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Abstracts

alphabetical by first name

Akshaya Ramanathan

University of Sydney

Transgenic TCR Therapy Targeting PRAME to Treat Cancer

Cancer affects >700 children every year in Australia, with incidence and mortality rates steadily increasing. Immunotherapy using genetically modified immune cells taken from the patients (cell therapy) is an effective alternative to current toxic chemotherapy. Immune T cells recognise cancer cells, using their T cell receptors (TCRs) when the tumour antigenic peptides are presented by the tumours on Human Leukocyte Antigen (HLA) molecules. HLA molecules are highly polymorphic. The HLA-A2 allele is present in most Australians. TCR sequences specific to an HLA restricted tumour peptide can be introduced into normal T cells to generate therapeutic transgenic (tg)TCR T cells. This technique is being developed in this project, to target PRAME (PReferentially expressed Antigen in Melanoma), a tumour antigen that is overexpressed in several paediatric cancers. Peripheral blood mononuclear cells were stimulated with HLA-A2 restricted PRAME peptides, activated cells (CD137+) isolated using magnetic bead separation, and cultured for 10 days. The Cytotoxic T Lymphocyte/cell cultures were tested for specific activation and function by stimulating with PRAME peptides, using intracellular cytokine flow cytometry. TCRs from reacting T cells were identified using 10X chromium single cell sequencing, cloned into the piggyBac transposon plasmid, and introduced into T cells. The tgTCR T cells generated were tested for activation and specific function. Anti-PRAME tgTCR therapy is a new and exciting cell therapy which will benefit a wide range of patients. The project will directly benefit HLA-A2 patients in the short-term and pave the way for future TCR therapies targeting other HLA restricted peptides and antigens.

Alex He

University of Sydney

Designing a Novel Gene-Editing Strategy Combatting TERT-specific Telomere Biology Disorders

Telomerase is an enzyme that can actively lengthen telomeres, which is an important cellular feature in normal stem cell physiology. Patients with hereditary mutations in TERT – the gene that encodes telomerase catalytic

subunit – usually develop bone marrow failure (BMF) due to proliferation defects in their haematopoietic stem cells. This study aims to develop a CRISPR-Cas9 gene editing strategy to form the pre-clinical foundation of a novel gene therapy targeting the TERT gene to combat BMF. CRISPR technology relies on the endonuclease Cas9 generating a double-strand break which is guided by a single guide RNA (sgRNA) targeting the specific genome location. We used two Cas9-sgRNA ribonucleoprotein complexes to cleave out the mutated gene and replace it with a functional gene copy carried in a viral AAV vector, a strategy known as Homology Independent Targeted Insertion (HITI). Our CRISPR-Cas9 HITI approach was successful in targeting TERT. Flow cytometry analysis of GFP expression showed successful viral transduction in 63% of cells. The top 10% of GFP+ cells were sorted for genotyping. One distinct heterozygous clone and the FACS-sorted GFP+ population were found to have successfully gene-edited TERT alleles; however, various insertions and deletions and some AAV random viral integrations were also present. A CRISPR-HITI strategy via double-cut Cas9-gRNA RNP and AAV donor integration was found to yield ~50% successful donor integration events. It provided some pre-clinical evidence that this gene-editing approach could be applied to haematopoietic stem cells as an ex vivo gene therapy. Future directions would aim to minimise insertion/deletion rates, and to optimise the gene editing efficiency, before efficacy testing in humanised-mouse models.

Alexia Nastatos

Macquarie University

How Stressful Can Studying Really Be?

Exploring associations between DGBIs and academic stress

Disorders of gut-brain interactions (DGBIs), such as Irritable Bowel Syndrome, involve the abnormal function of the gastrointestinal tract and have an estimated global prevalence of 40%. The disorders represent a significant health and financial burden for those diagnosed. These disorders are recognised as 'stress-sensitive' conditions, as the experience of stress has been implicated in symptom onset and exacerbation for those with a DGBI. Of the DGBI population, 13-26% are secondary and tertiary education students. Given academic study often evokes a significant amount of stress for students, it is not yet known how DGBI sufferers respond to and recover from stressors related to academic study. Therefore, this study explored whether the DGBI population responded to and recovered from academic stress differently from a healthy population. Furthermore, this study aimed to explore whether individuals with a DGBI experience less protective value of psychological constructs known to buffer against the negative consequences of academic stress. 70 individuals who met diagnostic criteria for either Irritable Bowel Syndrome or Functional Dyspepsia, and 103 healthy controls, were recruited from a pool of Macquarie University students. The participants took part in an online survey. Regression analyses involving statistical interactions and t-tests will inform the results of the study. The results hope to deepen our understanding of how stress, specifically academic stress, contributes to the physical and mental burden experienced by individuals with a DGBI. In turn, this information will aid in improving the quality of care and treatment for these individuals.

Amanda Purcell

University of Sydney

Weight Management in the Perinatal Period to Prevent the Adverse Effects of Maternal Obesity on Metabolic Liver Disease in the Offspring

The proportion of Australian women of reproductive age who are overweight or obese has been inclining for the last decade. There is a strong link between an obesogenic maternal environment and the programming of obesity and non-alcoholic fatty liver disease (NAFLD) in adult offspring, yet to date methods to alleviate this intergenerational onset of obesity and associated comorbidities remain largely unexplored. This study aims to determine the utility of weight loss in the perinatal period, either by diet modification or the administration of the drug liraglutide, in improving adverse hepatic outcomes in the offspring. Briefly, C57BL6 mice were fed high fat (HFD) for 8 weeks. Weight loss was induced by replacing HFD with chow diet (4 weeks before gestation or at the onset of gestation) or by administering liraglutide before gestation. All offspring were kept on HFD. Anthropometric and metabolic outcomes in the offspring were assessed at week 12 (representing adulthood). Offspring's weight was significantly higher in all maternal HFD-fed groups compared to the maternal chow fed group, regardless of maternal weight loss ($p<0.01$). There were significant differences in white adipose tissue between groups; offspring of obese dams receiving liraglutide had greater epididymal fat mass than the offspring of diet modification groups ($p<0.01$). The levels of steatosis, inflammation, oxidative stress and fibrosis are currently being assessed to determine liver function and disease progression in the offspring. This study will determine whether weight loss in the perinatal period improves hepatic outcomes in offspring and provide translational knowledge regarding the benefits of weight loss for prospective mothers.

Amber Bunting

Macquarie University

The Mechanisms of Mindfulness

This study aims to investigate the mechanisms by which mindfulness affects emotional health. Existing literature has suggested metacognition – the ability to accurately reflect and assess thoughts and behaviours – as a mechanism underlying the relationship between mindfulness and emotional health. Modulation of sense of agency – the feeling of having control over one's actions and thoughts – has also been implicated as a mechanism in this relationship. Connections between these processes and mindfulness have been described from a theoretical perspective but have yet to be investigated empirically. This study aims to recruit 200 participants. Participants will be quasi-randomly assigned to complete a brief online mindfulness meditation or listen to an audio-recording about a history topic (control condition). Following, participants will complete standardised surveys assessing their state mindfulness, metacognition, sense of agency and state emotional health. Data will be analysed in five parts. First, independent t-tests will assess previous findings that mindfulness meditation leads to increased metacognition, sense of agency, and emotional well-being, compared to a control intervention. Second, a Pearson correlation will test the relationship between metacognition and emotional

health. Third, a path analysis will test whether metacognition partially mediates the relationship between state mindfulness and emotional health. Fourth, second path analysis will test whether sense of agency mediates the relationship between metacognition and emotional health. Fifth, a final path analysis will test whether metacognition and sense of agency, together, explain the relationship between mindfulness and emotional health. Results have not been analysed yet. This study will contribute to a greater understanding of mindfulness-based interventions for emotional health.

Amelie Read

University of Sydney

Unravelling the History of the Milky Way with Gaia

We conjecture that the Milky Way has undergone numerous mergers throughout its 13.6-billion-year history and this hierarchical build up should be detectable in the stellar Halo. The Gaia mission, launched by the European Space Agency in 2013, aimed to create the most comprehensive 6-Dimensional map of millions of stars in the local solar neighbourhood. A triumph of the Gaia Mission was the discovery in 2018 of the Gaia-Sausage-Enceladus (GSE), an ancient galactic fossil of a merger event. Investigating the kinematics and chemodynamics of the GSE and local Halo is key to unravelling the structure and evolutionary history and future of the Milky Way. Gaia Early Data Release 3 (EDR3) was cross matched with SDSS DR9 and GALAH spectroscopic survey DR3 to obtain chemical abundances and cuts were made to reduce the number of disk stars. Properties of the GSE outlined in literature provided initial estimates of the GSE's location in various phase, action, and metallicity spaces. We then employed the Gaussian Mixture Model to more rigorously separate stars into three expected populations: GSE, Halo, and disk contamination. The clear extent of the GSE population in subsequent plots was thoroughly analysed. A group of high energy retrograde stars kinematically associated with the Halo, however occupying a similar metallicity range to the GSE, suggests that the GSE entered the Milky Way on a highly retrograde orbit. Moreover, we observe stars chemically identical to the thick disk but aligned kinematically with the GSE. We attribute this to the proposed mechanism of galactic evolution whereby disk stars were kicked into Halo-like orbits during the GSE merger.

Amir Hashemi Pour

University of Sydney

The Use of Transoesophageal Echocardiography in Fluoroless Pulmonary Vein Isolations

Pulmonary Vein Isolation (PVI), a common treatment for Atrial Fibrillation patients, requires puncture of the interatrial septum to access the left atrium, known as Transseptal Puncture (TSP). Transoesophageal Echocardiography (TOE) is a routine ultrasound imaging protocol capable of visualising cardiac structures, especially the septum. In order to reduce the traditional fluoroscopy use and its associated health risks (and to provide a cheaper alternative) this study aimed to determine the feasibility of TOE guidance in fluoroless PVIs. Secondly, it aimed to determine its procedural outcomes compared to fluoro controls. Data was collected

retrospectively from 32 historical controls and 20 fluoroless procedures. A detailed timeline of procedural steps including skin puncture, first ablation and isolation time were taken and the time to first ablation (TSP Proxy) and last isolation (ISO time) were calculated. Preliminary results indicate that TOE can be used to safely guide TSP, requiring 0 fluoroscopy. The TSP Proxy for the TOE group was significantly longer than controls (48.20 vs. 37.22 min, p = 0.0028). Conversely, the ISO time was no different in TOE group compared to controls (121.3 vs. 187.5 min, p = 0.3214). Conversations around safety need to be constantly revisited in healthcare settings. The elimination of X-ray radiation exposure can significantly reduce the malignancy risk for operating staff and patients. Secondly, the lower procedure costs of TOE compared to Intracardiac Echocardiography can make PVIs more accessible for a wider variety of patients, advancing conversations about removing barriers to healthcare. However, the safety implications of TOE-guidance should be investigated in future prospective studies with an adequate follow-up period.

Amy Cheng

Australian National University

Awareness Growth during COVID-19:

How do consequences shape our preferences?

COVID-19 is a time of uncertainty, often requiring decisions to be made without knowing all possible outcomes and consequences of an action. This study investigated the effect of introducing negative consequences of COVID-19 treatments on people's preferences for treatment methods, in a sample of 478 UK adults (mean age = 45.3 years, SD = 15.6 years). A survey was distributed using Qualtrics on Prolific, an online crowdsourcing platform. The three experimental conditions were: a) no consequences mentioned, b) consequences mentioned for antibiotics only and c) consequences mentioned for all treatments (i.e., self-healing, antibiotics and antiviral pill). Participants were asked to assign probabilities to the likelihood of themselves and their friends choosing each of the treatments and the total probability needed to add to 100%. It was predicted that people's preference for antibiotics would decrease when consequences for antibiotics only were mentioned, compared to no consequences mentioned or consequences for all treatments were mentioned. Contrary to the hypothesis, results indicated that no significant differences were found between the three conditions for both own preference and friend preference judgements. Distribution plots suggested that in all three conditions, there were a substantial number of participants assigned 0% to antibiotics, which may account for the insignificant effect of consequences. Future studies could assess whether those who treat the options as categorical (i.e., assign 100% and 0% to options) are fundamentally different in constructs like risk attitude and intolerance of uncertainty from those who are less definitive in their preference judgements.

Antonina Stewart

University of Sydney

What is Feedback Anyway?

Student perceptions of electronic feedback pre- and post- COVID-19

This study investigated student perceptions of electronic feedback by comparing data from three different groups of students in the Faculty of Medicine and Health (FMH) at the University of Sydney. Using a mixed methods approach, attitudes and experiences will be captured from those whose education took place prior to, at the onset of, and in the year following the COVID-19 pandemic. A survey was emailed to three cohorts from 2128 postgraduate and 2694 undergraduate students in the Faculty of Medicine and Health (FMH) at the University of Sydney. It was also dispersed through social media. Views and engagement with various modalities of electronic formative assessment feedback will be measured via a survey on REDCap and semi-structured interviews conducted. To date, the survey recruited 23 respondents, from which three students participated in semi-structured interviews. Albeit still in the recruitment and data collection stage, preliminary data has highlighted that students who began their studies at the onset of COVID-19 have noted a sense of disadvantage in navigating online feedback whereas the majority of undergraduates beginning in the year which followed noted a sense of advantage due to past experience with online learning. Comparing finalised data will uncover whether there are any differences in how students perceive and engage with feedback. These findings will *shape the conversation* within education research by informing future innovation. This study will provide novel findings by engaging students in dialogue to suggest practical solutions – ensuring that electronic feedback delivered by educators meets the actualised needs of students, while remaining robust in its versatility as time goes on.

Ariel Jones

University of Queensland

Are Inconsistent Reaction Rates Explained by a Radical Clock (Mis)-calibration?

A computational study of the trans-(2-phenylcyclopropyl)carbinyl radical clock

Determining chemical 'reaction mechanisms' – that is, the exact path by which chemical reactants are transformed into products – is a major goal in theoretical and synthetic chemistry. For example, the family of Cytochrome P450 (CYP) enzymes are known to perform hydroxylation reactions wherein they insert Oxygen into C-H bonds to form an alcohol (C-OH) group. Understanding this reaction mechanism can be used to develop synthetic catalysts for more green and efficient hydroxylation. Much research into the CYP hydroxylation reaction mechanism has involved 'radical clock' experiments. A radical clock contains an unpaired electron. This highly reactive molecule rapidly rearranges into a more stable configuration. When radical clocks are reacted with CYP enzymes, the radical clock can be hydroxylated either before or after the radical has rearranged, depending on the relative speeds for these competing processes. Alarmingly, when trans-(2-phenylcyclopropyl)carbinyl is used as the radical clock, the CYP hydroxylation reaction appears to be almost unphysically 'ultrafast'. The aim of this research was to investigate whether the trans-(2-phenylcyclopropyl)carbinyl radical clock has been 'mis-calibrated' which could explain the observed ultrafast CYP hydroxylation rate. Specifically, this study examined whether the rate of rearrangement for the trans-(2-phenylcyclopropyl)carbinyl radical clock depends on the method by which the radical is generated. Multiple

processes for forming this radical clock were simulated computationally using Molecular Dynamics to observe the system over time. The trans-(2-phenylcyclopropyl)carbinyl radical rearrangement rates were determined from these simulations. It was found that the radical clock 'runs fast' in CYP reactions, implying that the CYP hydroxylation rate may not be ultrafast but instead has been timed by a mis-calibrated clock.

Ashish Manchanda

Deakin University

IoT Methods for Determining Mask Fitness

The COVID-19 pandemic has proved to be a catalyst in putting a halt to our expeditious world for more than two years now. Scientists and health organisations from all over the world developed several rules, regulations, and advisories such as social distancing, periodic sanitisation, vaccinations, protective coverings, face masks etc, to mitigate the catastrophic effects of COVID-19. Personal Protective Equipment (PPE) has been instrumental in providing efficient and effective protection against exposure to the virus for its users. The widespread use of face masks has highlighted the shortcomings of single use PPE especially the inconsistent fit of a mask as it has a large impact on the effectiveness of PPE. The purpose of this research is to answer the question, can a smart mask monitor the seal formed on the user's face in real time? The research presented in this paper focuses on comparing smart masks and multiple single-use masks based on the features they offer and the effectiveness of the seal they form on the user's face. The approach used in this paper is to use IoT sensors attached to PPE masks to detect the tightness and fit of the mask which is tested on three different types of commercially available mask. The objective of this paper is to improve the effectiveness of PPE by monitoring the seal created by the mask with the help of IoT devices and sensors.

Ashleigh Correa

Macquarie University

Sudden Gains in University Students During Digital Treatment for Anxiety & Depression

Little is known about how digital treatments (DTs) effectively reduce symptoms of anxiety and depression in university students. Rapid and substantial symptom reductions occurring between consecutive treatment sessions, referred to as sudden gains (SGs), are a potential underlying mechanism of symptom change which have been associated with superior treatment outcomes. This study examined the incidence and timing of SGs during a transdiagnostic Cognitive Behavioural Therapy-based DT designed to treat the core symptoms of depression and anxiety in university students. Furthermore, the ability of traditional long-form and ultra-brief questionnaires to detect SGs was compared. Existing data from a Phase IV trial (N = 935) was analysed to identify the rate of SGs in anxiety symptoms using the Generalized Anxiety Disorder-7 Scale (GAD-7) and its brief counterpart, the GAD-2, as well as depressive symptoms using the Patient Health Questionnaire-9 Scale (PHQ-9) and its brief counterpart, the PHQ-2. Previous research has demonstrated each measure and their brief forms as having similar reliability, validity, and sensitivity to change. Longitudinal modelling was used to examine

treatment outcomes according to SG status, and outcomes were compared between questionnaire versions. Most SGs were identified during the first half of treatment across all measures. The overall rate of SGs differed across measures, such that more SGs were identified by the PHQ-9 than the PHQ-2, and the GAD-2 detected more SGs than the GAD-7. SGs were not associated with superior treatment outcomes. SGs occur in university students during DT for anxiety and depression. SGs were captured using both long and short questionnaires. In contrast to current theories, SGs were not associated with superior outcomes.

Ben Carew

University of Queensland

Detecting Dark Matter Through Atomic Ionisation

My aim is to accurately model interactions between dark matter and atomic electrons in the context of dark matter direct detection experiments. These experiments have traditionally only focused on nuclear scattering events which are impossible for low-mass dark matter models. I developed a computational method to perform the atomic physics components of these calculations with increased efficiency and reduced numerical error by modelling electron wave-functions with a finite basis of B-spline functions. I then calculated interaction strengths and event rates for a range of dark matter models and detectors. Dark matter-electron interactions can now be calculated more efficiently and accurately, including the critical atomic effects. The event rates I calculated suggest electron recoils from dark matter have the potential to produce detectable signals in current and future detectors. Electron interactions represent a new avenue of research in dark matter direct detection. Next, I will compare the theoretical results with new experimental data, to search for dark matter signals and narrow down the range of possible candidates.

Benjamin Simmonds

University of Adelaide

To What Extent Do Signifiers of Expertise Affect Belief Revision and Sharing Behaviour?

With the increasing use of social media as a medium for people to receive and discuss health information, there has been an increase in misinformation. Therefore, individuals need to be able to assess both the quantity and quality of evidence for and against different health-related claims. However, while there is considerable literature examining quality and quantity cues separately, there is a considerable lack of research comparing the two. Research in this area also does not address the way in which users can choose to share or retweet health claims online. The current study aims to examine the roles of expertise (a quality cue) and information frequency (a quantity cue) in belief revision online. The influence of source diversity and argument diversity (both forms of quality cues) will also be examined by using retweet choice as an outcome variable. An adult sample drawn from Amazon's Mechanical Turk was exposed to a series of simulated Twitter discussions on various health-related claims. Belief ratings for each claim were reported before and after exposure to a series of responses to the claim, measuring belief revision. Participants were also asked to choose which of the responses they would be most likely to retweet, measuring their retweet choice. The presence of expertise amongst the discussion was manipulated between two conditions (Expert VS Non-Expert) to determine its effect on belief revision. Argument and source diversity differed within subjects, with their effect measured using retweet choice. Results are still to be determined.

Breanna Tory

University of Western Australia

Capitalising on Psychological Capital in Individuals with Chronic Pain

Chronic pain, pain that persist for more than three months, is the international leading cause of disability and disease. Therefore, research to alleviate its physical and psychological impact is paramount to improving health and wellbeing. Our work aims to explore a new protective factor for individuals with chronic pain, Psychological Capital (PsyCap), and test PsyCap's associations with predictors (age and gender) and outcomes (depression and disability). PsyCap is a set of resources an individual can use for personal development. It comprises four elements: hope, self-efficacy, resilience, and optimism. PsyCap has been explored in the health literature; however, this will be the first study to explore PsyCap in a sample of adults with chronic pain. Participants were recruited through 62 pain-related organisations and social media to complete an online questionnaire. The questionnaire included demographics as well as validated measures of pain intensity and disability, PsyCap, and depression, taking approximately 15 minutes to complete. Preliminary results with over 250 participants suggest there are distinct PsyCap profiles of individuals with chronic pain with varying levels of hope, self-efficacy, resilience, and optimism. These profiles are also significantly associated with both predictors (age and gender) and outcomes (depression and disability). Our results demonstrate the value of PsyCap as a protective mechanism for people with chronic pain and should be considered for interventions to reduce depression and disability for people with chronic pain.

Camille Potier

University of Sydney

The Immune Diet: Food for thought

In the last 50 years, the increased consumption of the imbalanced 'western diet' in modern societies has been paralleled by a marked increase in the incidence of chronic diseases. Food is a major source of energy substrates that fuel metabolic pathways to support cell survival, proliferation, and function. Recent evidence shows that the type of metabolic pathway activated in immune cells not only provides energy but can also dictate whether they adopt a pro- or anti-inflammatory state. Our lab is investigating the impact of dietary branched-chain amino acids (BCAAs) on T lymphocytes, a critical cell in the immune system that is essential for fighting infections. Mice were fed on a control diet or on diets containing 20% or 200% of the BCAAs found in the control diet for seven weeks. Mice were then subjected to a model of listeriosis via intravenous injection of 2x104 or 1x105 colony-forming unit of Listeria monocytogenes to mimic an acute or chronic infection, respectively. Disease severity was assessed by survival and quantifying bacteria load in key organs 3- and 7-days post-infection. The metabolic state of immune cells before and after infection, and liver and spleen immune profiles were characterised by spectral flow cytometry. Our preliminary data indicate that increased BCAA intake potentiate T cell activity in vivo, leading to a more efficient immune response that decreased disease severity against listeriosis. Our work highlights tailored dietary manipulation as a potential novel, safe, and cost-effective strategy to harness the immune response and treat infectious diseases.

Celine Ogg

University of Queensland

The Mental Health Impacts of Climate Change:

A review of the Australian policy landscape

An increasing body of research shows that mental health is adversely affected by the consequences of climate change, such as recurring natural disasters, food insecurity, forced migration and ecological grief. However, little research to date has assessed the scope and quality of policy responses to this emerging health threat. We investigated Australian state and federal policies from numerous domains, including health, mental health, natural disaster response, and climate change to analyse policy directions, indicative actions, and potential gaps relating to the mental health impacts of climate change. A scoping review was conducted, returning 101 policy documents after screening. Building on the Awareness-Analysis-Action policy analysis framework, we developed a new approach using indicators which specifically address the overlap between climate change and mental health. Five coders took part in the pilot and analysis stages, ensuring intercoder reliability and replicability. Preliminary results have found that Australian mental health policies sometimes refer to the mental health consequences of natural disasters, such as floods, droughts and bushfires; natural disaster response policies often discuss the provision of mental health services to disaster-affected areas, and briefly refer to predictions that natural disasters will increase in severity with climate change. However, rarely does this acknowledgement extend beyond the immediate recovery process for individual natural disasters. Sustained, evidence-based planning, with concrete actions, was lacking, both at the state and federal level. If Australia's healthcare system is to become 'climate-ready' and resilient in the face of future demands, multisectoral policy action is needed to address this crucial gap.

Darshwiin Indrawathan

University of Sydney

MYOD1-Myogenesis for RNA-Diagnostics of Muscle Genes in Undiagnosed Families

Undiagnosed individuals with neuromuscular diseases present an unmet need for families. Whilst whole exome sequencing and whole genome sequencing can be used as a diagnostic tool, they are limited in their findings. RNA diagnostics is increasingly being used to study the impact that different intronic and splicing variants can have on the encoded protein. However, a muscle biopsy is required to study tissue-specific mRNA levels and gene expression, but it may not always be available. To alleviate this, MYOD1-transdifferentiation of primary skin fibroblasts will be used to derive myotubes that can be used for RNA diagnostics for families with neuromuscular diseases. The aims of the project are to optimise and establish a protocol for MYOD1-transdifferentiation whilst also determining if known RNA splicing variants in affected individuals can be replicated in mRNA from MYOD1-transdifferentiated fibroblasts. MYOD1 expression plasmid will be amplified and packaged into viruses before they are transduced into healthy primary skin fibroblast. The fibroblasts will then be transdifferentiated or converted into myotubes when their RNA will be extracted for gene expression analysis. This protocol will then be employed with known patients where a muscle biopsy is also available. This is done to determine the impact that different mutations can have on the mRNA when compared to the healthy MYOD1-transdifferentiated fibroblasts and biopsied healthy skeletal muscle samples. This project can help diagnose patients with neuromuscular disorders which can then enable them access to potential or available therapies, intervention strategies or clinical trials.

Dina Kazemi

University of Sydney

A Distributed Approach to Improving the Performance of Low-Bitwidth Neural Networks

Deep neural networks (DNNs) are the main tools used in deep learning to find the complex relationship between the provided inputs and the expected outputs. However, as indicated by the name, due to their larger size such networks usually require high computation power and take a long time to complete the task. Optimizing DNNs have been the focus of scholarly attention in recent years, for example, by implementing low-precision networks. The parameters in these networks are represented with lower numbers of bits, allowing for lower computation and storage requirements. Compared to full-precision networks, however, they have a significant reduction in their accuracy, which makes them unsuitable for certain tasks and datasets. Using an ensemble of multiple small-sized DNNs, my research aims to introduce a novel architecture to improve the performance of low-bitwidth DNNs in situations where low tendency or low power is required, with the ultimate goal of achieving comparable results to those of the full-precision networks. Given the novelty of such an approach, the system was built in multiple steps through carefully designed experiments using Pytorch as our main framework and MNIST as our main dataset. We were able to achieve a collective accuracy of 91.25% for the system, with

each small DNN in the ensemble having an accuracy of less than 41%. Future studies should evaluate the effect of different datasets and model architectures on the system performance.

Elsa Kohane

University of Sydney

Assessing the Impact of Multi-Scale Factors on Urban Bat Box Usage Using Passive Acoustic Recorders

Most insectivorous bats in Australia roost in natural hollows in old trees. Unfortunately, hollow availability is rapidly decreasing due to habitat degradation. Artificial bat boxes are designed to mimic tree hollows and are a popular tool for offsetting their loss. However, bats often use some boxes but not others, and the causative factors are poorly understood. Bats are unique in their high mobility and roost switching behaviour, which research has struggled to account for. We aimed to address these gaps by investigating the interactive influence of biological, behavioural, and multi-scale temporal and spatial factors on box selection. We also tested the utility of using camera trapping and new bioacoustic technology to capture bat roosting behaviour. We deployed passive acoustic recorders and cameras on every bat box within four urban reserves across Sydney, NSW. Boxes were simultaneously and continuously monitored for fourteen nights, allowing monitoring of whole-site box usage over a short but intensive period. Additionally, we measured landscape, microhabitat, box design, and species-specific factors to evaluate their impact. We found activity patterns captured by cameras and acoustic recorders, as well as those detected by manual box checking, differed considerably. Additionally, temporal factors greatly influenced bat roosting behaviour, while spatial scales had less of an effect. We observed typically cryptic species interactions and behaviour at boxes, including temporary night roosting and group size fluctuations. These results illustrate some of the limitations of current roost surveying methodologies and demonstrate the potential of new approaches taking advantages of recent passive recording technology.

Emily Deschacht

Macquarie University

Seeing Is Believing:

The effect of visual exposure on perception of normal food portion size

Exposure to images of food has increased in recent years with the rise of social media. In conjunction with increasing portion sizes, this has been accompanied by an increase in food consumption. Viewing images of large or small portion sizes has been shown to influence what an individual considers a 'normal' sized food portion after exposure. The current study will examine whether this effect reflects changes in visual perception (what the food portion actually looks like) or changes in criterion (one's internal benchmark for what is considered 'normal'). It will also investigate the longevity of the effect. We will measure participants' settings of 'normal' portion sizes both before and after 2 minutes of exposure to large or small portions of a variety of foods. These settings will be made by gradually increasing or decreasing the size of a food portion on screen until it appears 'normal'. Participants will also be asked how much they think the food shown on screen weighs. These settings will be performed five times at 3-minute intervals after visual exposure. We predict that although settings for visual images of 'normal' portions will change after exposure, estimates of food mass will not, indicating an effect on perception, not criterion. We also predict that the portion size aftereffect will diminish over time, as demonstrated for similar visual aftereffects. Our findings will pave the way for future public health interventions that can utilise this phenomenon to alter eating habits and facilitate better portion control.

Emma Gardiner

Macquarie University

Body Size Perception Contrast Effects:

A result of memory bias or perceptual encoding?

Body size misperception is a key component of body image disturbance and a known risk factor for the development of eating disorders. In clinical populations some individuals overestimate their size leading to disordered behaviours to further reduce their weight. The current study probes the mechanisms that contribute to these misjudgements. One source of error in size perception involves contrast effects, wherein the size of an object is misperceived because of the size of surrounding objects. For example, circles appear smaller when surrounded by large circles. We used this paradigm to probe the mechanisms of body size estimation, aiming to establish whether surrounding bodies influence body size perception. We also sought to discover whether perceptual mechanisms or memory processes are responsible for this effect. Participants were presented with two bodies and chose which appeared larger. The two bodies were either presented alone or surrounded by large or small bodies. Half of the participants made ratings while the bodies were visible (perception). The other half made ratings after the bodies had been removed from the screen (memory). We predicted that the size of the surrounding bodies would influence body size judgements, and that this effect would be larger in the

memory condition. The conclusions of this study will advance the understanding of body size perception. Understanding these mechanisms will help inform treatment options for individuals with body image disturbances thereby reducing their risk of developing an eating disorder.

Emma Brown

University of the Sunshine Coast

Flying Under the Radar:

The case for narcissistic abuse in the workplace

Research abounds regarding the interpersonal challenges and dysfunction of pathological narcissists in the workplace; however, scholars are yet to explore whether these behaviours comprise narcissistic abuse, a form of emotional abuse comprising manipulative communication, deception, and exploitation. Narcissistic abuse is a repeated cycle of abuse perpetrated by a pathological narcissist through distinct phases of idealizing, devaluing, and discarding. Behaviours are often covert and insidious and may fly under the radar of management or human resources. As such, validating a measure of narcissistic abuse in the workplace could assist the increased recognition and understanding of this phenomenon to minimise the complex psychological distress and challenges experienced by victims. Participants (N = 307) were recruited through social media to respond to an anonymous, online survey about their experiences working with a difficult personality. Participants answered a battery of questionnaires about a range of negative workplace experiences including 37 items derived from a literature review regarding characteristic behaviours of narcissistic abuse, termed the Narcissistic Abuse Inventory in the Workplace Scale (NAI-WS). To determine whether the participant experienced narcissistic abuse, first, a validated tool assessed the presence of pathological narcissism in the person with the difficult personality. Next, participants reported the degree to which they encountered the experiences included in the NAI-WS. Most participants answered regarding their boss (n = 183) or colleague (n = 97). To validate the NAI-WS, items were subjected to principal component analysis before subscales were compared to measures of abusive supervision, workplace incivility, and passive aggression. This measure can be used by researchers and clinicians alike.

Ethan Italiano

University of Sydney

Lysed Red Cells Obstruct Vessels in Ischemia-Reperfusion Injury

Prompt reperfusion of occluded arteries is the primary therapeutic goal for acute myocardial infarction and ischemic stroke, in order to limit ischemic injury and prevent tissue death. However, the effect of reperfusion therapies is limited by underlying microvascular obstruction (MVO) that can occur during ischemia-reperfusion (IR). Despite numerous proposed mechanisms, current therapeutics remain ineffective in treating MVO. Our research defines a novel mechanism contributing to MVO following IR injury, which is distinct from the conventional platelet/fibrin thrombosis, instead involves red cell aggregation in a haemolysis-dependent manner. This study aims to develop a methodology to investigate the red cell mechanism and assess the contribution of platelets/fibrin and red cell aggregation to MVO in ischemic patients. A correlative histological and multiplexed immunofluorescence protocol was developed to critically analyse the endpoint deposition of red cells, platelets, and fibrin in formalin-fixed paraffin-embedded (FFPE) ischemic and non-ischemic human tissues. We demonstrated success in detecting fibrin, platelets, and red cells through a modified biotin-streptavidin indirect immunofluorescence protocol. Preliminary correlation of immunofluorescence with H&E, Carstairs and Martius Scarlet Blue staining depicts minor colocalization of platelets and fibrin with red cells, which were observed obstructing the microvasculature in a haemolysis-dependent manner. Haemolysed-promoted red cell aggregation was observed as the dominant mechanism leading to MVO in human IR scenarios, with relatively minor contribution from platelets and fibrin. Future research should explore the regulation of red cell-mediated MVO. Our findings suggest new therapeutic strategies to treat MVO in IR injury.

Frank Fei

University of Sydney

Development, Synthesis and Characterisation of a Self-Setting and Antibacterial Injectable Bone Cement Using Bismuth-Doped Baghdadite for Orthopaedic Repair

Critical-sized bone defects, arising from injury, infection, disease or from surgery, are voids of bone too large to heal spontaneously and require surgical intervention to heal. These defects are an increasingly prevalent problem in orthopaedics and current treatments possess many imperfections that limit their use and efficacy. Autografts have limited availability while allografts have biological compatibility issues. Recent developments in tissue engineering solutions have shown promise but do not possess adequate mechanical strength. In this study, we investigated a doped variant of baghdadite, bismuth-doped baghdadite ($Ca_{2.9}Bi_{0.1}ZrSi_2O_9$, BisBag), recently developed by Young et al., in the development of an injectable bone cement to treat such defects. Bismuth baghdadite cements were compared against a control, baghdadite cements. Trial and error was used to shortlist four mixtures that exhibited optimal physical and mechanical properties. Further experiments were then conducted on four shortlisted groups to develop a physical, mechanical, and biological characterisation of the cement end product. A 140% to 270% increase in mechanical strength was observed from baghdadite to

BisBag. This was corroborated using X-ray diffraction analysis and scanning electron microscopy. Samples were incubated in culture medium for 14 days, with all groups exhibiting similar trends in pH and higher degradation observed in baghdadite cements, confirming its biodegradability. With elasticity and strength comparable to cancellous bone, BisBag cements show great promise for use in orthopaedic repair. Future studies should examine the biological effects of incorporating BisBag into cements, notably the antibacterial properties of this cement stemming from the innate antibacterial properties of bismuth.

Gallifrey Lawler

University of Notre Dame

Changing the Narrative of Australian History:

Using art in schools to facilitate a decolonised future

1770 marked the beginning of the European occupation of Australia, which has consisted largely of the domination of the unceded lands of Indigenous people. From this point on, Australia has become synonymous with the achievements of the bushrangers, sports stars, and ANZAC diggers. This curated image, which had preoccupied the Australian history curriculum in schools, creates a specific and deliberate mythology around what it means to be Australian that is white, able-bodied, heterosexual, and male. This symbol was shaped in the conversations and media of the white governing class, who systematically removed the voices of Indigenous peoples through, amongst other policies, the prohibition of Indigenous citizenship and the right to vote, the racial segregation of society, and the removal of Aboriginal children from their homes and culture. By investigating the works created by Aboriginal artists such as Gordon Syron and his 1999 trilogy of paintings 'Invasion', which aims to confront the idea of peaceful settlement by British colonists, it is clear that a new conversation is being shaped by the modern generation of Australians through the merging of the artistic traditions of Western and Indigenous cultures. A combined effort of content analysis and scoping review of the semiotics of such artworks will reveal a conversation centring Aboriginal voices which should be integral in the creation of a decolonised history education syllabus. Implementation of this within Primary and Secondary school contexts will provide students with the skills to defend themself against the propaganda of the oppressing Australian mythos.

Georgia Acutt

University of the Sunshine Coast

Conceptualisation, Development, and Preliminary Validation of the Narcissistic Abuse Inventory for Intimate Relationships

Although the Internet is rife with articles and support groups about narcissistic abuse, limited research supports the phenomenon. Narcissistic abuse comprises the manipulative communication, intentional deception, exploitation, and control by someone with pathological narcissism. Increased understanding of the experiences and characteristic behaviours which comprise narcissistic abuse is needed particularly by people supporting survivors, including therapists. This study comprises a preliminary validation of a measure of characteristic narcissistic abuse behaviours within intimate relationships. Participants (N = 461) aged 18-69 years (M age = 39.98; SD = 9.93) completed an anonymous, online survey, answering questions about their current or previous partner they believed was a narcissist. First, participants answered a validated tool that provided a valid description of the presence of pathological narcissism in their partner. Second, participants reported the degree to which they encountered a range of abusive experiences whilst in an intimate relationship with a narcissist. Principal component analysis revealed four distinct factors of narcissistic abuse behaviours, and each factor possessed strong internal consistency (love bombing α = .91, baiting α = .87, devaluing α = .73, discarding α = .93). Further, when comparing the difference of abusive behaviour between groups, individuals whose partner met the criteria for pathological narcissism reported statistically significant higher scores on the devaluing subscale (M = 4.20, SD = 1.10) compared to individuals whose partner did not meet the criteria for pathological narcissism (M = 3.51, SD = 1.07); t(-2.16, p <.05).

Hannah Gibbons

University of Wollongong

When Your Doctor is Sick: Comparing patient attitudes towards general practitioners with chronic mental illness versus chronic physical illness

Doctors have been identified as a high-risk group for developing mental health illnesses during their careers. Stigma towards mental health illnesses remains prevalent in the community and understanding patient perceptions of doctors with mental health illnesses may assist in creating new initiatives to break down stigma. This study aims to investigate how doctors with a chronic mental health illness are perceived by their patients when compared with a chronic physical illness. An online survey of 407 Australian based participants was created to collect quantitative and qualitative data in response to a hypothetical case of a doctor with Type 2 Diabetes (T2DM) or Major Depressive Disorder (MDD). Response formats included Likert scales, fixed category responses, and free text responses. Comparisons between groups, geographical location, and history of a diagnosis with MDD were analysed. Participants who were assigned the MDD case were significantly less comfortable seeing a doctor with that health diagnosis than participants who were assigned the T2DM case. This was supported by

thematic analysis where participants assigned to the MDD case described concerns of professional impairment. Analysis between participants geographical location found potential increased stigma towards MDD in major cities compared to regional/remote areas. However, thematic analysis indicated that participants in regional/remote areas may have less concern about their doctors' medical conditions due to lack of access to doctors. This study confirms that doctors with chronic mental health illnesses are perceived more negatively when compared with a chronic physical illness. Further research is needed into the impact of lived experience of doctors with chronic illnesses and how patient perspectives differ in metropolitan vs regional/rural areas.

Harley Nguyen Tran

Western Sydney University

How Commercialised Social Media Platforms' Algorithms Constrain Social Movements and the Case of Online Cloth Nappy Communities

My research explores the relationship between social media and social action with insights from modern cloth nappy (MCN) communities on Facebook, and the role of online communities on sustainable parenting practices in general. Cloth nappy communities are coming together on social media platforms to provide support for MCN use, encourage reusability, build community, and provide education (Black, 2019). I focused on investigating the impact of social media algorithms on the activities of social media groups and their everyday activism by analysing qualitative data from four focus groups with MCN community leaders on the Facebook platform. Given that the most popularly used social media platforms across MCN communities are owned by profit-oriented companies and are operated with opaque and ambiguous algorithms, this may cause false perceptions and misinterpretations in activists' operation strategies and raise ever-present risks in creating and maintaining social media-based communities. Current laws and regulations also highlight some of the dangers faced by unpaid and unprotected 'accidental community administrators' within these groups. Meanwhile, there is a heavy reliance on the Facebook platform for the MNC communities as groups would experience significant communication lag or complete closure in the case that Facebook disappeared. In short, although digital communication has been found to be a key factor in motivating sustainable ecological practices, there are certain constraints presented by the architecture of social media that may stand against MCN groups and have detrimental impacts on their social movements.

Holly Hughes

University of Sydney

Molecular Predictors of Unstable Atherosclerotic Plaque

Cardiovascular diseases are the leading cause of death worldwide. They are often caused by blood clots, which in turn are often the result of unstable atherosclerotic plaque rupture. Notably, unstable plaques cannot be reliably detected by imaging or targeted assays. The aim of this study was to identify and rationalize any

significant compositional differences between stable and unstable plaque tissues, and to ascertain if there are significant changes between plasma of the two phenotypes. Stable and unstable plaque tissues and plasmas from a mouse model were analysed on the proteomic, lipidomic and metabolomic levels. Various softwares were used to clean and statistically analyse the data, identify and characterise the molecules present, determine relationships between molecules and phenotypes, and ascertain the biological significance of molecules. For proteomics, networks were formed between identified molecules and literature reviews performed to determine their association (if any) with plaque stability. For lipidomics and metabolomics, molecules were shortlisted if they were upregulated by at least eight times in unstable plaque plasma, and putative identifications were made by correlating molecule properties with quantifications and biological associations from existing databases. Six significant proteomic and thirteen significant lipidomic features were determined as potential biomarkers. However, none of the lipid molecules could be conclusively identified. Targeted analysis of plasma samples holds promise in identifying unstable plaque before it can rupture. Future research avenues include correlating tissue with plasma-based findings, testing if drug or genetic activity impacts plaque stability, and determining a biomarker combination to use an unstable identifier.

Irina Lotsaris

University of Sydney

Structure-Based Discovery of GlyT2 Inhibitors for the Treatment of Neuropathic Pain

Lack of glycinergic signalling in the central nervous system facilitates the painful perception of non-noxious stimuli. Signalling can be normalised by inhibiting glycine transporter-2 (GlyT2), a promising target for neuropathic pain treatments. This study investigates the use of a combined *in silico* and *in vitro* approach to generate and develop GlyT2 inhibitors to restore the function of glycine neurotransmission. *In silico* screens using the deep convolutional neural network 'Atomnet' generated novel compounds that bind in the lipid allosteric site of GlyT2. Phases one and two generated novel candidates and phase three screened for analogues of hit compounds. Compounds from phase three were tested for inhibition *in vitro* using Xenopus laevis oocytes expressing human GlyT2. Two-electrode voltage clamp electrophysiology was used to measure changes in currents to determine the inhibitory action of compounds on GlyT2 and characterise their reversibility and mechanism of inhibition. 4/94 compounds from the phase three screen have been identified as hits (IC50 = 485 – 1572nM, maximum inhibition = 64 – 84%) with promising reversibility properties (t1/2 = 1 – 8 min, maximum recovery = 51 – 81%). One compound is a non-competitive inhibitor with the remaining 3/4 compounds still to be tested. In conclusion, a combined *in silico* and *in vitro* screening approach was used to generate novel compounds that inhibit GlyT2. Future experiments will characterise the compound *in vitro*. Future studies should assess these compounds *in vivo* to determine effects in animal models of pain along with further optimisation of the compounds prior to clinical pursuit.

Isabella Gilbert

Macquarie University

Understanding Students' Experiences of Learning about Sexual Consent:

An interpretative phenomenological analysis

A cornerstone of sexual and reproductive health includes the enjoyment of sexual relations without exploitation, oppression, or abuse, which is underpinned by the notion of sexual consent (SC). So important is SC, that it is embedded as an expectation within staff and student codes of conduct across higher education institutions globally. However, the prevalence of sexual misconduct in Australian universities remains high, with a lack of consistent and mandated SC education programs within the school curriculum. Victimology reports reflect that womxn (an inclusive term used to describe all people who identify as women, including cisgender females and transwomen) remain at high risk for sexual coercion and so their experiences of learning about SC may need to be better understood and meaningfully included in the development of a comprehensive sexual health education (SHE) curriculum. As such, this study aims to capture the lived experiences of learning about SC for undergraduate womxn. Transcribed data, obtained from six semi-structured one-on-one interviews, will be qualitatively analysed following a critical realist framework to inform an interpretative phenomenological analysis that distils the experiences driving learning about SC. Data gathering is underway with scope to discuss initial findings during this presentation. New theoretical and practical insights regarding SC contributes to the existing literature to include the formal and informal learning experiences that may have significant impacts on the way SC is understood by womxn. These findings are of value to universities who seek to continuously improve SC-based education interventions, specifically for young womxn.

Jack Miller

Australian National University

Training & Evaluating Deep Neural Networks for Cyclone Trajectory Prediction

Currently cyclone trajectory prediction is completed with the use of large-scale dynamical models which simulate certain atmospheric regions. However, deep learning has recently shown great promise on this task with rapid increases in performance over the last five years. This study investigates the application of certain deep learning and statistical techniques which have not yet been tested on the cyclone trajectory prediction problem. We train the deepest convolutional neural network yet used for this purpose on a database of atmospheric wind data and cyclone paths from 1979 to 2021. In addition, we develop a novel method based on maximum likelihood estimation to find best estimates for the model's performance with information about storm location and category. The convolutional network trained showed excellent performance on the prediction task, achieving a 24-hour prediction error of 110.6 km. In addition, the use of maximum likelihood estimation was found to be a good strategy for evaluating estimation algorithms for model errors. These promising results show that the further adoption of ideas from deep learning and statistics could shape the conversation in cyclone prediction and atmospheric science more broadly.

Jacob Lapin

United States Military Academy at West Point

The Modernization of Tzu: Strategic Understanding Across the Pacific

The newly published United States national strategic guidance ATP 7-100.3 ‘Chinese Strategy’ heralds a new era of cross-Pacific mutual understanding between China and the United States. This document, while critical to global posturing, lacks adequate reference to historical evidence of Chinese philosophical thought. My research analyses the DoD’s recently published ATP in contrast with Chinese national strategic publications. Two primary sources are used to guide my analysis of ATP 7-100.3. First, Sun Tzu’s *The Art of War* is a definitive historical Chinese text which remains the most influential strategic work in East Asian warfare. Second, I used the PRC’s recently published *People’s War Under Conditions of Informationization* which codifies the CCP’s people’s war in a modern permutation. The political-military relationship between the US and China relies on a mutual understanding (or lack thereof) of available information in peacetime and conflict. This research seeks to promote peaceful cooperation between these two countries and an increased understanding of classic Chinese military strategy.

Jamilla Smith

Western Sydney University

Application of a Language Learning App to Support Communication and Relationships in an Aged Care Context

Previous research suggests that communicative language learning may be facilitated by learning phrases rather than words (Ellis, 2005; Wray, 2012), and has led to the previous development of the Listen N Talk app (Richards & Lardy, 2019; Richards et al., 2019) as a tool for providing learners with access to a body of audio phrases. The research discussed in this presentation explores the application of the Listen N Talk digital tool to the aged care context in partnership with Fresh Hope Care. This research aims to investigate the effectiveness of a resource codesigned with staff and residents at the Fresh Hope Care facility using Listen N Talk in (1) supporting communication between residents and staff by respecting and celebrating language and cultural diversity, and (2) building relationships and promoting enjoyable meaningful interactions and personalised activities for/with residents. The research plan was developed in light of discussions between the WSU research team and the managers of Fresh Hope Care, Pendle Hill. Staff will be invited to participate in a 1-hour information session to provide insight into their role as well as assist with the co-design process of developing the app. This session will include a pre-study measure of their self-rated understanding and knowledge of residents participating in the project. In a series of four 1-hour workshops, residents will contribute their stories and phrases in their own language/dialect. Staff will test the tool for six weeks. To gather data on the experiences of users of the app, we will run a focus group (with staff) and interviews (with residents and family/friends) to gather qualitative data. To gather some pilot data on whether the use of the app may have any effect we will measure self-ratings in a short, simple, questionnaire which staff complete before using the app, and after a 6-week period of using the app. As a means of familiarising myself with the Listen N Talk tool I created user guides, helped edit audio content and prepared the ethics application. This research is ongoing. The research will provide some preliminary evidence as to the feasibility of app use by aged care staff with residents, and any benefits or challenges experienced during the process of app development (in codesign with aged care staff, and with involvement by residents and families/friends in creating personalised app content). Communication and relationships are vital in aged care. Future research will examine the extent to which the tool supports a resource that is useful to aged care providers in a real-world day-to-day care. It is hoped that these outcomes will form a basis for further collaboration between WSU researchers and Fresh Hope Care.

Jasmine Sullivan

University of Newcastle

Women, War, and the Nazi Party: The Role of War-Related Traumas in Motivating Female Support for National Socialism

This study explored the role of First World War related traumas in shaping German women voters' support for Nazism in the final years of the Weimar Republic. The study strove for a deeper understanding of the Party's appeal for women, despite its patriarchal rhetoric, by examining the war's long-term impacts on women's emotional, material, and economic lives. The study analysed written and visual sources produced by and for women, including diary entries, artworks, and propaganda posters that engaged with themes of wartime and post-war suffering. Source analysis was grounded in wider research into the German war experience, Weimar society and Nazi ideology. The study suggested the First World War did trigger a cascade of traumas that contributed to female support for Nazism. Wartime bereavement and loss, economic insecurity, and shifting gender roles contributed to deepening uncertainty and material hardship. Nazi propaganda exploited these concerns by evoking visions of a mythic pre-war past and asserting a new model of traditional womanhood that promised to counter Weimar Germany's social chaos. This study helps reframe the First World War as a site of long-term cultural trauma and contributes to ongoing conversations about the appeal and rise of Nazism by foregrounding psychological motivators. Greater nuance could be brought into the discussion by considering distinct groups of women and examining the mediating influences of class, religion, ethnicity, and age.

Jasmine Nguyen

University of Sydney, Centenary Institute

Dipeptidyl Peptidase 9 - An Answer Behind Lung Disease Severity

Coronavirus Disease 2019 (COVID-19) can cause severe lung inflammation. Dipeptidyl Peptidase 9 (DPP9) gene variants have been associated with increased risks of lung pathogenesis including fibrosis and severe COVID-19. DPP9 is a ubiquitous protease that can suppress the inflammation-stimulatory molecule NLRP1. We hypothesise that low levels of DPP9 in mice cause increased inflammation in COVID-19. Our method was to deplete DPP9 in our transgenic adult mice, then infect them with SARS-CoV-2. To make the mice susceptible to COVID-19, we use a recombinant adenoviral vector to make them express the human angiotensin-converting-enzyme 2 (hACE2), a protein that the virus uses to enter cells. The mice and their tissues would be evaluated at day five post-infection with SARS-CoV-2. In our lab's previous COVID mouse model, we found more DPP9 protein in infected wild type (WT) lung parenchyma than in uninfected controls, suggesting that DPP9 was upregulated and localised in leukocytes recruited during inflammation and that male and female mice differ in the percentage of monocytes expressing DPP9. Here, we generated a systemic depletion of DPP9 (>50% in liver, testis, and muscle) in our mouse model, compared to both WT and negative control littermates. If future data supports our hypothesis, it will align with evidence that dysregulation of DPP9 gene expression in human contributes to lung disease and provide a valuable model for further study.

Jayden Lucas

University of Western Australia

A Kinder Response to Chronic Pain is Key:

Investigating the role of self-compassion within the fear avoidance model

Chronic pain — pain that persists for more than three months — affects up to 20% of Australians and is estimated to cost the Australian economy 144 billion dollars per year. Pain catastrophising is a key psychological element within the fear-avoidance model that is used to understand how disability and depression develop through lowering a person's confidence in managing their pain. In this project, we examined whether self-compassion (i.e., kindness to oneself) reduced pain catastrophising's impact on disability and depression by allowing a person to maintain their confidence even if they catastrophise. Participants (N = 271) were recruited through social media, pain organisations and private clinics, and completed an online survey. We tested whether pain catastrophising was associated with a person's reduced perception in their abilities to manage pain, and whether this in turn was associated with more pain-related disability and depression. We also examined whether this relationship depended on how much self-compassion the person had, such that people with higher self-compassion still felt confident in managing their pain even if they catastrophised. This was tested using structural equation modelling. Results suggest self-compassion does maintain confidence, even in the face of catastrophising about pain. This study provides an understanding of how self-compassion might improve people's lives when suffering from persistent pain. Treatments for pain catastrophising and self-efficacy (i.e., confidence in managing their pain) have been only modestly effective. Hence, interventions that explicitly target self-compassion may be a promising avenue for future research.

Jessica Freund

University of Adelaide

'Life-Changing': The effect of autism assistance dogs on the wellbeing of autistic Children and their families

Autism Assistance Dogs (AADs) are specifically trained to perform tasks to increase the independence and quality of life of autistic people. AADs typically achieve this through assisting with absconding and 'meltdown' behaviours in public settings. Despite rising interest in their potential usefulness for autistic people, the evidence base for AADs remains limited. Therefore, using a qualitative design, this study aimed to inductively explore how AADs might affect the wellbeing of autistic children diagnosed with Level 2 or 3 autism spectrum disorder. It also aimed to explore how AADs might affect the wellbeing of other people in the AAD's household (i.e., the autistic child's family). Nineteen interviews in total were conducted to achieve these aims. Specifically, nine interviews were undertaken with carers of Level 2 or 3 autistic children with an AAD. To achieve triangulation, interviews were conducted with three parents who have an autistic child on the waitlist for an AAD, four allied-health professionals who work with autistic children who have AADs, and three AAD trainers. So far, thematic analysis has returned seven themes. These include that the AADs are "life-changing"; facilitate community involvement; increase self-confidence of the autistic child and their parents; help strengthen inter-family relationships; and improve the safety, sleep, and stress levels of all family members, including the autistic child themselves. Notably, waitlist parents anecdotally recounted struggling within these domains.

Joanna New

University of Sydney

Working Towards Diagnostic Innovation for a Life-Threatening Disease: Transthyretin amyloidosis

Aggregation of the serum protein transthyretin (TTR) into an insoluble, fibrillar form known as amyloid is reported as the cause of life-threatening transthyretin amyloidosis disease (ATTR). Elucidation of the pathogenic mechanisms involved in ATTR has led to the development of disease-modifying therapies that significantly slow disease progression and improve survival rates. However, symptomatic variety and overlap with other conditions means misdiagnosis is common, delaying effective treatment. Current diagnostic methods such as histological identification and genetic testing, whilst effective in many regards, have shortcomings that could be mitigated with high specificity binders carrying fluorescent, radionucleotide, or other ligands compatible with patient screening. Advances in developing protein-motif specific binders raise the possibility of discovering TTR-amyloid specific probes but requires the optimisation of in vitro TTR amyloid fibril production. Therefore, this work aims to develop a robust in vitro system for producing TTR amyloid fibrils with the hallmarks of ATTR. Wild-type and mutant variant forms of TTR have been cloned into bacterial expression vectors to determine which construct has superior expression and ease of purification. The ability of purified TTR to form amyloid fibrils is

also assessed. TTR amyloid *in vitro* is triggered by proteolytic cleavage between residues 48 and 49, releasing a highly amyloidogenic product. Once formed, electron microscopy and protease digestion are used to characterise amyloid morphology. These characterisation methods will be applied to compare *in vitro*-produced and *ex vivo* TTR fibrils and to assess the binding of potential TTR-specific probes.

John Starkey

Macquarie University

Does the Truth Lie in One's Gestures?

Hand gestures are a pivotal component of communication that allow humans to convey non-verbal information that is not easily accessible through speech. Gestural accompaniments to speech have been demonstrated to ease cognitive load, benefiting a variety of domains including narrative comprehension and recall. In contrast, lying – a ubiquitous aspect of communication – has been demonstrated to increase cognitive load. However, there is currently limited research on whether the increased cognitive burden associated with lying can be alleviated with gestures. Therefore, the present study examined whether people were more likely to produce gestures when lying than when telling the truth, and whether producing gestures when lying eases cognitive load. The study further assessed whether gesturing improved recall for those who told the truth, and the ability to integrate false testimony for those who lied. Moreover, this study assessed whether non-verbal memory moderates the effects of gesture usage on recall. University undergraduates (N = 100) completed the study in pairs, watching one of two randomly assigned videos depicting a minor crime. At a subsequent interview, participants were required to answer truthfully, or lie when recalling to their partner. During the testimony, some participants were instructed to produce gestures while others were not given any instructions regarding gestures. Participants then completed a cognitive load questionnaire and rated the believability of their partner's testimony. This study's findings may have important practical and theoretical implications regarding lying and gesture production.

Jubilee Sloane

Macquarie University

Don't Stand So Close to Me:

Effects of surrounding bodies on the perception of fat and muscularity

Humans often make inaccurate body size and shape judgements. Body size misperception plays a role in body dissatisfaction, which may increase the risk of eating disorders. However, the mechanisms underlying these judgements are poorly understood. One influence on body perception involves the size of surrounding bodies – a phenomenon known as the 'contrast effect'. Here, 'target' bodies presented amongst large surround bodies are perceived as smaller, while those seen alongside small bodies appear larger. However, body size is associated with variations of body fat and muscularity – two aspects of body composition that have different relationships with health outcomes. To establish whether the brain processes body fat and muscularity separately, the current study examines whether surround bodies with extreme levels of fat or muscle affect judgements of fat or muscle for target bodies. Participants were presented with two target female bodies on screen with normal fat and muscle levels. Each target was presented in between two surround bodies, which were either high or low in fat or muscle. In separate trials, participants judged which target body appeared higher in fat, or in muscle. It was predicted that surround bodies with high or low body fat would have a significant effect on judgements of target body fat, while those with high or low muscle would have a significant effect on judgements of target muscularity. This would suggest that the perception of body fat and muscularity are underpinned by separate brain processes. Implications of the findings for real-world applications will be discussed.

Julian Walker

Western Sydney University

Incorporating Eighteenth Century America:

Motives of library companies

The background of this research emerged from internship work on part of the eighteenth-century Libraries online project based at the University of Liverpool. It seeks to investigate why libraries in America became incorporated earlier than their counterparts in England, Scotland, and Ireland. It also analysed whether there was a similar divergence between coastal and inland colonies and later American States. 14 American Libraries were identified as incorporated, and the rulesets and constitutional documents were analysed in short form document reports. This was to further emphasise my knowledge of the documents throughout the process of the research output. As this research has been jointly conducted with Professor Mark Towsey and Dr Sophie Jones, they have handled the larger historiography of the Library History field, while I have focused upon the documents that is the foundation of the argument. The analysis showed that all incorporated American libraries stipulated company ownership of land, and property housed in the library itself. The motivations for this varied from requirements from financial backers based to communal decisions seen as beneficial to the library

community. Further, it revealed a divergence between libraries on the coast, which prioritised their legal rights as a company, and those inland that faced more immediate threats due to colonial or state relations with indigenous peoples. Further research could explore the social and political dynamics of identified motivations, as it may reveal more about the post-Revolutionary period in America and how people organised established their own rules, regulations, and rights.

Karen Tran

University of Sydney

Investigating how Molecular Changes Influence Substrate Selectivity in the Glutamate Transporter (SLC1A) Family

The Solute Carrier 1A (SLC1A) family consists of Human Excitatory Amino Acid Transporters (hEAATs) and their Drosophila Melanogaster homologues (dEAATs). Despite having high sequence homology, these proteins transport different acidic amino acids (AA); dEAATs only transport aspartate; hEAATs transport both aspartate and glutamate; their clearance of synaptic glutamate prevents excitotoxicity, regulating nervous system function. Impairment of these transporters results in acute and chronic neurological conditions, including ischaemic stroke and episodic ataxia. Given their pathological relevance, designing treatments is paramount, however this requires understanding the structure and mechanisms of these proteins. Hence, I aimed to interrogate the role of 1) an alanine residue in the extracellular gate (HP2) that must close over substrates for SLC1A transport to proceed – it is hypothesised to introduce dEAAT2 glutamate selectivity, and 2) arginine residue in the hEAAT1 substrate binding site on its selectivity for acidic amino acid substrates. Xenopus laevis oocytes were made to express dEAAT2 with mutation, S426A. Their substrate uptake was measured to elucidate the role of the HP2 alanine residue on glutamate selectivity. Substrate uptake by oocytes expressing hEAAT1/R479C was also measured to identify functional changes. Results/findings: The S426A mutation did not introduce glutamate transport into dEAAT2, indicating residues other than this HP2 alanine must also govern SLC1A transporter glutamate selectivity. The R479C mutation in hEAAT1 completely switched its substate selectivity from acidic to neutral AA transport, indicating R479 is critical to hEAAT acidic AA selectivity. These findings further our understanding of SLC1A transporter substrate binding mechanisms and offer a potential avenue for designing pharmaceuticals for glutamate transporter-related neurological conditions. R479 is of particular interest given its key role in hEAAT1 substrate selectivity.

Kate Quadrio

Macquarie University

Spotting Imposters:

Does feedback improve performance on unfamiliar face matching tasks?

Unfamiliar face matching is relevant in settings such as border security, where officers must determine whether an unfamiliar passenger matches the individual depicted in their identity document. As it is crucial that border officials are highly proficient at this task, it is important to develop effective training programs to enhance their performance. This study investigated how different types of feedback may influence one's ability to correctly identify unfamiliar face matches and whether the effect of feedback accumulates over time. Undergraduate Psychology students were asked to determine whether two faces presented on-screen depicted the same or different people in a computer-based experiment. After making their decision, some participants received 'simultaneous' feedback while the stimuli were still visible, whereas others received 'non-simultaneous' feedback after the faces had been removed from the screen. Others received no feedback at all. We predict that immediate feedback, compared to non-simultaneous and no feedback, will best improve face matching accuracy and that the benefit of feedback will accumulate over the course of the experiment. It is hoped that the findings will allow the development of improved training programs for situations such as passport ID verification at airports. This would improve border officials' ability to detect mismatched identities, decreasing identity fraud and illegal immigration. Future studies should i) attempt to replicate the findings using border officials as participants, and ii) investigate whether feedback benefits can generalize to operational settings, where physically present faces must be matched to photographs.

Kavya Thakore

Macquarie University

Gesturing for Remembering:

The impact of emotion and gesture on memory

This study is aiming to investigate the gap in literature about the impact of producing gesture, emotion, and verbal memory, on recall. First- and second-year psychology students were randomly allocated to a gesture or spontaneous condition. They read aloud three emotive narratives (positive, negative, neutral) then completed a verbal memory task. Participants were then asked to recall each narrative, followed by answering specific questions. Whilst this study is still in progress, expected findings include a correlation between emotion and recall, with the negative story being recalled best, followed by positive, then neutral. Secondly, we expect that those in the gesture condition will have better recall than those in the spontaneous condition. Thirdly, we expect that participants with higher verbal memory scores will have better recall. We also expect the effect of gesture will be higher for the neutral story and for those with lower verbal memory. We also expect that the effect of emotion will be higher for those with lower verbal memory. Finally, we expect that the correlation between gesture and emotion should be strongest for those with lower verbal memory. Thus, the results will show how gesture, emotion, and verbal memory influence recall.

Kayley Zielinski-Nicolson

Macquarie University

Personality, Altered Consciousness, Rest and Relaxation:

Understanding the rapidly emerging psychological phenomenon of ASMR

This study is a current investigation into the increasingly popular psychological phenomenon of Autonomous Sensory Meridian Response (ASMR). ASMR is a relaxing and euphoric alternative state of consciousness that includes pleasurable tingling sensations felt on the head, back and limbs in response to audio-visual stimuli. Online videos that elicit ASMR are regularly used to relieve stress and improve sleep. This study aims to develop upon this relatively new research area by examining how the ability to experience ASMR may relate to a range of previously unexplored variables including creativity, personality traits and cognitive experiences. 376 undergraduate Macquarie University psychology students completed a range of questionnaires, word association and idea creation tasks in an online survey. Analysis indicates that positive schizotypal traits, roleplaying ability, emotional contagion susceptibility and transliminality may help predict ASMR propensity. This may indicate that those who experience ASMR to higher degrees possess a particular cognitive style of thinking, perceiving, and engaging with their environment. This investigation contributes to the scientific understanding of psychological mechanisms underpinning ASMR experience. Furthermore, understanding how personality and consciousness variables relate to the ability to experience ASMR has important applications for its clinical use as an accessible relaxation tool for relief from anxiety, stress, insomnia, and depression. Future research should consider how a unique cognitive style may explain ASMR experience. This may have important practical applications to improving mental health outcomes in groups with this cognitive style who may experience ASMR to higher degrees.

Kevin Chang

University of Sydney

The Cross-Talk Between Pancreatic Cancer Cells & Tumour Microenvironment

Pancreatic cancer (PaC) is one of the most untreatable cancers in the world with 5-year survival rate <10%. PaC progression is facilitated by the complex and multifaceted tumour microenvironment (TME). In TME, cancer cells and surrounding stromal cells constantly communicate with each other via secretion and uptake of soluble factors and extracellular vesicles (EVs), reshaping the landscape of pancreatic cancer. EVs are predominately packaged and released through Endosomal Sorting Complex Required for Transportation (ESCRT) pathway. Recent evidence suggests that the metastasis suppressor N-myc downstream regulated 1 (NDRG1), interferes with intercellular communication between PaC cells and stromal cells. This study investigates the potential role of NDRG1 in the biogenesis and uptake of EVs in PaC. EVs isolated from condition media (CM) collected from PaC cells with over-expression or silencing of NDRG1 were enriched using gradient ultracentrifugation. Nanoparticle tracking analysis was used to examine size distribution and concentration of EVs. Proteomics and mRNA analysis were performed on isolated EVs to further analyse their cargo and distinct markers. The expression level of key proteins involved in intracellular trafficking and ESCRT pathway were analysed via immunoblotting. We have found that elevated NDRG1 expression in PaC cells interferes with EV biogenesis, secretion and affects the cargo loading machinery, resulting in the disrupted communication between PaC cells and fibroblasts. NDRG1 expression in PaC cells significantly altered the expression of key proteins involved in the ESCRT pathway of EV biogenesis. We are the first group to observe that NDRG1 expression inhibits the cross-talk between cancer cells and TME by disrupting the biogenesis and uptake of EVs in PaC. Our discovery has the potential to change the direction of therapeutic development for PaC, by inhibiting communication between PaC cells and the TME to expose new cancer vulnerabilities.

Kyle McIndoe

Macquarie University

Exploring the Effect of an Exercise Intervention on Doctoral Candidates

Doctoral candidature is plagued by high attrition rates and widespread mental health issues, which cause diminished research output and lost socioeconomic potential. Several personal behaviours have been identified to significantly improve or exacerbate doctoral candidature experience. The primary aim of this study was to ascertain whether an exercise intervention could improve the doctoral candidature experience by enhancing candidates' mental health, wellbeing, research motivation and productivity. The secondary aim was to examine whether the intervention could improve candidates' alcohol use, social support, and sleep hygiene, which may indirectly affect the candidature experience. 19 doctoral candidates (M age = 39.7, SD = 13.2; 78.95% female) were randomly allocated to either a four-week exercise intervention condition (n = 10) or to a waitlist control condition (n = 9). All participants underwent daily monitoring for eight weeks and completed four questionnaires assessing various behaviours and mental states over 12-weeks. The intervention was associated with an increase

in exercise behaviours. Whilst the study's hypotheses were not supported, participants in the intervention condition worked on their research project significantly more than the waitlist condition. Furthermore, the waitlist condition felt significantly more social support post-intervention than pre-intervention; a finding not replicated in the intervention condition. Several limitations and implications for future directions are recommended. Future research should examine the effect of exercise interventions on research output and the relationship between poor mental health, alcohol use, and time spent researching. Longer and more intensive interventions may be necessary to produce results that improve the candidature experience.

Lauren Moffat

University of Notre Dame

Structured Experiences of Palliative Care Nurses Working with those with Muscular Dystrophy: A critical discourse analysis

Contemporary scholarship in palliative care forefronts geriatric, oncologic, and paediatric experiences, neglecting spaces in which young people with life-limiting conditions such as muscular dystrophy and their families occupy. The unique presentations of the various muscular dystrophies result in a care experience differing from most of the literature. Discourses which operate in the space of end-of-life care influence people's perceptions of, and interactions with, palliative services. The language and socially constructed symbols of Western palliative care and experiences with death influence behaviour and conversations within the healthcare professional-patient relationship (Zimmermann, 2012). However, there is an identified gap in the language and perceptions of barriers and facilitators of palliative care decisions for young adults, families, and healthcare workers in this space. In light of this, the research question is as follows: what have been the structured experiences of palliative care nurses working with people with neuromuscular conditions in Australia? How has Western medical discourse and other discursive bodies ordered such experiences to facilitate or hinder care? Methods consist of five to ten semi-structured interviews with experienced palliative nurses with transcripts analysed utilising thematic analysis with a critical discursive lens. Critical discursive methodologies focus on the way that positions of power and subjects may be constructed through language, inspired by Foucauldian thought. Such in-depth findings aim to extend existing discursive knowledges within palliative nursing and create novel understandings of how critical discourse theory operates in this unique context. By further understanding the positioning of language in this clinical context, this research also serves to benefit neuromuscular communities by normalising such conversations and improving nursing practice.

Leon Wiesner

University of Queensland

The Identification of Foehn Winds in Southeast Queensland and their Potential Impacts on Forest Fires

The rising threat of bushfires due to the acceleration of anthropogenic climate change, increasingly puts biodiversity and human livelihoods under pressure. While bushfires have been extensively studied, the local influences of foehn winds on bushfires in Australia remain largely unknown. This study aimed to identify the impacts of foehn winds on bushfires in the highly populated region of South-East Queensland (SEQ). Foehn winds are dry and warm winds on the lee side of topographic barriers. They have the capacity to substantially reduce humidity and increase temperatures and wind speeds on leeward facing mountain slopes, due to adiabatic warming of descending airmasses. Acquired meteorological data from the Bureau of Meteorology was utilised to identify changes in temperature and relative humidity which are conducive to foehn. Additionally, global forecast system reanalysis data was utilized to investigate meteorological characteristics in the vertical air column. Subsequently, landscape fire incident data from QFES is analysed for potential correlations with foehn wind events and spread alterations across space and time. The results highlight the presence of foehn winds in SEQ, which occur predominantly in the winter months and promote windspeeds of up to 65km/h. Most identified foehn wind events in the observation period are associated with minimum temperature increases of 10C and minimum relative humidity decreases of 30%. In conclusion, foehn winds have substantial impacts on local meteorological conditions which can override ambient synoptic weather conditions and substantially increase fire danger in SEQ. Continued research is crucial for emergency services and associated disaster prevention planning purposes which can include region-specific land management practices such as controlled burning and bushfire control resource allocation.

Leslie Tao

Australian National University

Attractive Cosplay and Asexualising the Attractiveness:

A qualitative interview with an aromantic asexual man about his cosplay story

The concept of 'cosplay' originated from the terms 'costume' and 'play'. Cosplay is a performance art in which cosplayers masquerade and re-enact fictional characters from movies, anime, or other media. Examining the existing cosplay-related research, it is found that female or transgender cosplayers seem to be overrepresented in this fandom community. Although the experiences and voices of others are less visible and often understudied in the academic field, they are equally valuable. Therefore, to obtain knowledge on the underrepresented subgroups, I focus on cosplayers from other queer subgroups and aim to study their cosplay stories and queer identity construction or performance. This is a pilot study of the qualitative interview project in my honours degree. I conducted face-to-face interactional interviews with a 27-year-old aroace (aromantic and asexual) Australian local man, who shared details of his own cosplay experience with his cosplayer friend who identified as aroace and non-binary. This study showed a number of notable findings regarding attraction and asexuality, including fictophilia (fictional attraction/love), sexual attraction versus aesthetic attraction, and the asexualised attraction-based cosplay context. It was found that 1) It is possible for cosplay participants to experience fictophilia and project the attraction onto the cosplayers in this imaginative space; 2) Sexual attractiveness is likely to be performed or emphasised in the cosplay context, resulting from the hypersexualised cosplay culture and the relaxation of societal expectations; and 3) The attraction-based cosplay scenario can also be a learning space for certain participants to experience, explore and perform their queerness and asexuality.

Leyla Mehag

University of Sydney

Investigating Means of Avoiding the "8-cell block" during *in vitro* Development of Bovine Embryos

As the global population rises, the demand for dairy and beef continues to grow. To prevent protein shortages, we need to efficiently produce large numbers of quality cattle. *In vitro* production of bovine embryos presents an exciting opportunity to improve agricultural productivity and combat food insecurity. One approach is to collect large numbers of oocytes from high-quality cows, fertilise them, and grow them *in vitro* as embryos before transferring them into surrogate cows. However, 80% of bovine embryos cultured in vitro undergo developmental arrest at the 8-cell stage and are unable to develop to the blastocyst stage required for embryo transfer. This developmental block can arise for a variety of reasons, including oocyte cytoplasmic quality, DNA damage, culture conditions (including energy courses, growth factors, pH, or the gaseous environment), poor metabolism or the effect of metabolic by-products. This work aims to overcome the developmental arrest at the 8-cell stage through supplementation of *in vitro* culture media with various compounds which may modulate culture conditions, metabolism, and metabolic by-products. The parameters used to assess the effects of the

test compounds will be developmental rate up to the blastocyst stage, percentage of embryos that develop to the blastocyst stage, blastocyst diameter, and cell numbers within the blastocyst. The results of this work may provide valuable insights into the effects of a range of compounds on bovine embryo development *in vitro*. This will have significant implications for the large-scale production of bovine embryos *in vitro* and help address the growing protein demand.

Linda Lin

University of Sydney

Deep Phenotyping of Multiple Sclerosis Patients' Leukocyte Subsets and Extracellular Vesicles

Multiple sclerosis (MS), a disease of the immune system that affects the central nervous system, is characterised by demyelinating plaques and disruption of the blood-brain barrier (BBB). This allows transmigration of immune cells into the brain to attack myelin resulting in physical or cognitive disability. Extracellular vesicles (EVs) also can cross the BBB and modify recipient's cell functions. The role of monocytes, dendritic cells and EVs in MS pathogenesis remains unclear. Among several immunotherapies for MS, cladribine is a well-tolerated drug that depletes lymphocytes, but little is known about its mechanisms of action. Our study explores the migratory ability of innate immune cells across the BBB and assesses the number and phenotype of EVs in healthy subjects, untreated and cladribine-treated MS patients. Peripheral blood mononuclear cells are isolated from these three categories and added to our *in vitro* transmigration assay. Spectral flow cytometry is used to analyse the phenotype of migrated and unmigrated immune cells. EVs are isolated from platelet-free plasma and analysed using nanoparticle tracking analysis and flow cytometry. Classical and intermediate monocytes migrate across the BBB *in vitro*, with a significant difference in classical monocytes. In comparison, non-classical monocytes and general dendritic cells did not migrate. Precise phenotyping of monocyte and dendritic cell subsets in our three categories of subjects will shed light in the mechanisms of action of cladribine. Identifying EV subsets associated with active MS may also delineate novel biomarkers of disease severity and of cladribine efficacy. Furthermore, our results could point towards novel therapeutic targets.

Lukian Adams

University of Sydney

Habitat Quality and Stream Flow Modulate the Dispersal of Cherax Destructor Crayfish in an Artificial Stream

Crayfish play important and specialised roles in stream ecosystems, but many crayfish species are threatened with extinction. The spread of invasive crayfish is contributing to crayfish extinctions, as once translocated into a new environment they can spread rapidly and outcompete native taxa, leading to displacement of native crayfish and loss of ecosystem function. It is thought that reduced habitat quality and stream flow may contribute to the spread of invasive crayfish, as both phenomena are hypothesised to increase the propensity of crayfish to disperse and seek new habitat. In this study, we experimentally tested the effects of habitat quality and stream flow on the dispersal of Cherax destructor crayfish in an artificial stream, designed to mimic a natural stream environment. Crayfish were subject to 20-minute experimental trials, where their movements across stream channels between habitat patches were noted, and these data were analysed with generalised linear mixed models. We found that crayfish dispersed between habitat patches more frequently when habitat quality was poor, with a lack of refugia representing poor quality habitat. We also found that crayfish provided with poor quality habitat moved more upstream, while those provided with good quality habitat moved more downstream. Stream flow also had an effect on dispersal, making crayfish quicker to leave the pool into which they were first deposited. The results of this study have important management implications, as they suggest that loss of habitat complexity in stream environments may indirectly contribute to loss of ecosystem function by facilitating the spread of invasive crayfish

Melissa Ritchie

Australian National University

An Investigation into the Immune Cell Phenotypes that Associate with Cancer Progression and Treatment Outcome

Cancer diagnostics and clinical decision making while rapidly advancing still relies heavily on a ‘one size fits all’ approach. However, it is becoming increasingly clear that individuals have unique immune phenotypes that associate with disease progression and treatment outcome. Thus, building and applying a methodology that takes in to account this immense diversity while remaining accurate is a fundamental step in ensuring that each patient receives a personalised treatment. The aim of this project was to identify key immune cell phenotypes that may be used as biomarkers for cancer progression. Spleen and blood samples isolated from mouse models of breast and colorectal cancer were studied using a range of flow-cytometry based arrays. Flow cytometry serves to characterise the physical and chemical properties of cells, in this case, of the immune system to identify tumour driven alterations. Retrospective analysis of how these immune changes correlated with disease progression and treatment outcome allowed us determine “biomarkers” of prognostic value. The results of this study showed that cancer systemically alters immune cell phenotypes to drive tumour progression and

treatment resistance. We uncovered approximately 30 markers and some unique cell populations, that are either up or downregulated in tumour bearing animals and correlate strongly with tumour size. We endeavour to use our new high throughput screen to correlate biomarker presence with treatment outcome. Furthermore, in the coming months a refined panel will be used to screen human blood and characterise healthy individual immune diversity, paving the way for future immune phenotyping of cancer patients.

Michael Xie

University of Sydney

Investigating Predictive Biomarkers in Adjuvant Immunotherapy Stage III Patients

Melanoma is the leading cause of skin cancer-related deaths and makes up 11% of all cancer diagnoses in Australia. The severity of melanoma is categorised (Stages I-IV) based on the degree of spread and physical features of the tumour. Survival of patients with advanced melanoma (Stages III/IV) has improved greatly with adjuvant immunotherapy, which involves treatment with immune checkpoint inhibitors following tumour removal. Immune checkpoint inhibitors work by upregulating the immune system to increase the killing of cancer cells. However, treatment often leads to side effects and not all patients respond, highlighting the need to study the biomarkers in patients with prolonged tumour-free survival. Our study will investigate genetic mutations, gene expression, and immune cell composition in Stage III tumour samples between patients with a positive or negative treatment outcome. Collating the various biomarkers, we will build a predictive model to identify patients that will benefit from treatment. We expect a higher mutational burden, elevated gene expression signatures for immune response and increased immune cells within the tumours of patients that do not reoccur following adjuvant immunotherapy. Collectively, this research will assist treatment decisions and reduce unnecessary treatment-related side effects in a step towards personalised medicine.

Mikaela Jacka

University of Wollongong

When Your Doctor is Sick:

Attitudes towards General Practitioners with a chronic health condition

The health of doctors is important to both the medical workforce and patients alike. Doctors with untreated health conditions (physical and mental) may lead to poor health outcomes for patients, and dangerous work environments. Stigma surrounding doctors with chronic health conditions, as well as potential professional consequences of disclosure may lead to those conditions remaining untreated. This study aims to identify the general population's perceptions of GPs living with a chronic physical or mental health condition, and whether perception differs based on educational background (health vs non-health). An anonymous online survey to assess attitudes towards general practitioners with a chronic illness was distributed on various online social media platforms, the results of which were then analysed using both qualitative and quantitative methods. There were 354 participants in this study. No association was found between respondents' level of education in either a health or a non-health background, and their comfort and confidence in their GP, with most respondents being either 'comfortable' or 'very comfortable' in a GP with a chronic physical illness, or a chronic mental illness. The results of this study may reflect decreasing stigma within the general population surrounding chronic health issues. Decreasing stigma may lead to more doctors with a chronic illness feeling comfortable to seek treatment for their condition – which may subsequently lead to safer workplaces, and better outcomes for patients.

Mikayla Hyland-Wood

Australian National University

Investigating Carbon Calculators for Use in PNG Coffee Production

Carbon farming is a known catalyst for improving sustainability of rural livelihoods. In Papua New Guinea (PNG), 87% of the population depends on semi-subsistence agriculture for basic income. In light of such staggering statistics, this research investigates what carbon calculator could be used in PNG coffee, helping local growers to engage with emerging carbon markets. These calculators, also known as carbon budgeting tools, rapidly assess and quantify greenhouse gas (GHG) emissions from agricultural production. They can link to verified offset schemes and be used as high integrity evidence in offset activities. This can assist PNG communities in tackling diverging insecurities of gender equity, food security, and climate change. Through a mixed method approach, 41 models were identified using a systematic literature review. Each model was subjected to eight unique exclusion criteria, assessing their appropriateness for PNG smallholder and plantation coffee production. These criteria considered social, cultural, economic, and environmental perspectives, validated by independent experts in Pacific agriculture and carbon accounting. Four models successfully satisfied criteria and were tested on-ground with PNG coffee growers in a validation exercise. Fieldwork concluded no existing model is a perfect fit for the case study, but there is compelling evidence that by engaging with growers, exporters and government agencies, existing tools can be modified to fit the system. As this project is the first of its kind, it is uniquely

positioned to help other Pacific Island nations accurately quantify emissions from agroforestry sectors, offering them a competitive seat in the carbon-responsible agriculture market.

Mohamad Elzein

University of Sydney

Virtual Galleries and the Curation of Student Learning

Pandemic-driven disruption in education has accelerated changes in course design and delivery in order to adapt to more online engagement strategies with a shift to pedagogies that more explicitly address graduate workplace qualities. Recent technological advances have simplified the development of digital and creative literacies by reducing the barrier of entry for both students and staff. Hence, this study aims to promote the transition of students from consumers of knowledge to co-creators and collaborators. We adopted the Unity software development environment as an emerging technology to build a platform that allows students to create unique virtual galleries enable them to curate collections of 3D artifacts related to their learning in human biology. Galleries can be viewed on either a flat-screen or through a virtual reality headset. This novel and personalised learning approach introduces students to an Object-Based Learning pedagogy as an additional strategy for the communication of science. We conducted a series of workshops to provide basic skills in Unity to 500 first-year human biology students. Working in groups of five, they used templates to create their own virtual galleries, populating their exhibitions with artifacts relating to the content they were exposed to in the unit of study. The completion of these galleries demonstrated student mastery of basic digital and creative literacies and represents a new and novel approach to complement traditional learning strategies. Importantly students acquire tools to personally curate evidence of their learning that can be incorporated into a portfolio of achievement of their journey through their degree.

Naomi Fenton

Macquarie University

Cyber-Bystander Behaviour at University:

The role of empathy and defending self-efficacy

Despite limited attention in the academic literature to cyberbullying at universities, evidence suggests it is rife and causes significant harm to students, such as poor mental health and suicidal ideation. Those who witness cyberbullying could stop the bullying, however many bystanders remain passive or defend victims in ineffectual or harmful ways. Some bystanders cyberbully the original bully (Aggressive Bully-Focussed Defending), while others comfort cybervictims (Victim-Focussed Defending). These forms of defending are less effective at reducing cyberbullying compared to reporting (Reporting Defending) or denouncing (Constructive Bully-Focussed Defending) the bully's behaviour. While empathy and defending self-efficacy (DSE) are two factors previously linked to overall defending, it is unclear how they differentially influence these four dimensions of defending among university bystanders. This study therefore aims to assess the effects of empathy and DSE on cyberdefending among university cyberbystanders. 458 university students aged 17–37 completed an online survey on defending over the past 6 months. The defending and DSE measures developed for this study demonstrated good psychometric properties. Bootstrapped regression analyses revealed that Reporting, Victim-Focussed, Constructive Bully-Focussed, and Aggressive Bully-Focussed DSE were associated with increases in corresponding defending dimensions. Empathy was not related to defending, nor were there any significant interactions between empathy and DSE. Hence, effective cyberdefending at university may be facilitated by improving Reporting and Constructive Bully-Focussed DSE. However, empathy may not significantly influence cyberdefending amongst university students. Future research would benefit from assessing ways to promote effective defending without simultaneously inflating harmful Aggressive Bully-Focussed Defending.

Naomi Luo

University of Sydney

Improved Modelling of Endothelial Cell Dysfunction in a 3D Perfusion Bioreactor

Cardiovascular disease is the most prevalent cause of morbidity and mortality in diabetes. Endothelial cells that make up the inner lining of blood vessels are often dysfunctional in diabetes due to hyperglycaemia, high blood glucose. Traditional 2D cell culture systems are limited in their ability to model critical vascular architectural cues and haemodynamic forces such as pressure, flow, and shear. The aim of this study is to demonstrate the use of an innovative bioreactor platform as an advanced *in vitro* model simulating the coronary circulation of diabetic patients. Human coronary artery endothelial cells (hCAEC) were cultured in high glucose conditions using a novel 3D perfusion bioreactor with a vessel-like scaffold that provides forces mimicking physiological conditions, compared to traditional 2D cell culture. Attachment and proliferation assays measured endothelial growth. Assessment of endothelial function was also performed by immunohistochemistry. Preliminary data shows hCAEC in high glucose conditions enter a dysfunctional state; however, the effect of hyperglycaemia is

modulated by the addition of shear in the bioreactor. Low shear exacerbates measures of dysfunction, while high shear is protective, compared to static conditions. The establishment of this bioreactor is an innovative vascular model, emphasising the importance of spatial and haemodynamic cues on endothelial growth and function. It can serve as a platform for evaluating the efficacy of clinical intervention, providing better treatment strategy for patients with cardiovascular disease and diabetes.

Nora Holmes

Macquarie University

Pink Polygon or Polygon and Pink:

Differentiating conjunctions and relations in synaesthesia

In synaesthesia, often termed a 'blending of the senses', sounds evoke colourful patterns and smells have distinct sounds. In grapheme-colour synaesthesia, letters and numbers elicit specific colours. When graphemes are printed in these colours, synaesthetes are faster and more accurate to name the colour than when the colour mismatches their synaesthesia, demonstrating a synaesthetic congruency effect. One theory proposes that the brain represents these grapheme-colour associations similarly to representations of typical colours for objects (e.g., yellow and banana). If so, mechanisms underlying learning and memory of associations may be involved in synaesthesia. Synaesthetic associations may reflect unusually strong associative memory in synaesthetes relative to non-synaesthetes. Previous studies report inconsistent findings regarding synaesthetes' memory for associations; however, these typically do not distinguish between object-colour associations (conjunctions) and object-object associations (relations). We tested whether synaesthetes have better associative memory overall or possess enhanced memory specifically for conjunctions or relations. We recruited grapheme-colour synaesthetes and non-synaesthete controls to participate in a supervised online experiment. In the memory task, participants briefly viewed three coloured shapes (conjunctions) or shape-colour pairs (relations). Participants then reported whether a subsequent coloured shape or shape-colour was one of the previous three ('old') or had not been presented ('new'). Additionally, to test whether the synaesthetic congruency effect is related to memory performance, we included the colour naming task where subjects named coloured graphemes. The results elucidate the role of associative memory in synaesthesia. Future research may examine whether any synaesthetic advantage can be used to boost learning in other contexts.

Nusrat Asad

University of Adelaide

Do Cues to Expertise Affect Belief in Health Claims?

Social media platforms have become one of the most frequently accessed sources of health information. However, this ease of access is not without its pitfalls, with a plethora of true and false medical advice online. It is unclear how individuals evaluate the quality of such medical information. This study investigates whether

people are sensitive to important cues that indicate the quality of health claims, namely the expertise and diversity of the sources disseminating information. In an online experiment, participants will be recruited via Amazon Mechanical Turk. Participants will be presented with various health claims on a mock Twitter interface, followed by related tweets supporting and refuting the claims. The sources of the tweets will be either diverse or non-diverse and from health organisations, individual health experts, or laypersons. Participants' belief in the claims will be measured before and after viewing the related tweets to see if the expertise and diversity of the sources impact belief revision. Linear regression models will be utilised to test the effect of source diversity and whether experts have a greater influence on belief revision than laypersons. The models will also test if there is any differentiation between the influence of individual health experts and health organisations and if source diversity interacts with levels of expertise. The findings from this study can help to make recommendations about which types of experts and whether their diversity online might result in the greatest impact on belief in health information.

Olivia Breen

University of Sydney

Effects of Invasive Weed Lantana Camara on Ant Assemblages and Seed Dispersal in Urban Ecosystems

Anthropogenic influence, such as urbanisation, can fragment ecosystems. Often, these systems are at greater risk of invasion by non-native species than undisturbed areas. Invasion can alter the structure and processes of these systems and produce 'novel ecosystems'. Lantana camara is an efficiently invasive perennial shrub. Its sprawling, woody understorey outcompetes native bushland, and alters habitats significantly. Its complex structure may alter the capacity for ants to navigate, forage, and disperse seeds (myrmecochory). A vital mutualism for the germination of many Australian flora, I aim to investigate whether the structure and presence of *L. camara* impedes this process, alters ant assemblage composition, or both. In Sydney's North Shore, comparison between eight paired sites was conducted. Sampling occurred in Lantana-invaded plots, and areas that contained no Lantana within 50m. Ant species abundance and richness were collected using bait and pitfall traps. Ant seed removal rates were assessed using *Dillwynia juniperina* and *Acacia longifolia* seeds. Vegetation structure was determined using physical attributed (e.g. leaf litter depth) and photographs of foliage cover. Lantana and Non-lantana sites differed significantly in vegetation structure. Species richness and abundance from bait traps were negatively associated with ground flora height and ground cover, as were combined assemblages from all traps. Presence of Lantana reduced total species richness and abundance, but increased species richness in pitfall traps. Lantana had no impact on bait trap or pitfall trap assemblages. Leaf litter depth significantly increased the total number of seeds removed, and increased ground cover significantly reduced total rates of elaiosome theft. Ground flora height and ground cover reduced elaiosome theft of *A. longifolia*. Leaf litter depth increased the total number of seeds removed, and ground cover reduced total rates of elaiosome theft. Presence of Lantana increased *A. longifolia* seed removal, and total seed removal rates. However, it reduced rates of elaiosome theft for *A. longifolia*. Lantana presence altered ant assemblages but

was conducive to seed removal; vegetation traits associated with Lantana elicited similar results. Invasive species, although characterised as inherently antagonistic, can have complex, and sometimes beneficial, impacts on interspecies processes.

Olivia Williams

Australian Catholic University

International Students, Neglected in a Time of Crisis:

Gaps in Assistance for Overseas Students in Pandemic Time

Victoria has been the host destination to a plethora of international students for decades. Each year international students make the active choice to call Victoria home while they work towards qualifications. These students contribute over $10 billion to Victoria's economy annually; however, they also contribute more than what can be determined by a monetary scale. This is why it is important that the wellbeing and success of Victorian international students is nurtured. During the COVID-19 pandemic, the State and Federal Governments drastically underperformed on this sentiment. The report produced for the Victorian Parliamentary Internship identified the physical, mental, educational, employment and financial impacts of the pandemic on the Victorian international student body and evaluated the gaps in the assistance provided by tertiary education, the Victorian Government and the Federal Government. The research ascertained these findings by engaging in in-depth literature review, interviews and data analysis. Interviews were an extremely insightful tool, and those conservations provided a framework to understand the problem from a humanised and lived perspective. It found that international students were disregarded and ignored when they were at their most vulnerable. Opening active discourse on this topic highlights the marginalisation of international students and ensures said treatment does not continue. The treatment of international students was afforded limited attention during the crisis, and no specific Victorian viewpoint had been researched. This exemplified why sparking conversation on the sector was necessary. The paper, which discovered that the pandemic had exacerbated pre-existing problems for international students, shapes the conversation of the sector's future and communicates that action is needed in this space.

Paris Tsoukatos

Macquarie University

Symptom Severity and Appraisal of Functional Gastrointestinal Disorders:

Role of illness schema

This study is investigating the unique contribution of illness related schema to the negative appraisal and symptom severity of functional gastrointestinal disorders (FGIDs). Schemas refer to knowledge frameworks which influence how an individual attenuates to, interprets, retrieves, and encodes information. Therefore, illness related schemas refer to the cognitive representations of illnesses, which influence an individual's coping

mechanisms and health outcomes in response to an illness. This study will compare the contribution of illness schema to the negative appraisal and symptoms severity of FGIDs against other known psychological factors, such as neuroticism, hardiness, depression, and anxiety. As an additional exploratory research question, we will also be investigating the differences between men and women with respect to these psychological constructs. 300 first-year Macquarie University psychology students will be recruited to complete this study via Macquarie University's research participation platform, SONA. This quantitative study will be delivered online, via a Qualtrics survey which takes approximately 45 minutes to complete, and consists of various measures of psychological constructs including neuroticism, depression, anxiety, hardiness, gastrointestinal symptom severity, negative appraisal, and illness related schema beliefs. The data will be analysed using the software STATA v.16, employing various testing methods including Pearson's correlations, hierarchical regressions, and path analysis. This study is not yet complete; future aims include supporting the development of more efficacious psychological treatment of FGIDs and understanding more about the gender differences in FGID severity and prevalence which disproportionately effect women.

Patricia Macabulos

Macquarie University

Using Levels-Based Training to Enhance Procedural Memory in a Category Learning Task

The current study investigates whether training a new skill in levels of increasing difficulty, versus in decreasing difficulty, results in the greater uptake of an implicit learning strategy. Expertise in any skill, such as speaking a language or performing calculations, is often the result of having learned the behaviour implicitly within the procedural memory system. It is therefore possible that optimising training designs to encourage implicit learning strategies would improve how efficiently one learns new skills. We test this idea using a category-learning task, where a participant learns the category membership of novel stimuli by guessing on each trial. The stimuli were partitioned into 12 levels that increased in set-size. Participants ascended through the levels based on their performance, so that they would only be given more stimuli if they achieved 100% accuracy on their current level. In the Easy-To-Hard condition, the stimuli grew more perceptually similar as participants reached higher levels, making them harder to categorise. In the Hard-To-Easy condition, the stimuli grew less similar across higher levels, making them easier to categorise. The training sets were designed so that no explicit rule could determine an object's category membership, meaning the only way to progress to higher levels was with an implicit learning strategy. By comparing progress in both conditions, we expect to find useful implications for how we can develop training protocols that facilitate procedural memory - particularly in areas like language learning or mathematics, where performance is largely governed by one's procedural knowledge of the task.

Pavani Subramaniam

Charles Sturt University

Understanding Paramedics' Experience of Everyday Racism in Australia

Paramedics originate from diverse backgrounds; however, minority groups remain underrepresented, disadvantaged, and discriminated in the job. Evidence shows these groups are more likely to face racism from patients, colleagues, and institutional structures. Racism experienced by paramedics is largely unexamined, with its form, frequency, and perpetrators unknown. This study aimed to report on the impact of racism on paramedics working in Australia. This was with the purpose of uncovering central themes and comparing results with the existing literature. Focus was maintained on the nature and source of racism experienced, as well as support provided. An inductive analysis of semi-structured interviews with registered paramedics was utilised. 21 eligible participants were invited to be interviewed through a snowballing process and passive social media techniques. Nine interviews were conducted and included in this study. Thematic organisation of data revealed issues of racial bias in the workplace. These experiences came from patients, colleagues, and bystanders, leaving the paramedic feeling isolation and disrespect. Paramedics also expressed helplessness that these behaviours were unreportable and often dismissed. Five central themes emerged in relation to ambulance culture, diversity, training, landscape, and support. They highlighted the pervasiveness of racism. Support made available to paramedics was similar across the country, regardless of employer. Overall, racism was found to occur in all

settings with no specific correlation to geographical location. Our findings highlight the importance of recognising diversity in the workplace and shed new light on the ambulance culture. While training and support exists, there are large strides still to be made in recognising and addressing the discrimination and disadvantage that paramedics from minority groups experience.

Phan Nguyen

Western Sydney University

Material Performance Prediction of Additively-Manufactured Acrylonitrile Butadiene Styrene Using a Multiscale Analysis Approach

The use of additive manufacturing technology, e.g., 3D printing, for fabricating polymer materials was first introduced in 1986 and is a process of creating 3D components by joining materials layer by layer. The components can be first designed in computer-aided engineering (CAD) software and exported to 3D printers for manufacturing. With its core principle of joining materials layer by layer, this new technology creates great opportunities to rapidly produce components with complex geometry but at low cost, lightweight, and minimising manufacturing wastes. However, at the present stage, there are still limited methodologies developed to model and extract the properties of 3D printed parts. The main goal of this study is to develop a systematic numerical modelling process for determining material properties and mechanical behaviours of 3D printed parts. In this study, polymeric testing samples are fabricated by using additive manufacturing and evaluated by using both experimental and numerical studies. Acrylonitrile Butadiene Styrene (ABS) is commonly used in toys, bottles, housewares, and light-duty industrial components, and it is selected as the primary material in this research. According to ASTM Standard, tensile testing samples of polymeric ABS are fabricated by using a typical additive manufacturing technology – Fused Deposition Modelling (FDM). After that, the samples are tested and evaluated to extract their tensile strength. The systematic modelling process includes constructing Representative Volume Elements (RVE) in CAD modelling software and performing Finite Element Analysis (FEA) in ANSYS and MSC Digimat Software. Then, the extracted tensile strength results from modelling are compared with experimental results to verify the effectiveness of the developed process. Good agreement between simulated and experimental data is achieved. Research outcomes from this project can further assist the optimal design process of 3D printed products in various engineering applications, such as prolonging the service life of 3D-printed ears and scaffolds in the biomedical field, fabricating electronic sensors in a one-off 3D printing process, etc.

Phoebe Schramko

Macquarie University

Same Same, but Different:

Understanding task-dependent processes of the semantic priming effect with EEG

The semantic priming phenomenon involves faster and more accurate responding to target stimuli ('EAGLE') following a semantically related prime ('hawk') than an unrelated prime ('table'). This effect is widely assumed to be mediated by an automatic process. The Lexical Decision Task (LDT) and the Semantic Categorisation Task (SCT) are popularly used to study this effect, though recent comparative studies have proposed that the effect is driven by different processes depending on the task used, challenging the assumed automaticity of the effect. This paper aims to replicate the comparative behavioural investigation of semantic priming in the LDT and SCT. To provide a new perspective of the underlying processes in these tasks this study will use electroencephalography (EEG), with specific focus on the N400 event-related potential (ERP) – a stereotypical negative peak in EEG data linked to processing of semantic information. Participants will complete either the LDT or SCT task while wearing a portable EEG headset, the EMOTIV EPOC+. Behavioural measures (reaction time and accuracy) will be analysed, as well as the amplitude (size) and latency (timing) of the N400 ERP component. Semantic priming effects are expected in both tasks, replicating previous findings. The difference in underlying process of the effect is expected to be reflected in the N400 component, with a difference in the mean amplitude and latency between the tasks. This study will provide new insight into understandings of the semantic priming phenomenon and may also reveal the benefits of using novel and accessible electrophysiological technologies to answer psychological questions.

Rachel Tan

University of Adelaide

'Trial by Google': Should Australia keep jury trials in its legal system?

Today's jury system has been challenged with the rise of internet, where news and online resources are easily accessible. This research discusses whether the jury system can remain impartial in this Google-Age and if jury trials in Australia should be abolished. The methodology consists of legislations, case laws and reasoning of judges throughout history – from England, Australia, and the United States of America. This paper uniquely scrutinises the historical establishment of jury trials by building arguments solely around primary sources, which sets out real-life negative and positive experiences of jury trials in this social media age. News articles and independent studies from Australian law reform institutes are referred to regarding jury reform. The internet has provided an accessible platform for the divulgence of external and internal information, which has ultimately shaken the integrity and impartiality of jury trials. However, if jury trials are deemed ineffective, the deep-rooted issues that anchors the proposition of 'trial by judge alone' outweighs the complications of jury trials and fails to provide optimal justice. Instead, improvements on jury instructions and the allowance for the jury to ask questions would maintain its viability. While the Google-Age provides continuing problems for jury trials, the community involvement institutionalised in the jury system remain the bedrock of democracy in Australia. It is far from perfect, and reforms on Australia's long-standing jury system still has a long way to go. Therein lies the challenge; however, it must be reckoned with, ultimately proving that jury trials are justified and deserving of preservation.

Rebecca Hetherington

University of Notre Dame Australia

The Politics of Drug Policy:

Pill testing and penal populism in New South Wales

Drug-related injuries and fatalities at NSW festivals and music events have been a topical issue in recent years. Drug use is a hot-button political issue that intersects with issues of criminal justice, healthcare, and social norms. The current policy landscape in Australia assumes a punitive approach, with blanket criminalisation of any form of drug use. My paper explored the relationship between pill testing, harm reduction, drug policy, and politics in the context of NSW music festivals. My paper is a critical analysis of NSW and Australian drug policy, which comprises legislation, bills, government reports, parliamentary debates, and policy strategy documents. drew on critical scholarship on penal populism and the relationship between criminal justice policy and politics. I also drew from the example of Medically Supervised Injecting Centres (MSIC) in Australia, as well as empirical research on pill testing services globally. Pill testing services have been shown to promote tangible harm reduction through intervention and education, not only to the individual service-user, but also to the people they come into contact with at events. Yet, the NSW government resists their implementation. Non-punitive approaches, such as pill testing services and MSIC's, are an effective harm reduction strategy. Young Australians need government action that prioritises their safety and respects their agency. In light of community support for pill testing and other non-punitive drug policies and the proven harm reduction benefits of pill testing services, the NSW government's strong resistance to the implementation of pill testing requires closer investigation and critique.

Ryan Cheng

University of Sydney

Change for the Better: Examining the alleviating effect of team proactive change management on employee burnout, withdrawal and performance

Due to the fallouts of the Covid-19 pandemic, work demands for nurses and related healthcare workers are increasingly at an all-time high. This research explores how helpful proactive change management is for teams since, to date, there is a lack of empirical evidence that examines how proactivity in change management processes is beneficial to organisations. I aim to examine whether team proactive change management can mitigate the flow on effects of work demands to employee withdrawal and performance within teams via burnout. Particularly, whether it can lessen the impact of work demands on burnout, and in turn help prevent absenteeism, turnover, and patient medication errors. I have drawn on team aggregated survey data from a local health district in NSW, comprising 2324 nurses and midwives across 197 teams who were surveyed on their perceptions of their work. This data was then liked to patient safety outcome data – specifically the number of medication and IV-related errors that occurred across the 12 months post-survey completion. Utilising

descriptive and multivariate statistical analyses, initial results indicate that team proactive change management is able to lower withdrawal outcomes while simultaneously increasing performance via burnout. However, this indirect effect is effectively lowered when work demands are high. In terms of implications, theoretically, I hope to add to the organisational behavioural literature – particularly by exploring a particular change management style that may mitigate the well-known effects of work demands through helping employees to conserve resources and ultimately protect them from being burnt out, and other downstream consequences. Practically, this may help organisations by introducing ways to effectively manage their change processes. Looking at whether team proactive change management can safeguard employees from the impacts of job demands, not only in terms of their wellbeing but also in terms of the safety of their patients.

Samanda Mularachchi

Western Sydney University

The use of Social Media in the Social Housing Sector

My research focuses on a longitudinal study of social media use for tenant participation in the social housing sector. By examining the digitalisation of the social housing sector, this study provides an overview of the social impact posed on tenants and community housing organisations in an emerging digital era. With digitalisation contributing to what is known as the 'digital exclusion' of social housing communities, this study aims to identify the possibilities of tenant participation and impactful housing advocacy through new digital practices. Furthermore, by implementing a qualitative data analysis, I have explored the possibility of challenging the digital exclusion of tenants with low language proficiency and those residing in low-income communities. The key aim of this study therefore is to explore the broader impact of social media and the digital community in tenant participation and the inclusion of community housing organisations in its advocacy. In doing so, this research will elucidate the reverberations of tenant participation through the use of digital technology in a fast-paced digital era. Through collaboratively curated datasets and qualitative research findings derived from focus group discussions, a range of digital communication tools have been identified to augment tenant participation while observing its role in strengthening the relationship between tenants and landlords. This research will include focus group data to analyse various aspects of tenant participation and digital engagement across social housing communities. In saying that, this study encourages social housing practitioners and organisations to embrace up to date digital practices to reinforce tenants' influence in the process. Quite generally, the broader aspects of this study aims to highlight the importance of equitable technologies and digital communication strategies that centre the needs of tenants and their communities.

Sarah Smith

University of Sydney

The Impact of Public Health Interventions on Population Genomics of SARS-CoV-2

The novel field of genomic epidemiology has enabled the impact of COVID-19 interventions to be measured using genomics. It can allow genomic differences that enhance SARS-CoV-2 fitness to be seen. The aim of this study is to compare and contrast the effect of non-pharmaceutical interventions, such as border closures and social distancing, and pharmaceutical interventions, including vaccines and therapeutics, on the genomic diversity of SARS-Cov-2 between Sydney, New South Wales (NSW) and San Francisco, California. This study will look at the first 18 months of the pandemic between 1/1/2020 - 30/6/2021. It is further aimed to examine the emergence of specific mutations in SARS-CoV-2 genomes and their impact on viral fitness. Consensus genome sequences were obtained from GISAID, an open access international database of SARS-CoV-2 genomes, for the first 18 months of the pandemic. The SARS-Cov-2 diversity has been represented in a fishplot and phylogenetic trees. Public health interventions in NSW and California for the same period have been examined. A feature matrix as well as training and testing data sets containing the mutations present within variants will be created. Machine learning algorithms will be applied to predict the role of mutations or their combinations on SARS-CoV-2 fitness and the emergence of variants of concern. Current results indicate a lower prevalence of SARS-CoV-2 cases in NSW in the study period and a higher density of genomic surveillance compared to San Francisco. There was higher SARS-Cov-2 diversity present in community-based transmission in San Francisco compared to NSW, and there was no statistical significance in Simpson's index of diversity regarding the lineages present. This research will highlight genomic features of SARS-CoV-2 populations that change in response to public health interventions. The findings will inform and target public health response against emerging and future variants. Increased understanding of variants of SARS-CoV-2 will allow the public to make informed decisions about their health and safety.

Sarra Lorford-Mills

Macquarie University

Do Autistic Traits and Gestures Impact Narrative Comprehension?

Theory of Mind (ToM) is an important part of social interaction that allows individuals to interpret the mental states of others. Within the literature, it has become a standard assertion that individuals on the autism spectrum perform poorer on ToM tasks than typically developing individuals. However, empirical evidence of this claim is mixed, as recent literature has found that poorer ToM performance is not a unique or universal characteristic of autism. Instead, based on Neuroconstructivist theories, it is proposed that language difficulties can impact social communication development and, consequently ToM performance. In addition, gestures play an essential role in social communication and lexical retrieval. However, limited research exists on whether gesture production assists or hinders ToM performance for individuals with higher autistic traits. Although studies have found evidence of a relationship between language development and ToM performance, the effect of expressive language ability and non-verbal communication has yet to be investigated. Therefore, this study will investigate if autistic traits and expressive language are related to ToM task performance and if gesture production moderates this relationship. To investigate this, university students will be randomly allocated to either a gesture-promoted or spontaneous condition and asked to comprehend Frith-Happe animations. Participants will also complete a self-report measure of autistic traits and an expressive language test. It is

predicted that a significant relationship between autistic traits, gestures, and expressive language ability on ToM task performance will be found.

Shanella Kang

Macquarie University

Artificial Agents in Pick and Place Task

Rapid improvements in artificial intelligence and virtual reality have highlighted the potential benefits of an interactive artificial agent (AA) in real-world social contexts such as helping individuals with motor rehabilitation following an accident. However, the robustness of these multiagent interactions involving collaborative behavioural activities relies on the AA's ability to behave reciprocally and spontaneously in a human-like manner. As such, to create an effective AA model, it is important to deconstruct human behaviour into the following components: action decisions (i.e., where and when to move), constrained by affordances or opportunities for action, and movement dynamics (i.e., how to move). The current study used a joint action pick-and-place task where two actors stand on opposite sides of a table and pick up objects that appear on one end of the table and drop them on the other end. Co-actors are required to decide who picks up and drops the object, and either to pass or not to pass an object while completing the task. Previous research has shown that the action decisions of human participants during this task can be modelled by an affordance-based low-dimensional model and movement dynamics can be modelled by dynamical motor primitives constituting discrete (such as throwing a ball or reaching for an object where there is a definite start and end) and rhythmic movements (such as walking or waving where the action is periodic in nature). Human participants will play this collaborative pick-and-place task with an AA, modelled by action decisions and movement dynamics models of humans, via virtual reality. The study aims to explore the differences in the collaborative dynamics including who, why and when actors decided to pick up, drop off or pass between human-human and human-AA interactions. Findings suggest that action decisions of humans with the AA were like those of human-human interactions thus validating the modelling approaches. These action decision model further provides an insight into the task dynamical and informational couplings that influence human actions.

Sophie Chiang

University of Queensland

Exosomal CD73 Serves as a Potential Biomarker for Breast Cancer Diagnosis

Exosomes are extracellular vesicles that are secreted by various cells and play different roles in both physiology and pathology pathway (Subedi et al., 2019). The heterogeneity of exosomal contents is correlated to cell of origin and contributes to the function of exosomes in cancer pathology (Roh et al., 2020). CD73 can transform extracellular ATP to adenosine, an anti-inflammatory modulator, that downregulates immune responses and inhibits the function of T cells to help tumour cells evade immune surveillance and immune attack (Roh et al., 2020). This project aims to establish the correlation between exosomal CD73 level and breast cancer patients'

TNM staging and identify exosomal CD73's role in distant metastasis in breast cancer. Exosomes from CD73+ cells (MDA-MB-231) were isolated using Tangential Flow Filtration (TFF) System while the ones from patients' plasma samples were isolated with size exclusion column. Exosomal contents isolated from patients' plasma samples were analysed with western blot. A significantly higher concentration of CD73 is seen in breast cancer patients' samples, compared to samples from patients with benign lung tumour ($p=0.0094$) but there is no significant difference in the amount of CD73 between samples from patients with relapsed breast cancer and non-relapsed breast cancer ($p>0.05$) five years after breast tumour resection. This study fulfills one of the hypotheses that exosomal CD73 concentration is significantly higher in patients with breast cancer. In order to explore the correlation of CD73 level and breast cancer development, different subtypes of breast cancer samples would be used in the future to compare CD73 level in patients with each subtype of breast cancers and their tumour, nodules, metastasis (TNM) staging.

Sophie Macklin

University of Queensland

Consumer Health Information Flows in Rural and Remote Healthcare Settings in Australia

The journey of health information exchange between health services can be seen as fragmented, lacking interoperability, and with the potential result of inconsistent delivery of care. In combination with the barriers of digital health transformation in rural and remote communities, geographical and socioeconomic factors can negatively impact the real-time access to information of health care consumers. First Nations Australians are adversely affected by this phenomenon, due to the increased population in these regions and the necessary use of multiple agencies to receive healthcare. The present study will identify and compare the patient journey with the flow of their health information with and between hospital and health services in rural and remote communities in Queensland. Possible recommendations will also be produced for these hospital and health services to create a consumer-centred healthcare record. The study involves three phases: a desktop review of the current state of information flows in rural and remote Queensland; a mixed-method qualitative analysis of interviews with healthcare staff using a text mining software; and an interview with an executive Queensland health staff representative to consolidate any gaps in knowledge. Data collection is underway with preliminary results to be presented at ACUR2022 Conference in September. Using the findings of this research, other healthcare settings can further understand this phenomenon and incorporate the outcomes into digital health infrastructure and planning, with the aim to enable better integrated care for consumers through real-time access of health care information.

Teegan Gardner-Harrex

Macquarie University

Mechanisms Behind the Cognitive Bias of Performance in Social Anxiety Disorder

Cognitive models of social anxiety highlight the role of negative self-perceptions in maintaining Social Anxiety Disorder, with individuals underestimating their social performance compared to observer perspectives (i.e., self-observer discrepancy). Individuals with social anxiety experience greater self-observer discrepancy than non-anxious individuals. This distorted self-perception is proposed to result from heightened attention to internal bodily sensations as a cue for constructing a mental representation of how they appear to others. However, it is unclear whether this self-observer discrepancy is the result of attention to objective physiological arousal, or cognitive biases in subjective arousal. This study aimed to examine the relative contribution of objective and subjective arousal in predicting self-observer discrepancies during a speech performance task. 38 individuals [TGH1] with high levels of speech anxiety and 40 individuals with low levels of speech anxiety completed previously validated self-report measures of speech anxiety, general anxiety, and depression. Participants completed a 10-minute impromptu speech task, during which objective heart rate and galvanic skin response was measured. After, participants self-reported their subjective arousal during the speech. Speech performance was rated by participants and observers to assess self-observer discrepancy. Results will examine differences in self-observer discrepancy between high and low speech anxiety groups, as well as differences in subjective and objective arousal. The relative contribution of subjective and objective physiological arousal in predicting self-observer discrepancy will be assessed. Results have implications for elucidating the mechanisms underpinning cognitive biases for social anxiety disorder and may highlight novel targets for treatment.

Thomas Woldhuis

Macquarie University

"You're Fine": Understanding the role of symptom invalidation in chronic physical health conditions

Symptom invalidation describes the experience where someone has their symptoms of a health condition discounted or met with lack of understanding by another person. Recently, symptom invalidation has received increased attention for its potential role in predicting poorer adjustment and psychological health outcomes in individuals with chronic physical health conditions (CPHCs). However, there is a lack of empirical research in this area. This study aimed to determine whether symptom invalidation predicts increased psychological distress in Australian adults managing a confirmed or suspected CPHC. It was hypothesised that higher levels of symptom invalidation from (1) family members, (2) spouses and (3) medical professionals would significantly increase psychological distress above and beyond demographic, medical and self-efficacy variables. A large cross-sectional online survey was conducted where participants self-reported symptom invalidation using a validated measure called the Illness Invalidation Inventory. Demographic and medical information were collected, along with self-reported levels of self-efficacy in chronic illness management using a standardised PROMIS scale. Several Australian chronic health advocacy groups helped promote the survey. The sample (N=1447; Mean age: 37.33 years [SD= 13.86yrs; 18-84yrs]; 87.01% female) reported a large range of CPHCs and symptoms. Analyses are ongoing and will be conducted using hierarchical multiple regression analyses. This is the first study to measure the role of symptom invalidation in predicting psychological distress in Australian adults with CPHCs.

The findings of the regression analyses will be presented, as well as any implications for models of adjustment to chronic illness and intervention strategies.

Victoria Lopez

Macquarie University

A Foucauldian Discourse Analysis of the Constructions of Autistic Females Within a "Love on the Spectrum" Discussion Forum

Due to ongoing gender inequalities globally, a significant amount of research has focused on cisgendered men, with findings simply extrapolated to be representative of the experiences of womxn (an inclusive term used to describe all people who identify as women, including cisgender females and transwomen). This has led to the delegitimisation of womxn's health issues, including the presentation, diagnosis, treatment, and care of those with autism spectrum disorder (ASD). The patriarchal norms under which neurodiverse womxn's experiences are understood are evidenced in an open online forum where unsolicited commenters discuss the cast of the Australian ABC network television ASD reality dating show, 'Love on the Spectrum' (LOTS). Thus, we used a Foucauldian Discourse Analysis (FDA) to explore the ways words are used to maintain social power hierarchies by examining how dating-active womxn with ASD are portrayed in these forums. Initial findings show commenters draw upon moral, gender, and biomedical discourses to portray womxn in the cast as deviant and loud, subverting 'ideal' feminine standards. Moreover, autistic womxn are positioned as more socially and romantically capable than neurodiverse mxn, who are frequently infantilized as a justification for their interpersonal shortcomings. These discourses are contrasted with defenders who draw attention to the lack of womxn's representation within ASD research and the perpetuation of sexism and ableism within the discussion forum. This study draws much needed attention to an under-researched and misunderstood group who may be systematically disadvantaged by the ways in which neurotypical and patriarchal norms construct their unique ways of being.

Vincent Yuan

Western Sydney University

Establishing Trans-Professional Inclusive Competencies for the Emerging Health Workforce

Vulnerable, disadvantaged, and marginalised communities experience poorer health outcomes due to inadequate and inappropriate health and support services. These populations often experience sub-optimal care and delayed intervention as service providers fail to understand their co-existing needs and barriers. The absence of a clear definition of what health workforce competencies are required to work effectively, inclusively, and responsibly with the vulnerable, disadvantaged, and marginalised communities makes it difficult to effectively prepare the emerging health workforce for the pluricultural society. The aim of this study is to define a set of trans-professional health workforce competencies that facilitate inclusive approaches for working with vulnerable, disadvantaged and marginalised populations. A modified Delphi survey with 'experts' (health

consumers, service providers, health professionals, academics and researchers, and policy decision-makers) will be employed to develop and validate the competency framework. This framework will be derived from a preceding scoping review of published empirical studies and review of discipline-specific professional competencies. Three rounds of voting with 45 experts are anticipated. The three competency domains of focused are skills and knowledge, behaviours, and attitudes. Results and conclusions will be reported at the conference.

William Tanner

University of Sydney

Novel Behaviours and Urban Adaptation:

The exploitation of anthropogenic food subsidies by Sydney's birds

Urbanisation, and the environmental changes that come about from it, is a significant cause of biodiversity loss. Nonetheless, some species, including Australian parrots like the Sulphur-crested Cockatoo and Rainbow Lorikeet, have adapted successfully to the growth of urban areas. Although the reasons why some animals adapt to urban areas and others do not is an important subject of study, the role of behaviour in urban adaptation is highly variable with species and habitat and is thus poorly understood. Some behavioural traits, such as boldness and aggression have been proposed to aid in urban adaptation. This is important as behaviours caused by these traits may be at the root of human-wildlife conflict. As a consequence, human-wildlife conflict may be deeply entrenched within urban ecosystems, due to the behaviours required to adapt to them. To investigate this thought, I reviewed the literature pertaining to the behavioural traits of urban birds and the traits most responsible for human-wildlife conflict. Additionally, I performed an analysis of the feeding of Sulphur-Crested Cockatoos (Cacatua galerita) by local residents of Sydney. I assessed whether birds were provided a wider range of or healthier food in habitats like apartments, which feature a greater human presence or more heavily modified anthropogenic structures. In order to accomplish this, I used data gained through the Big City Birds citizen science project, a project which allows volunteers to record and describe interactions that they have with urban birds in Greater Sydney. I determined that behavioural traits such as innovation, neophilia, boldness, and aggression aid in urban adaptation. Additionally, I determined that these behaviours exacerbate human-wildlife conflict, as actions which came about as a result of these traits were found to be frequently at the root of behaviour considered problematic. Through my study on the feeding of birds I found that boldness around people and the use of anthropogenic structures aided in urban adaptation by allowing birds to better access healthier anthropogenic subsidies.

Yogashree Thirunavukurasu

Australian Catholic University

How Systemic Racism Within The Australian Theatre Industry Diminishes Artists of Colour Through Covert Biases

The aim of this study was to investigate how systemic racism within the Australia theatre industry diminishes artists of colour through covert biases. A primarily quantitative analysis of various reports by arts practitioners, arts organisations and funding bodies was carried out. This analysis seeks to quantify the biases faced by artists of colour in Australia and the resulting challenges that they face in developing their careers. By putting numbers to this particular arena of racism, my aim is to create meaningful discourse within this field. Systemic racism is racism at a systems level and less about one-on-one racist encounters. It is broken down into two components: first, the 'exposition' or back story behind racist socio-political laws and policies and second, the implicit biases which are primarily racial stereotypes that result in various forms of discrimination. While the back-story cannot be changed, implicit biases facilitate the perpetuation of systemic racism. Within the theatre, racism at a systems-level results in a lack of diversity within creative arts leadership. This trickles down to all levels of the industry, creating a negative feedback loop and diminishing the presence of artists of colour who constantly find themselves at the margins and facing immense challenges in an already difficult industry. This research aims to provide concrete evidence that artists of colour within the Australian theatre industry face discrimination that negatively impacts their careers and to reform or dismantle these structures within the industry as a starting point to tackling these biases.