

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University of Adelaide

Purpose
The development of organic electronics has been subject to substantial research efforts in recent years. Organic devices, such as polymer solar cells and organic light-emitting devices, exploit the semiconducting properties of certain polymers. These devices show promise over their silicon counterparts in cost, flexibility and ease of production. Organic device fabrication depends on the ability to control the structure of the material on the micro- and nanoscale. Recent experimental research has found that this structural control is possible in one particular system due to an apparent change in solubility of the polymer under irradiation of light when in the presence of a dopant molecule. This change in solubility is thought to occur due by light-induced electron transfer between polymer and dopant.

Methodology
The body of work presented here used computational modelling to explore the molecular mechanism underlying this light-induced charge transfer process and its consequent impact on solubility. The system studied was analogous to the semiconducting polymer P3HT combined with the strong electron acceptor dopant molecule F4TCNQ, which was the prototypical system used for light-controlled patterning. A computational technique called density functional theory was used to model the system.

Findings
Non-integer spontaneous charge transfer was observed to occur between a polythiophene molecule and an F4TCNQ molecule. The charge-neutral geometry was found to be higher in energy than the charge-separated state. The impact of polymer size on charge transfer and intermolecular distance was studied, and a longer, methyl-substituted polythiophene molecule was found to produce simulated absorption spectra that best matched experimental results. Inclusion of an implicit solvent was observed to induce near-integer charge transfer while still replicating experimental absorption spectra.

Value
This work begins to explain the light-induced charge transfer process

between P3HT and F4TCNQ. Exploiting this process could lead to improved design of organic solar cells and light-emitting devices.

The role of pigment epithelium derived factor in pancreatic beta cell physiology

Nikita Walz
Curtin University

Pigment epithelium derived factor (PEDF) is a naturally occurring protein in the human body. It has several properties including cellular protection, via anti-inflammation and anti-oxidation properties. Diabetes mellitus is a major world health issue with an estimated 336 million individuals worldwide affected by this disease. Impaired insulin secretion by pancreatic β cells is a major contributing factor in type 2 diabetes. PEDF is associated with type 2 diabetes as it alters lipid metabolism and promotes insulin resistance. However the role of PEDF within the pancreas is unclear. In this study, we used rat pancreatic β cells to investigate the role of PEDF in insulin secretion, glucose and lipid metabolism. Materials & Methods: BRIN-BD11 cells were incubated for 24 hours, PEDF was added and the cells were cultured for a further 24 hours. We quantitated several parameters including insulin secretion, glucose consumption, and glycerol secretion (an indication of lipolysis). We performed a Western Blot to identify the presence of PEDF receptor at the protein level. Finally we measured glycolytic enzyme gene expression using qPCR. Results: Preliminary data indicated that administration of PEDF (100 nM) significantly increased chronic (24hr) insulin secretion compared to control group however there was no significant change at 10 nM concentration or supra-physiological levels. There was no significant increase in glucose consumption or expression levels of glycolytic genes, however there was a significant increase in glycerol secretion following PEDF treatment. In addition, we identified the presence of the PEDF receptor ATGL in BRIN-BD11 cells. Conclusion: PEDF can increase insulin secretion and lipid metabolism in β-cells, however glucose metabolism was not altered. PEDF shows promise, given its multifunctionality, to provide therapeutic intervention within the pancreas but also other organs and tissues in various diseases. A full appreciation of PEDF action could be lead to development of novel therapeutics.

Shedding Skins: (Re)claiming Cleopatra in the Post-colonial Context

Billy Barrett
The University of Warwick

This paper examines British theatre's practice of casting white performers as Cleopatra in Shakespeare's Antony and Cleopatra, despite critical evidence that he wrote her black.

I begin with the play-text, positing the queen as a site through which early modern anxieties about women and foreigners are performed through proto-orientalist tropes. Citing its racial signifiers and the era's association of Egypt with blackness, I suggest that this Other-ing is raced.

I demonstrate that the subsequent "blanching" of Cleopatra in performance has been legitimated through claims to historical authenticity, but shares a symbiotic relationship with her co-option as a white cultural icon in mass media. I contrast this with the simultaneous claim that diasporic black culture stakes to the queen in its own representations.

Finally, I consider how Tarell McCraney's 2013 production at the RSC – in which Joaquina Kalukango played the theatre's first black Cleopatra – operated as a post-colonial response to the play-text, its performance history, and the culture wars over the last pharaoh. I argue that in re-setting the play in colonial Saint-Domingue during the Haitian Revolution, McCraney foregrounded its racial tensions and contributed towards opening the title role to black actors. However, I counter that this directorial concept was framed with the discourse of novelty and unique authorial vision – ultimately containing and re-Other-ing black Cleopatra. I propose that mainstream theatre should embrace a custom of reserving the role for black performers, to better serve the play-text and for a more inclusive practice of representation.

How do Courts, when faced with the extra-judicial appointments of their Justices, ensure that these roles do not undermine public confidence in the Judiciary?

Joel Lisk, Rebecca Slimming, Angas van Balen & Jessica Wakelam
The University of Adelaide

Purpose

Public confidence in the Judiciary is essential for the effectiveness of Courts in upholding the rule of law. Maintaining respect for the Justices and Courts in which they serve is essential to the Australian legal system. It is common practice for the members of State and Federal Courts to be appointed to extra-judicial roles, commonly known as *persona designata* appointments. This paper examines how the Courts scrutinise the extra-judicial appointments of Judges to determine whether these roles could undermine the public confidence vested in the judiciary, invalidating those appointments which do.

Methodology
This paper examines and critiques the Court's reasoning in decisions resolving challenges to the appointment of Justices to *persona designata* roles, and analyses the opinions of public law academics and practitioners in order to define the strengths and weaknesses of current approaches.

Findings
Our analysis suggests that there are robust criteria for determining whether an extra-judicial appointment will undermine the public confidence in the Court at a Federal level. The State level is much more ambiguous. A unification of the State and Federal principles would solidify the test for public confidence in the Judiciary and better protect the rule of law in Australia.

Social Implications
If extra-judicial appointments are not scrutinised, the ability of Courts to enforce the rule of law may become compromised by a loss of public respect, reducing their capacity to make reputable determinations and to administer the law. This is what these tests seek to prevent.

Originality/Value
The paper critiques and compares the two approaches (Federal and State) to extra-judicial appointments, providing an analysis of the legal merits and failings of each, while giving insight into the area of *persona designata* and how public confidence in the Courts is protected by the Courts themselves.

Women in STEM at the ANU

Katie Ward, Allisa Li, Meaghan Powell, Jonathan Tjandra
Australian National University

The perceptions, attitudes and experiences of students regarding the gender culture in STEM (science, technology, engineering and mathematics) subjects at the Australian National University were investigated in order to improve the student experience. Results were collected through quantitative data analysis and a qualitative survey was distributed throughout ANU. The quantitative survey showed that the gender distribution varied across STEM subjects. There was an approximate gender balance (equal male and female students) enrolled in environmental science, chemistry and science communication. There were more female than male students in biology and psychology subjects where as in mathematics, physics, computer science and engineering, there were more male students than female students, with approximately a ratio of 80% male to 20% female. A qualitative survey was conducted and distributed to all the ANU students as well as other universities to investigate the perceptions and attitudes of the students enrolled in these

courses. The survey was distributed via social media and the ANU email and received over 1000 responses, 95% of which were from the ANU. The survey showed that almost 50% of female students have felt uncomfortable or isolated in their study environments due to their gender as opposed to males in areas that were typically more male dominated. Short responses written by students revealed that there is a serious issue of sexism and passive harassment within STEM courses at the university. Three strategies are recommended to the university to improve the STEM student experience to actively recruit, promote and retain females in STEM. First, introduce support networks for women in STEM to enable students to interact with each other, role models and mentors. Secondly, achieve a gender balance in STEM lecturers and tutors. Thirdly, introduce initiatives such as STEM challenges that are aimed at high school students so to recruit the younger generations.

Testing the Efficiency of Bharati: A Universal Script for Indian Languages with Second Generation Indians in Australia

Deepika Rajamanickam
The University of Western Australia

India, a country that epitomizes multiculturalism is known to teach in 58 different languages at schools using a dozen major scripts. Though the country once boasted about this linguistic complexity, people have since found that it poses barriers to effective communication. To overcome this, a unified script that can convey information in all Indian languages should be put to use as picking one script out of the existing scripts can be difficult due to serious political and social barriers. Bharati is a simple, unified script for most Indian languages developed by Chakravarthy, a neuroscientist. Bharati characters are designed that their visual form strictly reflects their phonetic identity, unlike other Indian alphabet systems where the phonetic identity of characters is not strictly reflected in their visual form. The present study aims to show the efficiency of Bharati over Devanagari scripts (Hindi) in a second generation Indian population in Australia. These participants will be taught Bharati and Hindi in two training sessions. The correctness in capturing the sounds and the increment in performance over two training sessions will be analyzed to compare the efficacy of both scripts. It is hypothesized that the Bharati script can be learned quicker and more accurately than the conventional Devanagari script. If the hypothesis is supported, the design principles of Bharati can be utilized for the unification of other South Asian languages. The results will also be presented to the Indian Education ministry, proposing the introduction of Bharati script in Indian schools.

Friend or Foe: Separate Visual Processing for Ingroup and Outgroup Faces

Zoe Purcell
Macquarie University

Visual adaptation is a non-invasive technique used to examine the neural processes underlying visual phenomena. Adaptation studies have demonstrated that we process faces of people from our own race separately to faces of people from other races. However, categorising faces by race typically involves both physical and social differences. The present study therefore examined whether contingent adaptation can occur for faces that are categorised using only social information. The study demonstrated that categorising faces as belonging to one's ingroup or outgroup can facilitate separate neural processing.

Pepper spray, neoliberalism and the law: An analysis of civilian self defensive pepper spray use in Australia

Aprill Miles
Macquarie University

In recent years there has been much academic discussion on the use of pepper spray by police, especially analysis of its legal status. However there has been scarce analysis of this same issue in regards to civilian uses; even though there is evidence from legal records that civilians do seek to possess and use pepper spray for personal self defence. This paper seeks to address this lack of analysis by assessing whether or not pepper spray is legal for civilian self defensive use in New South Wales and the consequences of legal weaponised self defence. The methodology that has been utilised reflects the two part structure of the paper. The first part comprises of a comparative legal analysis focussed on weapons legislation and case law concerning pepper spray use in New South Wales and Western Australia. The case law comparison is based on the cases of Taikato v R (1996) 186 CLR 454 and Hall v Collins [2003] WASCA 74; as they demonstrate the legally dichotomous positions of self defensive pepper spray use by civilians in New South Wales where it remains illegal, and Western Australia where it is legal. The second half of the paper utilises a literature review that explores the neoliberal politics surrounding weaponised self defence and its consequences, particularly the issues of victim blaming and continued responsibilisation of the citizenry in terms of crime prevention. With these issues in mind, it is clear that it may not be wise to legalise pepper spray for general civilian use. However should any new cases of self defence with pepper spray appear in New South Wales courts, the Western Australian position on the criteria for self defence should be applied!

The Battle of Teutoberg Forest and Roman Vulnerability to Ambush

Daniel Morgan
The University of Newcastle

Centuries since they faded from existence, the Roman legions still retain a reputation as one of the most effective fighting forces in history. However, they did suffer the occasional defeat. One of the most notorious of these was the total annihilation of a field army under Publius Quinctilius Varus, governor of Germania, in AD 9. This defeat not only affected the morale of the Emperor Augustus and the imperial family, but it had a permanent effect on Rome's imperial policy in Germania, as it seriously curtailed its expansion across the Rhine for the rest of the Empire's existence. Varus was blamed by Augustus for the debacle, but there were a range of factors, aside from poor leadership, that might have contributed to the defeat. There are several earlier examples of major defeats of Roman legionaries in similar settings: by the Samnites at the Caudine Forks in 321 BC, by the Boii during the Punic Wars, by the Eburones in 54 BC, and there were reversals in Germania itself prior to AD 9. By setting the defeat of Varus in a broader context of Roman military losses through ambush, I will show that his defeat was perhaps not entirely unexpected, as there was a specific set of circumstances under which the Romans were susceptible to less sophisticated foes. To expose these, I will focus on aspects of accounts of several Roman defeats as depicted by major ancient writers (e.g. Polybius, Caesar, Velleius Paterculus, Livy, Tacitus, and Cassius Dio), and I will also make reference to archaeological and topographical evidence.

Il prete e il mangia-preti: the unlikely friendship between archaeologist Luigi Pigorini and Bishop Rosendo Salvado (1867-1884)

Lucy Davidson
The University of Western Australia

This paper explores the interaction between the Australian missionary project and 19th century European science, by examining the correspondence between Bishop Salvado, founder of New Norcia mission in WA, and Italian scientist Luigi Pigorini, a leader in the nascent discipline of prehistoric archaeology in Italy.In 1846, Spanish monk Rosendo Salvado arrived in the recently formed Swan River colony on the west coast of Australia. He lived nomadically with the Aboriginal Yued people, before founding a mission, which became internationally renowned for its almost unique success. In this period, Luigi Pigorini was emerging as the central figure of the new science of prehistoric archeology in Italy, a field of great political and ideological significance, especially regarding the legitimisation of the Italian nation.Pigorini's archaeological work led him to propose a novel, controversial theory of prehistoric human migration and cultural development on the Italian

peninsula. Salvado's first-hand experience with an Australian Aboriginal people, considered at the time by Europeans to be the least developed form of humanity in the world, was therefore of great interest to Pigorini, as the prehistoric Italian ancestors about whom he had theorised were thought to resemble the Aboriginal people. Pigorini was at the forefront of European scientific endeavour, and the insights into Aboriginal culture shared with him by Salvado often challenged prevailing European beliefs. This correspondence may well have had a significant impact on the development of European ideas about race whilst facilitating the development of national identity in Italy.

A Spell from the Papyri Graecae Magicae: New perspectives on gender relations and justice systems in late antiquity

Erica Whye
The University of Newcastle

Papyrology is an under-represented field in the Humanities, particularly the study of the *Papyri Graecae Magicae* (*PGM*). This collection from Graeco-Roman Egypt is a compilation of spells and rituals dating from 4th Century BC to the 4th Century AD and is believed to have been the personal handbook of an ancient magician. While receiving limited attention, particularly in Australasia, the *PGM* reveals substantial information on Graeco-Roman cultures over a period of 800 years. This paper sheds new light on the practice and motivations behind ancient magic through examination of a specific spell: *PGM* VII 593-619. This particular spell (*circa* 4th Century AD) has been labelled "Attraction of an Ungovernable Woman with Lamps and Slander" (Ogden 2009: 234), and has been categorised as an *agoge* (an erotic spell). One of many such spells in the collection, *PGM* VII 593-619 would have been copied by the magician and sold to individual customers to perform. This scholarship originated in a research project on the *PGM* that entailed a detailed analysis of one chosen spell. The methodology employed was a close analysis in regards to aspects such as patterns, motifs and symbolism in addition to the specific materials used in the spell to consolidate extended research to reveal power-play as a significant theme and purpose. Preliminary findings suggest that this approach to an individual spell from the *PGM* allows for a much more thorough and deeper extraction of valuable information about issues in antiquity that would have been overlooked in future research in this area. This research explored the unique patterns and structure of this spell neglected by other scholars and has discovered embedded traits previously thought to be exclusive to justice spells. By challenging general assumptions this research has unearthed a unique hybrid category where a judicial spell employs the elements of an erotic spell. This hitherto unexplored connection between Graeco-Roman systems of justice and personal revenge reveals more complex motivations behind ancient magic than previously thought and sheds new light on how the ancients viewed gender relations. To the

Greeks of late antiquity, for example, when women were gaining more autonomy, we can see male attempts to reinstate power and disempower the female.

Delayed release drug delivery from self-assembling peptide hydrogels to treat traumatic brain injury

Jonathan McPhail
Australian National University

Recovery after traumatic brain injury (TBI) is greatly hindered by the formation of a scar that, if persistent, prevents repair of the injured region. When other organs in the body are injured, there are three stages of response that eventually lead to repair. The first stage is clean-up; debris and material foreign to the area are digested and removed. The second stage is scar formation; the injury site is closed and any remaining damaged tissue or foreign material is sealed off by the scar, similar to a scab forming after a scratch to the skin. The final stage is tissue remodelling; normal function is returned to the injury site, however, sometimes scars do remain after more severe injury. This is analogous to what occurs in the brain after chronic TBI, however, a persistent scar in the brain inhibits normal function and can lead to permanent brain damage. To overcome this barrier to repair, biomaterials such as self-assembling peptide (SAP) hydrogels have been investigated. They have the ability to fill the injury site, providing support to surviving cells, and provide drugs to control initial scar formation. They can also assist in tissue remodelling and repair, and hence, have the potential to overcome permanent brain damage as a result of TBI. Using these SAP hydrogels in conjunction with long polysaccharide chains, we hope to delay the release of these reparative drugs by 3 days, a critical time-point in the recovery process of the brain. Samples of a supernatant incubated on drug-loaded gels were taken daily for a week following loading, then an enzyme-linked immunosorbent assay (ELISA) was performed to quantify the amount released each day. We hope to further develop this promising technology for implementation in traumatic brain injury models in vivo.

Dysregulation of Glucose Metabolism in Haemochromatosis Model Mice

Robert Harvey
Curtin University

Aim: Investigate biological energy production in haemochromatosis mouse liver.

Background: Changes in body iron status may lead to anaemia or iron-overload. Therapies are available; however, if left untreated, prolonged alterations in iron levels may lead to heart and liver disease. The genetic

disorder Hereditary Haemochromatosis (HH) may result from mutations in several genes, leading to liver iron-overload with variable penetrance. Type 2 Diabetes Mellitus (T2DM), an endocrine disorder, affects an increasing Western and Asian cohort, and is linked to high fat-sugar diets. Recent evidence shows extended periods of high iron stores may lead to insulin resistance and pre-diabetes. However, association of HH gene mutations to T2DM remains controversial.

Methods: Livers from three male mutant mouse models (Hfe-/-, TfR2Y245X, and Hfe-/-xTfR2Y245X double mutant) and two controls (normal iron: 0.01% iron, and high-iron: 2% iron) were harvested at 10 weeks. RNA was extracted and reverse transcribed. Gene expression was determined using Qiagen's Glucose Metabolism RT2 PCR array. Animal procedures were approved by the Animal Ethics Committee of the University of Western Australia.

Results: Genes encoding regulatory enzymes in gluconeogenesis were significantly down-regulated compared to normal wild-type: glucose-6-phosphatase down 5.8-fold, fructose bisphosphatase down 2.0-fold and phosphoenolpyruvate carboxykinase down 2.5-fold. However, no change in glycolytic regulatory gene expression was seen. Many tricarboxylic acid (TCA) cycle genes decreased significantly compared to normal wild-type, including succinate dehydrogenase down 2.0-fold and aconitase down 2.5-fold, suggesting a decrease in energy (ATP) production.

Discussion: Down-regulation of gluconeogenesis and TCA cycle coupled with unchanged glycolysis may result in shunting of acetyl-CoA into other pathways. Reduced TCA gene expression suggests reduced energy production, which is consistent with lethargy commonly reported by HH patients.

Conclusions: Changes in the levels of genes seen in mice with HH suggest a link between HH and disorders of glucose metabolism.

How are authors of Japanese manga revolutionising the use of loan words in Japanese society?

Jodie Langford
Monash University

Over the years gairaigo (translated as â€˜loan wordsâ€™), have been considered problematic by Japanese scholars and the general public alike. With the influx of gairaigo from languages such as English into the Japanese vocabulary, some scholars have taken a new approach, looking at the phenomenon in terms of how it is actually impacting language use. Previous research has looked extensively at how gairaigo are presented in

the media (Tomoda, 2009). Despite this, with nonconventional uses of Japanese orthography use on the rise, as described by Tranter (2008), there are new openings for these words to be presented in innovative ways, and for authors to use new methods and orthographic styles to assist in understanding the use and meaning of these gairaigo.

One of the biggest sources of gairaigo and the most well-known medium for nonconventional language play is manga comics. Within the genre of manga itself there are different methods authors use to convey gairaigo to the reader through orthographic and other choices. These choices can translate the word, give another meaning to a word and sometimes just spell the word out phonologically to the reader. This, in combination with footnotes and pictures, gives a great depth of understanding of the words and their meanings. With these tools, manga is a vital source through which people in Japan can access new conventions and fun ways to develop their English vocabulary.

The Retention of Tracking Devices on *Cassiopea Jellyfish*

Shelby Simpson
Griffith University

Cassiopea Jellyfish (common name: Upside-down Jellyfish) are found in sandy or muddy inshore ecosystems. Although the distribution and role of *Cassiopea* Jellyfish has been investigated using methods such as shoreline surveys and visual counts, the depth distribution of the species remains unknown. With the development of new technology, Time-depth Recorders (TDRs) are able to be used to record the vertical movement of *Cassiopea* within the water column. This study aims to determine how best to attach a TDR (model: CEFA G5 Longlife) to *Cassiopea* Jellyfish. By determining their migration patterns, the species can be better understood to highlight their role within their preferred ecosystem.

To conduct this experiment *Cassiopea* Jellyfish of various sizes were collected from Lake Magellan, Sunshine Coast, Queensland and transported to a lab on the Gold Coast where they were kept alive in an artificial environment. For the purpose of this experiment, 'dummy devices' were moulded out of plasticine and Styrofoam to match the dimensions and weight of the *CEFA G5 Longlife* TDR. The three methods trialled were as follows. Method 1: directly gluing the device to the underside of the Jellyfish using a water-proof superglue; Method 2: attaching the device via a piece of nylon stocking tied loosely around the peduncle of the jellyfish; Method 3: securing the device to a cable tie and then connecting the cable tie around the peduncle. The total sample size for this experiment was 45.

From the results of this trial, Method 1 and 2 were unsuccessful due to severe tissue damage caused during the trials. However, Method 3 was determined to be the best method as it was longest retained and caused no tissue damage. It is recommended that any future studies use this method to track the movement of Cassiopea Jellyfish.

How can biomimicry-based computational design support ecosystem-specific innovation in architectural design at Merri Creek?

Laura Williams
The University of Melbourne

The investigation of the capabilities of architectural workflows to engage with dynamic and hybrid ecosystems is significant in the conditions of anthropogenic degradation of natural habitats and significant in the context of Merri Creek where surface water pollution has been identified as one of the major concerns. Research question: How can biomimicry-based computational design support ecosystem-specific innovation in architectural design at Merri Creek? Methodology: To answer this question, the project engaged speculative design (Dunne & Raby, Speculative Everything, 2013) and redirective design (Fry, Design Futuring, 2008) research methodologies to expand the collective imagination on the futures of Merri Creek by developing an innovative design for an urban waterway filtration system. The investigation began with the analysis of case studies that exemplified biomimicry-informed computational design (VoltaDom at MIT 2011, ZA11 Pavilion in Cluj, Romania 2011) and demonstrated novel types of architecture that can be guided by quantifiable objectives. These precedents were reverse-engineered using parametric modeling software in order to understand how computational tools can be used to simulate natural phenomena. The application of this preparatory research to a practical challenge began with an analysis of naturally occurring filtration systems. This analysis was then used to conceptualize a novel filtration system for an urban creek. To test the performance of this concept, multiple versions of the system were automatically generated from a parametric model and evaluated through a particle-based flow simulation. Techniques and artifacts of the project will be made available for discussion and analysis to the diverse stakeholders involved with the site (Merri Creek Management Committee, Friends of Merri Creek, local councils, planners, environmental campaigners, designers, users, etc.) via an exhibition at CERES (June 2015) and disseminated online. Conclusions: The project suggested future possibilities for design by demonstrating an innovative proposal tailored to integrate into living ecosystems.

Investigating the Google Scholar Effect

Jie Zhu
Macquarie University

The purpose of this project is to investigate citation accuracy in the business ethics field based on the "Google Scholar Effect". Supervisor: Dr. Johannes Dumay (Macquarie University, Department of accounting and corporate governance), Alexander Serenko (Lakehead University, Canada). Project: This study will extend the investigation of the phenomenon of the Google Scholar Effect to the business ethics discipline. The Google Scholar Effect is defined as a situation when older academic publications continue being cited because of their appearance in the top rankings of Google Scholar because researchers believe that journal reviewers and editors expect to see these citations, regardless of their actual fit and contribution to their publications. Thus, it is hypothesized that many citations are ambiguous or false citations. Methodology: In the project, 400 references are randomly selected from three major business ethics journals, Journal of Business Ethics, Business Ethics Quarterly and Business & Society from 2005 to 2015. After this, the researchers analyse the articles to determine if the source article is correctly cited. Preliminary conclusions: It is argued that the Google Scholar effect is at least partially responsible for the continuously growing number of citations to the well-cited business ethics articles. Additionally, a growing number of citations are ambiguous or false. Therefore, it is questionable why these articles should be so highly cited because they become more popular through a virtuous cycle of citations. Because of the popularity of the articles, we need to question their contribution and whether or not researchers are citing for the sake of citing, rather than using critical analysis of the previous literature to develop robust research questions and projects.

Multiple Voices, Multiple Selves: A study of the influence of alternative identity performance on Japanese as a second language learners in Australia

Breanna Osborn
Monash University

Identity has become one of the most vibrant research areas within the field of Second Language Acquisition with increased significance placed upon post-structuralist understandings of identity, unstuck from rigid reference points. The current study explores Japanese as a second language learner identity in Australian university students. In particular it focuses on how Japanese speakers negotiate their second language identity, and how affirmation of their second language speaker identity increases learners investment in acquiring Japanese as a second language.

A significant outcome of this study observed students performing alternative identities accessible in Japanese language that are contradictory or inaccessible in their first language speaking context and the resultant impact of learner affect towards Japanese language.

Ethnographic semi-structured interviews were conducted with students currently studying Japanese at university. Participants reported changes in affect, extroversion and investment in Japanese language learning and use when engaging with their 'shadow' Japanese speaking identities. These identities included divergent gendered identities, kawaii (cute), otaku (nerd) and other identities that were either stigmatised or inaccessible in their first language context.

This study establishes that these identifies function as motivating Japanese language learners to aspire to their ideal second language self and use Japanese language to integrate with and legitimize their membership of particular communities of practice. Pedagogical implications of the study are identified as to how teachers can harness this sort of motivation in and outside of the classroom, as well as the necessity to further tease apart language and environment in light of these findings.

Keeping Managers in the Not for Profit Sector: what kind of passion sustains employment?

Ronelle Toop
Edith Cowan University

The Not-For-Profit (NFP) sector is commonly described as having issues recruiting and retaining talented employees. This phenomenon places additional pressure on employees in the sector and has a negative impact on NFP organisational performance. NFP organisations are often prone to voluntary turnover pressure due to poor remuneration, poor working conditions, and onerous duties (Colleran, Gilchrist, & Morris, 2010). The majority of research in the NFP sector has focussed on the retention of volunteers. However, this study will explore the issue of retaining employees within the sector, in order to improve longevity of tenure and subsequent organisational performance.

There is a lack of research into the motivation underlying the decisions of NFP employees to join the sector and to remain in the sector. The motivation to join the sector is often associated with altruistic behaviour, the desire of employees to care for others and the nobility of the work (Collaran, et al., 2010). However, the associated concept of work passion, an individual's persistence and emotional desire to gain positive work appraisals (Perrewe, Hochwarter, Ferris, McAllister & Harris, 2014), has had limited attention, but is also considered to be an important

motivational factor. This research examines these motivational factors and their relationship to remaining in NFP sector employment. The concept of 'Job Embeddedness' was used for this study as it has been described as a valid indicator when explaining the voluntary turnover of employees more effectively (Yang, Ma & Hu, 2011). Job Embeddedness is the notion that employees may become more deeply connected to their work due to a combination of organisational and community-related connections (Yang et al., 2011). A quantitative approach was used in this study using a self-completed survey questionnaire that was distributed to employees in four organisations producing 98 viable responses.

The analysis of the data collected consisted of descriptive statistics, one-way ANOVA and hierarchical regression. The results indicate that a variety of factors influence employees to remain in the NFP sector. However, the factors that appear to motivate employees to remain with an NFP organisation are harmonious passion and on-the-job embeddedness. The results highlighted issues that require greater focus within the NFP sector if retention is to be improved, and these include the lack of retirement and health benefits, promotional opportunities, benefits on the job, and poor remuneration. The findings suggest it is important for managers to understand what motivates employees within their organisation so they can generate strategies to improve retention and employee satisfaction.

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Migrant residents and neighbourhood belonging

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Social inclusion literature emphasises the significance of initiating and strengthening community networks to enable local citizens to produce and sustain their security and wellbeing (Blaxter et al, 2003; Fawcett et al, 2010). In this approach, neighbourhood belonging, or the meaningful

connection people develop with their place of residence, is both a measure and a key contributor to active citizenship and social capital enhancement. This research aims to apprehend migrant residents' belonging to two adjacent social housing neighbourhoods in the city of Sydney: South Maroubra and Matraville. The research analyses data from the 2011 household survey collected by Working From the Ground up (WFGU); an action research project focused on developing a range of community regeneration initiatives to generate sustainable social change in these two neighbourhoods. The survey instrument included the Buckner neighbourhood cohesion scale in addition to other probes about citizenship, safety and community leadership to capture neighbourhood belonging, and this study explores responses given by migrant residents. The research provides detailed analysis of migrant residents' 'neighbourly' patterns of trust, relationships, group belonging, attachment and feeling safe. This paper discussed these patterns in relation to the findings of literature from Europe and North America on neighbourhood cohesion, gentrification and belonging in an Australian context. Recommendations for community renewal projects working with migrant population are also offered.

Association between popliteal artery wall thickness and early structural knee changes in an asymptomatic cohort of middle-aged women

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Background/Objective: Osteoarthritis (OA) is a common and debilitating condition, with multiple pathways resulting in joint failure. Evidence exists for a vascular role in the development and progression of OA. This study investigated the relationship between popliteal artery wall thickness (surrogate marker of vascular disease) and early structural knee changes related to knee OA in an asymptomatic cohort of women aged 40-67 years.

Methodology: A community-based, prospective observational cohort study of 176 women with no significant knee diseases was conducted using random sampling. Participants underwent magnetic resonance imaging (MRI) on the dominant knee at baseline and two-year follow-up. Popliteal artery wall thickness, cartilage volume loss, and the presence/absence of bone marrow lesions (BMLs) were measured. Results were analyzed using multiple linear regression or logistic regression, adjusting for confounders.

Outcome: 148 participants (87.1%) had the two-year follow-up MRI. Greater popliteal artery wall thickness was associated with an increased rate of medial tibial cartilage volume loss, after adjusting for age, BMI, and tibial bone area. With increasing tertiles of popliteal artery wall thickness,

the mean±standard error of annual medial tibial cartilage volume loss was 1.62±0.45%, 2.18±0.43%, and 2.98±0.48%, respectively, p for trend = 0.04. There was a trend for association between greater popliteal artery wall thickness and an increased prevalence of lateral tibiofemoral BML (OR = 1.141, 95% CI 0.990, 1.270, p = 0.065), after adjusting for age and BMI.

Conclusion: These findings indicate that vascular disease is associated with increased rate of medial tibial cartilage volume loss in this population. Although confirmation from other studies is required, these results provide evidence for the role of vascular disease in the onset of knee OA. Consequently, vascular pathology may provide a potential target for the prevention and early treatment of knee OA in middle-aged women.

A Review of Cultural Training for Engineers in Western Australia

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Cultural training (CT) programs are an integral part of the organizational culture of institutions (government, non-government, corporate), which offer services to, or which employ, Aboriginal people. It is often assumed that such programs have inherent value but little work has been carried out into the effectiveness of such programs, particularly when evaluated in light of whether enhance participants' engagement with Aboriginal society. A small but significant body of research has emerged in Australia, which suggests that the CT programs for health professionals may not be as effective as previously assumed. The purpose of this preliminary scoping study is to understand the value of the CT programs from the engineers' perspective. The project provides unique documentation of the kinds of CT programs that are offered to West Australian engineers who work directly or indirectly with remote Aboriginal communities, be it in mining and in remote essential services. Engineering roles require the development of intercultural sensitivity, and formal CT programs and informal work experience learning have the potential to immeasurably enhance an engineer's stakeholder engagement and community relations. Accordingly this study asks how CT assists engineers in ameliorating the disadvantage felt by marginalised remote Indigenous communities in WA; and demonstrates the need for further focused research in order to continue to address issues of Australian Indigenous poverty and the responsibility of engineers to combat social problems.

Public Legal Aid in Australia and Canada: The Legacy of Federal Ideas and Institutions

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The notion of a public responsibility for legal aid was not widely accepted across the developed world until the rise of 'welfare politics' in the post-war period. Consistent with a newfound commitment to the pursuit of substantive personal equality, legal aid was justified as a means to empower the disadvantaged to defend their legal rights and pursue judicial remedies to their legal problems. However, in federal systems, where the constitutional distribution of legislative authority is divided between the national government and a number of substate territories, the task of fulfilling this social obligation faces additional challenges. Previous studies have concluded that uneven revenue raising capacities and partisan differences between multiple levels of government may engender diverse transformations in the way in which public responsibility for the funding and management of social services is shared. This inquiry seeks to advance this understanding of the federal welfare state by assessing the impact of intergovernmental relations on the provision of legal aid in two comparable systems: Australia and Canada. Given the primacy of formal institutional structures and informal federal dynamics in the provision of social services in both countries, this inquiry has adopted a historical institutionalist analytical framework. This approach anticipates a greater degree of decentralised policymaking in countries that possess a clear and enforceable jurisdictional division of authority. Where the constituent units, or substate territories, have a direct constitutional claim over a particular policy domain, the political dynamic in a federal system is expected to reflect strategies of "competitive state-building", as territorial governments seek to pre-empt national encroachment by developing their own autonomous systems of service provision.

The Neglected Objective: the failure of reintegration with the Dangerous Sexual Offenders Act 2006 (WA).

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This research is based in law and examines the preventive detention of dangerous sexual offenders in Western Australia. The *Dangerous Sexual Offenders Act 2006* (WA) (*DSOA*) enables supervision in the community or detention in prison of dangerous sex offenders. This supervision or detention results in control of the offender beyond the terms of their sentence. In addition to community protection, the objectives in s4 of the *DSOA* are 'care, control, and treatment' of the offender.

An analysis of WA Supreme Court Judgments is being conducted to determine the reasons for the decision to either supervise or detain dangerous sex

offenders. The research intends to determine if the objectives of the *DSOA* are being met. Content analysis is being applied to analyse the data collected.

The background of this research is based in an accepted principle in Australian legal jurisprudence, distilled in *Chu Kheng Lim v Minister for Immigration* (1992) 176 CLR 1, which is that as detention is punitive in nature, it should only be authorised as a response to criminal guilt. Numerous exceptions to this principle have resulted in the use of detention for non-punitive means. The *DSOA* is justified on the grounds of non-punitive ideals contained in its objectives, such as community protection, rehabilitation and reintegration.

The emerging results reveal that although most of the offenders have completed their assessed treatment needs, a failure to ensure that appropriate resources such as accommodation and supervision means that reintegration is not supported, culminating in further detention. The lack of resources means that the objectives of the *DSOA* in relation to care are not being achieved. The costs of continued detention are not only financial, but also affect the ongoing wellbeing of the offender.

Perceptual Distortions of Face and Body: Implications for the Neural Processes Underlying Body Image Disturbance

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Body image disturbance is a key characteristic of eating disordered behaviour. Sufferers are believed to be influenced by media exposure to unrealistically thin images, leading to a shift in the body size that is considered normal, and negative perceptions of their own comparatively larger body. This idea is supported by recent experimental findings that prolonged exposure to thin bodies can alter one's perception of body size to be larger than it actually is: a perceptual aftereffect that is referred to as visual adaptation. In addition, adaptation to male body shapes has been shown to produce an aftereffect wherein an androgynous body appears female, and vice versa. Furthermore, this effect can transfer to face stimuli (i.e. androgynous faces also appear female). The current research aimed to investigate the mechanisms underlying these effects by examining the interdependence of body and face size perception. We explored the possibility that adaptation to smaller faces would elicit an aftereffect in bodies, and vice versa, suggesting that face stimuli may contribute to body image disturbance. Participants received prolonged exposure to images of small/large bodies or faces. Subsequently, participants viewed test images of faces and bodies ranging in size, and indicated which they perceived to be 'normal'. Adaptation to small (large) images is expected to result in a lower (higher) point of subjective normality than before adaptation, i.e. a smaller (larger) than average body will be perceived to be 'normal'. While substantial transfer of this aftereffect between faces and bodies would suggest common neural processing mechanisms for size-related aspects of these stimuli, dependence of the aftereffect on stimulus type would imply a separation of body and face size processing. Findings, as

established by ANOVA and post-hoc comparisons, will be discussed in relation to models of face and body perception, the issue of common neural processing, and the implications for understanding body image disturbance.

Residential University Colleges: Learning Communities and Transformational Aspects of Residential Living

Julian Coleman
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The University of Western Australia (UWA) like many other higher education institutions places a strong emphasis on maximising students' learning experiences through residential living and the learning communities within them. Significant research into the perceived transformational aspects of learning communities exists more broadly but little is known about the perspectives of Australian collegians in residential living. Using a detailed survey of residents' participation in different aspects of college life, perspectives of their experiences and programs within the college system was collated. Likert rating scales were used to determine whether participants perceived they had had a transformational experience. Questions gaging their involvement in the learning community and its different programs gave the information to cross reference against those students that had a perceived transformational experience. The results indicate which programs and aspects of college life contributed more to a perceived transformational experience. These results can inform the development of existing and future programs at UWA and similar institutions. Ultimately the purpose of the study is to better understand how these communities can provide a more enriching experience for their residents.

Silent for Fear of Indefinite Incarceration: Reform of the consequences of unfitness to stand trial for Aboriginal youth affected by Foetal Alcohol Spectrum Disorder

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The overrepresentation of Aboriginal people is repeatedly identified as the single biggest issue confronting Western Australia's criminal justice system, in which Foetal Alcohol Spectrum Disorder (FASD) plays an increasing role. Of particular concern is the potential for the indefinite incarceration of FASD sufferers deemed unfit to stand trial. This is only exacerbated by recent statistics revealing the highest prevalence of FASD worldwide in the remote Aboriginal town of Fitzroy Crossing, Western

Australia.

This forms the background against which current attempts to reform the statutory scheme of fitness must be read. Through a comparative analysis with the Canadian jurisprudence, this paper examines options for reform that facilitate the involvement and ownership of Aboriginal communities in solutions to this problem.

"How Good An Historian Shall I Be?": Engendering Ethics and Social Action Through Holocaust Education

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Holocaust remembrance and education has increasingly located their purpose with reference to a social function of historical knowledge; an assurance that knowing about the Holocaust and maintaining its memory can combat prejudice, overcome indifference, and can inspire and instruct ethical conduct and social action. Taking as case studies two key Australian institutions of Holocaust education (the Sydney Jewish Museum and March of the Living Australia), this paper seeks to examine the historical and social nature of this claim, and moreover, to assess the extent to which their representations of the past sustain the social and ethical aims they articulate. Ultimately this essay will argue that there is a deep disjunction between the purposes these institutions claim to pursue and the discursive and political implications of the ways they present the past. Although both institutions have made significant contributions to Holocaust research, their public displays and education efforts have habitually favoured historical narratives and modes of analysis that reflect out-dated research and are so severely reductive that they are only capable of encouraging social action or engendering ethical behaviour in the most facile sense. This paper argues that in order to offer a presentation of the past that might meaningfully contribute to cultivating contemporary ethical behaviour, Holocaust education, remembrance (and indeed, Holocaust history) needs to grapple with the immense historical complexity of the past, and to recognize the difficult complexities of ethics both in the concentration camps and in contemporary life, and the problems of drawing every day ethical lessons from the most extreme conditions. Finally, this paper suggests that the best ethical lesson that history can offer is perhaps the practice of empathy.

The Rise of Third Sector as a Provider for welfare services in Australia: The Third Sector and Social and Affordable Housing.

Sarla Hallock
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The welfare state has become historically weaker in the West, Third Sector Organisations (TSOs) now occupy a significant space in civil society. TSOs provide welfare and development services that were once provided by the state. This paper identifies a need for alternative providers of social affordable housing other than government, and that Not-profit housing organisations (NPHs) are a suitable alternative. This paper will briefly explore the evolution of the welfare state and TSOs in Australia, and further investigate TSOs as a provider of social and affordable housing in Australia. The provision of welfare services in Australia has historically decreased, neo-liberal economic policies has reduced the generosity and conditionality of social services provided by government. Australia has a non-government, not-for-profit affordable housing sector that is providing cost effective, high quality and well located affordable housing, and is able fill the widening gap in the supply and demand for social and affordable housing. The case studies of City West Housing and Port Phillip Housing Association show the scope and capability of not-profit housing organisations to deliver social and affordable housing. In 2014 City West Housing's revenue grew by 56% and had a net profit of $50.4 million, showing that once initial funding and support is provided NPHs are able to be self-sustaining. In order to secure the future of the NPH sector there needs to be support from governments through start up funding and favourable policy initiatives.

Rapid Modeling and Analysis of Risks in Complex Supply Chains by Network Theory Approach

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As the development of modern industry, supply chain becomes a matter of life and death in more and more corporations. In order to help these enterprises update their supply chain and stabilize their material and product flows, we will try to use agent-based simulation to study and improve such supply chain management system mentioned above. Agent Based Modelling and Simulation (ABMS) is a scientific method to study the behavior of the supply chain. An agent is considered as a computing entity, which has a definite purpose and can run in the distributed environment independently and persistently. A multi-agent system can be used to model and simulate complex systems.

We compared four kinds of supply chains with different strategies in the first stage of work. The supply chain shown in the left made the greatest profit under given conditions. We also found the most appropriate

strategies for different supply chain networks. In conclusion, by using this method, we can predict the evolution of supply chain effectively and make suitable decisions in practice.

Third Party Securities and the Personal Property Securities Act 2009 (Cth): Are Lenders Better Protected?

Ryan Kabat
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Given the prevalence of corporate groups in Australia, lenders have been compelled to find ways to access the assets of the corporate group in order to secure their lending. These assets are likely to be spread over several different companies. One obvious way to access to these assets is to have companies within the group provide security for the debts of other member companies. These so called third party securities have, however, proven particularly problematic for lenders because of courts' reluctance to allow transactions to be enforced that seem to have no benefit for the company involved. This thesis will examine whether the wide spread and radical reforms introduced by the Personal Property Securities Act 2009 (Cth) provide any assistance to a lender who finds itself with a third party security that has earned the ire of the courts. The thesis will do this by examining the doctrines used to challenge a third party security and the effect these doctrines have at general law. It will then proceed to look at how the PPSA interacts with these doctrines and whether this provides any protection to a lender.

A case for punishment: a hybrid justification with rule-utilitarianism consequentialism and revenge-based retributivism

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Legal philosophers have been casting doubt on the use of punishment against wrongdoers, highlighting a need for a moral justification so that the practice can be considered as acceptable. Several attempts from the schools of consequentialism and retributivism have been made to fill this lacuna. This essay attempts to present a novel hybrid justification: rule-utilitarianism and revenge-based retributivism. These two theories are first individually presented. Rule-utilitarianism is shown to be challenged with several objections: a socially-optimal rule might justify punishing the innocents or not punishing the guilty. Next, to argue for the theory of revenge-based retributivism, I first attempt to remove the perceived intrinsic vileness in vengeance, arguing that revenge can be seen as a moral cousin of punishment. I then argue that having the state serve

revenge in proxy for the morally injured would help vindicate the victims. However, revenge-based retributivism does not answer why controversial mirror punishments are not permissible. These punishments include torturing the torturer, kidnapping the kidnapper and raping the rapist. To overcome the challenges presented in each theory, we may use revenge-based retributivism to justify whom to punish, and rule-utilitarianism to justify the type and severity of the punishment exacted to the offender. Thus, every wrongdoer would merit some amount of punishment, to which its type and severity would be socially-optimal.

Design Thinking in Start-up Business

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The establishment of a start-up business is becoming more prevalent in today's society. In recent years we have seen a societal change in which more and more individuals are willing to take the risk of embarking on a new business venture. Seventeen percent of the world's population is involved in some type of start-up business. With a population that is rapidly growing, it is estimated that by 2025, 1000 start-up businesses will be created annually in Queensland. In conjunction with the rise of start up businesses, the term 'Design Thinking' has garnered substantial attention and is increasingly being integrated into business lexicon.

The term refers to a methodological process that uses a human centered ethos, drawing upon logic, imagination, intuition, and systematic reasoning to devise solutions to complex problems. This methodology is particularly relevant to the present research, as Design Thinking has been identified as a problem-solving tool in the context of business, specifically, at a start-up business level.

Current research indicates that Design Thinking is being implemented in large and medium enterprises, however, the exploration of this methodology for start-up businesses is very limited. The role of the present study is to fill this gap by investigating how Design Thinking can be implemented in the creation of a start-up business; entailing the exploration of the process of design thinking and the steps undertaken in order to establish a start-up business.

This honours research project will examine the creation of a start-up business from the perspective of a product designer. The research will utilize the Hasso Plattner model of Design Thinking, Participant Action Research and Case study methodologies in order effectively explore how design thinking can be used in order to create a start-up business.

Bio-Degradable Natural Fibre Composites

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Prior to the turn of the century, high performance materials such as composites primarily focused on the improvement of mechanical properties, but society and government opinion has since shifted as the impact of climate change is realised. As greater emphasis is now given to environmental concerns, the composites industry has made technological developments that have resulted in a wider selection of materials for a wider range of applications. New products in both polymer matrix and fibre reinforcement have emerged.

Natural fibre composites using thermoplastics are an attractive alternative to mainstream choices such as E-glass and Carbon Fibre but have inherent weaknesses regarding moisture and temperature sensitivity during processing and for suitable application. This makes using thermoplastic resins a delicate procedure as balancing between adequate temperature for consolidation and prevention of degradation of fibres gives little room for error. Using Poly-Lactic Acid (PLA) and natural fibre materials for the manufacture of renewable and bio-degradable composite products is an attractive concept. The ability to step away from a reliance of petroleum based resins in addition to the benefit of a crop based fibres means that these composites are considered renewable for the foreseeable future, an additional benefit from these new composites is end of life disposal as they can be composted and used to fertilise the next crop of raw materials.

In addition to new renewable materials now being commercially available, new and existing manufacturing procedures have been under constant development, this study tested the methodology of manufacturing hollow cylindrical tubing for bicycle components using Poly -Lactic Acid (PLA) and woven long strand natural fibres (Flax) with layer stacking and compression moulding through application of a sandwich mould and inflatable bladder. The testing conducted demonstrated that a fully consolidated final product could be produced reliably and, with modifications to the procedure, be used in mass-production.

Walking in Consumers' Shoes: reshaping pharmacy student placement curriculum via mystery shopping with feedback

Emily Soon
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Background: Provision of appropriate advice in non-prescription requests is integral to the role of a pharmacist. If students lack sufficient competency development opportunities during placements, then entry-level pharmacists may lack the skills and experience to adequately perform their role. Targets to improve placement curriculum include the lack of standardisation and that students are commonly placed in the role of observers and asked to reflect on observed practices. By replacing this passive interaction with active engagement, student learning is hypothesized to be enriched through the experienced reflections of direct communication in the roles of both practitioner and consumer. Objectives: The overall aim of this research was to determine whether pharmacy students participating in placements involving Mystery Shopping with Feedback (MSF) in lieu of the traditional placement curriculum, gain more in terms of learning, research engagement, professional identity and clinical competence. The specific objective of this research was to explore student perceptions of professional identity. Method: 60 volunteer BPharm (III) students were exposed to both traditional placements and MSF placements over a year, during which, students can engage with pharmacy staff by providing feedback on their performance in a pseudo-patient visit. These visits were followed up by student focus groups regarding their experience. Results: Preliminary conclusions from student focus groups determined that from authentic experiences as patients, students were able to appreciate patient-centred care and potentially absorb this into their own future practice as pharmacists. By experiencing multiple professional approaches to practice, students were encouraged in developing their own unique professional identity. Importantly, by communicating and engaging with pharmacy staff as a patient, student, peer and educator, students were encouraged to move from an initial structured process to a personalised approach in providing pharmacy staff feedback, thereby developing their professional identity through an engaged learning process.

Powers of Two Modulo Powers of Three

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Modular arithmetic is best introduced by example. Working modulo 5, the equivalence, $8 \equiv 3$, is true because 8 and 3 differ by a multiple of 5. This, perhaps strange, concept of equivalent is in fact very familiar; a clock works modulo 12, so that 7 hours after 10 o'clock is 3 o'clock. We write $10 + 7 \equiv 3 \bmod 12$ to express this.
Modular arithmetic is fundamentally additive, and so its additive structure is somewhat unsurprising. On the other hand, the multiplicative structure is richer and not completely understood. The result we present concerns the following con- struction.

Let m be an integer. Compute $2^n \bmod 3^m$ for each n = 0,1,2,…. For example, with m = 2, the sequence begins

$$1,2,4,8,7,5,1,2,4,8,7,5,\ldots.$$

It was known to Euler (1763) that this sequence repeats for any m, with period $2 \cdot 3^{m-1}$, and continues in this way. However, its behaviour within one of these periods, that is

$$n=0,1,\ldots,2\cdot 3^{m-1}-1,$$

was unknown. We show that by splitting this sequence "into sixths", one observes a finer structure. The result is exemplified by the "first sixth", that is, the numbers $2^n \bmod 3^m$ for n = 6k, a multiple of 6.

These exhibit the periodic relation

$$2^{6k} + 3^{m-2} \bmod 3^m = 2^{6k+8\times 3^{m-3}} \bmod 3^m.$$

This says we can translate the j-th term of the sequence into the $j + 4 \times 3^{m-4}$-th term by simply adding a constant, namely 3^{m-2}. A similar relation holds for the other "sixths", with different constants.
The sequence is of interest in the context of strong normality. Strong normality is a technical condition that measures the randomness of the digits of a number. It has been shown that almost all numbers are in fact strongly normal, however, the strong normality of any particular number is yet to be demonstrated. Using the above sequence, it was hoped that a strongly normal number could be produced, and further, that the finer structure we discovered would provide the means to prove this fact.

A Newly Discovered Role for Protein Arginine Methyltransferase 5 (Prmt5) in the Developing Immune System

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Introduction: Protein Arginine Methyltransferase 5 (Prmt5), an enzyme responsible for modifying proteins, is important for development. Its role specifically in the developing immune system remains unknown. Thymocytes, precursors to T immunity cells, mature in the thymus, showing fluctuating levels of Prmt5 at different stages. Its most highly seen at a crucial point known as β-selection; where Notch signaling helps to select thymocytes that meet the criteria to contribute positively to immunity are chosen to become fully functioning T cells.

Aim: To determine whether Prmt5 is essential for thymocyte development.

Methods: We produced a genetically modified mouse that was unable to produce Prmt5 in thymocytes (the LCP mouse). Thymus, spleen and bone marrow samples were collected from age-matched LCP and related mice

that expressed Prmt5 normally. Genotyping and measurement of protein levels were performed to confirm the modification. Flow cytometry was used to separate thymocyte cells into their subpopulations. We used fluorescent microscopy to visualize where Prmt5 is found in normal thymocyte subpopulations. Deltex-1, a surrogate for the Notch signaling pathway, was assessed by measuring RNA expression in early thymocyte cells of the LCP mouse.

Results: Prmt5 is predominantly found in the nucleus in thymocyte subtypes, but showed greater cytoplasmic expression during β-selection. We showed a four-fold reduction in Prmt5 levels in LCP thymus samples ($p<0.001$), but normal spleen and bone marrow. LCP mice had small thymii with global reduction in thymocyte subpopulations, except those expressing T Cell Receptor (TCR) γδ (an alternate pathway to β-selection). We found reduced TCR-β expression, suggesting impaired β-selection. No abnormalities were detected in TCR-γ development. Reduced Deltex-1 expression suggested Notch signalling was downregulated in LCP thymocytes.

Conclusion: Prmt5 expression and sub-cellular localisation is dynamic throughout thymocyte development. Variation in expression is likely essential for normal thymocyte β-selection, possibly through regulating Notch signalling.

Personality, Mood and Emotion Regulation: Implications of Mindfulness-Based Therapy for Functional Gastrointestinal Disorders.

Kristie McDonald
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Health Psychology research has highlighted the existence of functional disorders, which cause debilitating physical symptoms, yet have no biological markers. Functional Gastrointestinal Disorders (FGIDs; e.g. IBS, Dyspepsia) significantly decrease the quality of life of sufferers due to their varied and persistent symptoms. Previous research demonstrated FGID sufferers are prone to experience heightened anxiety and depression. Psychological therapies have been shown to help sufferers, likely by altering maladaptive situational appraisal and emotion regulation habits. This two-part study aims to contribute to the current literature through identifying a time-, resource- and cost-efficient mindfulness-based cognitive therapy that may alleviate FGID symptom burden. Such a therapy is lacking from clinical practice, and as such, identification of a solution is much needed. One hundred female, first year psychology students were recruited for the correlational design, with fifty of these students being recruited for the experimental design.

In part 1, (*n*=100), participants were asked to self-report their neuroticism (IPIP) depression and anxiety (DASS-21 & STAI), emotion regulation strategies (ERQ), pain catastrophising (PCS), symptom burden (GSRS), stress (SAM-1) and symptom-related anxiety (VSI), as well as their rumination type (RRS) and emotional intelligence (WLEIS).

Part 2, (*n*=50), used a longitudinal design, over three time points. Participants were randomly allocated to listen to a brief mindfulness practice (experimental condition, *n=25*) or 'mindlessness' practice (control condition, *n=25*). Participants then provided self-report responses to questions concerning the effect of the intervention as a manipulation check, evaluating their stress (SAM-2) and state anxiety (STAI). These measures were readministered 1 month and 3 months later, to investigate the long-term effects of the mindfulness therapy.

Results will be presented and the implications of the findings discussed once collection and analysis have been completed. We hope the findings will contribute to the current research and identify an easily administrable and accessible therapy to increase health-related quality of life.

Why hormones may influence positive reactions to infant cues or stimuli

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In this review, possible answers to "why are people so often drawn to infants during the periods before and after birth?" are discussed. Search terms primarily used included "the influence of hormones on infant perception" and "social perceptions of infants". There were a great variety of secondary findings, so they were chosen from the common dominating factors relevant to hormones; hormone types, brain regions, visual stimuli and social influences. The hypothesis proposed is that certain hormones, sex steroids and some molecules trigger positive reactions to infant stimuli. The methodology used to investigate this theory is via a literature review of the 'Kindchenschema mechanism' first reported by Konrad Lorenz in 1943. Researching this topic also revealed that certain brain regions could influence positive reactions to rewards by producing hormonal signals to associated infantile cues. See Figure 1 below.

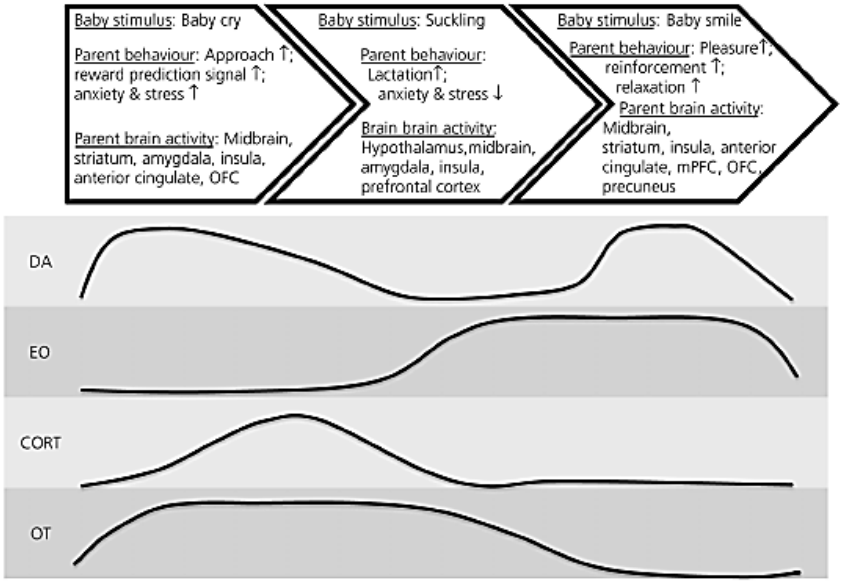

Figure 1 Schematic summary of neuroendocrinology activity in the brain in response to infant stimuli that is proposed to also apply to non-parents (except lactation) in an infant's presence. Dopamine (DA), endogenous opioids (EO), cortisol (CORT) and oxytocin (OT) are some examples of hormones produced by the different regions of the brain outlined above (Swain, Kim & Ho, 2011).

In recent studies, there have been observations of connections between social experiences, psychological (neuro- or brain) responses and endocrine (hormonal) responses. These mechanisms in connection to infant caring and nurturing are also considered to be an evolutionary means of improving survival of the offspring and genetics. Investigations have shown that neuroendocrine signals appear to influence positive attraction to infants, most notably, the female hormones progesterone and oestrogen. On the other hand, some investigations warrant further study to understand the mechanisms of visual attraction.

Can a model be created to allow assistive technology for short-term disability to be accessible through open source?

Paul Bardini
Griffith University

Research Question

Can a model be created to allow assistive technology for short-term disability to be accessible through open source?

Abstract

The digital revolution has allowed the transfer of knowledge to become global and virtually instantaneous through the utilisation of the internet. The Open Source ideology, which is generally associated with software development, has assisted in the facilitation of this information superhighway. Through websites such as Thingiverse, this open sharing framework crosses the threshold of the intangible digital world into the physical.

Open Source can be recognised as a paradigm of open collaboration and sharing, the community is freely able to replicate, adapt and innovate upon other members ideas. This research is directed at the Open Source community, and the significant influence it can have to assist the needs of people with Short-Term Disabilities.

According to Australian Institute of Health and Welfare, Short-Term Disabilities such as a fracture associated with the hand and wrist, account for over sixteen thousand surgical procedures per year. While this cause great expense to the community, in terms of lost work hours, rehabilitation and care services, it also challenges the independence of the individual affected. However because of comparatively quick rehabilitation time, the development of Assistive Technologies for this cohort, appear to be a lower priority.

The motivation for this project is that Open Source can create a channel to develop these technologies, giving broader knowledge and input from the wider community, while establishing greater accessibility.

This research focuses on Human Centered Design and will utilize a Participatory Action Research Methodology. The case studies involve participants as co-designers, collaborating with the researcher to create a design response to their disability. The outcomes of this research will be disseminated through an on-line community – developed specifically for the project. The intention of this study is to establish a model for a knowledge sharing culture with the Assistive Technology arena.

Changes in Iron Regulatory Gene Expression with Age and Presence of Mesothelioma

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Iron is an essential element which is tightly regulated to ensure appropriate storage and availability. This is to prevent the toxic effects produced by redox cycling which iron undergoes. There are multiple regulatory pathways which maintain homeostasis of iron. However, in aging, an increased iron loading in the liver has been demonstrated, which may indicate a change in regulation. Changes in regulation can have implications for treatment and progression in the elderly. In particular, fast proliferating tumours require large amounts of iron and alterations of iron regulation may explain various co-morbidities observed.

Mesothelioma is a highly proliferative tumour originating from mesothelial cells of pleural cavities and is a cancer seen in the elderly long after initial exposure. Development is predominantly linked to asbestos exposure. Asbestos has a high iron content and this may play a role in the tumour's development.

The aim of this study is to investigate the changes in iron regulation with age and changes with aging in the presence of the asbestos-related cancer, mesothelioma, which is of particular significance in Western Australia.

RNA is being extracted from livers of young (2 months old) or old (24 months old) C57BL/6 female mice with or without mesothelioma and with or without treatment. Gene expression will be determined using qPCR using ß-actin as the housekeeping gene. Hepatic iron concentration (HIC) will be determined colorimetrically. Protein expression will be determined by semi-quantitative Western blot.

Preliminary findings indicate that HIC increases significantly with age ($P < 0.032$). Young mice exhibited increased HIC in the liver in the presence of tumour ($P = 0.05$). However, in aged mice, HIC was not different between healthy mice and mice with tumour.

This work will expand our understanding of the role of iron throughout the life of an organism and its role in the presence of mesothelioma. This may lead to identification of novel drug targets and improved therapy for mesothelioma.

Macroeconomic Globalisation: Implications for Inequality in Japan

Kazuki Tomioka
The University of Western Australia

Since the abolition of the Bretton-Woods agreement in 1971, globalization has taken the form of increased openness to both trade and financial flows with both positive and negative implications. On the negative side, the economic performance of advanced economies has been uneven and inequality has increased in all. This paper focuses on

comparative stagnation of the Japanese economy and the associated rise in Japan's inequality both arising after the mid 1980s, following a period of stable expansion since WWII. A particularly sharp transition occurred with the emergence of Japan's asset bubble in the late 1980s, coinciding with accelerated expansion of the adjacent Chinese economy. The central topic of the thesis is to quantify the role of increasing macro-globalization on economic stagnation and inequality within Japan. As a means of formulating hypotheses, a dynamic general equilibrium model of two interacting regional economies is constructed. It is used to show that the key determinants of Japan's inequality include comparative productivity growth abroad and the investment of its savings externally. It is shown that these developments contributed to stagnation and widened inequality. The parameters that govern the elasticity of substitution between home and foreign assets are allowed to vary, to establish the strength of the globalization effects and to assess the particular importance of financial integration. This modelling work is then combined with an empirical analysis, to test emerging hypotheses. An error correction model is applied to test for the dependence of inequality on bond yields, components of the current account, total factor productivity (tfp), trade openness and capital taxation provisions.

Thinking Big: How Managers' Mental Models Inform Organizational Sustainability Responses

Hanako Frawley
The University of Western Australia

Mental models are implicit theories that guide personal behaviours, actions and involvements in order to achieve a goal or explain a phenomenon. Managers play a crucial role in organisational planning and operations, and so it's important to understand the impact their mental models have on organisation responses to global issues, such as the environmental sustainability crisis. The purpose of this study is to explore how managers' mental models inform organisational sustainability responses. This study aims to develop a greater understanding of mental models, how they can be elicited and the process by which they inform organisational strategy. A case-study method gathering in-depth information on managers' mental models will collect and analyse data from two rounds of semi-structured interviews, observations of relevant meetings and company documents. A theory building approach will be undertaken to build an initial exploratory framework consisting of themes that emerge. There are implications of this study for i) understanding how managers' mental models impact on organisational policy and strategy, ii) communicating about big global challenges in ways suited to their particular mental models, and iii) seeing how organisational responses to sustainability issues develop and how they are connected with how managers formulate those issues. Possible

applications of this knowledge will be in organisational change and sustainability initiatives, and management education and training on environmental responsibilities. This study will contribute to understanding how managers thinking about global sustainable issues, informs organisational strategies and policies in the area.

Africa's fall into Third World status

Kundai Mapfina
MSA

It is argued that decolonization was the first step of Africa's economic independence. With governments acquiring the ability to control national resources and make their own decisions based what they believe is best for their nation through the concept of sovereignty. This outlook is largely frowned upon by researchers as Africa as a continent has only deteriorated from the way it was in the colonial era. Famine, civil war, political instability, crime to name a few has been on the rise and it is evident that most of these occurrences are due to frustrated populations and corrupt governments: which were birthed and intensified after the fall of colonial rule. Africa was well established and developed by colonizers during the colonial era, 'abandoned' and left to its inexperienced leaders and its people. A lack of exposure to what is referred to as development by first world countries is one of the contributing factors to the fall of Africa into what is referred to as the Third World. Evidence of this is seen in the agricultural sectors in various African countries where adequate infrastructure had been established during colonization but once colonization ended an inadequate level of knowledgeable human resources became a large issue. Other areas that exhibit similar patterns include the political environment, education, International relations and social welfare. Liberalization in Africa has done very little in terms of development and had actually resulted in self-oppression of Africa by Africa.

Reflections

ICUR and ACUR provides a supported yet realistic experience of presenting your research at an academic conference. As presenters, you are given an opportunity to seek critical yet supportive feedback on your own research project. As members of the audience, you join a global community of undergraduate researchers united by common excellence and a passion for critical inquiry, engaging in dialogue over ideas produced by currents on the other side of the world. Throughout your valuable experience here, you may want to reflect on a few suggested topics provided below.

Your Research Experience

1. Reflect on your own research project and experiences.
2. If you were a presenter, how do you feel about your own presentation? What feedback did you receive? Where do you think you could improve?

Presentation and Communication

"To learn through listening, practice it naively and actively. Naively means that you listen openly, ready to learn something, as opposed to listening defensively, ready to rebut. Listening actively means you acknowledge what you heard and act accordingly." – Betsy Sanders, former Senior Vice president and General Manager, Nordstrom

1. Think about what you've heard and seen – which presentations and posters worked well and which didn't? Why or why not?
2. Which poster design grabbed your attention first? Why?
3. What presenters/ideas were most memorable to you?
4. Have you come across any ideas or techniques that you could apply to your own work in the future?
5. Did you hear any great questions or answers during the Q&As? What were they? Why did they interest you?

Learning Without Borders

Most areas of academic learning and research are improved if they are approached from an interdisciplinary perspective. Stepping outside the usual disciplinary silos gives the opportunity to learn about an area holistically, approaching complex ideas from a range of perspectives and exploiting the symbiotic potential of traditionally distinct disciplines. The conference gives you

the opportunity to think again about your research and consider it from an interdisciplinary standpoint, the opportunity to present alongside students researching the same area as you, but from a different discipline. Make the most of this opportunity to broaden your research mind!

1. What have you learnt from areas outside your own discipline?
2. How did other presentations effectively communicate to audiences from various countries/disciplines?

Making Connections

There is no time like the present to practice your networking skills. Getting to know your fellow delegates provides you with the opportunity to exchange and share information, discuss common interests or differing opinions, provide advice and support to each other and even work together on projects in the future. It's also not just about building these relationships now during your undergraduate studies, but maintaining ongoing connections in the future as well.... who knows when and where your paths may cross again.

Francesca Gino, a professor at Harvard Business School explains "Today, probably even more than ever before, networks are a key form of social capital for achieving goals in both your professional and personal lives." And meeting people at conferences "who likely have the same interests as you and are highly relevant to your work" is a good way to nurture and expand your network, says Dorie Clark, author of *Stand Out Networking*. "The fact that technology has made it easier to interact with people across great distances and time zones actually makes face-to-face interaction even more valuable" (*Harvard Business Review*, 2015)

1. Use the space below to collect email addresses, Facebook contacts, LinkedIn profiles, or even create a WhatsApp group to connect.

Publishing Your Research

As a participant at ICUR & ACUR, you have worked hard to present your research to this international and cross-disciplinary audience. The next natural step is to write a paper for publication!

Publishing will enhance your research and writing skills, and give you the experience of working through the editing and journal publication process. By collaborating with students and staff across your university, you will see your research efforts and hard work actually come to life, and be accessible to others.

Reinvention: An International Journal of Undergraduate Research, the research journal run by the Monash-Warwick Alliance, provides exactly that – a space for active undergraduate researchers, at universities around the world, to publish their work.

> *"Editing Reinvention has helped me learn what top-quality original work looks like, improving and honing my own approach to independent research and degree coursework. Whether you're intending to do a postgrad course or not, research experience as an undergraduate will equip you with skills different and beyond those of a standard degree."* – Joe Grimwade, Reinvention Assistant Editor (University of Warwick).

All participants are encouraged to further disseminate their research by writing a journal paper and submitting it to the Reinvention editorial board for review.
In early 2016, Reinvention will publish a special edition featuring submissions from ICUR 2015 presenters only. Meanwhile, the next issue open to submissions from all undergraduate researchers closes on 1 January 2016.

For more information about the peer review process and guidance on writing or submitting a paper, please visit warwick.ac.uk/reinventionjournal. You can also find publications in each journal issue printed online over the past 8 years, and learn about the development of the journal, or other useful 'top tips' there.

For continued updates, participants may visit or like the 'Reinvention: an International Journal of Undergraduate Research' Facebook page as well.

Wireless Internet Access

Conference attendees can access the internet via UNIFI or Eduroam. If you are unable to access it in this manner then please see one of volunteers who will provide you with guest credentials for the duration of the conference.