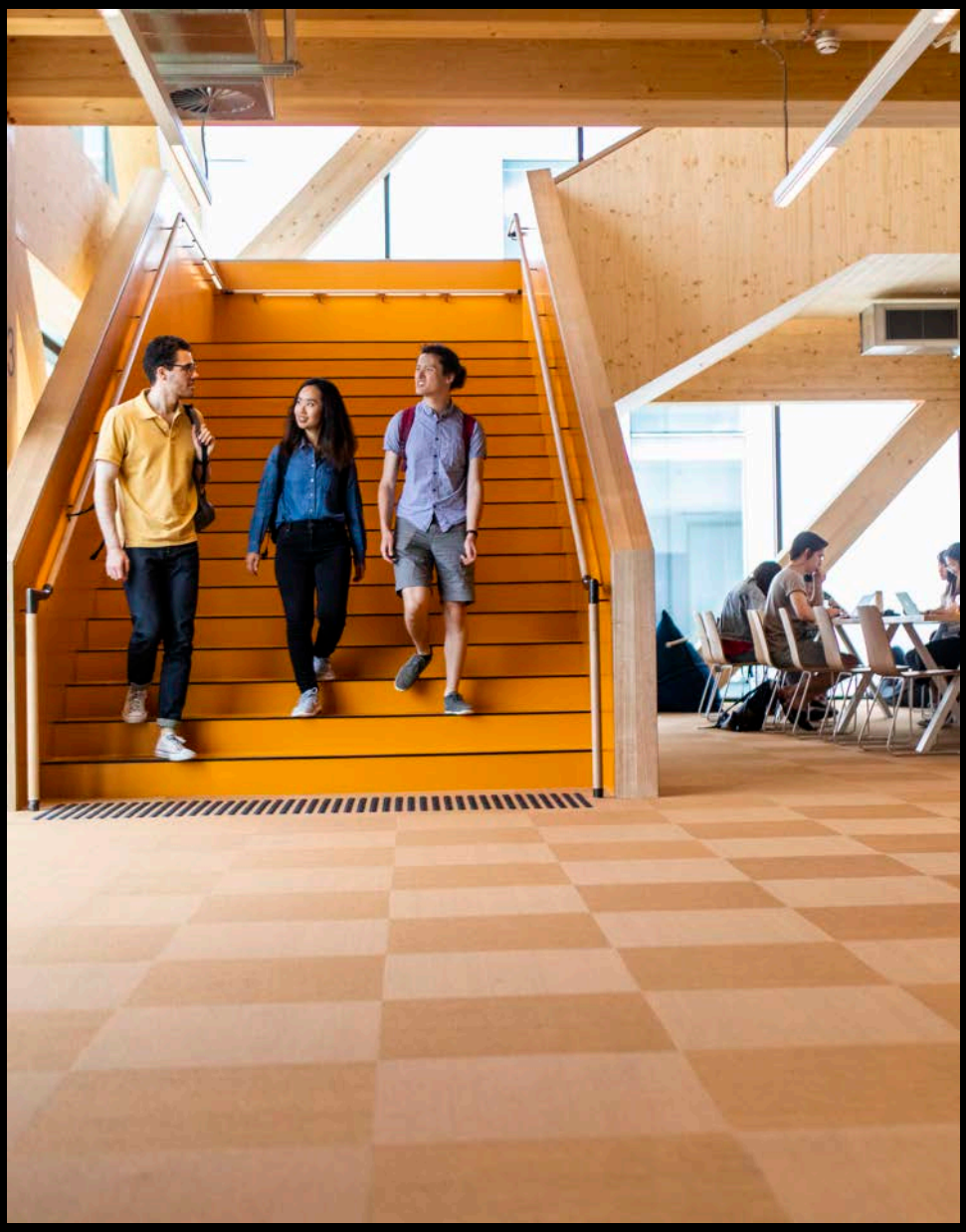
ACUR Conference hosted by ANU

ACUR@ANU Program of Events

Australian National University



Engagement and Success, ANU

Foreword

Welcome to this years' Australasian Conference of Undergraduate Research.

The Australian National University acknowledges, celebrates and pays our respects to the Ngunnawal and Ngambri people of the Canberra region and to all First Nations Australians on whose traditional lands we meet and work, and whose cultures are among the oldest continuing cultures in human history. We also pay our respects to all Conference participants who represent First Nations people from countries across the globe.

As one of the world's leading research institutions, the Australian National University (ANU) is proud to host emerging researchers from across the globe. The Australian National University (ANU) is unlike any other university in Australia. Founded in 1946, in a spirit of post-war optimism, our role was to help realise Australia's potential as the world recovered from a global crisis. It was envisioned at the time that Australia needed to build our national research capacity as we stepped on to a more complex world. It's hard not to reflect on the historical comparisons between the end of World War Two, the current COVID-19 pandemic and the need for inspiring minds to come together for the public good. More than ever, the development of undergraduate researchers is needed.

"In times of global disruption, we need mechanisms like ACUR to develop emerging researchers and recognise the power of research as a transformative vehicle for individual and collective action."

— DR JAMES BRANN

The development of undergraduate research is extensively supported by the ANU, including through the ANU Undergraduate Research Journal and our annual Australasian Conference of Undergraduate Research (ACUR). The ANU is therefore committed to providing opportunities for Conference attendees to present their research and attend the presentations of other students, network with potential employers and peers from universities around the country, and attend multidisciplinary panel discussions and workshops in an environment that supports and encourages critical and creative academic inquiry. In times of global disruption, we need mechanisms like ACUR to develop emerging researchers and recognise the power of research as a transformative vehicle for individual and collective action.

This year's conference will be one of the largest in its history. We've been overwhelmed by the number of participants, abstract submissions and peer reviewers which goes to the incredible work by this year's organising team. I would like to personally thank the ANU organising team for their incredible effort in standing up this conference in such uncertain times. You're a credit not only to the ANU but to the wider ACUR.

I wish you all the best of luck and I look forward to seeing how your work will ultimately shape our collective future.

Dr James Brann

Director, University Experience

The Australian National University

Foreword

It gives me very great pleasure on behalf of the Australasian Council for Undergraduate Research (ACUR) to welcome you to this 2021 conference of undergraduate research. The organising committee at the Australian National University have worked tirelessly to bring you a conference featuring the highest quality undergraduate research, and to ensure that the networking opportunities provided in the online environment are as rich and rewarding as those afforded by face-to-face ACUR conferences. As a multi-disciplinary conference, you will have the opportunity to meet other undergraduate researchers from your own and other disciplines. I'm confident that you will find the experience of presenting your research and hearing the varied presentations given by others exciting and stimulating.

This year's conference theme "Your Search: Our Future" speaks to the uncertain times that we face today. Thinking about our future reminds us of the enormous challenges facing the world. Over the past two years we have all had to undergo changes in our work and study priorities. In carrying out your (re)search, you will have had to be flexible and to work in different ways. There's nothing quite like research for teaching us how to cope with the challenges of change and complexity. At a time when dogmatic misinformation and unfounded assumptions are rife throughout society, critical engagement with topics through engaging in research is essential. Indeed, I believe that there are aspects of 21st century living that make undergraduate research experience an imperative in higher education today.

To assure the high quality of the research being presented at this conference, all of the presentation abstracts have been blind reviewed by disciplinary experts. As a selected presenter you are to be congratulated for the research you have done that you are about to share. I look forward to hearing about it.

Enjoy the conference!

Emeritus Professor Angela Brew

Chair of the Australasian Council for Undergraduate Research

ACUR Supporters

The Australasian Council for Undergraduate Research (ACUR) is a non-profit organisation dedicated to the promotion and support of undergraduate research. Established in 2012, ACUR advocates for the advancement of academic inquiry amongst undergraduate students. The annual Australasian Conference of Undergraduate Research is central to achieving this objective. Now in its 8th year, the conference is hosted annually by a different Australasian university, and is organised in partnership with the ACUR Executive and ACUR Student Committee.

For nonprofits like ACUR, many of our activites and conferences are only made possible through generous contributions and sponsorships from our supporters. This year, the Australian National University (ANU) is proud to be hosting the Australasian Conference of Undergraduate Research online from September 15th-17th 2021.

Our 2021 conference is supported by the Australian Bureau of Statistics, The John Curtin School of Medical Research and the ANU Gender Institute. We would like to thank our key supporters from their generosity and continuous support for ACUR 2021.

Australian Bureau of Statistics

The Australian Bureau of Statistics (ABS) is Australia's national statistical agency and an official source of independent, reliable information. The ABS tells the real story of Australia, its economy and its people by bringing life and meaning to numbers.

The John Curtin School of Medical Research

Founded in 1948, the John Curtin School of Medical Research (JCSMR), Australian National University, is Australia's national medical research institute. The School was conceptualized by Australia-born Baron Howard Florey, who won the Nobel Prize in 1945 for his contribution to creating penicillin as a drug while working at Oxford University.

ANU Gender Institute

The Gender Institute is a cross-campus ANU institute launched in March 2011. It has a dual mission: (1) to connect our ongoing work on gender and sexuality in research, education and outreach and (2) to promote innovative research and programs to help redress gendered inequalities at ANU.

Our approach to gender is inclusive and intersectional – embracing women, men, transgender and gender diverse people – and highlighting the profound interaction between gender, sexuality, race, religion, class, age and ability in structures of unequal power within and beyond the University.

Program of Events

Wednesday 15th September

9am	Welcome to Country and Keynote Address
10am	Panel Discussion: Gender Diversity in STEM
11am	Student Presentation Sessions
12pm	Student Presentation Sessions
1pm	Student Presentation Sessions
2pm	Panel Discussion: Language, Multilingualism and Translation in Research
2pm	Workshop: Python for Computational Economics, Data Science and Econometrics
3pm	Student Presentation Sessions
4pm	Student Presentation Sessions

Thursday 16th September

9am	Student Presentation Sessions
10am	Keynote Address: Professor Alexandra Zafriglu
11am	Panel Discussion: Research in Difficult Places
12pm	Student Presentation Sessions
1pm	Panel Discussion: Tips and Tricks for Honours Success
2pm	Workshop: Polishing your Work
3pm	Workshop: It's More Than Just Statistics at the ABS
4pm	Student Presentation Sessions

Friday 17th September

9am	Student Presentation Sessions
10am	Keynote Address: 'New Voices, Big Impact'-Dr Kathryn Grasha and Sophia Ridolfo
11am	Panel Discussion: Women in Security, brought to you by ANU Gender Institute
12pm	Student Presentation Sessions
1pm	Student Presentation Sessions
2pm	Workshop: 5 things you should know before you start a PhD
3pm	Annual General Meeting of the Australasian Council for Undergraduate Research
4pm	Closing Address and Presentation of Awards: Dr James Brann

Opening Address

Professor Grady Venville
Deputy Vice-Chancellor Academic, Australian National University

Professor Grady Venville is the Deputy Vice-Chancellor (Academic) at the Australian National University in Canberra, ACT. In this role, Grady is responsible for the academic mission of the University including academic standards and the delivery of an exceptional educational experience. Her priorities include enhancing the diversity of the international and domestic student cohorts; strengthening the University's research-led and interactive teaching model; and, providing a suite of exceptional quality micro-credentials in areas of ANU expertise to enable professional and personal life-long learning.

Professor Venville has a Bachelor of Science and a Graduate Diploma of Education from the University of Western Australia, and a Graduate Diploma in Science Education (Distinction) and PhD in Science Education from Curtin University. Career highlights have included a post-doctoral appointment at King's College London; appointments as the inaugural Professor of Science Education and Dean of Coursework Studies at the University of Western Australia; and a three-year appointment to the Australian Research Council College of Experts.

Professor Angela Brew
Chair- Australasian Council for Undergraduate Research (ACUR)

Professor Angela Brew is the Chair of the Australasian Council for Undergraduate Research (ACUR). Internationally recognised for her work on the nature of research and academic identity, she has published seven books including: The Nature of Research: Inquiry in Academic Contexts (2001); Research and Teaching: beyond the divide (2006), and over 250 papers.

In 2009 Angela Brew was awarded a prestigious Australian National Teaching Fellowship to enhance undergraduate research engagement. She is an elected Fellow of the Society for Research into Higher Education (SRHE) and a Life Member of HERDSA.

Wally Bell
Welcome to Country

Wally Bell is a Ngunawal man, and his clan group are the Yharr people from Yass. Wally is a Traditional Custodian caring for country. Wally has a Cert III in Conservation and Land Management. Wally actively participates in all aspects of Ngunawal Aboriginal cultural heritage and engages with the wider community through Cultural walks and talks to develop awareness of Ngunawal culture and its practices.

Wally consults with Federal Government, State/Territory Government and Local Government Agencies regarding Ngunawal Aboriginal cultural heritage management.

Wally is a director of Buru Ngunawal Aboriginal Corporation and holds positions on at least eight other consortia.

Helen Wilson
Deputy Australian Statistician, Statistical Services Group

Helen Wilson is the Deputy Australian Statistician leading the Statistical Services Group. The Statistical Services Group has responsibility for producing the ABS' demographic, economic and social statistics.

Helen joined the ABS in July 2020 as General Manager, Labour Market and Population Statistics Division. Helen was previously the First Assistant Secretary of the Industry, Infrastructure and Environment Division in the Department of the Prime Minister and Cabinet. Helen's experience spans both the private and public sectors. She has worked as an economist in the financial sector and ran a small business.

She has spent over fourteen years working in the Australian Public Service, including in the Treasury, and the Department of the Environment and Energy, where she has worked on climate change, infrastructure and monetary and fiscal policy. Helen has a Bachelor of Economics and Arts from the Australian National University.

Australian Bureau of Statistics

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Panel Discussion Gender Diversity in STEM

Wednesday ,15 September, 10 AM

As the involvement of people identifying as female and gender diverse increases in STEM fields, so too does the general knowledge, creativity, insight, and innovation within the field. However, the obstacles faced by female and gender diverse people in science, technology, engineering, and mathematics (STEM) are well-documented. Moreover, navigating an exciting career can be daunting, and even more so when contending with systemic barriers. Panellists will discuss their careers and provide invaluable insight for young female and gender diverse people who are considering the pursuit of similar pathways.

Robin Aguilar is a Gilliam Fellow and NSF GRFP Fellow in the Department of Genome Sciences at the University of Washington where they develop technology to study and visualize satellite DNA in human genomes. While navigating their experiences as a trans, first-gen, Latinx person from rural communities in Yucatán, Michoacán, and Jamundí in the diaspora, Robin is passionate about making STEM more accessible for historically excluded individuals. Their community building includes the co-foundation of the Genome Sciences Association for the Inclusion of Marginalized Students (GSAIMS) that provides peer support and mentorship to aid individuals as they transition and navigate through their careers in STEM. Further, Robin also uses their platform to develop workshops, curricula, and art centered on story-telling within and beyond STEM. They are currently writing their memoir and graphic novel based on their lived experiences and educational aspirations.

Saron Berhane is an engineer and scientist who is passionate about using deep tech to improve the lives of people and the planet. She graduated from the University of Sydney with a degree in Biomedical Engineering and Microbiology and went on to co-found an agricultural technology startup called BioScout that stemmed from her team's university research. Her work at BioScout has been celebrated for pioneering biosecurity in the agriculture industry and has been named as one the Top 100 Innovators by the Australian (2021), one of the Tech23 (2020), the FoodTech 500 (2020) and Australia's Agripreneurs of the Year (2019). She has worked in research labs, strategy and finance roles and applied this knowledge to BioScout's disease modelling, business development as well as marketing and sales. Since leaving BioScout in April 2021, she has been working with innovative engineering organisations and deep tech startups to assist them in the translation and commercialisation of research while exploring her next big career challenge.

Dr JJ Eldridge is currently an Associate Professor and Head of Department of Physics at the University of Auckland. Her general research concerns the lives and deaths of stars, from those in our own Galaxy to those in galaxies at the edge of the observable Universe. Particularly the effects of binary interactions on the lives of binary stars and how these change the appearance of galaxies, alter the rates of different types of supernovae and gravitational wave events.

Lisa Jennifer Kewley is a Professor and Australian Research Council Laureate Fellow at the Australian National University. Kewley obtained her PhD in 2002 from the Australian National University on the connection between star-formation and supermassive black holes in galaxies. She was a Harvard-Smithsonian Center for Astrophysics Fellow and a NASA Hubble Fellow. Her awards include the 2006 American Astronomical Society Annie Jump Cannon Award, the 2008 American Astronomical Society Newton Lacy Pierce Prize, and the 2020 US National Academy of Science James Craig Watson Medal. In 2014, Kewley was elected Fellow of the Australian Academy of Science "for her fundamental advances in understanding of the history of the universe, particularly star and galaxy formation", and in 2015, Kewley was awarded an ARC Laureate Fellowship, Australia's top fellowship to support excellence in research. Kewley is currently implementing her scientific vision through her Australian Research Council Centre of Excellence in All-Sky Astrophysics in 3D (ASTRO 3D). ASTRO 3D combines Australia's radio and optical ground-based telescopes with international 8-10m telescopes and world-wide super-computing facilities to understand the formation and evolution of matter, ionizing radiation, and chemical elements in the Universe.

Francesca Maclean is a leading advocate for diversity and inclusion in STEM. Combining her personal experience of being a young woman in engineering academia and industry, and a love of unravelling, communicating, and solving complex problems, she engages a broad audience to inspire greater progress for diversity and inclusion. Francesca is the Strategy and Insights (VIC) Leader in Advisory Services for the global engineering firm, Arup, where she was the Australasian Disability Leader and Melbourne D&I Leader from 2018-2021. She founded Fifty50 at the Australian National University to promote gender equity in STEM and The Fortem Project, an educational resource designed to empower people for progress in gender equity.

For her work in championing gender equity and diversity & inclusion, she was selected for the 2018-19 Joan Kirner Young and Emerging Women's Leaders program, named ACT Young Woman of the Year 2017, one of Science&Technology Australia's inaugural Superstars of STEM, and the 2018 ANU Postgraduate Student of the Year. She was also named one of Engineer's Australia's 10 Emerging Women Leaders in 2020.

Francesca holds a PhD in tissue engineering ('17) and a Bachelor of Engineering (Hons)/Bachelor of Science ('13) with First Class Honours from the Australian National University.

Sam Cheah (Moderator) (he/they) is an engineer by training and educator by passion. At the moment this looks like serving as Chief Development Officer of Robogals, a not-for-profit empowering volunteers to run engaging engineering workshops for girls all over the world. He brings a decade of experience showing girls the possibilities available to them in STEM careers, as well as and his own experience as a transgender person in engineering related fields. He is as excited as you are to hear from our panellists!

Panel Discussion Language, Multilingualism and Translation in Research

Wednesday, 15 September, 2 PM

Are you an undergraduate considering learning a language at university level? Are you currently enrolled in classes but unsure where your new skills may take you? This panel will focus on the powers and profits of multilingualism, with an emphasis on language as a facilitator of cultural understanding and tips on how to conduct research in a foreign language. Featuring graduates and academics with extensive experience in diverse multilingual settings, this panel promises a dynamic discussion around the unmistakable value and inevitable challenges of living, working, and studying in another tongue.

Cameron Allan is a Graduate Policy Officer at the Department of Foreign Affairs and Trade. Cameron graduated with a Bachelor of Laws (Honours) and Bachelor of International Security Studies from the Australian National University (ANU) in 2020, where he was a Hawker Scholar and National University Scholar. In 2019, Cameron studied at Gadjah Mada University in Yogyakarta and the National University of Singapore as the New Colombo Plan ASEAN Fellow. Cameron volunteers as the CEO (and Co-Founder) of the ASEAN-Australia Strategic Youth Partnership – the leading organisation for youth partnership between ASEAN and Australia. He also is a Non-Executive Board Member at the theatre company Curious Legends. In 2020, Cameron sat on ASEAN Australia Education Dialogue Advisory Committee and represented Australian young people at the Y20.

Leslie Barnes is a Senior Lecturer in French Studies at the ANU, where she has taught all levels of French language and courses in French and francophone literature and film. She is also the convenor of the Global Vietnam Field School. Before joining the ANU, she taught French at the University of California, Los Angeles and at Tulane University in New Orleans, Lousiana, and English in Hanoi, Vietnam. Her area of expertise is French-speaking Southeast Asia (Vietnam and Cambodia), and she has published widely on authors and filmmakers from these countries. Her most recent publication, The Cinema of Rithy Panh: Everything Has a Soul (Rutgers University Press, 2021), is an edited collection of essays on the award-winning Cambodian filmmaker and chronicler of the Khmer Rouge regime.

Alice Dawkins is a Senior Associate at Lydekker, a boutique consulting firm with a focus on Asian economies. At ANU, Alice completed in-country fieldwork for two honours theses: one in Asian Studies, and one in Law. Her Asian Studies thesis drew upon archival material to excavate Cold War political dealmaking in Southeast Asia's Golden Triangle, winning the ACT Federation of Graduate Women's prize for the best thesis in the cohort. Her Law thesis, funded by the New Colombo Plan, involved in-country participant observation and semi-structured interviews with Burmese political lawyers and activists and is nearing publication with Cambridge University Press.

Nicholas Farrelly is Professor and Head of Social Sciences at the University of Tasmania where he leads a vibrant, multi-disciplinary academic team. In his own research he specialises in the study of political, economic and cultural issues, with a focus on rapidly changing Southeast Asian societies. A graduate of the Australian National University and the University of Oxford, Nicholas previously held key leadership positions in the ANU College of Asia and the Pacific. From 2017-2019, he was the Associate Dean responsible for engagement across government, business and civil society. Nicholas is a Graduate of the Australian Institute of Company Directors and a Senior Fellow of the Higher Education Academy. In 2006 he co-founded New Mandala, a website which has gone on to become a leading forum in Southeast Asian Studies. Nicholas was appointed to the board of the Australia-ASEAN Council in 2020.

Gemma King is Senior Lecturer in French at the Australian National University. Her research focuses on contemporary francophone cinemas and museums, specialising in the representation of multilingualism, transnational connections, colonial histories, violence and social power. Her writing has been published in French Cultural Studies, Contemporary French Civilization, L'Esprit Créateur, The Australian Journal of French Studies, Inside Higher Ed, The Conversation, Francosphères and numerous edited volumes. She is the author of the monographs Decentring France: Multilingualism and Power in Contemporary French Cinema (Manchester University Press, 2017) and Jacques Audiard (2021), a volume in Manchester UP's French Film Directors series.

Sophie Tallis (Moderator) is a final year Bachelor of Arts and Bachelor of Languages student at the Australian National University where she is a National University Scholar. During her undergraduate, Sophie has studied at Yale University and ESSCA School of Management in Paris. In 2022, Sophie intends on pursing an Honours year in French cinema. Her writing on film and culture has been published in several publications including the Burgmann Journal and has led to her working on projects with local and national film organisations. In 2020 and 2021 Sophie was accepted into the Cannes Film Festival young people's program for film criticism.

My ACUR story

"I attended ACUR in 2017 at the University of Adelaide...It was a good experience to network with other undergrads with a research interest, as well as present my own research.

I am currently a third-year medical student at ANU and will shortly be moving to the UK to start and Masters and/or DPhil (PhD) at Oxford as a Rhodes Scholar. My undergraduate research experience has given me a strong foundation to continue research projects during my medical degree and the confidence to pursue a higher research degree.

My general advice to participants at ACUR and undergraduate students would be to not limit the scope of your research interests and engage in as many types of research as possible. My personal research interests have always been focused on health and medicine, but the types of research have included lab work, computational studies, qualitative surveys, and population level studies. Each requires a specific skillset and has their own challenges, and by doing a variety of research I find it often helps you to think more broadly when tackling a difficult research question."

> “My undergraduate research experience has given me a strong foundation to continue research projects... and the confidence to pursue a higher research degree.”
>
> — LACHLAN ARTHUR

Workshop
Python for Computational Economics, Data Science and Econometrics

Wednesday, 15 September, 2 PM

John Stachurski will run a short workshop on Python for computational economics, data science and econometrics. The workshop is aimed at undergraduate students with some programming experience. Topics will include an overview of Python and scientific computing, major scientific libraries in Python and several applications.

John Stachurski is a professor at Australian National University and co-founder of QuantEcon. He received the ARC Discovery Outstanding Researcher Award and the IJET Lionel McKenzie Prize, awarded to authors who have made outstanding contributions to economic theory. His research is published in leading journals such as the Journal of Finance, Automatica, Econometrica and the Journal of Economic Theory.

Keynote Address: Professor Alex Zafiroglu

Thursday, 16 September, 10 AM

Alex Zafiroglu is Professor and Deputy Director of the School of Cybernetics at the Australian National University. She began her research career as an undergrad archaeology and anthropology student followed by post graduate research on punk subcultures (Masters) and mobile telephony (PhD). She joined ANU's 3A Institute in 2019, following a long career in research and development at Intel Corporation, focused on Cyber Physical systems and the Internet of Things. She is a member of the Australian Academy of Science's National Committee for Information and Communication Sciences and the Ethnographic Praxis in Industry (EPIC) Executive Board. She holds 11 patents.

Panel Discussion
Research in Difficult Places

Thursday, 16 September, 11 AM

Are you an Undergraduate or Masters student from any discipline interested in undertaking research in active conflict zones, war torn societies, or authoritarian countries? These places have become increasingly dangerous countries in which to work, but they remain of great concern. Although advanced methods permit researchers to study certain components of conflict or closed contexts from afar, fieldwork remains imperative. This interdisciplinary panel will allow you to hear directly from leading researchers in their respective fields on the methodological confrontations faced, as well as problems associated with access to information and quality of data received. Here, you will learn from different academic fields the strategies they applied to mitigate these obstacles, and how they examined the impact of the relevant political environment on their research choices.

Peter McArdle has worked in crisis contexts for 10 years, including situations of armed conflict in Iraq, Syria and Yemen with the International Committee of the Red Cross (ICRC). But despite this, his research into conflict and community resilience amid water scarcity in Yemen and Australia has presented significant challenges of its own. Unclear governance structures, overcoming scepticism, ethics challenges, and personal safety were a few of these and certainly not things they teach you in engineering. Peter's research is through the Department of Peace and Conflict Studies at the University of Sydney.

Nick Ross is a PhD candidate in the department of Department of Politics and Social Change at the ANU. Nick has previously worked at the University of Cambridge, at the Inclusive Peace and Transition Initiative, and as an independent consultant. He has led or co-led projects in Myanmar on behalf of the Joint Peace Fund, the Australian Department of Foreign Affairs and Trade, and several Myanmar civil society organizations.

Meru Sheel is a global health researcher and an infectious diseases epidemiologist with expertise in public health emergencies, emerging infectious and vaccine-preventable diseases. She earned a PhD in life sciences from the Queensland Institute of Medical Research and the Queensland University of Technology working on new vaccines for bacterial pathogens (group A streptococcus). Meru completed my post-doctoral training in parasite immunology with a focus on malaria and visceral leishmaniasis. She obtained an MPhil in Applied Epidemiology (MAE program) in 2017, following which she worked at the National Centre for Immunisation Research and Surveillance. Meru has worked in several dynamic and challenging environments in Australia and in the Asia-Pacific region including India, Cambodia, Samoa, American Samoa. She has responded to international emergencies in Fiji, Dominica, Rohingya Crisis in Cox's Bazar Bangladesh, Tonga and Papua New Guinea. In 2019, Meru was awarded a Westpac Research Fellowship (2019-2022) to conduct operational research in health emergencies in the context of infectious diseases and global health security. She is a strong advocate for gender equity and passionate about seeing women in leadership positions. Meru is an active science communicator and advocate for increasing STEM-trained workforce globally. In 2019 Meru was recognised as the Science and Medicine winner for 40 Under 40 Most Influential Asian-Australians. In 2020, she was awarded the ANU Vice Chancellor's Awards for Impact and Engagement.

Gatra Priyandita (Moderator) is a PhD candidate at the Coral Bell School of Asia-Pacific Affairs at the Australian National University, where he studies Indonesia's response to the rise of China. He is also a Young Leader at the Honolulu-based Pacific Forum International. A security studies scholar by training, his research interests cover Southeast Asian security and Indonesian foreign policy. He provides regular commentary on foreign policy and security issues in East Asia. Prior to his PhD candidature, he was a research assistant at Jinan University. He received a Bachelor of Asia-Pacific Security (Honours) from ANU in 2014.

Panel Discussion
Tips and Tricks for Honours Success

Thursday, 16 September, 1 PM

Are you considering undertaking Honours? Are you unsure of whether Honours is the right path for you? Perhaps you are looking for practical advice for making the most of your Honours year, or perspectives on what a year of undergraduate research is really like. Join us for our annual 'Tips and Tricks for Honours Success' panel, which brings together motivated and passionate past and current Honours students from a range of academic backgrounds. Panellists will reflect on their experiences, offer tried-and-tested tips, answer your questions, and more!

Sam Coggins is passionate about supporting farmers and food security. He completed a Bachelor of Science in Agriculture (Hons 1, university medal, convocation medal) at the University of Sydney in 2017. Since then, he has been researching how farmers use digital services through a graduate program at the Australian Centre for International Agricultural Research, a successful social enterprise in Myanmar and a Gates-funded evidence review at Cornell University. He is continuing this research through a PhD at the ANU supported by the Westpac Future Leaders program. Sam's main interests are agriculture and effective altruism.

Eleanor Foster is a Bachelor of Philosophy student in her honours year of history at the Australian National University. Eleanor's research has focused on the intersection of history, museums and cultural politics and is currently exploring the movement of colonial-era Aboriginal Australian objects into international museum collections. Eleanor has been recently published in the Journal of Australian Studies and has conducted an interview with Secretary of the Smithsonian, Dr Lonnie Bunch, for the College of Arts and Social Science's Future Self podcast. Eleanor was the 2020 Regional Winner of the Global Undergraduate Awards for history, and throughout her degree has been able to study in Hanoi, Berlin and Copenhagen.

Matt Goh completed Honours in Physics in 2019 at the ANU, graduating with First Class Honours, the University Medal, and the John Carver Physics Prize. He has subsequently worked in roles spanning theoretical physics research, data science, strategy advisory, and deep tech. He currently works as a Quantum Control Engineer at Q-CTRL, a quantum technology start-up, where he is developing optimised control protocols for the next generation of quantum sensing devices. Matt has been selected as a Rhodes Scholar and will complete a PhD at the University of Oxford, focusing on near-term applications of quantum computing.

Emma Roff is an LLB (Hons I)/BA graduate of the ANU. In 2020 she completed her Law Honours thesis, entitled Engaging with the Reality of Domestic Violence: A Discourse Analysis of Judicial Understanding in Survivor-Perpetrated Homicides. The thesis was awarded the Blackburn Medal for Research in Law for the highest-ranking Law Honours thesis in 2020 and is forthcoming for publication with the Monash University Law Review. Emma spent the past year working as an Associate to Justice Mossop of the ACT Supreme Court and is currently a Prosecutor at the ACT Office of the Director of Public Prosecutions.

Mitchell Scott is currently undertaking an Honours in Statistics at ANU after completing an Honours in Economics last year. He moved from Sydney to Canberra to study a Bachelors of Finance, Economics and Statistics and will graduate with plans to continue studying abroad, hoping to undertake a Doctor of Philosophy in Economics in the UK. Mitchell is primarily interested in improving the toolkit that researchers have available to them. Last year, he developed an insightful theoretical model that helped explain how investors and entrepreneurs search for and match with each other, and how this determines output and returns on investment. This year, Mitchell is pioneering a new approach on how we treat panel data and hopes that this will allow researchers to extract more useful information from rich datasets.

Rhiannon (Moderator) is a final-year Bachelor of Psychology (Honours) student at the ANU, where her research seeks to elucidate the neurobiological substrates underlying cannabis dependence and subclinical psychotic experiences. Rhiannon completed a Diploma of Languages in 2020, and had the fortune of studying in Copenhagen, Paris, and Singapore during her undergraduate career. As a Program Coordinator, Rhiannon was involved in the Multilingualism, Gender Diversity in STEM, and Honours panels. These panels address some of her primary interests: gender parity within and access to research, and language as a mechanism of cultural understanding. She is delighted to have had the opportunity to collaborate with such a creative and supportive team.

Workshop
Polishing your Work

Thursday, 16 September, 2 PM

Would you like to take your writing to the next level? This workshop, aimed at undergraduate coursework and research students, builds on your foundational essay and report writing skills to show you how to develop more sophisticated writing practices and develop your authorial voice. Learn how to write with persuasion and polish your work in a systematic way to improve its overall quality. The workshop introduces you to an effective process for editing your work that moves you through the macro issues of argument, structure, and paragraphing, to more micro issues of editing for expression at the sentence level.

Jillian has been teaching writing and providing one-on-one academic support since 2003 at universities in the United States, the United Arab Emirates, and here in Australia. Prior to her role as a Learning Advisor, Jillian has taught Composition and Rhetoric, Research and Argument, and Creative Writing, and she has run several academic support services at the University of Adelaide. Jillian is interested in developing students' academic confidence through her one-on-one support sessions, and breaking down assignments into manageable chunks in her teaching practice. Jillian has an undergraduate degree in English, a Masters in Creative Writing, and a PhD in Gender Studies.

It’s More than Just Statistics at the ABS

The Australian Bureau of Statistics (ABS) is Australia’s national statistical agency, providing trusted official statistics on a wide range of economic, social, population and environmental matters of importance to Australia. In this session, the ABS team will share insights into how ABS operates as an organisation and the career pathways available for graduates at ABS.

Jacqui Jones
General Manager, Macroeconomic Statistics Division

Prior to joining the ABS in February 2016 Jacqui worked in the UK Office for National Statistics, on the 2001 Census, in the Methodology Division and in National Accounts. She has extensive experience of business survey methodology and is co-author of the Wiley book ‘Designing and Conducting Business Surveys’. She joined the ABS as Program Manager of the Labour and Income branch and took up the General Manager position in June 2017. Jacqui has a BA (Hons) in Social Policy Administration and an MSc in Social Research.

Rish Babji
Household Expenditure Analysis and Review Team

After completing my degree in Actuarial Studies/Finance in 2019, I started at the ABS in February 2020 as part of the Graduate Program. During my time here, I've been fortunate enough to partake in a variety of projects that look at how big data/ alternate data can be used to improve our statistics in key areas such as CPI, National Accounts, and Retail Trade. Currently, I'm working as part of the Household Expenditure Review team to re-imagine how the Household Expenditure Survey can make use of big data, and ultimately better serve users and the community.

It’s More than Just Statistics at the ABS

Heidi Young
People Development

Heidi has experience working within the Public Sector for over 12 years in corporate services and human resources teams. Currently Heidi is working within the People Development Section of the Australian Bureau of Statistics, and has been a part of the Graduate Development Team for 3 years.

Harry Raymond
Methodology

Harry Raymond is a senior methodologist at the Australian Bureau of Statistics, specialising in complex networks. He received his bachelor degree, majoring in economics, from UWA and is currently studying Public Policy at ANU. Beginning his career at the Western Australian Mental Health Commission, he moved to Canberra to work in qualitative methodology before shifting to data integration and complex networks.

My ACUR story

The first time I presented to a lecture hall of researchers was at the 2014 Australasian Council of Undergraduate Research (ACUR) conference held at the Australian National University, Canberra. ACUR conferences are unique because they showcase high-quality undergraduate research across all university disciplines. This is unlike most conferences, which are discipline specific. I am sure our undergraduate presenters would agree that the greatest challenge was figuring out how to present their research in a way that is meaningful to a very diverse group of researchers. I recall this process being more difficult than I anticipated. The many discussions I had with my honours supervisor certainly helped me articulate my research aims and results more clearly. These are the skills that I continue to develop today as a psychologist and PhD candidate, and I hope that all students have likewise enjoyed this challenging yet rewarding conference preparation process. Another fond memory of ACUR 2014 was the student social event, where we bonded over the stress of conducting undergraduate research. As I reflect on my time as a student researcher, I am reminded that research is often an arduous process and almost never done entirely by one person. I strongly encourage students to attend all conference events and take the opportunity to meet other students and academics. Enjoy the conference and good luck in your future endeavours!

> “ACUR conferences are unique because they showcase high-quality undergraduate research across all university disciplines.”
>
> — BRYAN NEO

-Bryan Neo is a PhD/Master of Psychology (Clinical) candidate at the University of New South Wales, Sydney. He completed a Bachelor of Science (Psychology) (Honours) degree at the Australian National University, Canberra in 2014. His research aims to improve the assessment of psychopathic and callous-unemotional traits.

Keynote Address: New Voices, Big Impact

Friday, 17 September, 10 AM

Dr. Kathryn Grasha is an observational astronomer at the Research School of Astronomy and Astrophysics at the Australian National University. Her research sheds light on the physics that governs how galaxies transform and evolve by tracing how oxygen atoms we breathe and the carbon we are made of formed across cosmic time. Dr. Grasha attended the University of Colorado for her Undergraduate studies and earned her PhD in 2018 from the University of Massachusetts. She moved to the ANU in 2018 for her postdoctoral research and is now an ARC DECRA Fellow and ASTRO 3D Fellow at ANU.

Sophia Ridolfo moved from Perth to study a Bachelor of Science (Advanced) (Honours) at the Australian National University and is now in her third year majoring in astronomy and astrophysics. She is interested in pursuing a career in research after interning at the Research School of Astronomy and Astrophysics at ANU and CSIRO Astronomy and Space Science. Since February 2020, Sophia has also worked as a research assistant under Prof. Lisa Kewley and Dr. Kathryn Grasha. Her research provides insight into the physics that links extragalactic star-forming regions and the chemical evolution of galaxies.

Panel Discussion Women in Security

brought to you by ANU Gender Institute

Friday, 17 September, 11 AM

Are you an Undergraduate or Masters student interested in understanding the importance of women in international security thinking, policy, decision making, implementation, and practice? Although in recent years the international community has recognised the importance of female contributors to international security, equal representation is yet to be a reality. Drawing on the analyses of leading female security experts from a variety of backgrounds, the panel demonstrates that issues related to women's participation and leadership, and the inclusion of different gender perspectives, are integral to international security. Featuring Pichamon Yeophantong, MaryAnne Iwara, Lisa Sharland, and Natalie Sambhi, this dynamic panel will allow you to hear directly from leading female security experts, and to reveal and investigate assumptions and challenges surrounding gender in international security research and this academic career path.

MaryAnne Iwara is a Senior Research Fellow at the Institute for Peace and Conflict Resolution, Nigeria, where she provides policy solutions to peacebuilding challenges in Africa. Until July 2021, Miss Iwara was a Jennings Randolph Senior Fellow at the United States Institute of Peace working on reintegration issues with women and children formally associated with Boko-Haram. MaryAnne was a Regional Advisor to the German Development Cooperation's Regional Peace and Security Programme in Ghana, where she supported the Kofi Annan Centre design peacekeeping and peacebuilding trainings. In 2020, she researched on pastoralism, peace, and security in the ECOWAS region as a Policy Leader Fellow at the School of Transnational Governance, European University Institute, Italy. MaryAnne who is currently a PhD. candidate holds an M.A. in African Peace and Conflict Studies and a B.A in History and international Studies.

Through her research, presentations and publications, **Natalie Sambhi** is committed to helping people gain a more nuanced understanding of Indonesian civil-military relations, Indonesian defence policy and Southeast Asian security. Natalie is Founder and Executive Director of Verve Research, an independent research collective focussed on the relationship between militaries and societies in Southeast Asia. She is also a Non-resident Fellow with the Brookings Institution's Foreign Policy Program and a PhD scholar at the Strategic and Defence Studies Centre, the Australian National University, focussing on Indonesian military history. Follow her on Twitter @securityscholar

Lisa Sharland is an Adjunct Senior Fellow at the Stimson Center with the Protecting the Civilians in Conflict Program. Lisa was previously the Deputy Director of Defence, Strategy & National Security, and the Head of the International Program at the Australian Strategic Policy Institute (ASPI) in Canberra, Australia. Her research has focused on UN peace operations reform, peacekeeping effectiveness, protection of civilians, preventing and countering violent extremism, and women, peace and security. Lisa served as the Defence Policy Adviser at the Permanent Mission of Australia to the United Nations in New York from 2009 to 2014, where she provided advice on peacekeeping and defence-related policy issues and represented Australia in multilateral negotiations in the UN Security Council and General Assembly bodies, including the Special Committee on Peacekeeping Operations (C-34).

Dr Pichamon Yeophantong is an Australian Research Council Fellow and Senior Lecturer in the School of Humanities and Social Sciences, University of New South Wales (Canberra) at the Australian Defence Force Academy. She also convenes UNSW Canberra's Asia-Pacific Development and Security Research Group, and is a non-resident Senior Research Fellow at the Wong MNC Center. A political scientist and China specialist, she has conducted extensive field-based research in the region and is currently leading a multi-year project exploring the human and environmental security implications of Chinese 'economic influence' in Southeast Asia. Prior to joining UNSW, Pichamon was a Global Leaders Fellow at the University of Oxford and Princeton University.

Sally Davis (Moderator) is a PhD student at the ANU Centre for Arab and Islamic Studies (CAIS).

Workshop
5 things you should know before you start a PhD

Friday, 17 September, 2 PM

A PhD can seem like an attractive proposition when you finish your undergraduate degree, particularly if you are still not really sure what you want to do when you finish Uni. The PhD can be a great option for some people, but there are a few practical things to think about before you go ahead and enrol. In this session with Professor Inger Mewburn (@thesiswhisperer) we will talk about what it takes to start - and finish - a PhD. Inger and draws on her experience of working exclusively with PhD students for 15 years, and more than a decade of the Thesis Whisperer Blog.

Inger Mewburn is currently the Director of Researcher Development at The Australian National University where she oversees professional development workshops and programs for all ANU researchers. Aside from creating new posts on the Thesis Whisperer blog, she writes scholarly papers, books and book chapters about research education, with a special interest in post PhD employability.

My ACUR story

Hi! I'm Max, a 3rd year human biology and neuroscience student at the ANU. Ever since my first year at university, I've found research a fantastic way of getting more deeply involved with content and material that I may be learning in the classroom. But more importantly, I've also found that research has given me the chance to hone writing/communication skills that I would not otherwise have gotten to develop...With the extensive support in place to ensure you get the right feedback for your abstract, the conference is a fantastic starting place for presenting your research and is certainly an opportunity I wish I had known about right from the beginning.

"...research has given me the chance to hone writing/communication skills that I would not otherwise have gotten to develop"

— MAX KIRKBY

Australian National University

THE JOHN CURTIN SCHOOL OF MEDICAL RESEARCH

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Closing Address and Presentation of Awards

Friday, 17 September, 4 PM

Dr James Brann is an award winning University executive at The Australian National University, Canberra. James holds a Masters degree in Education, a PhD in Politics and International Studies and has provided educational leadership in Australia, South East Asia and Europe. Dr Brann is currently the Director, University Experience at the Australian National University. Dr Brann has steered change and transformation projects to modernise the student experience, in particular through redesigned service portals; national benchmarking; and university-wide student wellbeing and on boarding experiences.

In 2016, Dr Brann led the development of the Charles Sturt Outreach Team, which won the Equity and Opportunity category at the Australian Financial Review Higher Education Awards. Dr Brann seeks to drive more innovative and equitable access to quality educational through transformative change to the student experience.

Acknowledgements: Judges

A/Prof Wendy Li	Dr Mark Nelson	Mr. Jonathan Yik Chang Ting
Adiba Fattah	Dr Michelle Hall	Mr. Tan Thanh Nhan Phan (Tan)
Aileen Walsh	Dr Sam Periyannan	Ms Ebonnie Landwehr
Amelia Gulliver	Dr. Li Gao	Natalia Gulbransen-Diaz
Ann Smith	Dr. Maria Christina Bernadette C. Aguba	Nic Badullovich
Associate Professor Deborah Hill	Dr. Nadim Darwish	Olivia Jessop
Associate Professor Melissa Davis	Dr. Ulrike Schumann	Parivash Mohammad Nezhad
Associate Professor Seana Gall	Hardip Patel	Pritam Dey
Chamikara Liyanage	Jihui (Aimee) Zhang	Professor Levon Khachigian
Darren Yi Sern Low	Kate Hannan	Robert Fleet
Dr Ayse Zengin	Kate Manlik	Sally Buck
Dr Barnaby Dixson	Marina Weckend	Sally Davis
Dr Ben Eldridge	Melinda Tunbridge	Sandra WALDEN PEARSON
Dr Bev Rogers	Mina Henein	Sarah Walker
Dr Celia Harris	Miss Hannah Clark	Tayyaba Zafar
Dr Kathryn Lucas-Healey	Miss Kristy Davis	Tuukka Kaikkonen
Dr Leigh Wilson	Mr. Gatra Priyandita	

Acknowledgements: Peer Reviewers

A/Prof Wendy Li (James Cook University)	Dale Mitchell (University of the Sunshine Coast)	Dr Joshua Chu-Tan (Australian National University)
Aditya Chopra (Australian National University)	Daniel Casey (Australian National University)	Dr Karen McCluskey, senior lecturer history (University of Notre Dame Australia)
Alexandre San Martim Portes (Australian National University)	Darren Yi Sern Low (Monash University Malaysia)	Dr Katherine Hannan (Australian National University)
Angela Brew (Macquarie University)	Doan Thanh Hai, PhD Candidate (The University of Otago)	Dr Leigh Wilson (University of Sydney)
Asheem Shrestha (Deakin University)	Dr AJ Mitchell (Australian National University)	Dr Lillian Smyth (Australian National University)
Assoc Prof Judi Homewood (Macquarie University)	Dr Amanda H A Watson (Australian National University)	Dr Ludovic Rapp (Australian National University)
Associate Professor Deborah Hill	Dr Ana Manero (Australian National University)	Dr Maria Jahromi (Australian National University)
Associate Professor Melissa Davis (University of Canberra)	Dr Ben Eldridge (University of Sydney)	Dr Mark Ian Nelson (University of Wollongong)
Ben Eliasaf (Australian National University)	Dr Brett Scholz (Australian National University)	Dr Martin Earl Brummell (University of New England)
Ben Silverstein (Australian National University)	Dr Catherine Anne Ferguson (Edith Cowan University)	Dr Md Zakir Hossain (Australian National University)
Bethany Muir (Australian National University)	Dr Douglas John Davies (University of Canberra)	Dr Nathan Emmerich (Australian National University)
Bomikazi Zeka (University of Canberra)	Dr Emily Hoedt (University of Newcastle)	Dr Nic Badcock (University of Western Australia)
Bryan Neo (University of New South Wales)	Dr Erica Mealy (University of the Sunshine Coast)	Dr Richard Vogt (Australian National University)

Charmaine Jane Hugo (The University of Notre Dame Australia)	Dr Gina Wood (Curtin University)	Dr Rodney Cross (Independent Researcher)
Colette Einfeld (Australian National University)	Dr Johra Fatima (University of Canberra)	Marina Weckend (Edith Cowan University)
Dr Susanne Ilschner (FAU Erlangen and Australian National University)	Elena Smertina (University of Canberra)	Martin Forsey (University of Western Australia)
Dr Ulrike Schumann (Australian National University)	Eman Khalaf (University of New England)	Matthew James Phillips, PhD Candidate, BPsych (Hons) (Curtin University)
Dr Virginia Marshall (Australian National University)	Farzaneh Kordbacheh (Australian National University)	Melinda Tunbridge (Notre Dame Sydney)
Dr Wilma Huneke (Australian National University)	Fatemeh Mehdiabadi (University of Adelaide)	Michal Smielak (University of New England)
Dr Yixuan Zhao (Australian National University)	Feng Li (University of Sydney)	Miss Hannah Clark (University of New England)
Dr Yvette Wooff (Australian National University)	Jack B. Muir (California Institute of Technology)	Miss Kristy Davis (University of Adelaide)
Dr. Chengxin Jiang (Australian National University)	Jonathan Yik Chang Ting (Australian National University)	Miss Ruyi Tong (Curtin University)
Dr. Dandan Tian (Australian National University)	Julie Hotchin (Australian National University)	Miss Tania Zebian (University of Adelaide)
Dr. Hardip Patel (Australian National University)	Junyi Cai (University of Sydney)	Mohamed Fadhil Mohamed Ismail (University of Adelaide)
Dr. Maria Christina Bernadette C. Aguba (Batangas State University)	Kai Zhang (Australian National University)	Mr Mason Musgrove (University of Queensland)
Dr. Pascal Bercher (Australian National University)	Dr Robert Cope (Australian National University)	

Dr. Sergio José Rodríguez Méndez, Ph.D. (CS) | MIT (ICT) | MiF (Finance) (Australian National University)	Kate Manlik (Macquarie University)	Mr Shahid Nazir (University of New England)
Duan Ni (University of Sydney)	Luca Casagrande (Australian National University)	Ms Ebonnie Landwehr (Curtin University)

Acknowledgements: ACUR@ANU Student Volunteer Committee

Sneha Bahl is a second-year Master's student at the ANU. She is majoring in Machine Learning and Computer Vision. She explored the field of research during her undergraduate study of Computer Science Engineering, where she got the opportunity to undergo a few research projects. It helped her develop her analytical and problem-solving skills through hands-on learning.
She is working as a Graphics Designer in the ACUR@ANU organizing committee. She works on designing posts for promoting the Conference and its different events. In this role, she was able to use her artistic skills and got to work with some amazing people.

Fiona Ballentine is pursuing a Bachelor of International Relations and a Bachelor of Arts, which encompass a double major in Middle Eastern and Central Asian Studies and Spanish. She is enthusiastic to be working with ACUR because of its commitment to affording Undergraduate students an instrumental platform to mobilise their unique, innovative perspectives.
Fiona developed the 'Women in Security' panel because she hopes to encourage consideration of the value of gender on international security thinking, decision-making, and implementation, and to explore the value of women's leadership, and the dangers associated with their absence. Additionally, Fiona developed the 'Violence, Corruption, Authoritarianism: Research in Difficult Places', to reflect on the ethical considerations and methodological confrontations researchers are faced with in such settings.

Lucas Greenslade is a Communications Support officer for this year's ACUR conference Organising Committee. He is a fourth year undergraduate at the ANU, studying a bachelor of PPE and and a Bachelor of International Security Studies. Lucas has research interests in human rationality, Southeast Asian security and non-traditional security threats. He is passionate about the transformative impact that undergraduate research can have on student perspectives.

Oliver Hervir is a third-year undergraduate student, studying a Bachelor of Philosophy (Science) at the ANU and hoping to pursue Honours next year. His main interests are in molecular physiology, drug design, synthetic biology, and public health, but he also enjoys other scientific fields and is presenting a project on renewable battery technology at the conference this year. As the Secretary and Conference Liaison of the ACUR Student Committee, Oliver is passionate about supporting undergraduate research students to find their voice, share their research, and build a network of like-minded peers. He has worked with both the ACUR SC and the ANU Committee to promote and organise the conference. He is very grateful to be part of such amazing teams and have helped with the conference.

Rhiannon Sandiford is a final-year Bachelor of Psychology (Honours) student at the ANU, where her research seeks to elucidate the neurobiological substrates underlying cannabis dependence and subclinical psychotic experiences. Rhiannon completed a Diploma of Languages in 2020, and had the fortune of studying in Copenhagen, Paris, and Singapore during her undergraduate career. As a Program Coordinator, Rhiannon was involved in the Multilingualism, Gender Diversity in STEM, and Honours panels. These panels address some of her primary interests: gender parity within and access to research, and language as a mechanism of cultural understanding. She is delighted to have had the opportunity to collaborate with such a creative and supportive team.

Sophia Ridolfo is in her third year pursuing a Bachelor of Science (Advanced) (Honours) at ANU majoring in astronomy and astrophysics. She is interested in pursuing a career in research after interning at CSIRO Astronomy and Space Science and working as a research assistant at the Research School of Astronomy and Astrophysics at ANU. Her research provides insight into the physics that links extragalactic star-forming regions and the chemical evolution of galaxies. Sophia's passion for research motivated her to work with ACUR as a Communication Support Officer, and she is excited to be part of such an amazing program.

My name is **Sheryl Singh** and I'm a first year Finance and Economics student at the Australian National University. Within my first year, I have had the opportunity to conduct my own research at the Research School of Finance, Actuarial Studies and Statistics (RSFAS). Additionally, this year I had the opportunity to contribute to the ACUR@ANU 2021 conference as a graphic designer and social media coordinator. The role enabled me to combine my research interests in FinTech, statistics and design innovation to be applied in the conference setting. Working alongside a dynamic team, it was amazing to be supported, share perspectives, and learn to collaborate in a safe and professional environment. ACUR@ANU has definitely equipped me with immense confidence and skills to continue research at ANU and apply it in the future.

Shruti Vellat is a part of the Graphic Design team for the ACUR 2021 conference. At the Australian National University, she is learning to become an evidence-based decision-maker, innovative problem solver, and future leader through her degree in information systems. She is currently supporting social impact organisations in Canberra to solve their business challenges as a consultant with 180 Degrees Consulting. Prior to this, Shruti worked as a software engineer in India developing software applications that solved client problems in the advertising technology industry. After completion of her master's degree, Shruti aspires to help businesses improve their products and services.

Thank you

ACUR@ANU 2021 conference would not have been possible without the support of our committee, volunteers, colleagues, sponsors, and supporters. This year, we have been supported by eight students from the Australian National University, who are part of the ACUR@ANU planning committee. Our student volunteers have assisted in promotional activities, administrative support and in-conference logistical support. They have worked harder than we could ever give them credit for, and we are so grateful for their support.

We would like to also thank Emeritus Professor Angela Brew, Chair of the Australasian Council for Undergraduate Research (ACUR), Donna Bennett and the members of the ACUR Executive and student committee for their advice and support in developing this conference. It has been a pleasure to host this year's ACUR conference and share in your vision to support undergraduate researchers from across Australasia.

We would like to thank the ANU Academic Skills team for their guidance throughout our planning and preparation process. Academic Skills has generously assisted us during the peer review process and in delivering pre-conference workshops and an in-conference workshop to support student development at every stage of the process.

We would also like to express a huge thanks to our sponsors and supporters who have made this non-for-profit conference possible. In particular, our Silver sponsors, the Australian Bureau of Statistics, and to our supporters: the John Curtin School of Medical Research and the ANU Gender Institute.

It has been very humbling to have received such an overwhelming support from our ANU community and beyond. We are very grateful to our peer reviewers and judges, who have been so generous with their time and expertise. ACUR peer reviewers and judges consist of academic staff and PhD students from around the world. We really appreciate your willingness to support undergraduate research alongside your busy schedules.

We would also like to extend our sincerest appreciation to Lauren Bartsch, Engagement and Project Manager at the ANU Communications and Engagement Office for her support in developing and delivering the online conference ecosystem. Thank you for supporting us in elevating the online conference experience for our attendees.

–Mr. Rubay Tessema and Ms. Caitlin MacDonald, ACUR 2021 Project Leads

Thank you

ACUR@ANU 2021 conference would not have been possible without the support of our committee, volunteers, colleagues, sponsors, and supporters. This year, we have been supported by eight students from the Australian National University, who are part of the ACUR@ANU planning committee. Our student volunteers have assisted in promotional activities, administrative support and in-conference logistical support. They have worked harder than we could ever give them

On behalf of the Engagement and Success team, I would like to say a special thank you to our conference organisers; Mr. Rubay Tessema and Ms. Caitlin MacDonald who have worked closely with the ACUR chair, ANU and ACUR student committee's to deliver key initiatives under the theme "Your Search, Our Future" for the ACUR 2021 conference.

Both Rubay and Cait have worked incredibly hard over the past nine months to ensure a high quality experience for contributing undergraduate students. Their work behind the scenes; training and mentoring the ANU student committee to develop the program and panel sessions, investigating and securing an online platform and actively engaging with the Academic Skills team and peer reviewers ensured that they facilitated opportunities to a greater numbers of undergraduates to showcase their research than in previous years.

We would like to recognise and celebrate Rubay and Caitlin's efforts, along with the student committee who have all contributed to this high quality undergraduate research conference. We sincerely thank all those who contributed and we hope you all enjoy the online experience.

Ms. Ash Dowling, Deputy Manager, Student Development, Engagement and Success.

Australian National University

Presenting Students | Alphabetical by first name

Student Name	Session Name	Session ID
Abby Gallagher	Government and the Law	15.16.2
Aidan Shaw Riley	Philosophy	16.09.1
Alexander Hendry	Conservation	15.16.3
Amber Anderson	Quantitative and Qualitative Data for Tomorrow	17.12.4
Amna Rafiq	Reviewing the Literature on Cancer	15.13.2
Amy Lu	Natural Sciences: Visualised	15.13.3
Andrew Quattrocchi	Brain Research	17.09.4
Arabella Hall	Dark Histories, Critical Eyes	16.16.1
Arjayeeta Samadder	Brain Research	17.09.4
Asha Clementi and Rebecca Crisp	Group presentations II	17.09.3
Avni Bharadwaj	Education Matters	15.15.2
Benita Lee	Whose truth?	15.11.4
Benjamin Lamb	Culture and Identity: Visualised	16.12.2
Brandon W Smith	Nursing and Caregiving	16.12.4
Breony Webb	Conservation	15.16.3
Bridget Mac Eochagàin	Values, Cultures and Norms	17.12.1
Bridget Smart	Insights from a Digital World	15.11.1
Brindy Donovan	Democracy and Governance	16.09.2
Brittany Smith	The Power of Language and Discourse	15.15.1
Brooke Petre	Gender and Sexuality II	16.16.4
Callum McKenzie	Historiography: Visualised	15.16.5
Callum Ormonde	Neurological Insights	15.13.4

Carmine B Buss	Values, Cultures and Norms	17.12.1
Charmaine Howie	The Natural Environment	15.12.3
Cherry Zheng	History	16.12.1
Christine Hill	Wellbeing and the Self	15.16.1
Claudia Goodman	Reviewing and Theorising Health	17.12.3
Coco Huang	Drugs, Treatments and Healing	17.13.5
Conor Patton	Insights from a Digital World	15.11.1
Courtney Muir	Care and Patient Rehabilitation	15.11.3
Cynthia Jia Ying Feng	Brain Research	17.09.4
Daniel O'Connor, Patrick Capaldo and Jason Huynh	Group Presentations I	16.12.5
Darby Liersch	Quantitative and Qualitative Data for Tomorrow	17.12.4
Darsiha Balakirishnan and Nibras Jasim	Group Presentations I	16.12.5
Deeahn Sako	Insights from a Digital World	15.11.1
Dejun Cai	Soil	17.09.2
Dorothy Mason	Foreign Matters	15.11.2
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Dylan James Woodhouse	Government and the Law	15.16.2
Edward Hootman	Sleep	16.09.4
Eleanor (Nellie) Pease	The Natural Environment	15.12.3
Elissa Price	Nursing and Caregiving	16.12.4
Emma Brown	Body Image and Eating Disorders	16.16.2
Emma Lin	Complex Problems: Visualised	17.13.2
Emma Sinn	Cardiovascular Research	17.12.2
Evelyn Richards	Philosophy	16.09.1

Fletcher Howell	Chemistry: Macro and Micro	16.16.5
Flynn Linton	Physics	17.13.3
Freya Langley	Gender and Sexuality I	15.13.1
GARY DEEBAN FERNANDEZ	Hope and Resilience	15.12.1
Georgia Acutt	Cognition and psychology	15.13.5
Georgia Hayes	Historiography: Visualised	15.16.5
Ginger-Rose Harrington	Dark Histories, Critical Eyes	16.16.1
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Hadassa Gitau	Culture and Identity: Visualised	16.12.2
Hannah Ahmad	Culture and Identity: Visualised	16.12.2
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Isla Ford	Complex Problems: Visualised	17.13.2
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Jessica Tacey	Multidisciplinary Perspectives on the Environment	16.15.1
Jessica Turner and Narelle Jones	Group presentations II	17.09.3
Jia Wei Teh	Astrophysics	15.16.4
Jocelyn Ware	Astrophysics	15.16.4
Katie Clark	Mental health and wellbeing	15.12.4
Kayla Jaye	Reviewing the Literature on Cancer	15.13.2
Keira Mullan	The Power of Language and Discourse	15.15.1
Kip Hay	Gender and Sexuality II	16.16.4
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Laura Mobbs	Body Image and Eating Disorders	16.16.2
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Lily Kenchington-Evans	Drugs, Treatments and Healing	17.13.5
Lucinda Bek	Vaccines and Medicines	15.15.4
Luke Waldie	Cancer and the Immune System	15.12.2
Madeleine McGregor	Whose truth?	15.11.4
Mark Wadsworth	Whose truth?	15.11.4
Mark Werner	Government and the Law	15.16.2
Martha Reece	Physics	17.13.3
Max Kirkby	Neurological Insights	15.13.4
Michael R Gee	Materials Engineering	16.12.3
Mikayla Hyland-Wood	Soil	17.09.2
Moeko Reilly	The Power of Language and Discourse	15.15.1
Nan Chen	Cognition and psychology	15.13.5
Natalie Smith	Cancer and the Immune System	15.12.2
Natalie Tuckey	Nursing and Caregiving	16.12.4
Natalien Isenia	Democracy and Governance	16.09.2
Neco Kriel	Physics	17.13.3
Neha Bal	Sleep	16.09.4
Neil Lu	Astrophysics	15.16.4
Nicholas Herriot	History	16.12.1
Nohad Maroun	Cancer research: Visualised	15.15.3
Nur Hanifah	Conservation	15.16.3
Oliver Hervir	Materials Engineering	16.12.3
Olivia Nolan	Foreign Matters	15.11.2
Olivia Rose Maurice	Cognition and psychology	15.13.5
Paige Goldman	Care and Patient Rehabilitation	15.11.3

PALAK	Cancer research: Visualised	15.15.3
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Phan Quoc Khang Nguyen	Materials Engineering	16.12.3
Pranujan Pathmendra	Reviewing the Literature on Cancer	15.13.2
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Rebecca Marie Hetherington	Gender and Sexuality II	16.16.4
Rochelle Schoff	Democracy and Governance	16.09.2
Rosemary Zielinski	Physics	17.13.3
Ruby Olsson	Conservation	15.16.3
Ruby Olsson	Multidisciplinary Perspectives on the Environment	16.15.1
Sabrina Morrison	The Natural Environment	15.12.3
Sanyukta Singh	Neurodegenerative Diseases	16.16.3
Sarah Rosolen	Neurodegenerative Diseases	16.16.3
Shanara Visvalingam	Wellbeing and the Self	15.16.1
Shannon Campbell and Zoe Chandler	Group Presentations I	16.12.5
Shi (Tina) Lin	Body Image and Eating Disorders	16.16.2
Shuo Li	Education Matters	15.15.2
Siqi Chen	Drugs, Treatments and Healing	17.13.5
Sophia Ridolfo	Astrophysics	15.16.4
Sophie Hogg	Values, Cultures and Norms	17.12.1
Soriya Farah	Historiography: Visualised	15.16.5
Stefan Subasic	History	16.12.1
Stefanie Krieg	Historiography: Visualised	15.16.5
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Sylvester Jian Ming Lim	Climate and Natural Biology	17.13.4
Sylvia Eugene Dit Rochesson	Care and Patient Rehabilitation	15.11.3
Tabitha Singer	Neurodegenerative Diseases	16.16.3
Tamara Bock	Cancer and the Immune System	15.12.2
Tawanrat Marit	Complex Problems: Visualised	17.13.2
Te Wai Pounamu Telena Hona	Natural Sciences: Visualised	15.13.3
Thy O'Donell	Complex Problems: Visualised	17.13.2
Tiarne Mitchell	Chemistry: Macro and Micro	16.16.5
Tina Marie Sheil	Hope and Resilience	15.12.1
Toni Hassan	Hope and Resilience	15.12.1
Tori-Lee Monk	Soil	17.09.2
Veronica Padilla	Climate and Natural Biology	17.13.4
Vincent Zhang	Computer Vision Models	17.09.1
Vrinda Jain	Neurological Insights	15.13.4
Weifeng Tao	Gender and Sexuality II	16.16.4
Xinqi Zhu	Computer Vision Models	17.09.1
Xuyang Shen	Quantitative and Qualitative Data for Tomorrow	17.12.4
Yashaswat Malhotra	Cardiovascular Research	17.12.2
Yastika Banerjee	Vaccines and Medicines	15.15.4
Yimeng Cheng	Mental health and wellbeing	15.12.4
Yiting Luo	Democracy and Governance	16.09.2
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Ziqi Yuan	Chemistry: Macro and Micro	16.16.5

Australian National University

Insights from a Digital World | 15th September 11am

Session ID: 15.11.1

Conor Patton | Bachelor of Philosophy (Honours), The University of Western Australia

"Lurk More": A digital ethnography exploring the emergence of identity through symbol on an anonymous website

Anybody can access /pol/, a sub-sub-board of popular website 4chan; all one requires is a computer and an internet connection. However, upon entering, one uncovers a digital place quite unlike any other. Here, political vitriol fuses with crude humour. Users casually deride one another, reprimanding anybody who fails to correctly participate in their unique cultural 'slang' of insults, nuanced references, and profanity. A highly insular community, /pol/ exists within a deceptively anarchic interface; there is no tailored 'news feed', users are anonymous, and posts expire rapidly. This ethnography explored how such a community maintains identity, finding that it did so not despite these ephemeral and discrepant links between users, but rather, because of them. Departing from the ethnographic archetype, I did not directly interact with users, but 'lurked', or participated only by observing. Most users engage with /pol/ in this way, and it presents a more viable means of approaching such online communities. The research suggests that identity on /pol/ is expressed both individually and collectively, and is established via two primary symbols: the sharing of memes solely comprehensible to /pol/ users, and the demonstration of fluency in a similarly impervious shared dialect. Together, these allow users to prove their identity as culturally valid members by adopting /pol/'s digital hexis - the way users interact online - posting content that conforms to communal expectations, and enthusiastically pillorying that which does not. This reflects and reinforces the broader habitus of distrust toward outsiders and presents a strange and fascinating subject of ethnographic inquiry.

Deeahn Sako | Graduate Diploma of Psychological Studies, Western Sydney University (WSU)

"Mummy, let's see Grandma again!": Facilitating inter-generational communication in video-calling formats

The COVID-19 pandemic and its associated restrictions have resulted in an unprecedented increase in video-calls. Video-calling platforms are both an excellent alternative to and a significant departure from face-to-face interaction, requiring interlocutors to adjust accordingly. The ease with which one adapts to video-calls is influenced by such factors as communicative style and technological capabilities. Older adults and young children are two demographics least equipped to adopt the sudden substitution of face-to-face with video-call interactions imposed by COVID-19 lockdowns and restrictions. A

recent article in The Conversation (Lam-Cassettari et al., 2020) reported their findings from an Australian survey, showing that many grandparents have relied on video-calls to remain in contact with their grandchildren throughout the COVID-19 pandemic. The responses to this survey inspired an investigation into the particular challenges video-calling poses for the grandparent-grandchild dyad and how such issues might be addressed.

A detailed literature review called focus to attentional, communicative and technological factors that pose particular barriers to older adults and young children when video-calling. Considerations such as the shorter attention span characteristic of young children and the limited interface literacy stereotypical of older adults, as well as the vastly divergent communication styles of these demographics, show how grandparent-grandchild communication is disproportionately disadvantaged by replacing face-to-face interactions with video-calls. However, by incorporating this knowledge into the design of a video-calling platform, an application or extension can be created to address the difficulties. Video-call features that cater to the specific needs of older adults and children can facilitate communication between grandparent and grandchild. Automated attention-getters for children, an interface that varies to reflect the technological capabilities of the user and built-in activities catering to different ages and interests are features that can enable a relationship to develop even when physically apart. A detailed description of video-calling features are given in this paper.

In order to further the current research and substantiate the value of attention-getters on video-calls, the current study investigates grandparent-grandchild engagement in Zoom calls in both filtered and normal conditions. Data on looking times, facial expressions and self-report measures are being collected.

Research has shown a wide variety of benefits resulting from grandparent-grandchild relationships, ranging from individual physical and mental health to broader societal security and economic benefits. In light of such evidence, and the “new normal” of societal changes the COVID-19 pandemic has caused, using technology to foster grandparent-grandchild relationship growth has never been more important.

Special thanks to Dr Tijl Grootswagers and Prof Paola Escudero, whose supervision and guidance were invaluable in this project.

Bridget Smart | M.Phil in Applied Mathematics and Statistics, The University of Adelaide (UoA)

How the online landscape impacted events during the 2021 Capitol Riots

In Washington, on the 6th of January 2021, a riot occurred which aimed to prevent the counting of the Electoral College votes, with rioters eventually breaching the Capitol Building. Online social networks had a large influence on the formation of ideas that led to these riots, and helped the rioters organise. More generally, online social networks are a large and growing factor in the formation of opinions around topics from politics to public health. Understanding influence online can be better captured and understood is key to developing strategies that support safety and security, counteract malicious activity and ensure productive dialogue in our online communities.

Using 1.8 million Tweets containing the keyword 'trump', this work develops a strategy to identify patterns of behaviour in the online landscape from the Capital riots, gauging public opinion and response to events both internal and external to the online network. The contribution is a framework capable of quantitatively identify users and events of interest, which were validated against real world events.

A lexicon and rule based sentiment analysis tool is used to analyse the large volume of qualitative data, identifying users who drove emerging sentiments toward key events and topics. The limitations of these tools are explored, and findings are combined with network analysis tools, including betweenness centrality, to provide a robust framework for identifying the critical users and events.

This work is the first step toward developing a generalised framework to identify sources of influence online, capturing features which contribute to the success of phenomena including disinformation campaigns and "echo chambers".

I would like to acknowledge the supervision of Associate Professor Lewis Mitchell.

Australian National University

Foreign Matters | 15th September 11am

Session ID: 15.11.2

Grace Lim | Bachelor of International Security Studies, the Australian National University (ANU)

Rational Actor and Behavioural Models of Decision Making on the UK's Decision to Join the 2003 Invasion of Iraq

This research uses the case study of UK's decision to join the 2003 invasion of Iraq to compare the rational actor (RAM) and behaviour models (BM) of decision-making. Although limited to open-source information about the UK government's decision-making and Prime Minister Blair's thought process, this research analyses how factors like individual bias, public opinion and alliance dependence brought about one of the most controversial British foreign policy decisions. It also demonstrates the importance of foreign policy analysis of identifying personal bias disguised as rational considerations. RAM finds that because of alliance dependence on the US, the UK had incentives to resist the myopic temptation to free ride and prioritise alliance maintenance over other rational considerations. RAM conceptualises the state as a unitary actor and ignores imperfect reasoning and bias; BM focuses on Blair's individual psychology. BM rejects the overemphasis of alliance maintenance - historically, the Anglo-American alliance has survived conflicting positions. Rather, Blair's personalisation of the alliance and his overestimation of his personal influence over the Bush administration contributed to increased privilege of alliance maintenance in decision-making. Finally, Blair's orientation to his political environment and confidence in challenging domestic political constraints like public and parliamentary opinion disposed him to prioritise strategic imperatives over domestic political constraints. Although findings from this research show that BM more accurately explains the UK's decision than RAM, BM has greater predictive ability in general. The cost-benefit analysis can be estimated but it is nearly impossible to measure the individual impact of different psychological factors.

Dorothy Mason | Bachelor of Philosophy (Honours), Asia and the Pacific (ANU)

Contested terrains: Land governance reform during Myanmar's democratic transition

Between 2011 and 1 February 2021, Myanmar began to move from authoritarian rule to quasi-democracy. This period was marked by intense social, economic and political change, including efforts to accommodate local demands for rights-based land reform and restitutions. But while the new regime set up some mechanisms to redress past injustices and return confiscated lands, the majority of reforms appear to have exacerbated landlessness and land insecurity for the

rural poor, especially in ethnic nationality-controlled areas. Drawing on library and archival research, along with interviews with practitioners working on land reform during this period, this thesis seeks to understand the motives behind the reform process and the key contestations over land it generated.

I argue that the land reforms were embedded in part of a broader neoliberal development agenda, driven by an influx of foreign investments in land, which sought to advance the commercial and political interests of Myanmar's military elites. Yet, while many military-affiliated businesses profited from the new legal framework, which formalised existing patterns of land appropriation of dispossession, the reforms also partly constrained the military's absolute exercise of power. In particular, the promotion of individual farmers' rights and the opening up of civil society carved out a political space to contest military dominance in the land sector. I argue that this process created new political subjectivities and produced new configurations of state-society relations, ultimately leading to a growing, and increasingly untenable, divergence between the military-state and rural civil society.

Olivia Nolan | Bachelor of International Security Studies and Bachelor Politics, Philosophy and Economics (PPE), the Australian National University (ANU)

An Investigation of the Third Taiwan Strait Crisis

The Taiwan Crisis (June 1995 - March 1996) was a crucial turning point in Sino-Taiwan-US relations. 25 years on, there continues to be wide-ranging debate over the nature of the crisis and what caused it. This study aims to examine the major causes leading to the crisis, key phases of the crisis and its implications. First, the study examines the background to the crisis. Despite burgeoning economic interaction and cross strait travel from 1987, political relations between the PRC and Taiwan have been tenuous. This case study argues that Taiwan's democratisation, power struggles within the Chinese Communist Party and America's ambiguous policy stance towards Taiwan have all but extinguished hope of Taiwan's reunification with the PRC and meaningful political cooperation. The study also highlights how Taiwan President, Lee Teng Hui's, trip to America in 1995 was the proximate spark that ignited Beijing's ire over international support for Taiwan's sovereignty. Endeavouring to undermine President Lee and legitimise its claim to Taiwan, Beijing undertook military exercises from July 1995 - March 1996. To maintain its reputation in the region and stave off criticism from Republican Representatives, the U.S. Congress agreed to deploy an aircraft carrier east of Taiwan in March 1996, escalating tensions to crisis point. The study finds that American might, deft diplomacy, and China's clear signalling diffused the crisis leading to an era of unparalleled Sino-U.S. detente. In conclusion, the study discusses the important lessons from the crisis including the necessity to address misperceptions and initiate confidence building measures.

Australian National University

Care and Patient Rehabilitation | 15th September 11am

Session ID: 15.11.3

Paige Goldman | Bachelor of Occupational Therapy (Honours), The University of Queensland (UQ)

Occupational therapy rehabilitation groups: understanding the patient experience

Inpatient rehabilitation patients often experience increased anxiety and levels of tension due to associated psychosocial adjustments, such as, loss of independence and physical capacity, uncertainty of prognosis and changes in self-esteem. Whilst research explores relaxation practice with specific population groups, there has been limited occupational therapy-specific relaxation group research in inpatient rehabilitation settings. This study aimed to understand patient's experiences in relaxation groups and the impact of relaxation participation on patient tension. Participants were urban metropolitan hospital rehabilitation inpatients who were participating in the relaxation group. This study used a mixed methods design. Quantitative data were collected from 48 participants who completed a self-rating of tension scale prior to and following group participation. This data were analysed using descriptive analysis. Qualitative data were collected using semi-structured interviews with 10 participants who attended a minimum of two relaxation groups. This data were analysed using content analysis. Following group attendance, 68% of participants reported a reduction in tension, with this being significant (z=-7.606; p less than 0.001) and no participants reported increased tension. Key themes that emerged from the interviews related to the mood and ambient environment of the group, and the outcomes of relaxation group, such as the impact of group participation on mood, sleep and ability to engage in rehabilitation. The findings of this study provide insights into patient experiences of relaxation group participation and recommendations for facilitation of relaxation groups in an inpatient rehabilitation setting. Further research warrants exploration into the long-term use and effectiveness of relaxation strategies post discharge.

With thanks to fellow co-researchers Mereki Collins, Freyr Patterson, Tammy Aplin and Brendan Issacs.

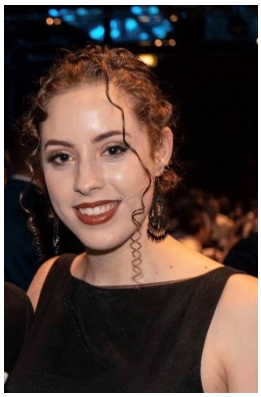
Sylvia Eugene Dit Rochesson | Bachelor of Arts (Honours), The University of Sydney

IMPROVING SEXUAL HEALTHCARE FOR LGBTIQ+ CANCER SURVIVORS: AN INVESTIGATION OF CHALLENGES FACED BY HEALTHCARE PROVIDERS

Although sexual health is important to the wellbeing of many cancer survivors, it is not routinely addressed by healthcare providers (HCPs). Existing barriers

which hinder communication about sexual health may be exacerbated when HCPs care for lesbian, gay, bisexual, transgender, intersex, and queer (LGBTIQ+) communities due to limited health education and training that they receive. As such, this study aimed to explore the experiences of Australian and New Zealand HCPs with LGBTIQ+ cancer survivors to uncover strategies to improve sexual healthcare. HCPs were recruited through advertisements distributed in (i) healthcare professional networks, (ii) social media posts, and (iii) emailed invitations to participate in an online survey and qualitative interviews exploring their knowledge, attitudes, and practices. Our survey revealed healthcare providers (n=60; oncologists=33%, radiation therapists=25%, nurses=20%, allied health/other=22%) had moderate knowledge of LGBTIQ+ healthcare on average. The majority felt uninformed about LGBTIQ+ healthcare (70%) and wanted more education (87%). Although most were comfortable discussing sexual health (68%), only half felt comfortable discussing this topic with LGBTIQ patients (53%). Qualitative analyses of interviews (n=11) yielded four main themes, indicating (1) HCPs' knowledge and values, (2) patients' needs, (3) organisational barriers, such as limited resources, and (4) systemic values, often prioritising curative treatment over general wellbeing, impacted decisions to discuss sexual health with LGBTIQ+ patients. These findings suggest that existing barriers to communicating about sexual health increase the complexity of delivering individualised cancer care for LGBTIQ+ survivors. LGBTIQ+ health education and structural support within healthcare systems is needed to improve HCPs' capabilities to care for LGBTIQ+ patients' sexual healthcare needs.

This research was made possible through the support and contribution of my co-authors: Associate Professor Haryana Dhillon and Dr Alana Fisher.



Courtney Muir | Bachelor of Psychology (Honours) with the degree of Bachelor of Human Sciences, Macquarie University

Anxiety in later-life: an examination of family accommodation

Family accommodation refers to the ways in which loved ones take part in a person's anxiety, such as providing excessive reassurance or facilitating avoidance. Although these behaviours are typically intended to reduce the individual's distress, they unintentionally maintain and exacerbate anxiety by reducing exposure to feared stimuli. Despite evidence documenting the almost ubiquitous nature of accommodation in families of children and young adults with anxiety, and the association with greater anxiety severity and poorer treatment outcomes, there is a paucity of research in later-life. Older adults can experience a range of physical, social, and cognitive changes that may affect the experience and impact of accommodation. For example, differentiating appropriate assistance and caregiving from anxiety-related accommodation may be more complex for older adults with physical limitations or health problems. Increased levels of late-life anxiety, potentially exacerbated by accommodation, can lead to a reduction in quality of life, increased risk of suicide, and earlier onset of disability. This study aimed to examine how older adults experience family accommodation, and the relationship between accommodation and anxiety severity. To examine this, older adults and their loved ones completed measures on accommodation, anxiety, depression,

reassurance-seeking, health, and functional ability. The dyad also completed two behavioural tasks designed to elicit accommodation from supporters, which was qualitatively coded on criticism, reassurance, avoidance, and intrusiveness. This methodology allows for the examination of factors contributing to accommodation, including anxiety, and the understanding of the types of accommodation portrayed in older adults. The results for the questionnaire and behavioural tasks will be presented. With previous research in pediatric anxiety highlighting the importance of reducing family accommodation in treatment, this study has implications for understanding the mechanisms of late-life anxiety and providing an insight into the future of treatment for anxiety.

Australian National University

Whose truth? | 15th September 11am

Session ID: 15.11.4

Benita Lee | Bachelor of Arts, The University of Texas at Austin

(Middle-Skill) Jobs are Going Away…Now What? Challenges and Key Considerations for Sector-Based Workforce Training Programs

Economic disruptions driven by automation and globalization have adversely affected low-skilled workers and catapulted labor issues to the top of the political agenda. Programs to retrain displaced workers have emerged as a popular policy response to address the plight of these workers. The US Department of Labor promotes sector-based programs through which local employers and educational providers collaborate to retrain and place displaced workers in jobs in new fields. Despite the heightened political salience of the problem and growing support for retraining programs, little is known about their effectiveness.

This study examines the challenges these programs face and identifies key factors that administrators should consider in order to improve program outcomes. It relies on interview data collected from twelve sector-based program managers. The study finds three key challenges beyond the obvious one of insufficient programmatic funding. First, program participants face structural barriers that transcend program mandates. Barriers include inadequate access to transportation, childcare, and housing as well as obstacles inflicted by criminal records. Second, administrators struggle to balance competing interests of employers and job-seekers. And third, they struggle to place workers in new jobs that offer terms of employment that match or exceed those of their previous positions. The study explains how these factors undermine participant program-completion rates and subsequent worker retention. It also identifies ways in which administrators can meet the challenges they face—such as by advocating locally for reforms that address structural barriers—while acknowledging the constraints within which administrators operate.

Project was supervised and guided by Dr. Rhonda Evans at The University of Texas at Austin.

Mark Wadsworth | Bachelor of Philosophy, University of Canberra

EQUITY AS FAIRNESS

In Kakavas v Crown Casino (2013), Harry Kakavas was known by Crown Casino (Crown) as a 'classic pathological gambler' yet it allowed him to continue gambling at its Melbourne premises. Kakavas subsequently claimed under equity law that he was unconscionably exploited by Crown. Equity can set aside contracts if a party can show unconscionable exploitation by a stronger party. The High Court unanimously denied Kakavas relief to set aside his gambling transactions with Crown. Denial was based on understanding him as a capable intelligent person who chose not to control himself whilst gambling rather than a victimised addict. The dissertation argues that the denial should be superseded on the basis that the Court did not properly understand Kakavas' addiction. The dissertation offers three arguments founded on law and political theory. Firstly, 'Rawlsian Equity' (considering unconscionability using Rawls' Veil of Ignorance Test) is a suitable theory for use within law to provide the 'ideal' conscience in addressing Kakavas' claim that he was unconscionably exploited. Secondly, a reasonable person behind that Veil would consider the background circumstances and make use of well-established scientific data about problem gambling. That data shows that problem gamblers are addicts, lacking volition in some circumstances and thus impermissibly exploited by entities aware of that disability. Lastly, equity should provide relief to Kakavas on basis of the mind of a reasonable person behind the veil of ignorance who considers background circumstances and use of scientific data.

Madeleine McGregor | Bachelor of Laws (Honours), Bachelor of Economics, the Australian National University (ANU)

WHAT GOOD IS THE TRUTH? The role of fact-finding for international disputes in a post truth era: Syria and Myanmar as case studies

The recent rise of 'alternative facts', polarisation, and appeals to emotion over objective information has been coined the 'post-truth' era. This calls into question the utility of Commissions of Inquiry (CoI) and Fact-Finding Missions (FFMs), which engage a third party to determine questions of fact, with the aim of resolving international disputes. The impact of 'post-truth' on international dispute resolution has received no previous academic attention, with post-truth studies focused on domestic socio-political consequences. This research essay asks whether post-truth conditions have rendered CoIs and FFMs pointless. This is assessed by identifying trends in the use of CoIs and FFMs by United Nations organs, and reviewing literature and international responses to the CoI into Syria and FFM on Myanmar. The paper argues that the conditions of the 'post-truth' era create unique opportunities for resolving disputes by CoIs and FFMs. First, CoIs and FFMs can bypass political impasses and requirements of state consent to reduce international inaction in response to disputes. Second, fact-finding can unravel complexity in modern conflicts and provide a credible basis for further action by states or international organisations. Third, the versatility of CoIs and FFMs allows for adaption to changing dimensions of a conflict or evidentiary requirements of accountability bodies such as the International Criminal Court. The opportunities identified support an increased role for CoIs

and FFMs in the resolution of modern international disputes. These findings are significant to ensuring international dispute resolution adapts to best maintain international peace and security, and promote the rule of law.

Australian National University

Hope and Resilience | 15th September 12pm

Session ID: 15.12.1

Tina Marie Sheil | Bachelor of Anthropology, Western Sydney University

Living the Pandemic: people, community, and resilience in the upper Blue Mountains, NSW, 2020-2021.

This research project is a case study focusing on the community of the upper Blue Mountains, NSW, Australia. It explores the extent to which immobility, imposed as a government response to COVID-19, changed people's perceptions of their immediate social and geographic community. The upper Blue Mountains was chosen because it hosts a diversity of neighbourhood organisations, has few transitory peoples, and the residents have a strong sense of community, evidenced in the response to the bush fires of 2019-2020. The research was conducted via observations and interviews with residents and neighbourhood organizational staff during the summer of 2020/21. Desktop surveys of local media, Facebook and government websites were also conducted. What emerged strongly was 1) 'Gratitude' for local leadership and for the beauty and relative freedom of the local environment; 2) 'Preparedness' - interviewees felt that they had already been mobilized as a consequence of their collective response to previous bushfires; 3) 'Real Community' - there is a strong sense of the 'Mountains' as a separate and more 'authentic' community (than Sydney). Given the world is expected to face an ever-increasing array of man-made and environmental challenges, research in the area of community resilience is of vital important. The three themes explored; Gratitude, Preparedness and Community Connection, are all indicators of the upper Blue Mountains community's level of resilience. This case study can teach us more about what types of communities will be successful in combating the negative impacts of crisis, which consequently, will contribute to future crisis management strategies.

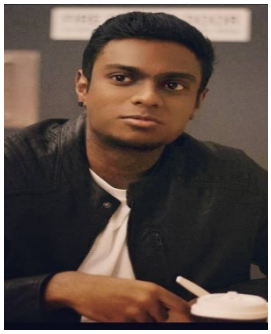
Research project was supervised by Profession Mary Hawkins and Dr Helena Onnudottir, School of Social Sciences, Western Sydney University

Toni Hassan | Bachelor of Visual Arts (Honours) - the Australian National University

Good grief: Conversation Pieces in the wake of Black Summer and Canberra's severe hailstorm

My Honours project in the ANU School of Art and Design taps into the emerging topic of environmental grief and storytelling; mourning and sharing as a starting point for transformative change and the possibilities of hope. Australia's Black Summer of 2019-20, which included encroaching bushfires, a devastating hail

storm and near unbreathable air in Canberra, heightened consciousness about climate change and the depleted biosphere. The smoke that enveloped the capital region had impacts on body and breath. I knew this as a person who has lifelong asthma. The ecological crisis moved me deeper into a lament which prompted questions about how I can engage narrative storytelling and visual art to process my grief and provide a conduit for other people who feel the same, and, at the same time, celebrate and showcase what might be spiritually sustaining? A key research question emerged: How can I make artwork that cathartically engages my grief and moves climate change from the abstract to the embodied? The research fed a social art practice project; a set of interviews with women called Conversation Pieces that focussed on the impacts of the Black Summer and the hailstorm on the body and on the breath. It led to a number of multimedia responses (using the materiality and language of paint with found canvas as well as video) that bear witness to the idea of stories as cathartic and protective. Among the eclectic works, in the end phase of the project, is the curation of an 'act of meaning', a multimodal, sensory and participatory event collaborating with musicians to create a space for shared climate grief (changes in an assumptive world) and to support existing and new relationships (with the self, planet and others).



GARY DEEBAN FERNANDEZ | Bachelor of Psychology (Honours), Macquarie University (MQU)

Effects of Brief Mindfulness and Self-compassion Meditations on Psychological Well-Being

Mindfulness and Self-compassion meditations are beneficial interventions in enhancing psychological wellbeing and mental health among clinical and non-clinical populations. Mindfulness and Self-compassion interventions, namely Mindfulness-Based Stress Therapy and Compassion-Focused Therapy, have been largely effective in alleviating psychological distress by attenuating anxiety, stress, depression and negative affect and cultivating positive affect. However, several studies accredit self-compassion in promoting psychological wellbeing rather than mindfulness. Yet, research exploring such propositions remains scarce. Furthermore, despite proliferations in meditation research, few studies have accounted for expectancy effects, rendering mechanisms underlying the positive effects associated with mindfulness and self-compassion interventions unclear. The current study examines the effects of brief mindfulness and self-compassion meditations on stress, anxiety, affect and depression amongst first-year and second-year psychology undergraduates. Further, it investigates whether participants' expectations enhance any benefits of the meditations. The current study utilises a randomised experimental single-factor between-subjects design with one independent variable (type of meditation) with three levels; mindfulness meditation, self-compassion meditation and a control. It is hypothesized that self-compassion meditation will be the most effective in mitigating stress, negative affect, depression and anxiety as well as promoting positive affect followed by mindfulness meditation and lastly the control condition (H1) and; treatment expectancy will play a moderating role wherein the positive effect of meditation condition on mean change scores in stress, negative affect,

depression and anxiety as well as the negative effect of meditation condition on mean change scores in positive affect will be larger for those higher on treatment expectancy (H2). On completion of data collection, a one-way ANOVA will be employed to detect the potential presence of a significant effect of type of meditation on measures of psychological wellbeing from pre to post treatment. Findings will clarify the role of self-compassion meditations in promoting psychological wellbeing as well as the influence of expectancy effects. Clarifying the underlying mechanisms underscoring meditations in improving wellbeing will inform clinical interventions used to bolster everyday mental health in clinical, organisational and home contexts, which is especially pertinent in the time of the novel coronavirus (COVID-19) pandemic.

I would like to acknowledge my esteemed supervisors A/Prof Naomi Sweller and Dr. Elizabeth Austin for their continuous support, guidance, and extensive feedback they have provided me throughout the preparation of this thesis.

Australian National University

Cancer and the Immune System | 15th September 12pm

Session ID: 15.12.2

Natalie Smith | Bachelor of Science/Bachelor of Advanced Studies, The University of Sydney (USyd)

Metabolic changes alter immune cell signalling to define immunotherapy outcomes in lung cancer.

Immunotherapies targeting the negative regulator of T cell activation, programmed-death protein-1 (PD1) have gained significant clinical interest in recent decades. These treatments have potential to revolutionise the standard of care for cancer patients due to their potent anti-tumour activity and limited toxicity profile, however generating a durable response remains a significant problem. Patients who fail to respond to anti-PD1 show immunosuppression of cellular populations critical for anti-cancer defence, namely T and natural killer (NK) cells. Investigation of the mechanisms underlying this immunosuppression could identify novel therapeutic interventions that could prime these patients to anti-PD1. Several lines of evidence point to the involvement of a crucial T and NK cell signalling component, CD3ζ, in this immune dysfunction. Increased activity of arginase, an immune regulating enzyme, is known to correlate with decreased T and NK cell expression of CD3ζ. Despite this, a link between increased arginase activity, decreased CD3ζ expression, and response to anti-PD1 is yet to be made. To address this, a high-throughput colorimetric microplate assay was designed, allowing accurate measurement of plasma arginase activity. Future work will involve the determination of arginase enzymatic activity in a cohort of lung cancer plasma samples. Matched immune cells from patients with high or low plasma arginase activity will then be chosen to perform single-cell cytometric analysis. This colorimetric assay will be used to find a relationship between arginase activity, downregulation of CD3ζ and clinical outcome, with potential to provide evidence for considering arginase inhibitors as a potential adjuvant therapy to anti-PD1.

Thank you to Dr Helen McGuire, whose guidance and support throughout my honours project has been invaluable.

Tamara Bock | Bachelor of Science and Bachelor of Advanced Studies (Advanced), the University of Sydney (USyd).

Understanding the role of CD300 molecules in COVID-19.

In the ongoing coronavirus disease pandemic (COVID-19), tools to detect molecules in the blood that predict disease severity are invaluable. CD300 molecules are bound to the surface of immune cells and regulate immune responses. CD300 molecules were reported to be detectable in blood samples of

COVID-19 patients. Within a small study cohort, the death or survival of COVID-19 intensive care patients was positively correlated with their levels of CD300 molecules. As cell surface molecules, a fast and widely available tool to detect their presence in soluble form in the blood did not exist. The mechanism by which they become detached from immune cells and the implication of this in immune responses is poorly described. We designed a tool that allows for rapid detection of soluble CD300 molecules in blood samples that can be used to determine their role in COVID-19. We hypothesise that in healthy individuals, soluble CD300 molecules will be at low levels in the blood but elevated in diseased states. Increases in CD300 molecules in the blood may be from immune stimulation. Upon stimulation, the level of CD300 molecules expressed on the surface of immune cells was shown to be decreased. We did not find that immune cells released CD300 molecules from their surface. Taken together, stimulated immune cells may be responsible for soluble CD300 molecules in the blood, but cell-cell interactions are likely required. This tool provides a framework to measure blood concentrations of immune molecules. Moving forward we aim to confirm the presence of CD300 molecules in the blood of COVID-19 patients and their association with intensive care outcomes.

I would like to thank my supervisors A/Prof Georgina Clark and Dr. Pablo Silveira, as well as the Dendritic cell research group for their support and contributions.

Luke Waldie | Bachelor of Science, the University of Queensland (UQ)

Distinct methylation profiles for lung cancer

Background: We investigated the potential for DNA methylation (reversible DNA modification) signatures to identify novel biomarkers for lung cancer, allowing more accurate diagnosis. Methylation gene inactivation of tumour suppressor genes underlies several human cancers, and hence novel biomarkers may assist in diagnosis.

Methods: Lung tissues were sampled from lung cancer tumours (LC) or normal (NL), and 27000 probes were sequenced for methylation status (HumanMethylation27 BeadChip array) and analysed with Biometric Research Branch (BRB) Array Tools. Paired sample (n=52, both NL and LC) comparison found 10457 differentially methylated genes (p>0.01). Prediction analysis was performed, finding the most predictive genes for diagnosis (n=158) (variation p >0.01, sig = p<1e-7). This was validated against thirteen external significant probe sets from literature (>4 matches) to create a 24 probe (14 gene) set. This 24-probe list was used to create a predictive algorithm for diagnosis based on accuracy, specificity, and sensitivity. This was internally validated against six unpaired 21 LC and NL sample (6 by 21; same NL used in all).

Findings: A final 24 probe set was created with predictive properties for determination LC/NL status of a lung tissue sample (88% accuracy), with internal validation performed on its predictive capacity as quantified by average sensitivity (0.873) and specificity (0.875).

Interpretation: This 24-probe set has predictive capacity of lung cancer status, allowing examination of methylation markers for cancer status. This allows examination of factors contributing to lung cancer pathology and aid in the diagnosis of cancer samples.

Funding: supported by NHMRC, TPCH Foundation

This presentation acknowledges the assistance of Casey M Wright PhD, Mitchell Stark BSc (Hons), Kylie Parsonson BSc (Hons), Santiyagu Savarimuthu PhD, Gerwin Heller, Sabine Zochbauer-Mueller, Nicholas K Hayward PhD, and Henry Marshall BM PhD, with special thanks to Ian A Yang MBBS PhD, Rayleen V Bowman MBBS PhD and Kwun M Fong MBBS PhD.

Australian National University

The Natural Environment | 15th September 12pm

Session ID: 15.12.3

Charmaine Howie | Bachelor of Arts, the University of Queensland (UQ)

Reconstructing environmental changes in the Kimberley

The Kimberley region, WA, contains some of the oldest evidence of human occupation in Australia, and some of the highest concentrations of rock art in the world. People have occupied this region for the past 50 000 years, and many of the Aboriginal populations who live there today continue to maintain meaningful connections to country. However, despite the region's cultural significance, there is a stark lack of reliable climate and environmental records. By examining past evidence of environmental changes in the region, we can better interpret the context in which the rock art was produced, especially during periods of severe climatological change, such as the Last Glacial Maximum (~18-21 000 years ago). Here, we present the initial key findings from marine sediment core U4183, collected from offshore the Kimberley. We provide a climate and environmental reconstruction for the past 20 000 years, based on terrestrial vegetation changes, as indicated by the amounts of different pollen species in the sediment. This will be accompanied by micro-charcoal concentrations, which are charcoal fragments that have been counted from the same sediment as the pollen, and reflect burning frequency and intensity on the adjacent landscape. These proxies combine to inform a detailed picture of changing landscapes over time, based on the preferred climate conditions of each species. Further constrained by oxygen isotope dating, which provides broader global changes in sea level and temperature, these proxies provide an excellent foundation on which to better contextualise changes in rock art styles and context.

I wish to acknowledge my supervisors, Professor Patrick Moss and Associate Professor Helen Bostock Lyman, who have provided invaluable guidance and support throughout my honours year.

Sabrina Morrison | Bachelor of Science (Honours), the University of Queensland

Verticillium Wilt: Using jellyfish genes and sea anemone proteins to understand a very nasty mould

Verticillium dahliae is a fungal pathogen that causes a devastating disease called Verticillium Wilt in upland cotton (Gossypium hirsutum). Recently, two novel, pathogenic V. dahliae strains, VCG 1A and VCG 2A, have been discovered in Australian regions of cotton production. The sudden emergence of these new strains, coupled with recent increases in field disease incidence, threaten

Australia's multi-billion-dollar cotton industry. We need a more comprehensive understanding of how these strains are transmitted between fields, and how they interact with other hosts commonly found in areas of cotton production. Specifically, this study investigates the potential for VCGs 1A and 2A to infect, and thereby be transmitted by cotton seed, as well as their capacity to colonise and multiply in weed species common to Australian cotton fields. To study infection patterns and pathogen localisation, VCG 1A and VCG 2A strains were transformed with the mCherry and Green Fluorescing proteins from Dicosoma spp. and Aequorea victoria, respectively. Upland cotton plants and various weed species were inoculated with the transformant strains, and transformant fluorescence was then visualised within plant hosts using confocal laser-scanning microscopy.

The VCG 2A isolate was recovered from asymptomatic weeds from the species' Sonchus oleraceus and Urochloa panicoides. This outcome suggests that V. dahliae VCG 2A has the capacity to colonise alternate hosts that are present in Australian cotton fields. Neither of the V. dahliae strains were detected in seeds from inoculated cotton plants, suggesting that cotton seed is an unlikely source of pathogen transmission. We expect that this study will provide a better understanding of V. dahliae dissemination and persistence in cotton fields, and thereby feed into management approaches in the Australian cotton industry.

I would like to acknowledge my supervisor, Professor Elizabeth Aitken, and my co-supervisor, Dr Donald Gardiner, for their continual support throughout my Honours program.

Eleanor (Nellie) Pease | Bachelor of Science (Honours), the University of Queensland

Reconstructing the marsupial tapir (Palorchestes parvus): an ecological study of a bizarre marsupial giant from prehistoric Queensland

Understanding how past ecosystems developed, functioned and evolved can provide crucial insights for understanding modern ecological communities, and predicting how these might respond to current and future environmental challenges. The Pliocene period (5.2-2.6 million years ago) is a particularly informative theoretical testing-ground for future models of climate change, as it represents the last time in Earth's history when temperatures and atmospheric carbon concentrations approached those predicted for 2100. However, in Australia, the usefulness of this analogy is hampered by a poor understanding of Pliocene ecosystems, largely due to limited data on the flora and fauna of this period. With this project, we aim to conduct the first detailed ecological study of Palorchestes parvus, a particularly bizarre and poorly-understood giant marsupial from Pliocene Queensland. We have employed a multiproxy approach, combining tooth-wear analysis with stable isotope geochemistry of fossil tooth enamel. While quantitative data is still undergoing collection (available by August 2021), preliminary observations suggest that Palorchestes was a specialised herbivorous leaf-browser that inhabited open-canopy forests. Linking this data with Palorchestes' large size and unusually robust body-form, we suggest that it may have acted as a keystone herbivore in its Pliocene

ecosystem, clearing vegetation and opening habitats around itself in a manner similar to modern elephants. This study will provide the most detailed and robust information to date on this bizarre and charismatic member of the Australian megafauna, and will also serve as an important first step towards understanding the ecosystems of this critical period in Australian prehistory.

Thanks to Gilbert Price for supervising this project, Larisa Desantis for microwear data collection & processing, and Kim Baublys for assistance with isotopic analysis.

Australian National University

Mental health and wellbeing | 15th September 12pm

Session ID: 15.12.4

Katie Clark | Graduate Diploma in Psychology, Murdoch University

Assessing Anticipatory Anxiety to Graded Painful Stimulus Exposure in Healthy Participants

This study used an experimental pain model to investigate whether graded exposure therapy inadvertently increases anticipatory anxiety in healthy participants. Graded exposure therapy uses classical fear conditioning models to encourage habituation by increasing the intensity of exposure to the feared stimulus in graded steps. However, the anticipation of painful or distressing stimuli might interfere with habituation by increasing the subjective perception of pain and triggering emotional responses. The pupil dilation response (PDR) is a measure of the human stress response which indicates sympathetic nervous system activation as well as cognitive and emotional arousal. Thus, it was expected that the PDR before painful stimulation would vary in proportion to the degree of anticipatory anxiety/distress. Participants immersed their hand in painfully cold water (the cold pressor test) for three intervals of 20 seconds, 40 seconds, and 60 seconds while the PDR was monitored. The ascending condition began at 20 seconds, increasing to 40 seconds, then to 60 seconds. In the descending condition this order was reversed. Three 60 second exposures were used in the control condition. It was hypothesized that the PDR and pain intensity ratings would be larger in the ascending than the descending condition, as expecting stimulus intensity to increase across trials would cause a larger stress response. Additionally, it was expected that anticipatory anxiety would be lower in the control condition than at maximum stimulus intensity in the ascending and descending conditions as stimulus exposure was held constant. It was also hypothesized that pain and PDR would decrease over the course of the three exposures in the control condition due to habituation. These hypotheses will be investigated in condition (ascending, descending, control) by trial (the three immersions) repeated measures ANOVAs. The findings may have clinical implications for the administration of graded exposure therapy to painful stimuli in chronic pain patients.

I would like to thank my supervisor Professor Peter Drummond for his patience and guidance, and those who helped make the data collection possible, Alex, Cait, Daisie, Emma, Jess, and Lachlan.

Yimeng Cheng | Bachelor of Psychology (Honours), the Australian National University (ANU)

Hikikomori (Long-Term Social Withdrawal) and Re-employment Seeking

Yimeng Cheng, Junwen Chen, Diana Cardenas, Motohiro Sakai

Long-term social withdrawal in young adults has become a major concern in Japanese society, a phenomenon known as 'hikikomori'. Withdrawn individuals are more anxious in workplace and refuse to attend work-related events, which leads to great loss in the labour market. Empirical evidence shows that job-searching self-efficacy (JSSE) plays a vital role in re-establish one's confidence in job-related events, as well as increasing one's effort and satisfaction in searching for jobs. This study aimed to investigate how people with hikikomori differ in employment-related psychological constructs, and the mediation role of JSSE in the relationship between hikikomori and employment anxiety, job-search satisfaction and efforts.

The study used secondary data collected in Japan with 81 participants with current and past hikikomori, matched with 100 participants without Hikikomori by age and gender. MANOVAs and Tukey's HSD demonstrated that the current hikikomori group had significantly lower job-searching satisfaction ($p = .043$) and JSSE ($p = .019$) than the control group. Regarding mediation effects, hikikomori had a negative significant indirect effect on job searching satisfaction and efforts. Furthermore, hikikomori had a positive significant indirect effect on employment anxiety through JSSE. Although the past-hikikomori group does not significantly differ from both groups, its scores were closer to the control group in all variables except for employment anxiety, demonstrating a certain level of recovery in their job-related wellbeing.

Future research should consider enhancing self-efficacy in Hikikomori individuals to encourage their re-engagement in employment activities.

I would like to thank Dr Junwen Chen, my primary supervisor for this research, for her thorough and patient guidance over the past year. I would also like to thank Dr Diana Cardenas for her critical comments and warm encouragement in accomplishing this project. Lastly, thanks to Dr Motohiro Sakai from Japan, whose collaboration made this study possible.

Australian National University

Gender and Sexuality I | 15th September 1pm

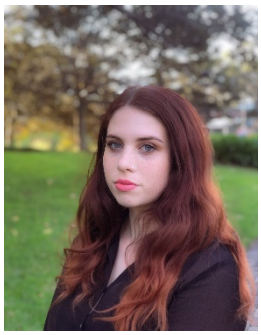
Session ID: 15.13.1

Freya Langley | Bachelor of Media (Honours), the University of Adelaide (UofA)

Fangirls to the Front: Camp Cope as an identity-shaping fan object

This research explores female (and gender non-binary) fans' identity shaping experiences with a feminist fan object. Using Australian indie-rock trio Camp Cope as a case study, this project is an in-depth exploration of how non-male fans, or 'fangirls'[1] form their ideas and identity through engaging with a female fan object. Historically, literature and mainstream conceptions of fangirls have been critically marginalising. While there has been significant work that challenges this, literature on female objects of fandom and their non-male fans is lacking. Using a combination of social constructivist theories, guided by principles of feminist standpoint theory, this study explores the ways fangirls' use relational and experiential interaction with a fan object to forge and activate identities in a smaller field of cultural production. In semi-structured interviews, three female and one non-binary fangirls detailed their experiential and emotional connections to the band. The findings highlight how Camp Cope has helped them in affirming and empowering individual and collective feminist identities, defining their morals, values and goals through social learning and feminist consciousness raising, and healing from abuse and assault. By foregrounding fangirls' voices in the research, this study challenges mainstream conceptions of fangirls as silly or hysterical and demonstrates the real and lasting impact of Camp Cope on their identities. This study brings fangirls' voices to the front of broader discussions of representation and accountability within the Australian music industry as it reckons with its #MeToo moment.

[1] I use "fangirls" throughout this study to describe a fan who is marginalised for both their gender identity and fandom, rather than as a 'fan who is a girl'.



Isabelle Yates | Bachelor of Arts (Honours)/Bachelor of Laws (Honours), the Australian National University (ANU)

Citizens on the margins: a socio-legal history of relations between the gay community and state institutions in Sydney, 1980-1997

The history of police antagonism and repressive practices towards the Sydney gay community has become notorious. Recent documentaries, public inquiries and police reinvestigations have promoted an accompanying story of how police-gay relations developed, conveying an impression of steady, linear improvements in this relationship since the dark chapter of criminalisation. I challenge the assumptions of this 'progress narrative', arguing that it obscures the multiplicity of relationships between state institutions and the gay community in late twentieth century Sydney. Although the legal and social status of the gay community undoubtedly advanced over the 80s and 90s, this progress was neither steady nor secure. My research reveals that marginalisation remained the rule rather than the exception during this period. By incorporating insights from socio-legal theory, criminology and social movement theory, I offer a novel perspective on this topic. Applying this approach, I analyse primary materials from gay activists and community members, police, and popular media, many of which have evaded prior academic scrutiny. These sources demonstrate how positive advances in gay rights existed simultaneously with both continuing and fresh practices of social exclusion and marginalisation. Through this process, I formulate a holistic narrative of police-gay relations in 1980s and 90s Sydney, showing how inclusive and repressive practices coexisted, renewed and reemerged. This alternate story prompts us, as historians, to reflect on how we understand 'progress', and whether the teleological appeal of forward movement can blind us to shifts in all other directions.

I acknowledge with gratitude the invaluable guidance and mentorship offered to me by my thesis supervisor, Professor Carolyn Strange, as well as Ms Sue Thompson generously giving her time to be interviewed for my research, and Annalise Humphris for kindly sharing her insights on the topic area.

Australian National University

Reviewing the Literature on Cancer | 15th September 1pm

Session ID: 15.13.2

Amna Rafiq | Doctor of Pharmacy, Institute of Pharmaceutical Sciences, University of Veterinary & Animal Sciences.

Prevalence and etiology of breast cancer in Asia: a systematic review

Background: Breast cancer is the most prevalent disease, with only 1% prevalence in men. This review aimed to explore the prevalence, incidence, and mortality rate of breast cancer and identify the risk factors of breast cancer in Asia.

Methods: A search was carried out from PubMed, Science direct, PLOS ONE, and Biomed Central with data entries from 1990 to April 2021. Search terms included breast cancer, epidemiology, Asia, etiology, risk factors, and a combination of these terms. Full text, English, observational (case-control, cohort, and cross-sectional studies) that referred to various etiological risk factors were included in the study. The quality of selected studies was assessed according to New Castle Ottawa Scale.

Results: Overall, 56 articles were included which met the inclusion criteria. 40 studies met the good quality, 15 met the average quality, and only 1 study met the poor quality requirements of the New Castle Ottawa scale. Based on the published studies, the increased risk factors have led to an upward trend in the incidence of breast cancer in Asia. This study show that the incidence rate is higher in developed countries, and the mortality rate is more in under-developed countries. The findings of this study show that obesity, low parity, smoking, family history, and BRCA1 mutations are significant risk factors of breast cancer.

Conclusion: This review provides significant evidence about breast cancer in Asia. Considering the increasing burden of breast cancer in Asia, preventive measures, early detection, and control of risk factors seem significant.

For the completion of this research project, I am highly grateful to my supervisors (Dr. Tahir Mehmood & Dr. Allah Bakhsh) and my co-authors (Amna Abdul Qayyum, Fiza Ayub, Quratulain, Maria & Amara Shabir).

Kayla Jaye | Master of Research, the Western Sydney University (WSU)

A systematic literature review on the link between gut microbiota and the most prevalent cancer types

Gut microbiota plays a vital role not only in the maintenance of health, but also in the onset, treatment, and prognosis of cancer. The link between gut microbiota and cancer is a rapidly evolving field of oncology research. However, comprehensive reviews on the link between gut microbiota and the five most prevalent cancer types, colon, lung, breast, prostate, and stomach cancers, are limited. In this review, we draw a comprehensive summary and assessment of the recent research performed to elucidate the direct and indirect role of gut microbiota in five prevalent cancers. A total of 9401 articles were screened from different scientific databases, with 137 relevant articles included, which were further analysed based on different aspects of our systematic literature review. In the five common cancers, the immunomodulatory and anti-tumoural effects of gut microbiota was observed. Gut microbiota was reported to have clinical implications in these cancers in addition to regulating the efficacy of chemotherapy and natural anticancer agents. Notably, Bifidobacterium spp. and Akkermansia muciniphila were correlated with favourable anticancer immune responses in both animal models and humans. Additionally, Lactobacillus spp. was found to enhance the efficacy of standard chemotherapy against colon, breast, lung, and stomach cancers. In contrast, Escherichia coli, Helicobacter pylori, Clostridium leptum, and Clostridium coccoides were found to have pro-tumoural effects. This review will directly inform future in vitro, in vivo, and clinical studies to further investigate the complex role of gut microbiota in different cancer types. Findings from these studies will define gut microbiota-focused preventative and therapeutic interventions for cancer.

I would like to acknowledge Professor Chun Guang Li and Dr Deep Jyoti Bhuyan, from the NICM Health Research Institute, Western Sydney University.

Pranujan Pathmendra | Bachelor of Science/Bachelor of Advanced Studies (Including Dalyell Scholars), The University of Sydney (USYD)

Wrongly identified reagents in original research papers from high impact factor cancer research journals.

With exponentially increasing numbers of research publications, studies that inform the reliability of published research are important to maintain high standards of research integrity and public trust in science. Nucleotide sequence reagents can provide a measure of biomedical research reliability, as these reagents are widely used in genetics assays and their identities can be reliably fact-checked. Previous studies have focused on fact-checking nucleotide sequence reagents published in cancer and genetics journals with impact factors of 2-3, where unreliable research findings could be viewed to have limited influence on future research. We are now fact-checking all nucleotide sequences in original articles published in 2014, 2016, 2018 and 2020 in a cancer research journal with a 2018 impact factor greater than 10. In 2018, 72/110 original articles described nucleotide sequences. Fact-checking the identities of

these reagents by querying sequence databases with Blastn and BLAT algorithms found that 6.0% (104/1,716) of these reagents were wrongly identified. Most incorrect sequences were claimed targeting reagents that were verified to be non-targeting in human (46%, 48/104), or to target different human genes from those claimed by the authors (40%, 42/104). The 36 papers with wrongly identified reagents described between 1-14 incorrect sequences/paper. These results predict that unreliable research papers could be unexpectedly frequent in high-impact cancer journals. In summary, high-impact cancer research papers with nucleotide sequence identity errors could pose a serious problem for future research, potentially leading to research waste through the pursuit of irreproducible findings, and through the reuse of wrongly identified reagents.

I would like to thank Prof. Jennifer Byrne and Mr Yasunori Park for their supervision, guidance and assistance with this project.

Australian National University

Natural Sciences: Visualised | 15th September 1pm

Session ID: 15.13.3

Amy Lu | Bachelor of Science (Advanced), the University of Adelaide

The Secret Life of Poo: A Study of Kangaroo Island Echidna Health After the 2019-20 Bushfires

In 2019 and 2020, Kangaroo Island experienced the largest bushfires in its history - putting the iconic and endangered local echidna subspecies at risk and in need of a bushfire recovery plan. Although echidnas are generally well adapted to bushfires, the severity of the 2019-20 event on the already threatened population left unknown consequences for this iconic Australian species. Previous studies have shown that gut bacteria have a strong influence on the health and fitness of animals. This study specifically looks to address the impact of the bushfires on the health and wellbeing of echidnas. To do this, echidna scats (faeces) were collected before and after the fires by researchers and citizen scientists through the project EchidnaCSI. Scats underwent DNA extraction and bacterial DNA was targeted, sequenced and identified. The results reveal a dramatic shift in bacterial communities seen in scats after the fires in comparison to before the fires. The change in bacterial communities is likely related to the destruction of echidna habitat and food sources as a result of the fire, where the altered gut environment may impact on echidna health through loss of beneficial bacteria. This is the first study to assess bushfire impacts on the gut microbiome for any mammal species. The results provide preliminary research to determine the impact of bushfires on echidna health. Future work will focus on the long-term impacts of gut microbiome changes in echidnas as bushfire recovery continues, in order to aid in conservation efforts for the Kangaroo Island echidna.

I would like to thank Professor Frank Grützner and Dr. Tahlia Perry for their constant guidance, support, and feedback throughout this project, as well as Dr. Peggy Rismiller for her inspiring efforts on Kangaroo Island and to EchidnaCSI.

Te Wai Pounamu Telena Hona | Bachelor of Biomedical Science (Honours), the University of Queensland (UQ)

Infra-Cranial Radiographic Comparison for Human Identification: The Influence of Radiographic Image Quality and Superimposition

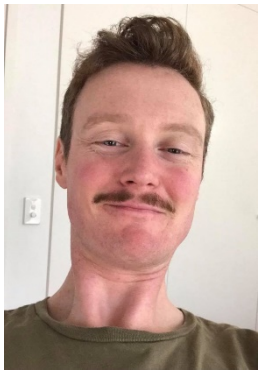
Radiographic comparisons involve visual assessment of skeletal morphology between antemortem (AM) and postmortem (PM) radiographs to determine if they originated from the same individual. While many studies have explored the utility of different skeletal features, few have systematically investigated the influence of factors determining bone visibility on these radiographs. Since the correct identification of unknown remains is paramount, investigations into such factors like image quality and hard tissue-shielding (e.g., superimposed bones) are important for the continued use of radiographic comparison. In this study, thirty-six identification arrays (using clavicles or vertebra) were constructed. Each array contained five radiographs: one X-ray of a single dry-bone (PM skeletal image) and four simulated AM radiographs (radiographs taken pre-skeletization e.g., tissue-encased). One AM radiograph in each array represented the correct match to the PM radiograph (=25% rate of randomly selecting the correct match). Radiographs were digitally manipulated, so that four varieties of quality (Gaussian blur = 12–0pr across 24 arrays), and four varieties of hard tissue-shielding (opacity of 40–0% across 12 arrays) existed. Arrays were evaluated for their correct PM/AM pair, by 8 anthropologists competency certified in chest radiograph comparison (CXR), 28 current American Board of Forensic Anthropology diplomates and 30 novices. Analysts' correct classification rates (CCRs) substantially improved with higher quality images (55% CCR at >10pr blur versus 89% for <10pr). On average, tissue-shielding increased CCRs by +10% for each -10% reduction in tissue-shielding opacity. To maximise CCRs in forensic casework, high quality radiographs should be preferentially sourced; body regions with decreased tissue-shielding should be awarded higher priority; and analysts should undergo competency training prior to conducting radiographic comparisons.

I would like to acknowledge the contributions of my Honours supervisor Associate Professor Carl Stephan.

Australian National University

Neurological Insights | 15th September 1pm

Session ID: 15.13.4



Callum Ormonde | Doctor of Medicine, University of Wollongong (UOW)

Perioperative clinical practices in Postoperative Delirium in Older People

Introduction: Postoperative delirium (POD) is a major complication of surgery in older people. Perioperative nurses play an integral role in the detection and management of POD in the post-anaesthesia care unit (PACU). Differences in POD presentation in patients presents challenges in diagnosis and management for nurses. Moreover, misdiagnosis and mismanagement of POD may lead to poorer clinical outcomes for patients.

Aims and Methods: This study aimed to assess the knowledge and clinical practice of Australian nurses delivering delirium care in the PACU. An online survey of 336 perioperative nurses assessed confidence, competence in delirium care against their level of delirium education. Respondents were categorised by the level of delirium care education they had received; ranging from their undergraduate training, post-graduate training, as part of their continued professional development or never received any delirium training.

Results: Results showed that with increased delirium care education, respondents were significantly more confident in detecting hyperactive delirium ($X2 = 17.634$, $p = 0.024$). There was a significant relationship between respondents' level of delirium care education and their perceived competence in detecting and managing hyperactive delirium ($X2 = 12.727$, $p = 0.048$ and $X2 = 14.791$, $p = 0.022$ respectively). However, there was no significant difference in the relationship between delirium education and respondents' confidence and perceived competence in detecting and managing hypoactive delirium. Data were analysed using IBM SPSS Statistics. Frequencies and descriptive statistics of respondent characteristics were performed. Normality of continuous variables was assessed by Shapiro-Wilk tests. Parametric data was assessed via a one-way ANOVA. For non-parametric data, Kruskal Wallis-H tests were used.

Conclusion: Nurses' practice of delirium care is multifactorial however a gap in knowledge exists. Targeted education sessions should combine practical multilevel strategies that are guided by evidence-based practices to ensure best outcomes for patients and professionals.

Ezinne O Igwe (PhD)1,3, Jessica Nealon (PhD)2,3 Victoria Traynor (PhD)1,3

1 School of Nursing, Faculty of Science, Medicine and Health, University of Wollongong, New South Wales, Australia

2 School of Medicine, Faculty of Science, Medicine and Health, U

Max Kirkby | Bachelor of Philosophy (Science) (Honours), the Australian National University (ANU).

The effect of voluntary exercise on light-induced retinal degeneration

Retinal degeneration is a leading cause of morbidity in the Western world. For many types of retinal degenerative disease, including age-related macular degeneration (AMD), many of the molecular mechanisms leading to vision loss remain poorly characterised and therapeutic options limited. Recent studies in comparable neurodegenerative diseases within the central nervous system, including Parkinson's and Alzheimer's, have demonstrated that physical exercise may mediate neuroprotection via inflammatory and neurotrophin signalling pathways. In this study, we explored the effect of voluntary exercise on mice subjected to photo-oxidative induced retinal degeneration, an animal model of AMD. Using electroretinography and optical coherence tomography we identify that mice with access to a voluntary treadmill for 4 weeks display preserved retinal function. Additionally, using terminal deoxynucleotidyl transferase dUTP nick-end labelling (TUNEL) and immunohistochemistry, we demonstrate that these same mice exhibit reduced inflammatory markers and improved photoreceptor survival. Further qPCR analysis of a similar mouse model of light-induced retinal degeneration reveals that these improvements may be mediated by non-coding microRNA able to regulate gene expression. Together, this study suggests that voluntary exercise is protective against retinal degenerations. Therapeutic usage of similar forms of physical activity may offer an exciting avenue for the non-invasive, inexpensive prevention of retinal degeneration. However, further studies are required to elucidate the molecular mechanism by which exercise acts to protect retinal function.

The author thanks Dr. Joshua Chu-Tan and Associate Professor Riccardo Natoli for their assistance with this work.

Vrinda Jain | Doctor of Medicine, Western Sydney University (WSU)

Development of the dopaminergic system in the mammalian retina

The neuromodulator dopamine (DA) plays an important role in body processes such as movement, memory, and motivation. In the retina specifically, it is thought to play a significant role in light adaptation, development, and modulation of neuronal circuitry. Dopaminergic amacrine cells, found in the mammalian retina, release dopamine in response to light, however, the pattern of activation of these cells has never been evaluated over the course of neural development. Through the implementation of immunohistochemistry techniques in mice retinae across various postnatal ages from newborn to adult, this study examined the distribution, activity, and development, of dopaminergic amacrine cells in the mammalian retina to gain a better physiological understanding of the development of the dopaminergic system. Antibodies against tyrosine hydroxylase (TH), an enzyme essential for dopamine production, as well as c-Fos, a marker of neuronal depolarisation were applied to fixed postnatal retinal

tissue at the following ages: p3, p4, p6, p8, p14, p19, Adult. Dopaminergic amacrine cells were found to be uniformly distributed across the retina with density decreasing following eye-opening (~P12) until weaning. DA cell light activation (c-fos expression in TH+ cells) was only observed following eye-opening suggesting classical photoreceptors (rods or cones) drive this activation. Furthermore, this data suggests that light-induced dopamine release in the retina is a process important for image-forming vision rather than development of the retina/eye. Overall, these results provide insight into the development of the dopaminergic system and the mechanisms underlying its release.

I would like to thank my supervisor Dr Morven Cameron for her exceptional support, guidance, and helping make this research project a reality.

I would also like to thank Sushmitha Raja, and Dr Sindy Kueh for all of their support throughout the project.

Australian National University

Cognition and psychology | 15th September 1pm

Session ID: 15.13.5

Dot Pagram | Bachelor of Psychology (Honours), the Australian National University (ANU)

Measuring cognitive dysfunction in ME/CFS and 'Long-Covid': highly sensitive neuropsychological tasks

Myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) comprises debilitating fatigue, post-exertional malaise (crashes after physical or cognitive exertion), unrefreshing sleep, neurocognitive problems and/or orthostatic intolerance. ME/CFS is commonly triggered by infectious illnesses. Covid-19 is expected to substantially increase worldwide prevalence, with some 'Long-Covid' sufferers already presenting ME/CFS-like symptoms. Determining levels of ME/CFS cognitive dysfunction typically relies on patient self-report, however, performance on neuropsychological tasks exists as an alternative assessment method. This review critically evaluates ME/CFS literature (Jan 1988-Apr 2021) to systematically determine sensitive tasks measuring cognitive dysfunction in patients. Relevant databases were selected and search terms including 'chronic fatigue syndrome' and 'cognition', applied. Inclusion criteria were: (a) ME/CFS diagnosed by CDC criteria (past or current), Canadian Consensus Criteria or International Consensus Criteria, (b) healthy control group included, (c) adult participants (18+), (d) utilised objective tests, (e) cognitive assessment conducted prior to treatment. This review included 52 studies and 81 different neuropsychological tasks. Results indicated cognitive impairment in ME/CFS is widespread across functional domains, and identifies many previous studies only tested the mildest-illness patients (not housebound/bedbound) on their 'good' days (ignoring post-exertional malaise crashes). The Stroop task (naming word 'red' written in green ink) which involves attention, executive function, and speeded processing, was identified as the most sensitive for detecting cognitive deficits. This review suggests that administering the Stroop task to ME/CFS patients may prove beneficial for patient care by validating objective functional impairments for support services applications, legitimising clinical ME/CFS treatment trials, and assisting clinician/patient tracking and management of symptoms.

I acknowledge the exceptional guidance and support from Professor Elinor McKone who has transformed my undergraduate research dreams into a reality.

Georgia Acutt | Bachelor of Psychology (Honours), University of the Sunshine Coast (USC)

"And 5, 6, 7, 8": Comparing the Differences in Psychological Outcomes Between Pole and Other Recreational Dancers

Recreational pole dancing or pole fitness—affectionately known as "pole"—has burgeoned in popularity despite being often stigmatised, incorrectly linked to the sex industry. This study was the first to explore whether polers experience higher positive psychological outcomes than other dancers, whether pole is a form of serious leisure—an activity that is more than a hobby, less than an occupation but creates a unique social identity—as well as whether pole engagement is explained by self-determination theory. A community sample of recreational dancers (N = 282) aged 18 to 71 years (95% female) voluntarily completed an anonymous online survey regarding their dance experiences, self-esteem, subjective wellbeing, and body image. Of the sample, 64% were pole dancers and 23% were dancers (i.e., ballet, jazz, contemporary, hip hop, ballroom, folk dance, and Irish dance). Unexpectedly, 12% of participants stated they identified as dancers because they engaged in Zumba or burlesque recreationally; these participants comprised a unique grouping others. Regarding self-determination theory, results revealed pole was no better at meeting basic psychological needs than other recreational dance forms. Although all participants reported high scores on all measures where high scores were beneficial, and all participants perceived their dance engagement as serious leisure, the only statistically significant differences between groups were others reported higher self-esteem, lower negative affect, and higher overall perceived benefits of dance than polers and dancers. Overall, consistent with positive psychology perspectives, this study highlights the importance that engagement in any exercise perceived enjoyable tends to produce substantial positive outcomes.

I would like to acknowledge Dr. Rachael Sharman and Jessica Blower for their supervision over my research project.

Nan Chen | Bachelor of Science (Psychology)(Honours), the Australian National University (ANU)

Investigating the effects of training using caricatured faces on other race-face recognition

Research aim: The present study seeks to investigate whether the training program using caricatured faces improves people's ability in recognizing other-race faces. This is the first study to examine the benefit of caricatured images in reducing ORE.

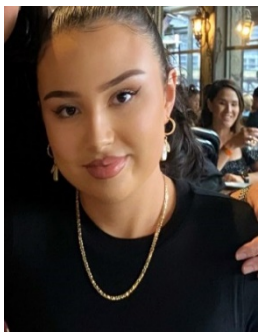
Background: The other-race effect (ORE) refers to the phenomenon that people have difficulty in recognising and identifying people with other-race faces. The ORE can lead to negative outcomes including false criminal arrests and misidentifications by passport officers. Therefore, it is essential for us to investigate how to reduce the ORE.

Caricaturing exaggerates distinctive features of natural faces compared with average faces.It can improve the facial recognition based on theoretical and empirical evidence. Previous researchers mainly used natural images in their intensive training to reduce ORE, yet few of them are effective. Therefore, it is really important to test whether training with caricatured faces can reduce ORE.

Methods: The whole study was laid out as four parts: pre-screening, pre-test, training and post-test. After the pre-screening, twenty Asian university students who were poor at recognising White faces were eligible for the following experiment. The pre-test and post-test both included a perceptual discrimination task and a similarity rating task. Between the pre- and post-test, participants completed five sessions of face-name learning tasks (i.e. ORE training). They needed to learn the names of caricatured White faces through feedback. These caricatured faces used in the training sessions were from different people in the pre- and post-test.

Results: The comparisons of pre- and post- test performance show that participants performed significantly better in both tasks. A within-subject t-test of the accuracy of perceptual discrimination tasks was significant [t(18)= -2.667, p=0.016]. A repeated measures ANOVA of similarity rating tasks showed the significant main effect of both the race of faces (Asian, White) [F (1,19) = 6.966, p=0.016] and the test time (pre-test, post-test) [F (1,19) = 16.427, p=0.001]. The significant interaction effect showed that White faces were rated as much more different than Asian faces after the training [F (1,19) = 4.628, p=0.045].

Conclusion: Results suggest that training with caricatured faces can reduce ORE. Importantly, both tasks in the pre- and post-test used completely novel identities from training. This shows the transfer of the training effect. By improving other-race facial recognition, participants become more confident in interacting with people from other races in the real world, which in turn improves their mental health and well-beings.



Olivia Rose Maurice | Bachelor of Psychology, Macquarie University

'Straya, We Have a Problem: Evaluating Neuropsychological Assessment Approaches for Diverse Populations

Neuropsychological assessment (NA) denotes the process of evaluating brain-behaviour relationships and subsequent intervention (Brickman et al., 2006). NA has predominantly normed Western, educated, industrialised, rich and democratic (WEIRD) populations' functioning, thus omitting culturally and linguistically diverse (CALD) backgrounds from test development (Casaletto et al., 2015; Sayegh, 2015). This has produced bias, misdiagnosis, and poor representativeness (van de Vijver, 1997). Current Australian demographic shifts have heightened demand for inclusive neuropsychological services providing accurate diagnoses, identifying treatment needs and tracking clients' progress (Berry et al., 2019). The current essay aims to evaluate approaches adopted by clinicians for diverse populations, and the factors influencing their validity.

The review examined 35 peer-reviewed publications, and found that tailored NA

(including the International Shopping List Test) consistently demonstrated robust test-retest reliability, and construct and cross-cultural validity for diverse samples (Lim et al., 2012). This owes to translatability, universally relevant stimuli, and reduced verbal items to mitigate translation difficulties. CALD-adjusted norms for batteries including the Wechsler Memory Scale also demonstrated robust criterion, factorial, convergent, discriminant, and concurrent validity (Walker et al., 2010). This owes to rectifying prevalent limitations of WEIRD-normed NA, including non-representative norms, item bias, intracultural variance, poor accessibility and limited CALD training (Carstairs et al., 2006; Cory, 2020; Lim et al., 2012).

NA approaches can thus be enhanced by increasing CALD-inclusive administration, test design, and clinical training (academically and professionally), thus facilitating increased cross-cultural fluency for Indigenous, multiracial, migrant and acculturated groups (Berry et al., 2018; Brickman et al., 2006). Through such action, CALD NA can improve diagnostic accuracy and intervention efficacy.

Australian National University

The Power of Language and Discourse | 15th September 3pm

Session ID: 15.15.1

Moeko Reilly | Bachelor of Arts (Hons), the University of Queensland (UQ)

Japanese heritage language learners: Considering family language policy and home literacy practices

This study investigates the undertaking of language and literacy activities by families in Brisbane who have a heritage link to Japan. By surveying Japanese mothers, this research aims to reveal the most common practices and determine in what way mothers' beliefs and frequency of activity completion are related, when developing and maintaining Japanese as a heritage language for their children. While previous studies have considered family language policy and home literacy practices separately, there is yet to be extensive research that brings the two concepts together and focuses on Japanese heritage language learners in Australia. I developed an online questionnaire by referring to studies such as Sénéchal and LeFevre's Home Literacy Model and newer, alternative conceptualisations of the framework. The questionnaire asked participants about demographical information, their child's Japanese writing, vocabulary and reading habits, as well as participant beliefs surrounding Japanese language education. The findings, aligned with those from previous studies, revealed that there was not a considerable relationship between mothers' beliefs and frequency of practices. Instead, select demographical data such as participant age, education and employment had a stronger link to home literacy practices. In light of this, I argue that the quality or undertaking a wide variety of practices to acquire varied skills is more important than frequency of activity completion. The findings also suggested that language use between family members was connected to the frequency of home literacy practices. The most common practice being undertaken was "Correcting pronunciation", which targets oral language and teaching skills.

Thank you to my supervisor, Dr. Sanako Mitsugi.

Keira Mullan | Bachelor of Arts/Bachelor of Languages, the Australian National University (ANU)

Documenting the Kufa Language: the number and gender of nouns

Of the estimated 6000 languages that are spoken in the world today, at least 43% are endangered and at risk of disappearing within the next century (Moseley, 2010). Kufa is a vulnerable language (according to criteria outlined in 'UNESCO Atlas of the World's Languages in Danger' [2010]) from the Nuba Mountains in Sudan and is part of the Kadugli-Krongo group. The only substantial study done previously on a language of this group is Reh's Die

Krongo-Sprache (1983). So by being the first description of the noun system of Kufa, this research provides vital information needed to understand the broader affiliations and history of the Kadugli-Krongo group, as well as adding to the typology of the relatively rare number system Kufa displays. More importantly though, this study, as part of a larger documentary project to produce a grammar, dictionary, and collection of texts, preserves precious knowledge about the Nuba Mountains' culture and landscape, knowledge that is currently under threat from continued conflict in the area. This research uses data gathered through linguistic elicitation with a diasporic Kufa speaker located in Australia, and analysed at the level of morphology, as in the following:

(1) nari kalu

na-ri ka-lu

plural-river masculine.plural.subject-be.good

the rivers are good

The research describes Kufa nouns as displaying four genders, or classes, and describes both singular and plural number inflections.

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I would like to thank Haroun Kafi, Abdallah Mongash, and the Kufa people for sharing their language, and my LING3012/LING6009 classmates and lecturers for collaboration, feedback and guidance.

Brittany Smith | Honours Degree of Bachelor of Psychological Science, the University of Adelaide.

Eco-Anxiety: A Discourse Analysis of Media Representations of the School Strike for Climate Movement

Introduction: Eco-anxiety has been described as worry (heightened concern), which may encompass various types and degrees of distress (physical and/or psychological) about the present environment/climatic crisis, and the future state of the health of ecosystems.

Aims: The main objective of the study was to analyse how young climate change protesters, eco-anxiety and climate change, were constructed by the Australian newspaper press in relation to the climate crisis. At present, no discursive research has explored how eco-anxiety, climate change and young climate change protesters are represented in the Australian media by newspaper

publications. The significance of this research is that young people have been shown to be substantially psychologically impacted upon by climate change, and no discursive research has explored this in relation to eco-anxiety, in Australian newspaper publications. Thus, an understanding of these aspects of these phenomena will advance psychological knowledge of this subject. Further, the media play a vital role in documenting this impact, positively or negatively, and shaping public opinion. Hence, the present research is important in understanding how the mainstream media construct the youth climate change protesters, in respect to eco-anxiety and climate change by newspaper print.

Methodology: This study used Wetherell's approach to critical discourse analysis to identify rhetorical strategies, repertoires and modes of argumentation. A search was conducted from NewsBank and from eight main Australian newspapers websites focusing on articles published during 2018-2019. A subsample of nine extracts from 100 opinion/commentary newspaper articles were utilised to illustrate the main recurring themes found in the data set.

Results: The findings suggest that articles published by News Corp (e.g. The Australian) gave negative portrayals of the School Strike for Climate movement, while Nine Entertainment Co. (e.g. Sydney Morning Herald) generally framed the school strikes positively, including all regional newspapers, irrespective of the media outlet.

Conclusions: The present study had shown that conservative leaning newspaper publications presented the School Strike for Climate movement utilising negative language, whilst progressive newspaper publications portrayed the young climate change protesters in a positive light, highlighting the significance of their climatic concerns, and the importance of the phenomenon of eco-anxiety. The significance of this research is that there is no other discursive research examining young people's psychological experience with climate change in relation to eco-anxiety, as represented in newspaper discussions, and thus this study has filled a gap in existing knowledge. Hence, the ongoing existential threat of climate change will ensure that eco-anxiety is an ongoing problem, so further research will need to investigate its longer-term significance, as well as public and media representations of the school strikers.

I would like to acknowledge my supervisor, Professor Martha Augoustinos from the School of Psychology, at the University of Adelaide, for her contribution/collaboration in designing this research project.

Australian National University

Education Matters | 15th September 3pm

Session ID: 15.15.2

Avni Bharadwaj | Bachelor of Psychology (Honours) with a Bachelor of Laws, Macquarie University

A Hands-On Approach to Learning: Gesture Production During Encoding and its Effect on Narrative Recall

Research has shown that gesture production supports learning across a number of tasks. It is unclear, however, whether gesture production during encoding can support narrative recall, who gesture production benefits most, and whether certain types of gestures are more beneficial than others. This study therefore investigated the effect of gesture production during encoding of a narrative on subsequent narrative recall, and whether individuals' levels of verbal and non-verbal memory moderated this effect. This study further investigated whether certain types of gestures were more beneficial than others during encoding. Ninety participants, ranging from 17 years to 32 years (Mage = 20.43), read aloud a narrative whilst under instruction to produce gestures, under no specific instruction to produce gestures, or were required to keep their hands behind their back to prevent them from gesturing. While gesture production during encoding benefitted narrative recall (as measured through specific questions), verbal memory moderated the effect, such that gesture production was more beneficial for individuals with higher than lower verbal memory. However, non-verbal memory did not moderate the effect of gesture production during encoding on narrative recall. Furthermore, producing representational gestures during encoding benefitted recall of points in the narrative at which those gestures were produced, whilst beat gestures had no effect. Findings have implications for understanding the mechanisms underlying the links between gesture and learning, as well as practical implications in instructional settings.

I would like to acknowledge my co-authors Associate Professor Naomi Sweller, and Dr Nicole Dargue for their constant guidance, support and encouragement as my amazing supervisors.

Suzannah Keene | Bachelor of Engineering Honours (Chemical and Biomolecular Engineering) and Bachelor of Music Studies (Cello Performance), The University of Sydney

Improving the Learning Process Through Understanding Fundamentals in Thermodynamics and Reaction Kinetics

This paper examines learning as a process and applies chemical principles, namely laws in thermodynamics and reaction kinetics, to create a novel, interdisciplinary paradigm to improve the effectiveness of learning. The

conditions that are conducive to effective learning are not always understood by learners or facilitated by teachers. When either a teacher attempts to improve the learning environment or a student attempts to improve their learning, the pathway to achieve this change can be obfuscated by bias or inexperience, with no formal mechanisms to adjust the exploration process. This paper overlays the pattern of the performance equation of a reactor, i.e. that output is a function of input, contacting between particles, and kinetics, onto the learning process. The mind of a learner, the site of a potential learning process, is characterised as comparable to the site of a chemical reaction. The performance equation of the reactor is thus appropriated to construct the paradigm, which is expressed as: learning is a function of ideas, accessibility, and rate. The research is theoretical and exploratory in nature. Literature outlining key phenomena in chemical processes, various texts on pedagogical best practice, and interdisciplinary work that applies scientific knowledge to the study of other disciplines including social systems and economics, guided the creation of connections between chemical processes and learning. Concepts in chemical processes are translated to a series of definitions that can be utilised to understand learning. A selection of scenarios in the learning environment where the paradigm can be applied is discussed. This work provides a crucial stepping-stone for learners and teachers to improve their engagement with the learning process.

I would like to acknowledge Dr Peter Cafe, my academic supervisor, for his guidance and support throughout the creation of this work.

Shuo Li | Bachelor of Science, the Australian National University (ANU)

The Role of University Support in Low-SES Students' Challenging Experience: A Qualitative Research with Two Cases

Students from low-SES (Socioeconomic Status) backgrounds are regarded as underrepresented in Australian higher education. Although one in four Australian citizens are recognized as coming from a low-SES community, only 15% have enrolled in university education. Worse still, low-SES university students are more likely to be affected by financial, academic and health stress than other students. Among all the universities in Australia, The Australian National University (ANU) has one of the lowest number of low-SES students. Past research has focused on the personal experience of low-SES students or government policies. However, few studies have investigated the role of university support in low-SES students' experience in an elite institution like ANU, which is consistently ranked as one of the best university and has the lowest acceptance rate in Australia.

To better meet the needs of low-SES students, university support is indispensable as teacher characteristics and institutional support have been identified as the most helpful factors in supporting students from low socioeconomic backgrounds. Current university student service and staff support do not have the capacity to fully scaffold any student's experience, including those from equity backgrounds such as low-SES students, leaving them to navigate the systems and find their own support. The present research focused on the challenges of low-SES students at ANU and their expectations

of university support. A case study design was constructed to collect qualitative data from interviews with two low-SES students in ANU and code the data with NVivo 12. The challenges discussed by these students could be grouped into three dimensions: financial, interpersonal and academic challenges. Through analysing their experiences the following recommendations could provide the required additional support to students like them: providing additional scholarships and funds for first-year low-SES students; give special consideration on class arrangements to students who have part-time jobs; and increasing the involvement of low-SES students in official organizations such as ANUSA (the ANU Students' Association), and the voice of the students with the university.

This research was conducted under the supervision of Dr Olivia Evans from the School of Psychology and Sarah Walker from the Engagement and Success team at ANU.

Australian National University

Cancer research: Visualised | 15th September 3pm

Session ID: 15.15.3

Yongyan Xia | Bachelor of Biomedicine (Degree with Honours), The University of Melbourne

Understanding dendritic cell immune checkpoint proteins in cancer immunotherapy

Immune checkpoint is a self-regulatory process of the body's immune system for avoiding hyperactive immune responses. Programmed death-ligand 1 (PD-L1) is one of the most well-studied immune checkpoint proteins that expressed in various types of cancer. It is a co-inhibitory protein expressed on antigen-presenting cells, such as dendritic cells and macrophages. Binding to its receptor programmed cell death protein 1 (PD-1) on T cells mediates T cells deactivation. Cancer cells also utilise this mechanism to suppress immune activation and escape from the host immune system. Hence, targeting immune checkpoint proteins with antibodies has been an important approach for recent cancer immunotherapy. However, non-responders to this therapy remains a major hurdle for effective immune checkpoint blockade therapy. Researching ways of improving immune checkpoint blockade therapy efficacy is the key to improve immunotherapy and achieve optimal clinical benefit. The use of bacteria polyhydroxyalkanoates (PHA) nanoparticles as an immunogenic adjuvant is a rapidly evolving field in drug and vaccine designs. We have demonstrated that blocking of T cell PD-1 improves PHA nanoparticle vaccination in mice. Furthermore, using genome-wide CRISPR/Cas9 knockout screening, we have identified B-cell lymphoma 6 protein (BCL6) and BCL6 corepressor as regulators of PD-L1 expression. BCL6 is a transcriptional factor that can recruit other proteins to inhibit gene transcription. Loss of function of BCL6 leads to increase expression of surface PD-L1 in dendritic cells as assessed by flow cytometry. Understanding genes that are involved in PD-L1 regulation may serve as future cancer immunotherapeutic targets.

I would like to thank A/Prof Justine Mintern, Dr. Christophe Macri and all members from the Villadangos and Mintern lab for all their support that provided for my honours project this year.

PALAK

PALAK | Bachelor of Science Honours in Zoology, Sri Venkateswara College, University of Delhi, India

ESTABLISHMENT OF PATIENT-DERIVED XENOGRAFT OF CHOROIDAL MELANOMA ON THE AVIAN CHORIOALLANTOIC MEMBRANE

This research highlights the use of avian chorioallantoic membrane (CAM) to monitor the growth and invasion of patient-derived Choroidal Melanoma (CM) xenograft (PDX). Despite the advancement in therapeutics, the median survival of patients with Choroidal melanoma is less than a year rendering it the second most predominant form of malignant tumors. The current cellular molecular research on Choroidal Melanoma often relies on matrigel invasion assay. However, it is extensively attributed to variability and does not layout true environment of a basement membrane for the tumor development like the chicken chorioallantoic membrane. Moreover, this study utilizes patient-derived xenograft and hence provides a more authentic representation of tumors compared to cell lines. To carry out the research, fertilized chicken eggs were procured, windowed and their CAM layers were dropped. On embryonic development day (EDD) 10, freshly chopped patient-derived Choroidal melanoma xenograft was implanted on the CAM layer and the setup was incubated for 7 days. Invasion of Choroidal Melanoma to CAM mesoderm was visualized in the form of pigmented nodules and significant changes were also observed in the vascularity around tumor indicating angiogenetic environment. High-reproducibility, short incubation time, simple set-up, and cost-effectiveness of CAM assay make it more ideal to conventional techniques. This research presents a viable in vivo model for studying tumorigenicity and invasiveness of aggressive ocular tumors like Choroidal melanoma. Moreover, this model can further be utilized to develop a potential future approach to their metastatic potential.

I am grateful to my advisor Dr. P. Jayaraj for his expert advice and constant support, encouragement throughout this research project as well as Sri Venkateswara College and AIIMS, New Delhi for providing us with the best lab facilities to carried out this research.

Nohad Maroun | Bachelor of Medical Science (Honours), the University of Sydney

Analysing the function of F-actin in telomerase recruitment to telomeres.

Replicative immortality allows for the uncontrolled proliferation of cancer cells. Telomeres normally limit cell lifespan; however, extension by telomerase can counteract this and lead to continuous cell division. However, the way in which telomerase is localised or recruited to telomeres is not well studied. Recently, our laboratory has demonstrated that telomerase recruitment to telomeres involves the DNA damage response and replication stress. Furthermore, preliminary evidence has been generated showing a link between nuclear actin fibres and telomerase recruitment. Hence, the aim of this project was to investigate the role of nuclear actin and actin-related proteins in the telomerase recruitment pathway. The pathway was studied utilising fluorescence in situ

hybridisation (FISH) paired with chemical inhibitors and siRNA treatments. Inhibition of actin-related proteins resulted in reduced telomerase presence at telomeres, further suggesting that actin and its regulators are important for telomerase recruitment. Ultimately, this study will aid in unravelling unknown components along the telomerase recruitment pathway and will contribute to the understanding of telomerase function in cancer cells.

Australian National University

Vaccines and Medicines | 15th September 3pm

Session ID: 15.15.4

Lucinda Bek | Doctor of Medicine, the University of Wollongong

Attitudes of medical students and junior doctors towards the therapeutic use of psychedelic and psychoactive substances to treat mental illness

The therapeutic use of psychedelic and psychoactive substances (PPS) to treat mental illnesses including mood and substance use disorders is an emerging field of research. Although doctors play a key role in informing policy changes and implementing new medicines, the opinions of Australian medical students and junior doctors on the use of, and research into, PPS to treat mental illness is unknown. As medical students and junior doctors are likely to be at the forefront of prescribing these potential medicines, we aimed to explore their attitudes towards the use of PPS to treat mental illness, and the factors influencing those attitudes. We surveyed 207 medical students and junior doctors from eight medical schools and seven hospitals in seven Australian states and territories.

Approximately 50% of participants agreed with the statement that PPS could be effectively used to treat mental illness, and participants who had tried a PPS were significantly more likely to agree with the statement than those who had not (p < 0.001). Similarly, participants who had been diagnosed with a mental illness were significantly more likely to agree with the statement than those who had not (p = 0.0485). Over one-third of participants believed that PPS are harmful and addictive. These participants were significantly less likely to agree that PPS could be effectively used to treat mental illness than those who did not believe that PPS are harmful and addictive (p < 0.001). The majority of participants supported further research into the potential therapeutic effects of psilocybin (86.5%), LSD (84.2%), ketamine (83.6%) and MDMA ('ecstacy') (76%) to treat depression, anxiety, post-traumatic stress disorder and substance use disorders. Understanding emerging doctors' attitudes towards the therapeutic use of PPS to treat mental illness may help to identify barriers PPS research in Australia.

I acknowledge my supervisor, Dr Jessica Nealon, for her guidance and support with this research project.

Yastika Banerjee | University of Queensland

Construction of a Herpesvirus vector Expressing Net B of Clostridium Perfringens using Transposon Mutagenesis.

The bacterium Clostridium perfringens produces a toxin called NetB which is responsible for causing Necrotic enteritis (NE). Another disease affecting poultry flocks is Mareks Disease (MD) which causes paralysis in poultry. Contrastingly NE is able to be treated by antibiotics whereas MD is controlled by vaccination of flocks with Herpesvirus of Turkey (HVT).

The aim of my project was to make a herpesvirus based live bivalent viral vaccine vector that could be used to treat both Mareks Disease and Necrotic enteritis. This was to be achieved by transposing the HVT genome maintained as a bacterial artificial chromosome (BAC). However, here as well as prior research has shown HVT is highly refractile to transposition and the large size of the MuA-NetB transposon (3.8kb) resulted in no recoverable HVT clones. To obtain proof of concept that a bacterial toxin gene can be expressed in a herpesvirus vector backbone, we alternatively transposed a BAC of Bovine herpesvirus 1 (pBACBHV-37) with MuA-NetB. Four putative MuA-NetB-O-pBACBHV-37 clones were recovered when transposition reactions were electroporated in DH10B cells. PCR, restriction endonuclease digestion and sequencing was conducted to confirm putative recombinant clones. Recombinant clones were subsequently attempted to be reconstituted by transfection into Madin-Darby Bovine Kidney (MDBK) cells where expression of NetB from the transposed herpesvirus clones was assessed by Western Blot. In conclusion, this study showcases that bacterial toxin gene can be expressed in a herpesvirus vector backbone, proving that there is a possibility to design a vaccine for both MD and NE in the future.

My supervisor- Dr. Karl Robinson

Prof Neena Mitter and Prof Timothy Mahony for allowing me to do this project

Australian National University

Wellbeing and the Self | 15th September 4pm

Session ID: 15.16.1

Christine Hill | Bachelor of Occupational Therapy (Honours), Western Sydney University (WSU)

The feasibility and acceptability of a self-regulation and mental imagery program to enhance everyday functioning for people with Parkinson's Disease: A pilot study

Background: Self-regulation is an active learning approach that enhances self-awareness and self-reflection to overcome daily challenges. Mental imagery assists a person to focus their attention on the task requirements, promoting a goal-directed action and overcoming the difficulties with the initiation and execution of movements seen in Parkinson's disease (PD).

Objective: This study examines the feasibility, acceptability and preliminary outcomes of the 'Self-Regulation and Mental Imagery program for Parkinson's disease' (SReMI-PD) to improve everyday activity performance.

Methods: Using a single-group, pre- and post-intervention design, 11 participants with mild to moderate PD attended a six-week intervention program. Attendance rate was recorded to indicate feasibility. A questionnaire was administered post-intervention to collect feedback on the program's acceptability. Outcome measures were conducted to evaluate performance of everyday activities, motor and cognitive function.

Results: 72.7% of participants attended all face-to-face sessions and 63.6% completed all home programs. Most participants 'agreed' or 'completely agreed' that the duration, schedule and content of the program was acceptable. All participants 'completely agreed' (54.5%) or 'agreed' (45.5%) they would recommend the program to other people with PD. The perceived performance of an important everyday task ($p = 0.011$) and cognition, including attention and mental flexibility ($p = 0.010$), were found to improve significantly post-intervention.

Conclusion: Preliminary results show 'SReMI-PD' is feasible and acceptable for use with people with mild to moderate PD to improve everyday activity performance. This preliminary evidence indicates combining attentional strategies to address difficulties with initiation and execution of movements may assists people with PD overcome daily challenges.

I would like to thank Associate Professor Karen Liu, Renai Pillay and Concord General Repatriation Hospital for all their help making this research possible.

Peta Bowler-Bowerman | Bachelor of Psychology (Honours), The Cairnmillar Institute

Predicting Stressor Appraisals Through the Lens of the Self

The experience, response, and outcomes of stress are informed by an individual's subjective interpretations of a stressful situation (termed stressor appraisals). Given that stress is experienced by everyone daily and poses inherent risks to mental and physical wellbeing (e.g., depression, coronary incidence), it is important to know what informs stressor appraisals. One possibility is that how critical or compassionate we are toward ourselves may influence how we appraise stressful situations. The present research examined whether stressor appraisals were associated with self-compassion and self-criticism, two personality traits known to relate to stress more broadly but yet to be directly associated with stressor appraisals. 193 general population participants completed an online survey containing demographic information, momentary stress, and measures of self-compassion and self-criticism forms (inadequate self, hated self, and reassured self) and functions (self-correction and self-persecution). Participants then read and imagined themselves to be in a stressful scenario before answering momentary stress and stressor appraisal measures about the scenario. Regression analyses highlighted that self-compassion and self-criticism significantly predicted stressor appraisals. Challenge appraisals ('this stressor is good') were positively predicted by greater self-compassion (β = 0.45, p < .05), self-correction (β = 0.40, p < .05) and the reassured self (β = 0.25, p < .05). Greater threat appraisals and primary appraisals ('this stressor is bad') were predicted by higher inadequate self (β = 0.60, p < .001; β = 0.48, p < .001) and lower hated self levels (β = -0.35, p < .05; β = -0.25, p < .05). Finally, secondary appraisals ('I can cope with this stressor') were weakened by self-persecution (β = -0.31, p < .05) and strengthened by the reassured self (β = 0.44, p < .05). These findings highlight the need for experimental intervention research into self-compassion and self-criticism to assess whether improving these variables will help individuals to perceive stressful situations more adaptively and facilitate better outcomes.

I would like to extend my sincere appreciation to co-author and Honours supervisor, Dr Chris Kilby, whose expertise was invaluable in formulating this research project.

Shanara Visvalingam | Master of Research (Psychology), Macquarie University (MQU)

Reducing the Consequences of Perfectionism in University Students: A Feasibility Study

Perfectionism, characterised by the pursuit of unattainable high standards accompanied by critical evaluations of the self and/or others, has been linked to various psychological disorders. Prior research with university samples have found perfectionism to predict psychological distress, poor academic performance, and burnout. Guided by the Perfectionism Social Disconnection Model, the purpose of the current feasibility study was to evaluate the efficacy

and acceptability of a newly developed educational intervention specifically designed to target the negative consequences of perfectionism in university students. Seventy university students (83.9% female; M = 19, SD = 5.41) reporting moderate to extreme levels of perfectionism completed the two hour 'Intentional Imperfection Program' (IIP). Participants completed self-report measures at baseline and at a two-week follow-up. Quantitative data showed statistically significant small to moderate reductions in self-oriented perfectionism, socially-prescribed perfectionism, hostility, rejection sensitivity, depression, and anxiety and also a small increase in perceived social support. Thematic analyses of qualitative data indicated that participants found the IIP feasible, enjoyable, and useful. However, given the absence of a control group the observed outcomes should be considered with caution. We concluded that the IIP shows promise in helping university students manage their perfectionism and a randomised control trial is warranted to further evaluate its efficacy.

This research was co-authored with Hannah L. McHardy, Susanne J. Norder, Natasha R. Magson, and Melissa M. Norberg and was funded by the Research Training Program Scholarship awarded to Shanara Visvalingam.

Australian National University

Government and the Law | 15th September 4pm

Session ID: 15.16.2

Abby Gallagher | Bachelor of Laws and Bachelor of Arts, the Australian National University (ANU)

Healthy Prisons are an Oxymoron

The Australian Capital Territory (ACT) Government touted the Alexander Maconochie Centre (AMC) as Australia's first 'human rights compliant' prison. The Government denounced punitive prison norms in asserting the AMC would operate under the 'Healthy Prisons' Philosophy, which protected detainee human rights and encouraged their rehabilitation. The prison cell windows would not have bars, and the doors would be brightly coloured, as physical representations of their human rights commitment. However, with a pattern of human rights breaches, riots, and a death in custody, alongside rising incarceration rates and several prison expansions, the AMC has experienced most milestones expected to occur at prisons. This paper analyses the disconnect between the AMC's human rights vision and its operational reality. It uses discourse analysis to reveal the role of the ACT Government's rhetoric in attempts to validate their human rights approach to incarceration. The paper engages abolition theory to explore the tension between human rights and carceral institutions, and asks the question: can a prison be compliant with human rights at all? The analysis demonstrates how notions of human rights and reform are implicated in prison propagation and expansion. The paper supports the abolitionist position that these reforms will not only fail in carceral institutions, but ultimately distract from the harm institutional punishment creates, as a site of violence and control. The major implication of this research is that abolition, not normative notions of reforms or human rights, must be the future of correctional practice in the ACT and beyond.

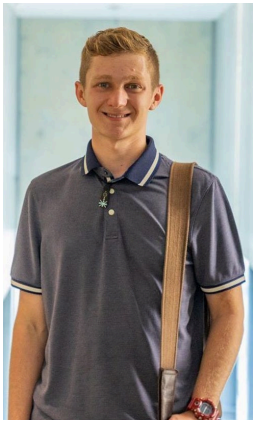
Mark Werner | Bachelor of Government, the University of Texas at Austin

Legislative Success in the Australian Parliament: Comparing the Passage Rates of Bills Over Time and Across Policy Areas

Contemporary Australian politics is frequently characterized in academic and popular discourse as constantly gridlocked, strongly divided, and inefficient. Critics claim that governments increasingly struggle to legislate effectively. But has actual legislative output declined over time? Have some policy areas experienced greater rates of legislative success than others? More specifically, are bills concerning materialist policy issues — i.e., economic or physical security and financial well-being — more likely to pass than bills in other policy areas? This paper uses a novel dataset of all bills introduced in the Federal Parliament between 2002 and 2009 to answer these questions. Each bill is coded by policy

issue according to the Australian Policy Agendas Project's codebook and by whether it was ultimately enacted into law. In addition to presenting a rich, descriptive account of trends in the federal legislative agenda, the paper analyzes the legislative success rates for bills across policy areas. It finds that overall rates of legislative success have declined over time and thus confirms popular perceptions of legislative ineffectiveness. The paper also finds that some bills — namely those concerning civil rights, immigration, and the environment, all of which are considered postmaterialist issues — were far less likely to pass than were bills concerning the materialist policy areas of macroeconomics and labor relations. The paper explores the political dynamics that might explain this disparity in outcomes and proposes avenues for future research that might deliver more insight.

Special thanks to Dr. Rhonda Evans and Dr. Andrew Gibbons.



Dylan James Woodhouse | Bachelor of Arts in Law, the University of Waikato

'Far from the mark? Evaluating New Zealand's changing firearms regulation in the context of growing gun crime rates'

'Truth is incontrovertible. Panic may resent it, ignorance may deride it, malice may distort it, but there it is.'

– Winston Churchill

This research employs a legal doctrinal methodology – a 'black letter law' approach and determines an inconvenient truth behind soaring gun crime rates in New Zealand and the legislative response to them. It is challenging to avoid political perspective when discussing firearms offences, as merely mentioning the problem, evokes memories of terrorism in Christchurch and an expanding catalogue of crimes. Altogether, these burgeoning crime rates amount to the worst recorded in New Zealand in a decade, despite firearms legislation becoming more restrictive. These circumstances make it difficult to present a balance of views regarding the successfulness of changes to New Zealand's firearms law. Instead, this paper finds and justifies an unfortunate, yet incontrovertible truth: legislative efforts have failed to improve public safety and curb criminal misuses of firearms. This paper identifies that policy has developed a hasty response to terrorism and has left ordinary criminality and gangs – which are the source of the current issue – unaddressed. It is suggested that Police be relieved of their administrative duties concerning the Arms Act 1983, enabling them to place greater emphasis on enforcement. Correspondingly, administration and licensing could be overseen by a new independent authority, responding to concerns around vetting consistency in findings. Ultimately, enforcement rather than regulation, is found to be the preferred means of responding to soaring firearms crime, addressing a contemporary gap in the discourse surrounding this issue.

Australian National University

Conservation | 15th September 4pm

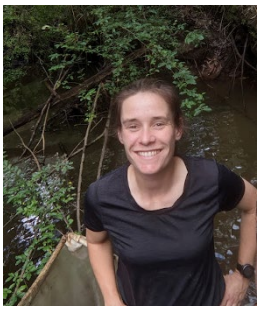
Session ID: 15.16.3

Alexander Hendry | Bachelor of Advanced Science (Honours), the University of Queensland (UQ)

The marbled cat (Pardofelis marmorata) is positively associated with large, intact forests and negatively associated with oil palm plantations in Southeast Asia.

Southeast Asia supports the greatest diversity of felids globally. However, this diversity could be threatened by the extensive forest loss and degradation occurring in Southeast Asia. Different felids may respond to anthropogenic disturbances in different ways. While the largely terrestrial leopard cat (Prionailurus bengalensis) appears to thrive in forest edges near oil palm plantations, due to the inherent difficulties in studying semi-arboreal species, our understanding of how the sympatric, semi-arboreal marbled cat (Pardofelis marmorata) responds to degraded habitat remains poor. The marbled cat is currently listed as Near Threatened on the IUCN Red List due to a suspected declining population. It is hypothesised that this species is adversely affected by deforestation as it relies upon tree connectivity for traveling and hunting. To investigate the marbled cat's habitat associations, as well as update its extent of occurrence, a large dataset of camera-trapping studies and marbled cat occurrence records was collated then analysed. The marbled cat was found to be positively associated with large, intact forests and high forest cover and negatively associated with oil palm plantations. The updated estimate of the marbled cat's extent of occurrence was found to be approximately 35% smaller than that estimated for its most recent IUCN Red List assessment, due to increased precision and deforestation. In view of the marbled cat's positive association with intact forest, apparent inability to adapt to oil palm plantations, and the continuous degradation of suitable habitat, the marbled cat's population decline is likely to be more severe than currently appreciated. Therefore the marbled cat's IUCN Red List conservation status should be upgraded from Near Threatened to Vulnerable. These findings suggest that semi-arboreal felids are likely to be more greatly threatened by habitat degradation than their terrestrial relatives, and that other semi-arboreal felids should have their conservation statuses urgently reviewed.

Co-authors of this research are Dr. Matthew Luskin, Zachary Amir, Henri Decoeur, Ilyas Nursamsi, Calebe Mendes, Jonathan Moore, and Adia Sovie. They are all thanked for their invaluable assistance and encouragement.



Breony Webb | Bachelor of Science (Zoology), Western Sydney University (WSU)

The effect of water quality and habitat suitability on the distribution of Platypuses; a pilot study in Cattai Catchment, North West Sydney

The platypus (Ornithorhynchus anatinus) continues to persist in urban waterways with high pollutant concentrations, altered flow regimes, channel morphology, and degraded stream substrate and bank vegetation cover. The purpose of this study was to determine whether water quality, specific habitat features, and macro-invertebrate assemblage influences the distribution of platypus as inferred by environmental DNA (eDNA) detection in a selection of 13 sites within the Cattai catchment, in North West Sydney. Sampling took place on two separate occasions: June 2020 and December 2020. Platypus DNA was detected in 9 of the 18 sites and 5 of the 9 waterways surveyed. The effective conservation of this iconic species in peri-urban and urbanised catchments such as that of Sydney requires ongoing monitoring of population status and health, and prevention of further habitat damage by informed local population management strategies. This study indicates that the loss of bank vegetation, an increase in aquatic weeds, high salinity and increased sedimentation are important urban stream factors to consider in developing local stream management improvements to sustain the population of platypus in the Sydney basin.

This pilot study is part of a broader research project led by Dr Michelle Ryan - Western Sydney University, with contributions and collaborations with community group - Cattai Hills Environment Network.

Nur Hanifah | Undergraduate of Conservation of Forest Resources and Ecotourism, the IPB University

COMMUNITY PERCEPTIONS AND ENVIRONMENTAL IMPACTS IN TOURISM DEVELOPMENT IN KELAPA DUA ISLAND, KEPULAUAN SERIBU, INDONESIA

Kelapa Dua Island is the smallest residential island in the Kepulauan Seribu National Park, Indonesia. The island with an area of 1.9 hectares are populated by 463 people. Apart from being a settlement, this island is also a tourist destination for domestic and foreign tourists. As a tourism area as well as a conservation area, the environmental impact is one of the important things that must be considered. The Kepulauan Seribu Government has determined environmental conservation as one of the priorities in making policies in Kelapa Dua island. So far, research on environmental impacts on Kelapa Dua Island has only been limited to the condition of coral reefs. There has been no research on island's condition, especially based on the community's perspective. Therefore, this study aims to identify public perceptions of environmental impacts in tourism developments that occur on Kelapa Dua Island. The environmental impacts studied are in the form of biophysical impacts, including impacts on terrestrial vegetation, ecosystem animals, and living ecosystems. Impacts that are not considered are soil erosion, noise, and decreased comfort. Impacts that are considered without sufficient data are living ecosystems. The method used

in this research is the distribution of questionnaires, field observations and literature studies. Questionnaires were distributed to obtain data on public perceptions to 90 people in Kelapa Dua Island aged 20-80 years. Respondents include local government officials, youth, community leaders, housewife, fishermen, tourism actors, janitors, fish farming actors, IPAL officers, and employees. Field observations were carried out in the form of exploration by visiting and circling the island to obtain data on environmental impacts. Data collection was carried out in June 2021. Literature study were carried out to obtain facts on the condition of Kelapa Dua Island based on relevant past studies. The literature study uses the scoping review technique because it's ability to synthesize various relevant research results, so that the facts presented to policy makers become more comprehensive and balanced. Analysis of public perception data was descriptive quantitative, environmental impact data was analyzed descriptively, and the relationship between public perception and environmental impact was analyzed descriptively. Data analysis was carried out thematically in order to be able to identify patterns and find factors through the data collected so as to find the relationship between each factor. The results of this study are as many as 77.5% of respondents agree that tourism has a positive impact on plant sustainability, 71.9% of respondents agree that tourism has a positive impact on ecosystem animals, and 75.3% of respondents agree that tourism has a positive impact on ecosystems. This study found the fact that local communities on Kelapa Dua Island still gave a positive response to environmental impacts (biophysical impacts) in their area. However, this is not in accordance with the actual conditions. Based on the literature study on the condition of the ecosystem on Kelapa Dua Island, it shows a decrease in fish catches, a decrease in water quality, a low index of marine biota diversity, and a decline in the abundance of reef fish. Meanwhile, field observations show that it is difficult for people to find fish so that they need to go further when sailing, the presence of chunks of coral in every resident's house, piles of garbage around the house and public toilets, the least number of residents who have MCK (washing toilets), and models of houses on stilts. which does not have a sewer. This research provides information to the local government that the community have no high consideration about environmental changes that occur because the level of public education tends to be low and the community is used to such conditions. Therefore, it is necessary to carry out more intensive environmental awareness to the community so that the community is able to cooperate in protecting the environment so that environmental impacts do not get worse.

In arranging this abstract, a lot of people have provided motivation, advice, and support for me. In this valuable chance, I intended to express my gratitude and appreciation to all of them. First, the deepest appreciation goes to my beloved parents, my mother, Susanah for the endless love, pray, and support, and my father, Torikhin for the phone call every week in order to remind me to keep going and never giving up. Also this abstract would not have been possible without the help, support and patience of my beloved advisor, Eva Rachmawati, PhD for her supervision, advice, and guidance from the very early stage of this research as well as giving me extraordinary experiences throughout the past few years.

Australian National University

Astrophysics | 15th September 4pm

Session ID: 15.16.4

Jocelyn Ware | Master of Science (Advanced) in Astronomy and Astrophysics, The Australian National University (ANU)

Radio Detected Galaxies are more Obscure than optically Selected Galaxies

Dust in galaxies has long been recognised as a key element of the astrophysical processes associated with star formation. Dust acts to obscure emission preferentially at bluer wavelengths, hampering analyses of star formation unless suitable corrections are made.

With the growth and variety of radio surveys being pursued using the Square Kilometre Array (SKA) pathfinder telescopes, it is timely to revisit the utility of radio-selected samples in probing star forming galaxy populations, and their sensitivity to dust obscured systems. This issue was explored by combining data from the Galaxy And Mass Assembly (GAMA) survey with early science data taken using the Australian SKA Pathfinder (ASKAP) telescope for the Evolutionary Map of the Universe (EMU) survey. Galaxies that were both detected in radio wavelengths and spectroscopically measured by GAMA were used to investigate the advantage radio detection may have over optical detection. The optical spectra from GAMA was used to probe interstellar reddening and subsequently calculate the Balmer decrement (H_α/H_β). Star formation rates in these galaxies were estimated from the H_α emission, as well as radio luminosity.

It was determined that galaxies with radio detections from the optically-selected G23 sample typically showed higher levels of obscuration than the optical sample in isolation. This result was used to explore the benefit of radio selection in probing heavily dust obscured galaxy populations as a function of redshift.

Neil Lu | Bachelor of Philosophy (Science)

Probing neutron stars with continuous gravitational waves

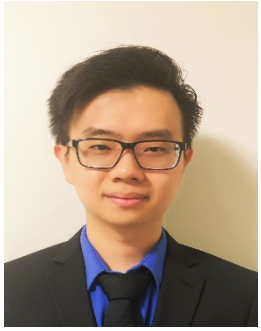
Neutron stars are extremely compact, dense astrophysical objects and are physically interesting because of the high pressures and densities in their interiors. In particular, the densities in the core of a neutron star are significantly higher than what can be achieved in terrestrial laboratories and offer a way to probe a density regime that otherwise cannot be explored. However, very little is known about the interior physics of neutron stars. In particular, the equation of state describes the relationship between density and radius inside a neutron star but is not currently known. Continuous gravitational waves are a type of

gravitational waves that have not yet been detected but should be observable using future gravitational wave detectors. This project explores how the successful detection of continuous gravitational waves would be able to constrain the neutron star equation of state. This was done by simulating different possible continuous gravitational wave signals and calculating neutron star properties from these signals. These calculations were then compared to different mechanisms by which neutron stars emit continuous gravitational waves. By comparing the theoretical predictions with the simulated calculations, the properties of a neutron star emitting a specific continuous gravitational wave signal were calculated. It was found that the successful detection of continuous gravitational waves would impose constraints on the neutron star equation of state and provide information about the likely physics that occurs in their interior.

Sophia Ridolfo | Bachelor of Science (Advanced) (Honours), the Australian National University (ANU)

Chemical Evolution of Spiral Galaxies: Investigating the Interstellar Medium of NGC628 with SIGNALS

The study of the interstellar medium and ionised gas components in galaxies is key to understanding the mechanisms that drive star formation and galaxy evolution. Most commonly used to trace star formation in galaxies are regions of ionised gas known as HII regions. These regions emit copious amounts of radiation which we observe as emission lines, or radiation at optical wavelengths. Analysing the properties of these regions can provide important insights into how stars form. In this study, I use optical IFU data obtained from the SITELLE instrument as part of the SIGNALS (Star-formation, Ionised Gas and Nebular Abundances Legacy Survey) program to study these highly-resolved star-forming regions in the local spiral galaxy NGC628 (M74). Using the largest and most complete sample of HII regions ever catalogued for this grand-design spiral galaxy, I derived properties of the interstellar medium and compared them to previous observations. I determined a negative radial oxygen abundance gradient and flat radial gradients for ionisation parameter. These radial profiles of oxygen abundance inform us of the chemical enrichment of the galaxy and the radial outflow of metals from the enriched inner region of the galaxy disk to the outer regions of the disk. Finally, I used new theoretical models to derive the interstellar medium pressure and electron density throughout the HII regions and find no radial profile for either pressure or density, suggesting there is no visible structure to the spatial distribution of pressure and electron density in the galaxy.



Jia Wei Teh | Bachelor of Science (Advanced) (Honours), The Australian National University (ANU)

The Mystery of Orphan H II Regions: Where are the Ionising Star Clusters?

H II regions are visually spectacular bubbles of ionised hydrogen gas typically found encompassing newly formed star clusters. They are created by high-energy radiation from the hottest and most massive stars in the cluster. By studying how interstellar gas processes this radiation, we can measure its properties (e.g. pressure, density) and the chemical history of the galaxy. We would like to understand the correlation between these properties and the properties (e.g., mass, age) of the star clusters enclosed in the region, ideally by matching star clusters with the H II regions they create. However, this task is proven to be surprisingly difficult: our observational study of a nearby spiral galaxy, NGC 628, shows 62% of H II regions lack corresponding star clusters. In this work, we critically examine possible explanations for these "orphan" H II regions using a combination of statistical analysis and synthetic observations of 100,000 simulated star clusters. After ruling out a number of other possibilities such as the uncertainty in observed positions of H II regions and star clusters, we determine that the orphan H II regions likely result from a difference in the sensitivities of the H II region and star cluster observations, where a star cluster can create an H II region bright enough to be seen, yet itself remain undetected. Based on this understanding, we vary the cluster detection criteria on a sample of simulated clusters, and show that increasing the sensitivity of cluster detection by allowing inspection of fainter clusters can, in theory, recover the majority of the orphan H II regions. Our work will provide important guidance for the design of future surveys intended to study correlations between properties of H II regions and star clusters.

Australian National University

Historiography: Visualised | 15th September 4pm

Session ID: 15.16.5

Georgia Hayes | Bachelor of Secondary Education, the University of Notre Dame Australia (NDA)

The Death Penalty in America and the New History of Experience

This paper aims to critique Andrea Lyon's text The Death Penalty: What's Keeping it Alive (2014), through the lens of the new History of Experience (HEX). The death penalty is a phenomenon which only 56 countries in the world continue to practice, many apparently with increasing frequency as noted by the International Observatory of Human Rights. It is striking to note that countries including Mongolia, Guinea, Bosnia and Herzegovina, Chad and Kazakhstan have recently abolished the death penalty yet the USA, arguably the leader of the free world, continues to use it. In fact, Lyon's text demonstrates that the use of capital punishment in America has a strong racial and socio-economic bias which seeks to control and suppress certain 'undesirable' classes and people.

In her book, Lyon focuses on the wrongfully convicted, their defence attorneys and the prosecutors but chooses to overlook the perspectives of other affected parties such as the families of both the victims and the offenders, other inmates, prison workers and society at large. The HEX methodology offers a way to address this, through a holistic critical examination of both collective and individual lived realities. By considering multiple perspectives and temporal, geographic, socio-cultural, and emotional contexts, a more powerful assessment of the practice and its various implications on all those involved can be undertaken. The paper ultimately argues that by employing a HEX lens, Lyon's anti-death penalty stance could be reinforced offering a stronger argument for diminishing or possibly abolishing the practice within the American justice system.

I would like to acknowledge the immeasurable help, guidance and wisdom given by my university lecturer and mentor, Dr. Karen McCluskey, Senior Lecturer and Discipline Head of History and A&S HDR Co-ordinator at the University of Notre Dame Australia.

Stefanie Krieg | Bachelor of Secondary Education (Religious Education)/Bachelor of Arts

The Lived Religious Experience of Rome's Vestal Virgins

The study of ancient Rome has traditionally focused on male-dominated narratives that emphasise masculine power and male spheres of action. Even today, Roman history remains predominantly the history of 'great' men. With

some notable exceptions, the intricate and personal experiences of other societal members continue to be sidelined in studies of Rome. The Vestal Virgin priestess cult, for instance, was once one of the most influential groups to operate within Rome, yet the study of their lives, and especially their socio-political roles, is greatly lacking in scholarship. Their lives are often reduced to trivial facts with these women hardly recognised for the decisive role they played in the maintenance of the Roman state. In using the History of Experience (HEX) methodology, this presentation aims to examine the lived religious experience of the Vestals and to interrogate what it meant to be a woman at the centre of the Roman Empire. Through my research of primary narrative accounts, especially Livy's recount of the trial and execution of two virgins, Opomia and Floriana, it has become clear that the lived religious experience of the Vestal priestesses was not straight forward. The variety of secondary sources reviewed showed a clear inconsistency in interpretation, with evidence often used sparsely and to support a modern understanding of gender. The HEX lens offers a more holistic appreciation of the Vestals' situated contexts, demonstrating that their lives were not merely framed by pure devotion to the goddess, Vestal, and duty to Rome, but may also have been characterised by feelings of fear, oppression, and coerced obligation. Implementation of the HEX methodology evokes a new path of history that is yet to be truly conquered and explored. It's person-centred focus aims to get into the crux of the individual experience, offering new perspectives overlooked by many traditional scholarship.

To my lecturer Karen McCluskey, who dedicated so much of her time to supporting our class throughout our entire research period, continuously checking up on us, and going above and beyond to give us access to all the resources we could ask for.

Soriya Farah | Bachelor of Secondary Education and Arts, the University of Notre Dame Australia (UNDA)

Teaching History through the Lens of Experience.

The current NSW History curriculum fails to meaningfully engage senior students with the emotional and sensorily experiences of everyday historical actors. This poster presentation argues that teaching history through the new History of Experience methodology (HEX) will address this issue. HEX examines the political, intellectual, and social structures of a given society at a fixed time and place, while seeking to understand how they are perceived by the groups or individuals who encounter them. The proposed study asks, 'how can HEX be utilised in a NSW Year 11 Modern History classroom to deepen a student's understanding of history through experience?' The test case invites students to explore the experiences of the Chinese in Australia during the White Australia Policy, specifically focusing on their attitudes towards the Dictation Test. The success of the proposed study will be assessed through the class' ability to engage with the emotional and sensorily experiences of Jan See Chin, one of the first Asian immigrants to be granted Australian citizenship. By analysing this case through the HEX methodology, it is hoped that senior students come to a more thorough understanding of the deep divisions in colonial society and the

dominant prejudicial attitudes of the Australian government. The poster ultimately argues that teaching history through a HEX lens disrupts the homogenised view of historical experience and thus, offers students a more varied and accurate account, not of historical facts, but of how people perceived and experienced historical situations.

I would like to acknowledge Karen McCluskey for all her support throughout this study and Pamela Wong for inspiring me to investigate the experiences of Jan See Chin, my great great grandfather.

Callum McKenzie | Bachelor of Secondary Education, the University of Notre Dame Australia (UNDA)

Video Games, History of Experience and Student Engagement

The paper explores the effectiveness of using war-themed video games and the History of Experience in engaging secondary school students in history. Recent scholarship has found that student engagement fell on average by 25% within two years of starting high school including in history. This may seem surprising given that video games have seen an increase in historical themes and settings over the same period, with 83% of children aged 15 - 18 playing video games. Their popularity strongly suggesting their success in offering an authentic historical experience.

The paper therefore proposes a novel way to retain and possibly enhance student engagement by bringing together video game technology and history in secondary schools to engage students. The case study will focus on teaching war experience using Call of Duty: WWII's presentation of the Canadian D-Day landings in combination with the History of Experience (HEX) methodology. The methodology seems best suited to the aim given its staunchly objective approach. HEX seeks critical, holistic, and situated explanations of the past by emphasising how the past was perceived and embodied individually through the senses and emotions. Thus, the paper asks can student engagement in understanding historical experience (of war, in this case) be enhanced through a holistic sensory approach offered by integrating HEX and war-themed video games?

Although it is expected that student engagement will positively shift using such an approach, such findings can only be ascertained once the theoretical justification is further refined. Thus, this paper proposes an approach for which a pilot study in the New South Wales school system will be undertaken in the future.

I would like to thank my lecturer Dr Karen McCluskey, Discipline Head of History at the University of Notre Dame, Australia, for challenging my understanding of history and supporting me through this process.

Australian National University

Philosophy | 16th September 9am

Session ID: 16.09.1

Evelyn Richards | Bachelor of International Relations and Bachelor of Arts, the Australian National University (ANU)

Hobbes and Rousseau: Identical or Opposite? Towards a comprehensive critique of Social Contract Theory

Social contract theory (SCT) holds that the legitimacy of government stems from the multitude contractually consenting to particular social and political arrangements. Most scholars of SCT agree that the classical social contract theorists Thomas Hobbes and Jean-Jacques Rousseau employ SCT to argue in favour of distinctive kinds of government. Specifically, Hobbes is regarded as wielding SCT in support of authoritarianism and Rousseau of democracy. However, there has been little attempt to understand whether SCT can, as an overarching framework, function to constrain the authors' accounts of government legitimation and dissolution. I address this question by arguing that there are three essential structural elements necessary to any SCT account, which could substantiate a renewed understanding of SCT as more restrictive. These are that 1) the state of nature prevents cooperation; 2) the social contract enables cooperation by legitimising government; and 3) collapse of government qua return to the state of nature occurs automatically. To explain how these logical constraints limit the possibility of meaningful differentiation between varying SCT accounts of government legitimacy, I present a comparative analysis of Hobbes's Leviathan and Rousseau's Two Discourses and The Social Contract. I find that the authors present structurally equivalent theories, whereby government is both formed, and can be dissolved, under the same conditions. My findings challenge the conventional understanding that the Hobbesian and Rousseauian accounts of SCT are substantially distinct by disputing that the authors' preferred regime type can be supported by SCT alone. If correct, further research should be undertaken concerning the extent to which SCT can comprehensively justify individuals' conceptions of political legitimacy.

Aidan Shaw Riley | Bachelor of Philosophy (Humanities and Social Sciences), the Australian National University (ANU)

The Temporal Cognition: How may we interpret Kant's fundamental theory of cognition in the Critique of Pure Reason?

In 1781, German philosopher Immanuel Kant published the Critique of Pure Reason, a major philosophical text that investigates the possibility and limits of human knowledge and reason. The text's theory, referred to as 'Transcendental Idealism', proposes that the experienced world is fundamentally structured by

the human mind and consciousness. Its implications have effected much of following metaphysics and epistemology. Despite this impact, it remains disputed how Kant justifies his argument for 'Transcendental Idealism', a dilemma that needs to be addressed given the Critique's enduring influence. In my research I analyse the Critique's central chapter, known as the 'Transcendental Deduction', to form a possible reconstruction and explanation of Kant's argument. I first consult commentaries by modern analytic philosophers Robert Paul Wolff and James Van Cleve on their analyses of the Deduction. I take Wolff's syllogistic exegesis as my starting point, which I critique with Van Cleve's lucid insight of placing Kant's 'Unity of Apperception' as the foremost principle. I then integrate this insight into my own interpretation. I argue that Kant builds his theory around how human consciousness and self-consciousness interact to create our basic qualities of experience and knowledge. Kant emphasises that the 'Unity of Consciousness' shared by both is the key factor in this mechanism of creation. I finally speculate that Kant holds this process to be intimately related not only to the existence and behaviour of our experience, but to the origin of space and time as well. Appreciating this reading of Kant has value not just to the Critique, but to contemporary debates about the mind and its relationship to the world.

Australian National University

Democracy and Governance | 16th September 9am

Session ID: 16.09.2

Brindy Donovan | Bachelor of Arts, the University of Western Australia (UWA)

The neoliberal student union?: The contradictory social worlds of elected student representatives

This critical ethnography investigates the social and structural forces that shape why students run for a role in their university student union, and their experiences once in the organisation. The political habitus students develop in their time in elected office ought to be of concern not only to the present student-body they are meant to represent, but also to the future communities they may potentially lead. I conducted this ethnography using an extended case method of 16 in-depth semi-structured interviews. I also utilised what Holmes and Marcus (2006; 2007) term a 'para-ethnographic' approach, which asks that we reimagine the researcher-informant relationship to take seriously the theorising of participants. Neoliberalism has affected not only the structure and functioning of Australian universities, but also students unions. Student representatives must navigate an increasingly bureaucratic and competitive environment both pre-election and once in the organisation. In response, many appear to adapt in ways seemingly contradictory to their stated goals. Most participants cited well-intentioned reasons for running. However, the high dependence on their own social capital and the need to navigate intra-organisational politics meant that students felt they needed to become increasingly partisan and self-interested to find success in their role. Any inclinations students had towards cooperation were quickly replaced with partisan-based competition, the desire for genuine connection became superseded by what participants referred to as "transactional relationships", and the personal and the professional often converged.

Thank you to Associate Professor Martin Forsey for coordinating the Anthropology and Sociology capstone unit, and for the support and feedback that made this research possible.

Natalien Isenia | Bachelor Security Studies, Leiden University (The Netherlands)

The Threat Perception of Social Movements against Police Brutality

The Black Lives Matter movement in the United States and the End SARS movement in Nigeria were both perceived as a threat to their respective governments. Protesters of both movements were met with excessive force during the 2020 protests. Protesters of the End SARS movement in Nigeria were met with excessive force from the very beginning of the protests, whilst

demonstrators of the Black Lives Matter movement in the United States were met with excessive force in a much later stadium of the protests. The goal of this thesis is to explain how a variation in threat perception of social movements against police brutality result in different government responses. This study is a qualitative research, making use of a comparative case study approach. By applying Walt's Threat Perception Theory, the researcher argues that four factors determine the level of threat of social movements. Namely, aggregate power, geographic proximity, offensive capabilities, and aggressive intentions. The paper found that although a movement's aggregate power and geographic proximity are sufficient factors for a movement to be perceived as threatening, some governments will not engage in repressive behavior until there is an increase in the movement's aggressive intentions. This disparity in threat perception explains the difference in government response. This research demonstrates that Walt's threat perception theory, although being a state-centric approach, is applicable to protests and social movements as well.

I would like to thank my thesis supervisor, professor Graig Klein, for the endorsement and for guiding me through every step of my thesis process.

Rochelle Schoff | Bachelor of Arts (Honours), the Australian Catholic University (ACU)

Imagining Region and the Nation: The Interwar Riverina New States Movement

After the First World War, several towns and cities throughout the Riverina imagined a future where separation from New South Wales might allow a new inland region to be admitted to the Commonwealth as an independent state. The interwar New States Movements responded to national anxieties over Australia's so-called 'empty spaces,' specifically the need to populate Australia's rural regions, which the movement argued could be achieved through smaller, locally governed states. The Albury New States League articulated their sense that the Riverina region shared a distinct area of interest that was connected by its ties to the Murray River, pioneer history of Hume and Hovell's journey through New South Wales and Victoria in 1834, and shared goals for a populous and prosperous future for agricultural communities. Benedict Anderson has famously understood nationalism in terms of an 'imagined community', where citizens imagine themselves connected by a sense of shared, geography, history, and print vernacular. Considering this, how did the New States Movements negotiate local and national identities? And how did the movement use interest in pioneer history and the rural automotive boom to articulate a distinct sense of local identity? Through a combination of archival research of local newspapers and souvenir materials related to the interwar New States Movements and Hume and Hovell centenary celebrations, I show how the Riverina imagined local and national identities through connections to past pioneer journeys and imagined a shared future as an independent state.

Yiting Luo | Bachelor of Sociology (Honours), the University of Sydney (USYD)

Is the Chinese Government Really that Violent: Rethinking of the 2019-2020 Hong Kong Protest Analysis

From March 2019 to the 2020, the Fugitive Offenders Bill promulgated by the mainland Chinese government sparked a series of social movements in Hong Kong. In response to the Anti-Extradition Law Amendment Bill Movement, much of the comments in Western and Hong Kong societies has focused criticism on the supposedly violence behaviours of the Mainland China Government. Through a review of the Hong Kong historical resources and the development process of the movements, supplemented by Bourdieu' Symbolic power & Arendt's Violence theories, as the analytical tools. I analysed why the Mainland Government would be criticised as arbitrary and violent and reveal other possible factors that have made negative influences on people's impressions on Chinese Government's behavior. The results contain three main focuses. Firstly, the Mainland Government is considered arbitrary because Hong Kong's unique social system have led to differences in habitus between Hong Kong and Mainland China, which weakened the Mainland Government's authority in socially constructing Hong Kong society. Secondly, the high dissemination rate of social media, the political emotions' inflammatory associated with pictorial messages, and the accumulated social and economic pressures of Hong Kong youth have together created the possibilities for government behaviors to be distorted. Thirdly, the above factors also created a destructive stimulus to the power dynamic between the Mainland Government and the Hong Kong masses, which further influenced the movements' development. Based on the study scale's limitation, the results are undoubtedly one-sided. However, I hope it can provide a new perspective for more researchers to allowing for more objective evaluations of the Mainland China Government.

Australian National University

Sleep | 16th September 9am

Session ID: 16.09.3

Neha Bal | Bachelor of Advanced Studies (Honours), the University of Sydney (USYD)

Metabolic Consequences of Obstructive Sleep Apnoea on the Liver: Links between OSA and Cardio-metabolic Disease

Obstructive Sleep Apnea (OSA) is a chronic respiratory disorder that affects more than 1 billion people worldwide. OSA patients experience repetitive collapse of the upper airway during sleep which causes pauses in breathing. This leads to intermittent periods of low oxygen in the blood (intermittent hypoxia) which is considered a key driver for the cardio-metabolic comorbidities, such as type 2 diabetes and cardiovascular disease, typically seen in the OSA population. To study the effects of intermittent hypoxia in isolation from other OSA sequelae, a gas model was used to expose Sprague Dawley rats to short- and long-term intermittent hypoxia mimicking rapid oxygen fluctuations experienced by OSA patients. We used a multidisciplinary approach including physiology, molecular biology and –omics techniques, to study both the acute and chronic effects of intermittent hypoxia on metabolism in the liver. The liver helps to regulate whole-body energy homeostasis and metabolite levels in the circulation and we hypothesized that intermittent hypoxia would cause metabolic dysregulation in the liver, altering metabolites circulating in the plasma. Preliminary metabolomic analysis of liver tissue collected from the Sprague Dawley rats revealed a dramatic shift in global metabolism in response to a single night of intermittent hypoxia, which continued to change following weeks of night-time intermittent hypoxia exposure. A number of metabolites altered in the liver, including ketones, were also altered in the plasma. While further study is needed, the observed metabolic changes may represent adaptive or maladaptive processes involved in the development of cardio-metabolic diseases seen in patients with OSA.

I would like to acknowledge the contributions and co-authorship of my supervisor Dr. Kristina M Cook, co-supervisors Dr. Melissa MJ Farnham and A/Prof John F O'Sullivan, and fellow lab members Dr. Polina Nedoboy, Dr. Yen Chin Koay, Chloe-Anne Martinez and

Edward Hootman | Bachelor of Science/ Bachelor of Advanced Studies (Advanced) (Honours), University of Sydney (USYD)

PAC1R knockout mice show inhibited metabolic responses to 50 days of chronic intermittent hypoxia exposure

Obstructive sleep apnoea (OSA) is estimated to affect over a billion people worldwide and characterised by repeated upper airway collapses during sleep which affects their ability to breathe, exposing them to intermittent decreases in blood oxygen, known as intermittent hypoxia (IH). This activates the sympathetic nervous system – the fight or flight response which alters whole body metabolism to maintain energy supply, mainly to the brain. The neuropeptide Pituitary Adenylate Cyclase Activating Polypeptide (PACAP) acting through its receptor (PAC1R) is necessary for the sympathetic activation in response to acute IH. Chronic exposure to IH (CIH) causes a persistent activation of our fight or flight response which is implicated in the onset of a range of metabolic diseases. Yet given the importance of PAC1R in this activation, its role in the potentially pathological metabolic adaptations to CIH has never been investigated.

To study this, male wild type (WT) and PAC1R knockout (PAC1R-/-) mice were exposed to 50-days of CIH (35-seconds 6% O2, 60-seconds 21% O2 cycles for 8 hours) or SHAM (21% O2) condition (n=5 per group). Non-fasting blood glucose and bodyweight were measured fortnightly, and mice underwent glucose and insulin tolerance tests (ITT) after 5- and 6-weeks of treatment exposure respectively. These tests are used clinically to assess whole body glucose regulation in the diagnoses of a range of metabolic diseases.

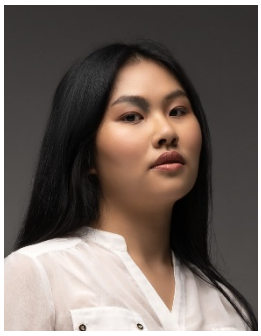
WT CIH had significant decreases in bodyweight and blood glucose after 2 weeks which did not significantly change in subsequent weeks. These changes did not occur in the SHAM controls nor CIH treated PAC1R-/-. CIH did not significantly alter glucose tolerance in either WT or PAC1R-/- relative to controls. PAC1R-/- were unable to complete the ITT due to severe hypoglycaemia, suggestive of a lack of the sympathetically mediated counterregulatory response, independent of CIH treatment. The PAC1R is involved in the metabolic responses to long-term CIH and may play a role in the onset of OSA related metabolic disease.

A big thanks to my supervisors Dr Melissa Farnham and Dr Polina Nedoboy for their guidance and assistance in carrying out this research.

Australian National University

History | 16th September 12pm

Session ID: 16.12.1



Cherry Zheng | Bachelor of Philosophy (Honours) - Asia and the Pacific, the Australian National University

Provincialising the Present: A Historiography of Deep History

The surfacing of Mungo Lady's cremated remains in 1968 doubled previous estimates of Aboriginal habitation in Australia. This shifted not only national frames of history, but also global understanding of humanity's origins. For Ann McGrath, Mungo Lady was key inspiration for the compilation of Long History, Deep Time, a 2015 volume edited with Mary Anne Jebb. The work represents a conceptual turn from McGrath's longstanding study of Indigenous history to a critique of the discipline's basic assumptions about time. This historiographical essay traces McGrath's inspiration and influences before analysing the book's most important contribution: the concept of 'deep history'. I find that deep history comprises an at times contradictory double task. At a disciplinary level, deep history opens up history's single timeline to the unarchived millennia of human experience. At an interdisciplinary level, deep history destabilises the authority of that timeline by communicating other ways of experiencing the past. These tasks straddle pluralities within and beyond the academy, building upon diverse literatures not limited to Australian history, postcolonial theory, and the natural sciences. To me, its most interesting problems exist at the higher, interdisciplinary level, where it dovetails with critical scholar Dipesh Chakrabarty's proposal to 'provincialise Europe'. Though history is in the title, the book represents a nascent effort to reconfigure the history discipline — starting with Australia, with global ambitions. If deep history succeeds at gathering itself into a coherent practice, its most interesting contribution will be a provincialisation of the present, questioning "why we place walls between the imaginative history of 'ourselves' and other peoples and times".

Nicholas Herriot | Honours Degree of Bachelor of Arts (History), the University of Adelaide

"The Best Way to Help Vietnam is to Make Revolution in Your Own Country": South Australian Student Radicalism in the Long 1960s

Australian student activists are rarely considered part of the political upheavals that engulfed the world during the 'long 1960s'. Yet, by the early 1970s, Flinders University had acquired a nationwide reputation as a hotbed of rebellion. My research identifies a significant opportunity to present new information about the local, national and international dimensions of political radicalisation at a South Australian university.

Despite enduring popular interest in the 1960s, few histories of Australian student activism during this period have been written. Against the master

narrative of a social democratic 'Dunstan Decade', my research re-centres students and their revolutionary politics in South Australian history. As a new suburban institution lacking established traditions, Flinders University provided a unique backdrop for the emergence of protest and dissent. Students made extensive use of the written word to gain influence and express their globally conscious ideas. My project draws on extensive document analysis of student print culture. But yellowing leaflets in an a library archive can only go so far in constructing an account of political radicalisation from the perspective of participants themselves. To further understand how real historical actors constructed their own transnational subjectivities, I am currently recording oral history interviews with former student activists.

I aim to test the extent to which local activists can be drawn into a transnational narrative of Sixties radicalism. In what ways did South Australian students encounter international rebellion and how did they 'translate' global ideas into local actions? Preliminary findings suggest that overseas rebellions, particularly anti-imperialist struggles in Vietnam and China, were a key reference point for activists at Flinders who hoped to perform a revolution in their own country.

Stefan Subasic | Bachelor of Arts (Honours), Australian Catholic University

No Quiet on the Eastern Front: Austria-Hungary's Serb Dilemma, 1911-16

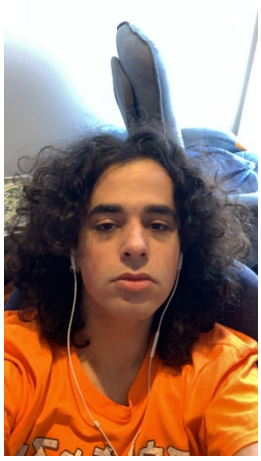
My thesis aims to directly challenge revisionist historiography of Austria-Hungary's relations with its ethnic minorities. While by no means a consensus, the revisionist theory argues that Austria-Hungary's ultimate collapse was not a foregone conclusion as a result of decades of decline; instead, the empire was a stable, if not always thriving, multi-national state that broke down mainly due to the duress of world war. My historical investigation will test the modern consensus through the prism of Austria-Hungary's Serbs, who were considered one of the most controversial and potentially disloyal ethnicities within the empire. Examining the years 1911-1916, my thesis will investigate events that fall within two themes – the military and law and order – which, together, will show the empire's troublesome relations with its Serb subjects predated the war. My main primary sources will be the newspapers, pamphlets and books published by the 'Jugoslav Committee', a political interest group which sought to promote the cause of South Slavs who lived within the Dual Monarchy's borders; and a collection of personal notes by Oskar Potiorek, Governor of Bosnia-Herzegovina from 1911-1914. This collection, compiled by the Bosnian Academy of Sciences and Arts, illustrates how Bosnia's provincial government adopted increasingly harsh and excessive measures in order to combat separatist and nationalist sentiment, which only intensified after the outbreak of war in 1914. My hypothesis is that the suspicion shown towards the Serbs was frequently unjustified and excessive; and that, especially in Bosnia-Herzegovina, these practices had their precedents many years before World War I.

I would like to acknowledge my thesis supervisor Nick Carter, who has helped me throughout my research in ensuring that I keep my topic focussed and that I am consulting as wide a range of sources as possible.

Australian National University

Culture and Identity: Visualised | 16th September 12pm

Session ID: 16.12.2



Benjamin Lamb | Bachelor of Asian Studies, the Australian National University (ANU)

How elements of Korean culture are displayed in hip hop

This paper aims to explore how Korean culture has been displayed and fused within the foreign art from of hip hop. In recent years, Korean hip hop has cemented itself as a unique genre within the global culture of hip hop, which originates from the US. In the past two to three decades, it has gone from being completely unheard of in South Korea to permeating mainstream media in almost every aspect. However, this popularity represents Korean and American cultures mixing in a distinct case of glocalization. This is important to explore in Korean and popular culture studies to grasp a better understanding of the factors that push both globalization and glocalization in our modern world, namely the individual identities and self expression of youth. The importance of global and local trends is linked to identity politics, and is exemplified through giving voices to the under represented, which may be missed in larger fields of study. By understanding this, we are able to contribute to the study of anthropology and sociology by examining the ways in which society might change. It is also important in order to understand the effect a foreign influenced pop culture has on societal and cultural trends in Korea. Within this relevance, the exploration of Korean hip hop yields its importance to studies of culture (both Korean and global), pop culture, media, music, and art. The methodology of this paper involves drawing upon previous studies of not just Korean hip hop, but Korean culture, globalization theory, and music history. Evidence is drawn from previous literature as well as individual analysis of artists and consumer trends and opinions spanning several decades. This is used to form the conclusions that hip hop in Korea has a strong basis in telling personal and otherwise unacceptable messages in collective Korean society, and that the mixing of two cultures (Korean and American) creates a platform for people on any spectrum within these cultures to express themselves, which further develops the genre of Korean hip hop.

I would like to acknowledge Dr Roald Maliangkaij for his help in mentoring the formulation of the research methodology and research topic itself.

Hadassa Gitau | Bachelor of Music (Musicology), Sydney Conservatorium of Music

Identity Formation through Worship Music among the South Sudanese Diaspora in Australia

This paper explores the process of identity formation among diasporic communities, specifically South Sudanese Australians, who have had to recreate a new national identity after leaving their war-torn home country. By focusing on music as a culturally significant phenomenon, this paper takes on an ethnomusicological approach to the study of migration. Studies in the field of ethnomusicology have only recently begun looking at the role of music in Australian immigrant life, with scholars such as Sorce Keller and Barwick (2012) focusing the music of Italian-Australian immigrants. On the other hand, experts on the African diaspora, such as Adogame (2013), emphasise the importance of religion to the lives of African migrants around the world. The South Sudanese diaspora in Australia take up a large portion of the African population in this country, and yet there is a significant gap in the field about the significance they place on music in their lives. The aim of this study is to fill that gap by exploring how South Sudanese Christians use worship music to reflect on these experiences and re-affirm their identity in a new environment. The research methods employed include interviews and participant-observation, in which the author takes part in the music-making and the church life in order to gain a more authentic understanding of the topic. The findings of this paper have shown how religion and national identity intermingle for the people of South Sudan, a discovery that has the potential to extend the discourse on immigrant life in Australia.

I would like to acknowledge my Honours supervisor, Catherine Ingram, as well as South Sudanese musician Mary David Mamour, both of whom I'm grateful to for their help and insights when writing this paper.

Hannah Ahmad | Bachelor of International Relations/Bachelor of Development Studies, the Australian National University (ANU)

Has the production of Ghanaian cuisine in the United Kingdom allowed Ghanaian migrants to build a sense of diasporic identity and Ghanaian identity in the context of migration?

This study presents an analysis of Ghanaian migration and Ghanaian cuisine in the United Kingdom (UK) through the lenses of postcolonialism, identity and social recognition. The Ghanaian population in the UK increased five-fold between the 1950's and 2000, to approximately 55,000. Foodways of this diaspora have played a crucial role in reproducing Ghanaian culture overseas, and have been key to ethnic identity formation. The two distinct approaches to migrant foodways, food and the politics of racism, and incorporation in host nations, are discussed. Parallels and comparisons are drawn from well-known and well-established foodways in Britain such as those of South Asian diasporas. As a result of the shared colonial history of Ghana and the United Kingdom, the foodways of Ghanaians have undoubtedly been shaped by prior

exposure to British customs, culture, and institutions. At the same time, the practice of communal sharing of dishes and the continuation of other Ghanaian traditions reinforces Ghanaian identity and strengthens communal identity in diaspora. Unlike their South Asian counterparts, Ghanaians in the UK opened few public food outlets to cater to UK patrons Rather, Ghanaian cuisine in diaspora has been a largely non-commodified, communal affair – but has nevertheless undergone transformations reflecting the process of settlement and incorporation of this diaspora into the UK.

I would like to acknowledge Dr Ashley Carruthers for his assistance and continued support.

Australian National University

Materials Engineering | 16th September 12pm

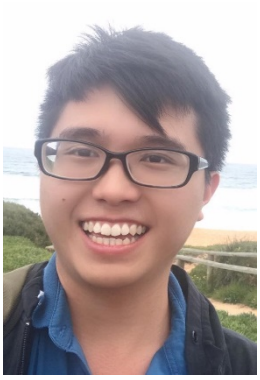
Session ID: 16.12.3

Michael R Gee | Bachelor of Science in Civil and Environmental Engineering, the University of California Berkeley (UCB)

Enhanced Adsorption of Perfluorooctanoic Acid (PFOA) from Aqueous Solution by Oak Sawdust Derived Activated Carbon

Perfluorooctanoic acid (PFOA) is a typical compound belonging to the Perfluoroalkyl Substances (PFAS). PFOA has been widely used in vast applications of various products, including everyday items, namely nonstick cooking appliances and fast-food wrappers because of its strong chemical stability and resistance to water and oil. However, decades after PFOA's initial production, researchers began linking PFOA exposure, especially from PFOA contaminated drinking water, to serious health impacts in humans such as cancer, thyroid disease, ulcerative colitis, and congenital disabilities. Hence, the United States Environmental Protection Agency established health advisory levels which currently stand at 70 parts per trillion. In this study, oak sawdust derived activated carbon (OSAC) was used as an adsorption agent to remove PFOA from an aqueous solution. Oak was selected because it is eco-friendly and a common waste product of the Oak industry. The pore structure of OSAC was optimized through carbonizing under different temperatures (500℃-1100℃). The surface was chemically functionalized by adding modifying compounds: boric acid, urea, and polyethyleneimine. The maximum adsorption capacity of OSAC, prepared at 900℃, was found to be 83.7mg/g. In addition, kinetic and isotherm studies were conducted to evaluate the adsorption behavior. Various background ions effects on the adsorption were also studied to explore the adsorption mechanism. Moreover, this adsorbent's high effectiveness, abundance, and potential low cost may provide a more sustainable, widespread solution to remove PFOA contamination at wastewater treatment plants to reduce human and ecological exposure to PFOA.

Xiaobo Lei, William Holmes, Pubali Sarker, Mark Zappi Ph.D., P.E., and Daniel Gang Ph.D., P.E.



Phan Quoc Khang Nguyen | Bachelor of Engineering (Honours), Western Sydney University

Fabrication and Evaluation of Polymeric Nanocomposites Using Additive Manufacturing

Phan Nguyen (1), Nima Zohdi (2), and Richard (Chunhui) Yang (3)

School of Engineering, Design and Built Environment, Western Sydney University, Penrith, NSW 2751, Australia.

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The use of additive manufacturing technology, e.g., 3D printing, for fabricating polymer materials was first introduced in 1986. This new technology created great opportunities to rapidly produce components with complex geometry but at low cost, lightweight and minimise manufacturing wastes. At present stage, most of 3D-printing products are commonly used as prototypes rather than mass production since there are still some technical issues needed to be solved. Recent studies showed that material properties of additively-manufactured polymers can be enhanced by adding nano additives to make them become nanocomposites.

In this study, polymeric nanocomposites are fabricated by using additive manufacturing and evaluated for improvements 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 main material (matrix) in this research for improvement. A nano additive - Multi-walled Carbon Nanotubes (MWCNT) is chosen as the additive material to the ABS matrix. According to ASTM Standard, tensile testing samples of pure ABS and ABS/MWCNT nanocomposites at a 0.5% weight fraction of MWCNT are both fabricated by using a typical additive manufacturing technology – Fused Deposition Modelling (FDM). Thereafter, the samples are tested and evaluated to extract their mechanical and thermal properties. Results obtained show significant improvements in both material properties. The materials are also modelled and simulated by using Digimat software for validation and verification. Research outcomes from this research can be employed in various engineering applications such as prolonging service life of 3D-printed ears and scaffolds in biomedical field, fabricating electronic sensors in one-off 3D printing process, using this new nanomaterials in state-of-the-art small satellites at low costs for aerospace engineering, etc.

Author woud like to express special thanks to Prof. Richard Yang, Mr. Nima Zohdi for their wholehearted instructions and supports; Western Sydney University for providing us with fundings and access to school facilities.

Oliver Hervir | Bachelor of Philosophy {Honours} - Science, the Australian National University (ANU)

Fabricating and Testing Dual-Carbon Batteries to Investigate their Electrochemical Properties and Performance Characteristics

Dual-carbon batteries (DCBs) have emerged as a potential replacement for rechargeable lithium-ion batteries (LIBs), in certain applications, because they can attain higher cell voltages. Batteries function due to the movement of ions between the electrolyte (an aqueous solution of the ions) and the electrode (a solid). Whereas LIBs rely solely on the movement of lithium cations, DCBs use both cationic (positive) and anionic (negative) ions, allowing them to achieve a higher cell voltage. Despite this, LIBs have excellent energy and power density, making them the most dominant battery in the market. They are, however, limited by their high fiscal and environmental production costs. Hence, the further development and refinement of rechargeable batteries, such as DCBs, is an important aspect of solving pressing energy crises. In 2014, Power Japan Plus released a DCB to market, claiming superiority to other batteries. Therefore, this study aims to determine whether their battery may be useful in the future, by first fabricating a comparable DCB, and then evaluating its performance characteristics, namely: (i) energy density; (ii) rate capability, ability to deliver high currents; and (iii) cyclic stability, consistency in energy deliver over time. Our DCB was fabricated in an argon glove box as a three-electrode Swagelok system, with optimised electrodes and electrolyte that matched those used by Power Japan Plus. Our results suggest that our DCB has an energy density of 164 Wh/kg (slightly smaller than LIBs), a moderate rate capability, and likely cyclic stability. We postulate as to why these findings are the case and suggest that DCBs are a good option for grid integration and electrical storage due to its low cost, sustainable design, and aforementioned performance characteristics.

I would like to acknowledge A/Prof Alexey Glushenkov and Dr. Thrinath Reddy Ramireddy for their guidance, advice and assistance in this project.

Australian National University

Nursing and Caregiving | 16th September 12pm

Session ID: 16.12.4

Elissa Price | Bachelor of Nutrition and Dietetics (Honours)(Deans Scholar), the University of Wollongong

Student Nurses' Perceptions of their Knowledge, Role and Experiences in Nutrition Care and Education

The high burden of chronic disease in Australia results in a significant demand on our health systems. Poor nutrition is a known modifiable risk factor impacting long-term health outcomes. Nurses are in a unique position to provide elements of nutrition care, given their availability across the healthcare system and high patient exposure. Nutrition education for student nurses may ensure Australian nurses are equipped with relevant knowledge and skills. Understanding student nurse perspectives regarding a role in nutrition care may inform nutrition education to support this role.

To explore student nurses perception of their nutrition knowledge adequacy, the nutrition education in their undergraduate studies, and gain insight into their confidence to deliver nutrition care in practice.

Semi-structured interviews were conducted with second- and third-year students in a Bachelor of Nursing degree. Interviews were audio recorded, electronically transcribed verbatim, and semantically coded, applying an inductive approach to theme generation.

Participants (11 female/2 male) identified their role in nutrition care as an element of holistic nursing. However, students provided insight to their limited knowledge and skills to support this role and could provide few examples of nutrition education in their university content. Participants emphasised the responsibility of the entire interprofessional team to support the delivery of nutrition care, including dietitians.

Student nurses value nutrition care as part of the holistic care of individuals, and recognise the role of professionals, specifically dietitians. Establishing minimum competency standards may be necessary to ensure nutrition education is included in university nursing curricula.

I would like to thank and express my deepest appreciation to my academic supervisors Mrs Lorraine Fields and Professor Eleanor Beck for their ongoing support with my Honours research.

Natalie Tuckey | Honours Degree of Bachelor Psychological Science, University of Adelaide.

Using an international online forum to explore the experiences of caregivers of patients with chronic kidney disease

Background: Burden is a major concern for caregivers of patients with chronic kidney disease (CKD), which is a progressive and debilitating chronic illness resulting in irreversible loss of kidney function. Online forums provide an important platform to caregivers of patients living with CKD for peer connection and expression of perspectives and concerns, but have not been used in research about consumer experiences. Research has addressed the psychosocial impacts for patients living with CKD, however psychological and physiological impacts on the patient's caregivers have been overlooked. Social support can improve caregivers' quality of life, with emerging research exploring online social support. Method: This study employed qualitative content analysis to examine 159 posts on an online international forum: Caregivers of Patients with Kidney Disease. Low risk ethics was granted with the stipulation of participant anonymity. This study examined the experiences and concerns raised by caregivers of patients with CKD. Posts were coded using verbatim words and phrases, then arranged into three overarching themes, 12 categories, and 71 sub-categories. Results: The three overarching themes were: Impact to Carer Wellbeing, Use of Online Social Support and Caregiver Knowledge. Online posts highlighted the psychological and physical challenges for caregivers of patients with CKD including social isolation, helplessness and the impact to paid employment. Participants used online social support to connect with peers and seek advice from the forum community on topics including: the patient's diet; clinical management; CKD symptoms; and how to support the patient to adhere to diet and medications. Conclusion: This study provides valuable insight into gaps in caregiver knowledge and their need to seek online peer support. Caregiver forums can inform support strategies from healthcare professionals to increase caregiver involvement in treatment and education options, as well as tangible assistance to support caregivers' and patients' needs such transportation services for dialysis.

I would like to acknowledge Professor Anna Chur-Hansen, Emily Duncanson and Shilpa Jesudason with the supervision of this research.

Brandon W Smith | Bachelor of Nursing (Honours), Western Sydney University (WSU)

Hidden (dis)advantages: Professional success of men in nursing

Abstract: In Australia, men represent 11.4% of the nursing workforce. In contrast to women, who are reported to experience social barriers that impede career progression, men in women-dominated professions are purported to experience the reverse – structural and societal advantages that accelerates their professional success. To examine the accuracy of this assertion, it was necessary to identify and summarise evidence of objective achievements and subjective indicators of professional success for men in nursing. An integrative

review was performed, guided by the PRISMA reporting guidelines for review articles. Seven electronic databases were accessed in January 2021 which identified six quantitative and six qualitative studies relevant to the professional success of men in nursing. These 12 studies revealed that men's minority status was a double-edged sword. Although two quantitative studies identified that men have increasingly occupied senior nursing positions and remained concentrated in high-status nursing specialties despite their consistently low representation in the total nursing workforce, seven studies identified obstacles to professional success arising from gender stereotyping, prejudice, and discrimination which included negative imagery about men in nursing, feminisation of nursing care, refusal of nursing care from men, and the disproportionate allocation of 'masculine' tasks. These findings highlighted the need for further exploration of men's contemporary experiences to elucidate issues related to professional success and gender dynamics in the nursing profession.

Acknowledgements: Professor Yenna Salamonson, Ms Jacqueline Rojo, Associate Professor Bronwyn Everett, Dr Jed Montayre, and Mr John Sierra.

Australian National University

Group Presentations I | 16th September 12pm

Session ID: 16.12.5

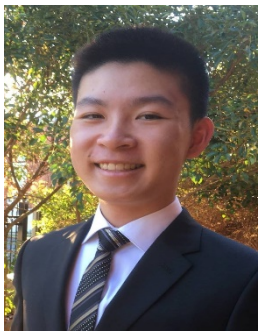
Daniel O'Connor, Patrick Capaldo and Jason Huynh |

Extending Sensor Capabilities with Unmanned Aerial Vehicles

The project involves the development of an Unmanned Aerial Vehicle (UAV) and a small sensor payload. The UAV will collect, transport, and communicate with the sensor payload. The primary objective is to support future capabilities in sensing by providing flexibility over conventional, large, and cumbersome sensor platforms in terms of range, positioning, and cost. One potential application may involve utilising numerous expendable sensors placed to form a versatile coverage capability. This would enable low-cost bushfire monitoring with minimal risk to human operators.

Using an integration-driven approach, commercial-off-the-shelf components are assembled to deliver the desired capabilities. The UAV's physical specifications and the ability to transport a sensor payload are benchmarked against existing designs. The communication system is prototyped through electronic experimentation and computer programming. Planned trial flights will verify the aerial payload transportation capability.

The preliminary results demonstrate the proposed design's reconnaissance capabilities. From initial testing, it is indicated that a wireless Bluetooth communication approach minimises cost and maximises sensor versatility. The UAV performance characteristics are verified through the utilisation of flight simulation software, thus improving confidence in its safety and reliability. Further developments are being investigated in the physical design of the UAV, particularly around a mechanical system to collect the sensor payload.



This UAV-sensor system's integration of commercially available components is a demonstration of a low cost solution within a bushfire monitoring context. Furthermore, the modular nature of the sensors is intended to allow for continual compatibility with the UAV transportation platform, enabling configurability for diverse future applications.

I acknowledge that my fellow project members, Patrick Capaldo and Daniel O'Connor, have made significant contributions to the project development and that we will present as a group in the ACUR Conference.

Darsiha Balakirishnan and Nibras Jasim

Effects and mechanisms of Tai Chi on dementia risk factors and early-stage dementia: A scoping review

Background: Dementia is associated with a decline in cognition and mobility, often co-occurring with depression. Early-stage dementia is characterised by cognitive decline that does not correspond to the age nor learning level of individuals. As there is no cure for dementia, interventions to support health and wellbeing are crucial. Although previous studies have documented the benefits of Tai Chi on health outcomes in people with early-stage dementia, none have systematically investigated these effects and their underlying mechanisms.

Aims: To identify the neurocognitive and psychological outcomes of Tai Chi on people with early-stage dementia and to explore the underlying mechanisms behind its effects.

Methods: We searched systematic reviews (SRs) and randomised control trials (RCTs) on Tai Chi for adults aged 50 years and older with early-stage dementia in MEDLINE, PubMed, Cochrane Library, EMBASE, and major Chinese databases, from their inception to December 2020. No language or publication restrictions were applied.

Results: The results from eight SRs with meta-analyses and seven RCTs revealed that Tai Chi had a mix of significant and non-significant effects compared to the control groups with regards to neurocognitive outcomes, including global cognition and visual span, memory, executive function and language, and perceptual-motor function. However, there were no significant between-group differences in attention and depressive symptoms. No studies of early-stage dementia investigating the underlying mechanisms of Tai Chi were identified.

Conclusion: Although Tai Chi shows promising effects on neurocognitive outcomes in people with early-stage dementia, further trials, and mechanistic studies are needed to fully appreciate these benefits.

Shannon Campbell and Zoe Chandler | Shannon Campbell: Graduate Diploma of Legal Practice, Bachelor of Laws, Bachelor of Health and Medical Science, the University of Adelaide

"That's just like, your expert opinion, man:" Evaluating the Credibility of Expert Evidence in Legal Contexts

The admission of expert opinions carries significant evidentiary value to assist the justice system. Recent research has revealed expert evidence is seldom supported by scientific rigor, and without requisite expertise to scrutinise, judges and juries presume such evidence is credible. Concerningly, each discipline defines credibility differently, preventing credibility from being translated between fields. Therefore, this research builds upon scientific and legal notions of expert credibility by comparing formal definitions with perceptions of lay people to create a uniform expert credibility assessment standard. This study aimed to encourage transparency of forensic evidence and to examine to what extent popular beliefs about expert credibility are reflected by scientific and legal notions of credibility. To do this, participants (n=142) were surveyed to first state characteristics of credible experts (n=426), then rate 36 variables in order of importance. The ranked variables were reduced into 4 broad factors (reliable, rigorous, confident, conservative). Three examiners compared the qualitative responses with these variables. These results are largely consistent with theoretical notions of credibility. 'Reliability' was the most influential factor on expert credibility with transparency being the most valuable characteristic. Based on our findings, a credibility assessment tool containing 14 items was created. This tool reduces discrepancies in definitions of 'credibility' by incorporating scientific, legal and general understandings of reliability into a single assessment. This encourages transparency and allows for in-depth scrutiny of expert evidence. Additionally, this study allows for a general understanding of public perception on expert credibility to use as a baseline for future research.

Australian National University

Multidisciplinary Perspectives on the Environment | 16th September 3pm

Session ID: 16.15.1

Jessica Tacey | Bachelor of Science (Honours), the University of the Sunshine Coast (USC)

A social distancing dilemma: Eastern water dragons do not modify their social behaviour to avoid a lethal fungal disease

Emerging infectious fungal diseases are considered responsible for 72% of disease-driven extinction events, with the proportion of documented fungal disease records increasing seven-fold in just 15 years. Group-living species often use social behaviour to avoid infection; diseased individuals isolate from the group, or healthy animals avoid those diseased conspecifics. However, there remains a lack of knowledge about social behaviour as a mechanism to avoid fungal infection. Here, we used a population of free-living eastern water dragons (Intellagama lesueurii) that are known to be impacted by an emerging infectious fungal pathogen (Nannizziopsis barbatae) as a study system, to better understand how species may modify their social behaviour to avoid fungal infection. Eastern water dragons are a large, long-lived reptile native to the east coast of Australia. They are highly social, preferentially associating with or avoiding certain individuals in their population. Within a single park located in Brisbane's Central Business District, we tracked social interactions between individuals over a five month period, and recorded the outcomes. Based on data collected from 647 observations of 126 unique individuals, our results suggested that (1) diseased dragons were not less social than their non-diseased conspecifics, and (2) non-diseased individuals avoided socialising with more severely diseased conspecifics. These findings warrant further investigation, given the implications for increased risk of disease spread and the potential for population decline if there are limited behavioural mechanisms to mitigate disease transmission.

The author acknowledges the advice and assistance provided by Associate Professor Celine Frere, Dr Barbara Class and Coralie Delme.

Ruby Olsson | Bachelor of Politics, Philosophy and Economics, the Australian National University (ANU)

An Inquiry of Reviews: International Conventions and Water Governance in the Murray-Darling Basin

Water allocation in the Murray Darling Basin is a hugely conflicted space in Australia, which the Commonwealth sought to address through the 2007 Water Act and 2012 Basin Plan. The Commonwealth's intervention in water allocations,

traditionally the domain of the states, relies on international environmental conventions for constitutional legitimacy. However, many scholars argue Australia is not fulfilling its obligations under these conventions, which include the Ramsar Convention on Wetlands and the Convention on Biological Diversity. This paper examines existing reviews and inquires of the Murray Darling Basin to assess recommendations on the implementation of international environmental conventions. As a crucial vehicle for adapting water governance, it is the role of reviews and inquiries to identify if Australia is failing to fulfil its obligations under international conventions and make recommendations to amend this deficiency.

This paper involved the qualitative coding of recommendations from reviews and inquiries on water governance in the Basin published between 2003-2021. To assess the implementation of international environmental conventions, recommendations relating to ecosystems were coded into the categories of explicit mention of the conventions, language of the conventions, and convention intent. This paper found that only two reviews identified that the Basin Plan was not fulfilling its obligations under the conventions, and that three recommendations undermined rather than realised the intent of the conventions. The failure of reviews to recommend action to sufficiently meet Australia's international obligations hinders progress towards protecting the Murray-Darling Basin's environment and jeopardises the constitutional legitimacy of the Basin Plan.

Australian National University

Dark Histories, Critical Eyes | 16th September 4pm

Session ID: 16.16.1

Ginger-Rose Harrington | Bachelor of Ancient History, Macquarie University (MQU)

Death on the Nile: the Tomb of Hesi in Saqqara

Emerging from beyond the veil of conspiracy and murder, the ancient Egyptian tomb of Hesi is a fascinating – albeit under-discussed – monument. This mastaba is located in the Teti Cemetery at Saqqara, where it was initially dedicated to the Sixth Dynasty vizier, Hesi. However, due to his suspected involvement in King Teti's assassination, the vizier's name and image were quickly erased from the monument, after which it was allocated to another official. Today, due to its almost total lack of publication, the tomb affords still greater resistance to the task of disentangling the life and crimes of its owner. The present work, therefore, comprises two simultaneous focuses. The first is cataloguing the tomb's architectural and artistic profile, noting any state-sanctioned graffito with which it is scarred. Comparing these findings with the broader cemetery's later treatment demonstrates how some heinous crime was, indeed, perpetrated against the king – an offence for which several officials, including Hesi, were severely punished. The charge of regicide is henceforth argued, corroborating the findings of several Egyptological studies of late-Old Kingdom biographical literature. The second focus is reconstructing the political landscape upon which this offence was perpetrated. By statistically analysing the distribution of official titles throughout the cemetery, this work demonstrates how King Teti had tried – and ultimately failed – to decentralise the growing power of the vizier. Identifying a hitherto unrecognised correlation between the tombs' extent of defacement and the official titulary with which they are inscribed, it suggests that Hesi's assault was agitated by restrictive political reforms.

RACHEL TAN SUE WIN | Bachelor of Laws and Arts, the University of Adelaide

Please listen to us: Upholding Honest and Respectful Consultation with Aboriginal and Torres Strait Islander Communities in Australia

The legacy of colonisation in Australia has effectively silenced Aboriginal communities, even until today. The catalyst for this research is the importance of authentic and culturally appropriate consultation with Aboriginal communities as opposed to the common formulaic or tokenistic consultations with Aboriginal people whose voices are often ignored.

Legally sound consultation is governed by the Gunning principles, but is incomplete for Aboriginal consultation. The research question formulates a template of good practice for appropriate consultation with Aboriginal communities. There is no single model that defines 'honest and respectful' consultation and partnering closely with Aboriginal communities to determine what promotes their well-being, beliefs and traditions is crucial.

This research investigates conventional consultation protocols, which inadequately cater to diverse Aboriginal customs and practices. The progressive steps taken by Canada and New Zealand regarding consultation with their First Nations people are examined in contrast. Finally, examples of both good and poor practices of consultations from Australia are considered.

The first step is to acknowledge and validate the injustices Aboriginal communities have and still endure. Aboriginal communities understandably want honest and respectful consultation, to be properly heard without being imposed with fixed questions, checklists or predetermined solutions. Meaningful consultation requires continuous relationships and rapport, uninterrupted and unrushed time.

Law reform and policy is not just for lawyers, experts and governments. Legally sound consultation is insufficient and principles for honest, respectful and culturally appropriate consultation with Aboriginal communities should be a template for modern essential practice, entirely discarding the common perfunctory consultations with Aboriginal communities.

I would like to extend my deepest gratitude to David Plater for his unwavering support and profound belief in my abilities.

Arabella Hall | Bachelor of Arts (Honours), the Australian National University (ANU)

Responding to the Silences of Australia's Archives through Coleman's Terra Nullius

The archive constitutes a well-established site of immense political power yet its involvement in the legitimisation of the logics and operations of racial privilege has proved difficult to disrupt, leading many to despair at their persistence. Indeed, since its inception in the 1970s, critical race theory has laboured to see such institutionalised racism both acknowledged and condemned. In an Australian context haunted by a colonial past, racial injustices certainly endure as a result of the concurrent silence and violence of its colonial archives and these injustices continue to be felt many Indigenous communities, albeit, in diverse manners as well as measures. Yet, in their applications of critical race theory to this context, Aileen Moreton-Robinson, Lisa K. Hall and Natalie Harkin consistently hail Indigenous scholarship and Indigenous voices as uniquely qualified for the interruption of problematic practices of knowledge production premised on and invested in white privilege. Based on Moreton-Robinson, Hall and Harkin's contributions to critical race theory, this paper critically examines Claire G. Coleman's 2017 novel Terra Nullius insofar as it

represents a rupturing insertion into Australia's colonial archive which markedly infers it with possibilities for healing and empowerment. This reading of Terra Nullius not only substantiates the subversive potentials of Indigenous voices as they are espoused by the likes of Moreton-Robinson, Hall and Harkin but also reiterates how crucial the promotion and encouragement of Indigenous voices and scholarship are to addressing Australia's enduring confrontations with racial injustice.

Australian National University

Body Image and Eating Disorders | 16th September 4pm

Session ID: 16.16.2

Emma Brown | Bachelor of Psychology (Honours), University of the Sunshine Coast (USC)

Personality as the missing piece in the body image puzzle.

While there is consensus that online environments like social media can threaten body image, research demonstrates personality traits also influence body image and appreciation. Body appreciation is an emerging construct defined through respect and acceptance of one's body. It warrants ongoing concern, as in its absence, research suggests negative body image is associated with higher risks of eating disorder onset, poor self-esteem and symptoms of depression.

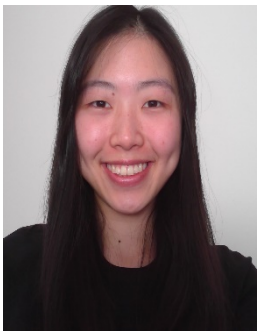
For this cross-sectional correlational study, it was hypothesised that the trait of extraversion would be positively related to body appreciation and neuroticism would be negatively associated with body appreciation. Neuroticism, also termed emotional instability is one of the big five personality traits. It is characterised by the experience of negative emotions, anxiety, and impulsiveness. Individuals who score higher on this dimension have a greater disposition to self-consciousness and perfectionism. Extraversion, or how outgoing a person is, is seen through sociability, positivity, assertiveness and excitability. To understand the extent these variables were related to body appreciation, 74 University students participated by completing an online survey drawn from reliable, extensively validated assessment tools including the Body Appreciation Scale and the Big Five Inventory of Personality. Based on participants self-reported ratings on a 5-point Likert-scale, scores were totalled and divided across the item categories, allowing mean scores to be calculated for each dimension. Pearson correlations using an alpha level of .05 showed a positive mild correlation ($r = .34$, $p = .003$) between extraversion and body appreciation. A large effect size was observed through the statistically significant negative correlation ($r = -.74$, $p <.001$) between neuroticism and body appreciation. These alarming statistics show individuals scoring higher on neuroticism report having very limited body appreciation. The findings from this study reaffirm the importance of developing intervention strategies to foster body appreciation. It was recommended that delivering programs to increase media literacy would promote critical thinking in the context of media consumption. This, in turn would aim to reduce internalization of unrealistic yet unfortunately prevalent beauty and weight ideals expressed throughout the media and society.

Laura Mobbs | Bachelor of Psychology (Honours) Macquarie University (MQ)

Does Paying Attention to Muscular Bodies Make Us Feel and Look Less Muscular?

Body image disturbance (BID) is a cause of distress amongst the population and is associated with the development of disorders such as anorexia nervosa and muscle dysmorphia. BID has two principal components. The attitudinal component involves feelings of body dissatisfaction (BD), while the perceptual component involves misperceiving oneself as higher in body fat or lower in muscle. While attention to idealised bodies in the media has been blamed for BID, similar effects have been demonstrated in the laboratory. Prolonged exposure – known as "adaptation" – to extreme (e.g. low fat or high muscularity) bodies makes subsequently seen bodies seem opposite in appearance (i.e. higher in fat, or lower in muscle). While attention to high- or low-adiposity bodies has been shown to influence body adaptation, it is not known whether attention also affects muscularity adaptation. The current study aims to answer this question through a 2x2 mixed experimental design analysed using two 2x2 mixed method ANOVAs. Participants adjusted 'test' bodies to a size they perceived as 'normal' and completed a body dissatisfaction questionnaire before and after simultaneous exposure to images of high- and low-muscularity bodies. Participants were instructed to either attend to the high- or the low-muscularity body. If attention is important in the development of BID, participants who attend to the high-muscularity body (low-muscularity) should exhibit an increase (decrease) in BD and a decrease (increase) in perceived muscularity. This is significant as it may help to explain why only some people develop BID, despite similar exposure to idealised bodies. Therefore, the results of this study are of importance as they could be used to inform the development of future treatments for BID.

This project was supervised by A/Prof Kevin R. Brooks and A/Prof Ian D. Stephen.



Shi (Tina) Lin | Bachelor of Nursing, Western Sydney University (WSU)

Developing and piloting oral health promotional resources for people with eating disorders

Introduction: Research has demonstrated close links between people with eating disorders (ED) and their oral health, including an association with tooth erosion. Given the risk of dental problems among individuals with ED and their risk of poorer oral health outcomes, it is important to consider the promotion of oral health in this population. There is limited evidence of adequate oral health resources to assist in the promotion of oral health in ED, and therefore a need to develop specific evidence-based resources.

Aim: This project aimed to collaborate with stakeholders to develop and pilot test a resource to support oral healthcare among individuals with ED.

Methods: A systematic search of peer-reviewed and grey literature was conducted across multiple electronic databases to retrieve information related to the impact of ED on oral health and key messages. Data were collated with the use of EndNote and evidence-based oral health messages were synthesised and recorded in Word.

Results: A preliminary health promotion brochure was designed in consultation with the study team with images and relevant oral health messages. We sought feedback from stakeholders, including ED organisations, local health district representatives, dental associations, and academics, on content, readability, and layout. The next stage involves piloting the resource with consumers to obtain feedback on acceptability before seeking endorsement from NSW Health and a peak professional ED organisation.

Conclusion: This brochure offers consumers sound advice on healthier choices, education about the effects of poor oral health, how to prevent further damage and where to access further support.

I would like to thank Lucie Ramjan, Ajesh George, Tiffany Patterson-Norrie, Jacqueline Rojo and Mariana Sousa for allowing me to take part in this project and for giving me this opportunity to grow in my academic career as a student.

Australian National University

Neurodegenerative Diseases | 16th September 4pm

Session ID: 16.16.3

Sanyukta Singh | Bachelor of Science (Honours), University of Sydney

Brain-derived cell-free DNA as a potential blood biomarker to differentiate behavioural-variant frontotemporal dementia from primary psychiatric diseases

Behavioural-variant frontotemporal dementia (bvFTD) is the second most common type of dementia in adults aged 45 to 64. The symptoms of bvFTD, which include changes in behavioural and emotional responses, overlap with those of primary psychiatric disorders (PPD) such as schizophrenia and bipolar disorder. This overlap results in a misdiagnosis and an average diagnostic delay of 6 years. There is a need for a reliable and economic test to diagnose bvFTD, particularly sporadic bvFTD in which cases lack genetic underpinning. Cell-free DNA (cfDNA) are DNA fragments that are deposited in blood plasma following cell-death. Our group identified the presence of brain-derived cfDNA within blood plasma following neurodegeneration. We hypothesise that the neurodegeneration that causes dementia will result in an increase in brain-derived cfDNA. The aim of this research project is to evaluate brain-derived cfDNA as a potential blood biomarker for the diagnosis and differentiation of bvFTD and PPD. We have assessed the levels of brain-derived cfDNA within 96 dementia patients and 15 age matched controls by sequencing analysis of cfDNA DNA methylation and are currently performing statistical analysis. In addition, we have used neuropsychiatry, brain imaging and genetics to identify 73 bvFTD and 33 PPD patients for inclusion in an ongoing multinational collaboration to develop diagnostic methods for bvFTD and PPD. Brain-derived cfDNA has the potential to diagnose bvFTD early and prevent the misdiagnosis of PPD.

Sarah Rosolen | Bachelor of Science (Medical Science), The University of Sydney (USYD)

Effect of exercise on metabolic activity in astrocytes in the 5xFAD mouse model of Alzheimer's Disease

Alzheimer's Disease (AD), a progressive neurodegenerative disease and second most common cause of death in Australia (ABS 2019), is an increasingly prominent societal issue, exacerbated by an ageing population and absence of effective disease-modifying treatments. Hence, focus has shifted to targeting modifiable lifestyle factors to slow or prevent AD onset and progression, such as exercise. Adiponectin, an anti-inflammatory adipokine, regulates energy metabolism and is associated with metabolic pathways potentiated following exercise. Animal and human studies have consistently demonstrated increased serum adiponectin levels following various exercise regimes. However, the

ability of adiponectin to cross the blood brain barrier and thus mediate neuronal metabolism is contentious. Yet, expression of adiponectin receptors within neuronal cells implies adiponectin holds an important function within the brain. We investigated cortical expression of adiponectin receptors, AdipoR1 and AdipoR2, in the aged 5XFAD mouse model of AD following an exercise intervention. Immunohistochemical techniques were applied to double stain brain tissue for adiponectin receptor and astrocyte expression. We observed neuronal AdipoR1 and AdipoR2 expression throughout the cortex of both exercised and sedentary control mice, however, neither receptor expression was significantly altered in the exercised mice relative to controls. Extensive expression of activated astrocytes was similarly observed throughout the cortex. Colocalisation analysis suggests astrocytes may utilise adiponectin receptors to fuel their metabolic activity in degrading toxic amyloid plaques within the AD brain. Although our preliminary results do not show altered metabolic activity between exercised and sedentary mice, the complex interrelationships between adiponectin receptor expression, exercise and AD require further investigation.

The completion of this research project would not have been possible without the expertise, support and dedicated involvement of my research supervisors, Dr Damian Holsinger and Quy-Susan Huynh.

Tabitha Singer | Bachelor of Occupational Therapy (Honours), Western Sydney University (WSU)

The Efficacy of Imagery in the Rehabilitation of people with Parkinson's Disease

Background: Parkinson's disease (PD) is characterised by a slowing of body movements, decreased balance, and difficulty initiating movements, thereby affecting everyday activities. Imagery may be a suitable treatment for such decline. Currently, there is no evaluation of the literature regarding the efficacy of imagery in PD.

Objective: To gather and synthesize research on the use of imagery in PD, and determine its efficacy in improving rehabilitation outcomes as classified by the components of the International Classification of Functioning, Disability and Health (ICF): body structure and function, activity, and participation.

Methods: A computer-aided literature search was conducted from inception to June 2021 in MEDLINE, EMBASE, Web of Science, Cochrane, PsycInfo, CINAHL, and Scopus. Search terms included "Parkinson's Disease", "Hypokinesia", "Guided Imagery", and "Mental Imagery". Randomised controlled trials were included. Characteristics related to participants, intervention, and results were extracted. Methodological quality was assessed using the PEDro scale.

Results: 281 individuals with PD from 11 studies were included. The methodological quality of the included studies was high (median PEDro score: 7/10). Six studies reported improvements in at least one component of body structure and function evaluated (cognition, balance, and gait), and four reported improvements in activity and participation (mobility).

Conclusions: Imagery was shown to promote improvements in some categories of the ICF. Based on the present findings, imagery can be recommended for individuals with PD when used in conjunction with other therapies. The current evidence pertains to cognition, balance, gait, and mobility. Further studies are recommended to review its effects on everyday activities.

I wish to thank my Honours supervisor, Professor Karen Liu, as well as Mr Paul Fahey for their contribution to this work.

Australian National University

Gender and Sexuality II | 16th September 4pm

Session ID: 16.16.4

Weifeng Tao | Bachelor of Arts, the Australian National University (ANU)

Sex consent: not nearly enough to regulate respectful relationships

Associations between sexual consent and ethical sex relationships have long been examined and subjected to debates. While consent is believed to be a key criterion in constructing respectful sex relationships, it is also seen as a controversial concept and criticised in a number of feminism literature. This paper argues that sexual consent is a 'cruel optimism' in both heterosexual and homosexual male relationships, which tends to reflect gender inequality and facilitate sexual violence rather than alleviate them.

The research is literature-based. This research finds that 1) consent only servers as a formal minimum requirement for legally acceptable sex, but not moral sex or desired sex; 2) The universal failure of consent in constructing moral and desired sexual relationships, firstly, results from its inherent ambiguity in conception and measurement. The general request-and-consent-or-refusal model itself also unfairly reflects women's passivity and assumed submissiveness; 3) Women's actual sexual consent communication ability is often restricted by patriarchal social and gender norms. Women in relationships tend to face the risk of date rape and martial rape due to the implied consent; and 4) Beyond heterosexual relationships, the failure of consent in regulating respectful homosexual relationships among gay men is also notable. This is associated with assumed gay men's hypermasculinity and hypersexuality, weak consent communication and implied consent within the gay community.

This research aims to respond to the debates and contribute new perspective on the effectiveness of sex consent. This report also contributes literature to feminism and queer theory, gender studies and relevant areas.

Brooke Petre | Bachelor of Arts (Sociology), Massey University, New Zealand

An LGBTIQA+ Hall: the exploration of resident perspectives on inclusion and support.

Current literature promotes the cultivation of safe spaces on university campuses for marginalised communities to build strong, supportive connections among their peers (Fetner et al., 2012). However, residential halls as a locale of safe spaces is considerably contested, particularly from those who cite re-segregation concerns (Hope & Hall, 2018). In 2021, Massey Halls provided the opportunity for those who identified as LGBTIQA+ to opt into an LGBTIQA+ inclusive hall. This mixed methods study explores residents' perceptions within

this hall and compares this with perceptions of LGBTQIA+ residents in other halls through an anonymous survey. The survey found that the LGBTIQA+ residents' hall was an affirming space for students; 100% of respondents from the LGBTIQA+ inclusive hall strongly agreed that their hall peers were accepting of their identity, compared with 57% of LGBTIQA+ in other halls. The thematic analysis of this study highlighted connectedness, privacy, education, relevance, and safety as key themes within resident's perspectives and saw the evidence of two distinct opinions. One group signalled the space lacked relevance, the other group deemed it a safe place of inclusion and acceptance. It is argued that providing LGBTIQA+ residents the opportunity to opt into residential safe spaces is a positive resolution to the argument of whether such spaces should exist. For LGBTIQA+ residents who determine these spaces are valuable to them, such spaces might just be life changing.

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Hope, M. A., & Hall, J. J., (2018) 'Other spaces' for lesbian, gay, bisexual,transgendered and questioning (LGBTQ) students: positioning LGBTQ-affirming schools as sites ofresistance within inclusive education, British Journal of Sociology of Education, 39:8, 1195-1209,

With thanks to my research supervisor, Dr Alice Beban.

Kip Hay | Bachelor of Social Science (Honours), The University of Newcastle.

Trans and Gender Diverse People's Experiences in Australia

Feminism has a history of exclusion, shaped by ongoing frictions over the core goals of the feminist movement and in what ways to incorporate the needs of marginalised groups whose experiences of patriarchy are not fully articulated within mainstream feminist politics – such as women of colour, disabled women, and trans people of various genders. 'Trans Exclusive Radical Feminists' (TERF's) antagonism towards transgender and gender diverse people's inclusion within feminism is a key example of this. While TERF ideology is not shared across all of feminism, it still has a pervasive influence. This research utilised semi-structured qualitative interviews drawing upon Bourdieu's theory of practice to investigate the experiences of transgender and gender diverse individuals' experiences in feminist spaces within NSW and ACT, Australia. It also explored their strategies for navigating their participation in these spaces. Participants engaged in a range of what they classified as feminist spaces both online and offline: including women's spaces, activist spaces, and queer and trans spaces. Feminist spaces were categorised by participants as those where the individuals engaged with them are feminists, with shared values and progressive leaning political views, and with feminist principles directly shaping group dynamics. Participants had a range of experiences in these different spaces with some facing transphobia and bullying, while others experienced

support and positivity. These experiences were shaped by a combination of individuals' gender identity and presentation, their strategies for choosing and navigating spaces, and particular group dynamics and politics.

Rebecca Marie Hetherington | Bachelor of Laws / Bachelor of Arts (Social Justice) (First Class Honours), The University of Notre Dame Australia (Sydney) (NDA)

Governing Through Self-Care: Neoliberalism and Gendered Labour in the Lorna Jane Brand

My thesis explored how Lorna Jane (LJ), an Australian women's fitness fashion brand, encourages self-regulation of women's bodies and minds, and how this represents a novel form of gendered labour in modern times. Using a combination of Foucauldian and feminist theory and Critical Discourse Analysis, I analysed three sites within the LJ brand: the retail website, the "Move, Nourish, Believe" blog, and the Active Living App. The LJ brand represents an intersection of postfeminist media culture, discourses of healthism, and neoliberal forms of regulation. It presents itself as empowering and health-focussed, yet covertly contributes to the maintenance of beauty ideals. Importantly, it reflects what feminist scholars have identified as the "psychic dimension" of neoliberalism, whereby subjects are encouraged to, and regulated through, continual refashioning and improvement of one's mind. "Postfeminist media culture" represents the evolving yet contradictory discourses that characterise contemporary gender relations. Recent feminist scholarship has turned to these phenomena, exploring a range of sites within popular culture and discourse. My research found that the LJ brand, while premised broadly on health and wellbeing and presenting an image of feminine empowerment, nonetheless contributes to the enduring regulation of female bodies — and increasingly minds — promoting an array of "self-care" practices. In particular, the brand encourages a range of "psychic" self-care practices that constitute new forms of gendered labour. My research explores the role and implications of postfeminist media culture, and demonstrates the capacity of popular discourse to evolve with critique, and the ongoing need for critical feminist analysis.

I would like to acknowledge my Honours Supervisor, Dr Denise Buiten, for her incredible support, guidance, and feedback.

Australian National University

Physical Chemsitry | 16th September 4pm

Session ID: 16.16.5

Fletcher Howell | Bachelor of Science (Advanced) (Honours), The Australian National University (ANU)

Unidirectional motion of a [2]-catenane molecular machine

Molecular machines use repeated directional motion to perform work. A key application for molecular machines is the conversion of one form of energy to another, like how a car converts chemical potential energy from fuel to kinetic motion of the wheels. Despite being a candidate design atomic-scale engines, no [2]-catenane system that can perform work has been conclusively defined in synthesis nor in simulation.

A [2]-catenane is a molecule comprising two interlocked rings. The smaller, minor ring can move freely around the major ring. When a [2]-catenane is dissolved in a solvent, like water, random collisions with vibrating solvent molecules cause the minor ring to move. These collisions equally move the minor ring forwards and backwards, so it experiences no net directional displacement. To behave as a molecular machine the chemistry of the [2]-catenane must be manipulated to provide a force that directs minor ring motion into repeated cycles in one direction.

This research has developed a simplified simulation of a [2]-catenane in solvent to define a scenario that optimises unidirectional minor ring motion. A forcefield is defined that imparts variable force on the minor ring as it moves. An asymmetric forcefield, with greater resistance to motion in one direction, is shown to achieve unidirectional motion in the less resistant direction. Sequentially removing and restoring the forcefield improves the unidirectionality, achieving on the order of 103 unidirectional cycles in 12 hours. The simulation model and optimised results are the first step in helping guide chemical design to synthesise a real-world [2]-catenane molecular machine.

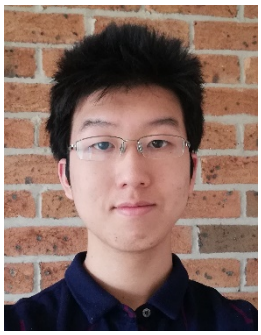
The author would like to acknowledge the support of Prof. Edie Sevick for her guidance and support throughout this project.

Tiarne Mitchell | Bachelor of Science (Advanced), the University of Sydney (USYD)

A click chemistry approach towards a new triazole-based self-immolative polymer.

Self-immolative polymers (SIPs) are a special class of macromolecule capable of complete degradation upon the stimulus-directed cleavage of its end-cap. While the unique behaviours of such “smart” polymers are highly promising for applications in sensing, drug delivery and degradable plastic technologies, only a handful of self-immolative backbones have been successfully synthesised to date due to the limited known mechanisms by which self-immolation can occur. As such, there is value in developing new self-immolative backbone motifs to expand the chemical and physical properties that may be expressed by SIPs. Herein we describe the synthesis and characterisation of a new type of SIP design based on a poly(triazolyl urethane) backbone. This was achieved by first synthesising a monomer containing both azide and alkyne terminal functionality. Monomers were then polymerised via the copper(I)-catalysed azide–alkyne "click" reaction, where the azide end of one monomer reacts so quickly with the alkyne end of another it appears as though they simply click together. To establish proof-of-concept, we prepared and studied oligomers (short polymers) of between 4 and 20 units long, controlling the average chain length by the rationed addition of terminal end-caps capable of cleavage via palladium catalysis. In situ NMR time course experiments confirmed successful degradation of these SIPs, and provided insights into both polymerisation and self-immolation mechanisms. Overall, this work establishes a new method for preparing self-immolative polymers using ‘click’ chemistry, and opens avenues for future work including the exploration of longer chains based on this structure, as well as investigating possible alterations to the current design to expand its chemical functionality.

Ms Annmaree Kenny assisted with syntheses; Mr Yuan C. Luong collected SEC data; Dr D. A. Roberts conceived and supervised the project, and collected NMR kinetics data.



Ziqi Yuan | Bachelor of Philosophy (Honours) - Science, the Australian National University (ANU)

The Galactic Helium-to-metal Enrichment Ratio from Low Main-sequence Stars

The chemical elements produced during the Big Bang consisted of almost entirely hydrogen and helium. Subsequent generation of stars produce helium as well as heavier elements (metals), with mass abundances denoted by Y and Z respectively. Hence, the helium-to-metal enrichment ratio, $\Delta Y/\Delta Z$, is one representation of the chemical evolution of the universe.

Stellar helium content required to derive the enrichment ratio is difficult to directly measure, where it is subject to effects of stellar evolution. However, parameters of low mass stars can be assumed to be dependent only on helium and metal abundances. I use a sample of approximately 25,000 low-mass stars observed by the Australian GALAH spectroscopic survey, with highly accurate

measurements of parameters and distances. Comparison against stellar models computed for various helium abundances allow me to indirectly derive helium abundances and hence $\Delta Y/\Delta Z$. I derive a helium-to-metal enrichment ratio of $\Delta Y/\Delta Z \approx 2.1$ along the entire range of the sample, consistent with theoretical estimates.

I identify shortcomings in the methodology currently used to derive helium abundances around solar metallicity, which I suggest to be a primary area of focus for future studies. As the GALAH survey comprises stars belonging to different populations of stars in our Galaxy, the methods I am developing will be able to applied to, and provide insights on the chemical evolution of such populations.

Australian National University

Computer Vision Models | 17th September 9am

Session ID: 17.09.1

Vincent Zhang | Bachelor of Engineering Honours (Mechatronic), Bachelor of Science (Computer Science), the University of Sydney

The effectiveness of object-based saliency models for making 360° video streaming more efficient and lightweight

360° video streaming has received significant interest over the past few years with streaming providers such as Facebook delivering 360° video content in higher resolutions and frame rates. Saliency models are visual representations of interesting areas within a 360° video frame. They plan an important role in efficient video streaming. Traditional saliency models rely on low-level features such as colour to highlight salient regions. However, these methods can perform badly in complex scenes where there are multiple regions of interests. This is because low-level saliency models do not take the context of a scene, created by the scene's objects, into account. To bridge this gap, this paper proposes an object-based saliency model that considers the contextual relationships between objects within a scene. We examine the effectiveness of this model in predicting the distribution of salient areas (saliency prediction) and user viewpoints within a scene (field of view prediction). Our results show that the addition of an object-based saliency component to low-level and motion-based saliency maps results in superior performance for both saliency and field of view prediction. These findings can be used to inform further research into alternative context-based saliency models for efficient 360° video streaming.

I would like to thank my co-authors: Chamara Kattadige, Amaya Dharmasiri and Prof. Kanchana Thilakarathna for their feedback and support with refining the manuscript.

Xinqi Zhu | Bachelor of Advanced Computing (Honours), the Australian National University (ANU)

Including occlusion in Human Pose Estimation benchmark - a photorealistic synthesis approach

Human Pose Estimation (HPE), defined as the problem of localization of human joints (also known as keypoints, e.g., neck, elbows, ankles, etc.) given images or videos in the wild, is the fundamental problem in all human-centric tasks in computer vision. Current research commonly relies on two public datasets, MPII and COCO. The performance on these datasets has been almost saturating despite the numerous novel methods proposed in recent years. However, most State-Of-The-Art (SOTA) models suffer huge degradation when testing on data with an occluded person (i.e., part of the human body not visible from the

viewpoint), and this problem has not been well studied in this field. The lack of large-scale datasets that specifically include occlusion is the main barrier to related studies. To solve this problem, this research designs a synthesis pipeline to generate samples under occlusion scenarios by animating 3D human models in a modern graphics engine. The finalized pipeline, named as PoseX v1.0, has been through multiple evolutions, guided by assessing different designs on 3 key dimensions – diversity, flexibility, and photorealism. Compared to manual collecting and annotating samples, our approach has a much lower level of cost regarding time, labor and funds. Furthermore, the synthetic dataset is free of the privacy concerns of identifiable persons. We conduct plenty of experiments and demonstrate that our synthetic datasets can boost SOTA model performance and with hyper-parameter for synthesis being controllable, inspire insights into influencing factors in human pose estimation.

I would like to thank Mrs. Xiaoxiao Sun, who has provided lots of guidance about the data synthesis pipeline and experiment design and has also provided valuable suggestions in polishing the thesis and this abstract.

Australian National University

Soil | 17th September 9am

Session ID: 17.09.2

Dejun Cai | Bachelor of Philosophy (Honours) - Science, the Australian National University (ANU)

Model calibration of a satellite data assimilation system for soil moisture prediction using Metropolis-Hastings Markov Chain Monte Carlo algorithm

Accurate estimation of soil moisture (SM) informs water resources management, agricultural planning and weather prediction. A data assimilation system uses satellite data from Soil Moisture Active Passive (SMAP) to optimally correct SM estimates from Antecedent Precipitation Index (API) model towards satellite observations. This study investigated the use of SMAP data in model calibration as another model improvement approach by identifying parameter values that help API model simulate the behaviour of SM variations more realistically. A Bayesian statistical algorithm, Metropolis-Hastings Markov Chain Monte Carlo (MH-MCMC) algorithm, was designed and implemented at 13 study sites in Australia to calibrate two parameters characterising SM memory in API model against SMAP data. Parameter distributions obtained from MH-MCMC were used to produce a collection of possible calibrated model states (ensemble). Uncalibrated estimates, estimates with MH-MCMC calibration and with assimilation were evaluated by linear correlation with in-situ cosmic-ray SM measurements (CosmOz network) within the same 5-year experiment period. Results showed that calibrated parameter values showed clear heterogeneity across sites and their spatial variations were linked to site-specific aridity conditions and seasonal rainfall patterns. MH-MCMC calibration improved model performance by as much as 105% for 11 sites. Data assimilation generally attained better performance than calibration, but there were two sites where some members in the calibrated ensemble improved SM estimation more evidently. These results demonstrated merits of site-specific model calibration and highlighted the prospect of complementing data assimilation with MCMC-based calibration. This would help maximise model accuracy for SM estimation and ultimately support various hydrological, agricultural and meteorological applications.

Mikayla Hyland-Wood | Bachelor of Advanced Science (Honours), the Australian National University (ANU)

Closing Agricultural Nutrient Gaps with Human Waste Streams: Case Study of Tongatapu

Global soil quality is declining with the depletion of nitrogen, phosphorus and potassium (NPK) macronutrients and soil organic carbon (SOC) as a result of human activity. Reduced soil health has stagnated farming productivity in Pacific Island Countries (PICs) such as Tonga, forcing high importation of expensive chemical fertilisers (~$500,000 per annum). This study uses Tonga's largest island, Tongatapu, as a case study for modelling human waste repurposing for agriculture. Human waste streams present an alternative to chemical fertilisers as a cheaper, domestic nutrient source and have associated environmental, social and economic benefits for the people and soils of Tonga. This research takes a literature review methodology to determine the nutrient breakdown on human waste streams, existing conversion methods and crop rotation recommendations. Perennial crops have been found to assist in NPK and SOC storage and final estimates suggest 100-200 ha of taro, legumes and coconut crops can be sustainably farmed with biosolid fertilisers on Tongatapu. This is a 1.2% reduction in chemically fertilised land. Additional benefits are identified in the environmental sphere, including diminished disease risk and lagoon pollution from human waste. Further research is required to gage social uptake and consider whether this intervention is economically feasible in a Tongan context.

Thank you to Prof. Jamie Pittock, Dr. James Quilty and Dr. Ben Macdonald for their support in bringing this project to life.

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Tori-Lee Monk | Bachelor of Science, Western Sydney University (WSU)

The role of fungi in allelopathy

Soil fungi contribute substantially to plant health and community structure, through their own community structure and functional diversity. Microbes are increasingly being recognised for their role as enhancers and mediators in biochemical plant-to-plant communication known as allelopathy. Allelopathy is classically defined as an exchange in which the production of secondary metabolites from donor plants typically inhibits the growth or productivity of target plants, thereby modifying the structure of plant communities. Interestingly, plants with close associations with fungi are suggested to be more sensitive to the effects of allelopathy. In this project, we investigate potential drivers of stunted commercial pine plants (Pinus radiata), showing inhibition by a native Australian heath plant known as nana (Allocasuarina nana). Our site is located in the Bombala region of NSW, and is characterised by three vegetation types identified by the density of pine and nana plants; "dense pine", "medium nana" and "dense nana" respectively. Rhizospheric soil samples (collected from the top 10cm of soil) were taken from six plots within each vegetation type, for use in amplicon sequencing for fungal community analysis and un-targeted metabolomic analysis for the detection of soil metabolomic

features. Community analysis indicates distinct functional differences by vegetation type, seen in relative abundance and classification of taxonomy and putative lifestyle. Similarly, trends observed in metabolomic analysis suggests biochemical gradients consistent with vegetation density. Overall, our findings revealed that the above-ground differences in community structure are reflected below-ground, both in fungal communities and soil metabolomic profiles, showing a unique perspective in allelopathy.

I would like to thank my supervisors, Jonathan Plett and Krista Plett for their support and encouragement throughout this project.

Australian National University

Group presentations II | 17th September 9am

Session ID: 17.09.3

Jessica Turner[1] and Narelle Jones[2] | [1]Bachelor of Science (Honours), the University of Adelaide; [2]Honours (Animal Science), the University of Adelaide

Cold blooded, but not unfeeling

Welfare assessment tools are used in zoos to monitor animal welfare. Reptiles are increasingly being held in zoos, however, most assessment tools developed primarily focus on mammals and rely heavily on resource- based indicators, with little research existing on the use of animal- based measures for reptile welfare assessment. The project aims to develop and validate a reptile specific welfare assessment tool and compare the outcome with that generated by a generic assessment tool through observational studies of 5 Tortoise collections (n=20) across 2 locations. 17 animal-based indicators including physical condition, relaxed movement and feeding, environmental exploration, co-occupant aggression and the occurrence of stereotypic behaviours, were identified as having potential for inclusion in a tortoise-specific welfare assessment tool through expert consultancy, and a pilot study was conducted to develop a testable prototype. Observations will occur before and after an environmental change designed to improve the animal's welfare, and the welfare scores generated using both assessment tools will be compared. It is expected that the use of reptile specific indicators will produce an assessment tool that is more sensitive to changes in behaviours indicative of the welfare of captive tortoises when compared to the use of non-reptile-specific assessment tools. Preliminary results indicate that variation in welfare scores exists, with the prototype producing lower scores than the currently implemented tool, however, it has not yet been determined if the difference is statistically significant. A validated reptile-specific welfare assessment tool that is more sensitive to changes in behaviours indicative of welfare will provide a foundation for future research with the aim of improving the welfare of captive reptiles by improving the accuracy of zoological welfare assessments.

We would like to acknowledge our supervisors Dr. Alexandra Whittaker and David McLelland, ZooSA and ZooVic for their contributions.

Asha Clementi[1] and Rebecca Crisp[2] | [1]Master of Diplomacy, the Australian National University; [2]Bachelor of Laws (Honours) and Bachelor of Politics, Philosophy, and Economics, the Australian National University

Reality or rhetoric: The role of education in achieving gender equality in Myanmar

United Nations Secretary-General António Guterres recently declared gender equality to be 'the unfinished business of our time'.1 Equality of opportunity, regardless of sex, seems a clear and accepted goal for policymakers. However, in most countries, progress remains slow. This report explores how, and why, some strategies for pursuing gender equality are failing to achieve progress.

For decades, education has been promoted as an invaluable tool for promoting gender equality.2 However, research into education in Myanmar challenges this assumption. Women outnumber men at every stage of education, yet remain economically repressed and politically underrepresented. Our research explores why traditional education reform is failing the women of Myanmar. Through policy analyses and interviews conducted in schools, communities, and political arenas, we investigate the disjunction between increased participation of women in education and improvements in post-education outcomes. By affirming existing gender inequality, the current education system is creating an unbroken cycle of discriminatory attitudes and outcomes.

We recommend integrated reform of Myanmar's school curriculum, examination structure, teacher training, and resourcing. By redefining children's experience in school, Myanmar's government can transform education into a tool to empower, not repress, the women it shapes.

We would like to acknowledge the contributions of the course convener, Ben Hillman, tutors Anthea Snowsill and Dinith Adhikari, along with our Burmese translators, guides, and interviewees who made this research possible.

Australian National University

Brain Research | 17th September 9am

Session ID: 17.09.4

Andrew Quattrocchi | Bachelor of Science and Bachelor of Advanced Studies (Advanced) (Honours), the University of Sydney

Alzheimer's Disease: Perivascular Macrophages and the Blood-Brain Barrier

In Alzheimer's Disease (AD), blood-brain barrier (BBB) dysfunction and vascular leak are early preclinical pathologies. The BBB is comprised of endothelial cells, pericytes and astrocytes, and is further supported by the highly connected populations of monocytes, microglia, perivascular macrophages (PVMs) and vascular smooth muscle cells - collectively known as the neurovascular unit (NVU). Loss of BBB integrity is seen as a driver of neurodegeneration, allowing for the infiltration of circulating immune cell populations, the entry of potentially damaging antigens and the accumulation of aggregated proteins within the central nervous system. However, within this complex microenvironment, the nuanced role of PVMs still remains unclear. PVMs are scavenger cells able to sample both the blood and interstitial fluid due to their exclusive location. We aimed to investigate the role of PVMs in maintaining the integrity of the endothelium of the BBB in AD. The APP/PS1 mouse model of AD was assessed, where amyloid plaque formation, the primary AD pathology, is observed at 6 months of age followed by gliosis and global neuronal loss. Immunofluorescence staining and confocal microscopy showed a significant increase in blood vessel-associated macrophages (BVAMs) in these mice compared to age-matched WT controls. Importantly this increase in BVAMs was observed before the formation of plaques, suggesting early changes in the NVU occur independent of the presence of amyloid plaques. Our findings suggest that one of the earliest observable changes in the BBB, in a mouse model of AD, is an increase in BVAMs, potentially implicating them as an important cell of interest in future studies of AD pathogenesis.

These findings are based on the preliminary research conducted by Dr Ka Ka Ting.

Cynthia Jia Ying Feng | Bachelor of Psychology (Honours I), the University of Sydney

Generality of the Forward Testing Effect and the Role of Metacognition

The forward testing effect occurs when repeated testing enhances future learning of untrained materials. Metacognitive explanations, involving "thinking about thinking", propose that this effect is driven by increased effort following metacognitive insight provided by testing. Generality of the forward testing effect across levels of learning (category-based inductive learning, paired associate "rote" learning) and devices (smartphones, computers) was tested to investigate metacognitive mechanisms. Category-based inductive learning is a higher level of learning involving categorisation of novel exemplars using rules abstracted from studied exemplars. Smartphones were compared to computers because smartphone users exhibit more shallow processing and higher metacognitive confidence. Calibrations (the correlations between predicted judgment-of-learning (JOL) and actual performance) were calculated to examine whether testing enhanced metacognitive performance awareness. Using a mixed design (N=74), with medium and training as between-subjects conditions and level of learning within-subjects, participants were tested on Swahili-English word pairs (paired-associate learning) and bird images (inductive learning). Performance and metacognition measures were assessed and analysed using ANOVAs and other analyses. The forward testing effect was not replicated – interim tests did not enhance performance more than restudy. Learning generalisation was not found. However, there was a testing effect on metacognitive measures: for test groups, encoding times were higher. JOLs were lower overall. Findings suggest metacognitive contribution to the forward testing effect. Metacognitive differences indicated testing-induced strategy change, but this alone was not sufficient for enhanced performance. Implications, such as reconsidering a pedagogical emphasis on strategy selection, are then explored, alongside other contributing factors and limitations, such as unequated materials.

Acknowledgements go to my supervisor Emeritus Professor Sally Andrews for her incisive suggestions and for guiding this research project from inception to submission in an uncertain year.

Arjayeeta Samadder | Bachelor of Advanced Studies (Honours), The University of Sydney (USYD)

Overcoming Radio-Resistance by Reducing Oxygen Consumption in DIPG

Diffuse Intrinsic Pontine Glioma (DIPG) is a rare and fatal paediatric brain tumour. It typically affects children between 4 and 11 years old and survival is typically only one year from diagnosis. DIPG tumours are located in the brainstem, making surgical removal impossible. Radiotherapy is the only treatment. However, DIPGs typically reoccur following treatment due to radio-resistance. Radiotherapy uses oxygen to be effective and hypoxia, or low oxygen, is a typical phenomenon in the tumour microenvironment. Hypoxia is therefore a common cause of radio-resistance. Hypoxia can be caused by both poor supply and high demand of oxygen by the tumour cells and if oxygen levels in the tumour could be increased by either increasing supply or decreasing demand, it may be possible to enhance radiotherapy. Previous studies have shown that biguanides like metformin and phenformin decrease oxygen consumption in tumour cells, leading to increased tumour oxygenation and enhanced radiosensitivity. Our aim was to identify more potent drugs that increase radiosensitivity by reducing tumour cell oxygen consumption. We screened a panel of 1963 FDA-approved drugs using the Seahorse assay which measures tumour cell oxygen consumption rate (a marker of mitochondrial respiration) and extracellular acidification rate (a marker of anaerobic respiration or glycolysis), before and after drug injection. We have identified multiple compounds that enhance tumour cell oxygenation in DIPG cells which will be further tested using in vitro and in vivo orthotopic pre-clinical DIPG models, aiming to move into clinical trials. This treatment strategy may prolong survival in children with DIPG.

I would like to acknowledge the co-authorship, contribution and support of my supervisor, Dr Kristina M Cook, co-supervisors Dr Han Shen and Dr Eric Hau, the contributions of Dr Harriet Gee and fellow colleagues, Cecilia Chang and Faiqa Mudassar.

Australian National University

Values, Cultures and Norms | 17th September 12pm

Session ID: 17.12.1

Sophie Hogg | Bachelor of Asian Studies, the Australian National University (ANU)

Banning Bushmeat - The Science and Ethics of Cultural Fearmongering

Since the onset of globalisation, there have been many questions surrounding the prevention of zoonotic disease outbreaks, and how to stop such outbreaks from quickly spreading across the world. Particularly since the coronavirus (COVID-19) outbreak in December of 2019, inquiries into the consumption of wild animals have become increasingly popular among both scholars and the general public. Many analyses have been done to investigate the dangers and possibilities of zoonotic disease outbreaks, both before and since COVID-19. However, very few of these analyses have combined this investigation with research into the biases present in such discussions. When does the Western term “game” become the foreign and fearful term “bushmeat”? What differentiates the Italian and Palauan practices of eating bats? What makes European food clean and safe in opposition to African and Asian food? This presentation seeks to clarify these questions, based on a 2020 essay submitted to ASIA2302, Culture and Modernity in Asia: Anthropological Perspectives. This essay used a combination of a qualitative and analytical research methodology, analysing largely anthropological evidence of interviews, news articles and observations. This essay concluded that the discussion surrounding the consumption of wild animals was often clouded with bias and without a sufficient understanding of cultural or dietary importance. These discussions are particularly stilted due to the “anthropology of disgust”, where the perception of what is dirty or unsafe is more important than realistic health risks.

Bridget Mac Eochagàin | Bachelor of Arts (Honours), the Australian Catholic University (ACU)

Radicalising Rape on Stage: A theoretical framework for subverting ‘the gaze’ and dismantling rape culture

In contemporary discourse, movements such as the Women’s March and ‘Me Too’ have underlined the urgency and topicality of rape culture in society. Their impact has inspired a discussion on how problematic representations of rape in the arts sector feed into a problematic rape culture, that reinforces and privileges the sexual exploitation of women. The purpose of my research was to isolate the contemporary rape plays that challenge these structures. In doing so I identified a trend of theatrical devices that were employed across numerous plays to challenge the idea that rape is sexually gratifying or titillating for audiences. Pulling influence from Feminist Theory and Political Theatre practitioners Antonin Artaud and Aleks Sierz, I created the theoretical framework ‘Radical Rape Theatre’. This framework sets a benchmark against

which to assess rape plays as tools to critique and analyse the prevalence of rape culture in contemporary society. The objective of Radical Rape Theatre is to dismantle the idea of 'the gaze' and facilitate a collective responsibility to challenge the way we view, understand and process representations of rape on stage. My research posits that there are three key theatrical devices that qualify plays as part of the 'Radical Rape Theatre' paradigm. Sarah Kane's Blasted is an apposite example of this genre, and can be considered the earliest contemporary rape play to radicalise and politicise rape for the purpose of subverting 'the gaze'. Blasted is consequently positioned in my research as the cornerstone of this new subgenre of political theatre.

Carmine B Buss | Bachelor of Psychology (Honours), the University of the Sunshine Coast (USC)

Climate Change Scepticism: A Randomised Intervention Using Value-based Messaging

It is well established that climate change is human-caused and that a unified approach to mitigate greenhouse gas emissions should be implemented to limit adverse impacts. Yet climate change scepticism is a major barrier to mitigation efforts. Right-wing orientation and associated values are found to be robust predictors for climate change scepticism. To encourage pro-climate attitudes and mitigation behaviours, traditional education-based communication strategies are largely ineffective due to cognitive and social identity biases. Social identity is one's self-concept based on social group membership, such as political orientation. Value-based communication strategies which align with one's identity may be more persuasive, although minimal research has been conducted. This study investigated the effectiveness of an education-based message and a right-wing value-based message on climate attitudes and behavioural willingness to support mitigation efforts. Using a pre-post and one-week follow-up experimental design, participants (N = 189) were randomly allocated to an education-based or value-based message and self-reported their values, climate attitudes, behavioural willingness, and perceived identity alignment with the message. Results confirmed that climate change scepticism and low behavioural willingness are strongly associated with right-wing political orientation and values. While no significant difference in climate attitudes or behavioural willingness between messages was found across time, message alignment was associated with greater pro-climate attitudes and behavioural willingness. The findings provide an understanding of contributors to climate change scepticism and highlight the importance of social identity in climate communication. Future studies should focus on creating specific value-based messages that align more strongly with one's identity.

I would like to acknowledge my supervisor's, Dr Karina Rune and Professor Patrick Nunn, for their guidance, mentorship, and ongoing support throughout the research project.

Australian National University

Cardiovascular Research | 17th September 12pm

Session ID: 17.12.2

Emma Sinn | Bachelor of Advanced Studies (Honours) (University of Sydney)

The Role of Normal Aging in the Development of Stiff Heart Failure

Heart failure (HF) disproportionally affects older adults (65+ years old) and is the leading cause of hospitalisations for this age group. Heart failure with preserved ejection fraction (HFpEF), or "Stiff Heart Failure", is the most common form of heart failure, describing impairment in the heart's ability to relax (diastolic dysfunction), whilst maintaining healthy pumping capacity as described by ejection fraction.

It has been postulated that age-related depletion of nicotinamide adenine dinucleotide (NAD+) underpins cardiac stiffening and diastolic dysfunction seen in the elderly. Other potential mechanisms of cardiac aging leading to decline in diastolic function are not well characterized. Furthermore, model systems thus far have studied HFpEF induced in young mice.

Therefore, we aimed to determine if replenishing myocardial NAD+ using the precursor Nicotinamide Riboside (NR) for 6 weeks can reverse murine cardiac aging, including reversal of diastolic dysfunction in aged hearts. We compared healthy 20-24-month-old C57BL/6J mice (60-70 human years equivalent) with or without NR-supplementation, to healthy 15-week-old mice (20-30 human years) without NR-supplementation.

Age-induced reduction in cardiac function, indicated by strain analysis from transthoracic echocardiography, was improved in NR-supplemented aged mice compared to non-supplemented aged mice. Fasting blood glucose was significantly lower, and the age-induced increase in insulin resistance was reduced in NR-supplemented aged mice. Together, this suggests NR-supplementation may induce improvements in cardiometabolic health of aged mice. Further study of cardiac energetics and NAD+ metabolism using enzymatic assays and LC-MS/MS metabolomics analysis will significantly improve our understanding of cardiac aging, and whether replenishing NAD+ can improve cardiometabolic health during aging.

Dr John O'Sullivan and Dr Yen C. Koay (Supervisors)

Yashaswat Malhotra | Master of Science in Biological Sciences, the University of California San Diego (UCSD)

Reprogramming Macrophages to Resist Atherosclerosis

Atherosclerosis cardiovascular disease (CVD) is one of the leading causes of vascular disease worldwide, accounting for 18 million deaths every year. Atherosclerosis is the narrowing of blood vessel that obstructs proper blood flow. Macrophages, a.k.a 'big eaters' are key cells in the innate immune system which play an important role in the development of atherosclerosis. During hyperlipidemic conditions, macrophages scavenge harmful oxidized low-density lipoproteins (ox-LDLs) that accumulate in the aortic wall and transform into 'sticky' foam cells to ultimately promote atherosclerosis. Here we present a novel atherogenic signaling pathway in macrophages which can provide a hitherto unforeseen avenue to manipulate atherosclerosis. The pathway is initiated by the multi-modular G protein activator and a potent inhibitor of cAMP, GIV (a.k.a Girdin). With the knowledge that cAMP is a versatile anti-atherogenic second messenger, we show that GIV plays a proatherogenic role. GIV stimulates macrophage foam cell conversion by significantly reducing the expression of genes involved in cholesterol efflux. In vitro studies revealed that ox-LDL stimulated macrophages rapidly increased cellular cAMP to process and clear up the lipid in the absence of GIV but transformed into lipid-laden foam cells in its presence. Using immunofluorescence and lipid staining, we demonstrated that WT mice fed with Western diet developed significant plaque formation, while mice lacking GIV in their macrophages were protected. This study might help dissect the molecular mechanisms underlying the pro-atherogenic role of GIV which could be a potential pharmacological target to reduce the occurrence of atherosclerosis.

I would like to thank Dr. Gajanan Katkar and Dr. Pradipta Ghosh for mentoring and guiding me during the course of this project.

Australian National University

Reviewing and Theorising Health | 17th September 12pm

Session ID: 17.12.3

Claudia Goodman | Bachelor of Nutrition and Dietetics (Deans Scholar, Honours)

A Scoping Review on the Preferences of Older Adults for Education Materials

Key Issue: As the population ages there is an increasing need for health professionals to provide health education for older adults. Dietitians are one group of health professionals who devote many hours each day to health education both within hospitals and in community settings. No reviews to date have systematically characterised or synthesised the existing literature on the preferences of older adults for education materials.

Objectives/Methods: This study aimed (i) to map and synthesise literature on the preferred mode and format of delivery of patient education materials to older adults, and (ii) to provide recommendations to support the development of future education materials for older adults. Studies were included if participants were >65years, lived in a high-income country, and if they were written in English. Studies in other languages or in other geographic locations were excluded.

Key findings: Overall, 20 studies were identified. One quarter of studies were on older people with an impaired ability to understand or produce speech (aphasia) (n=5 studies). Older adults preferred to receive information at the time of health visit and to use the internet to supplement knowledge. Written materials were the preferred format for health advice and apps and audio resources the least preferred format. Images to enhance the key messages were preferred as opposed to those used for decoration.

Conclusion/Implications: The findings can be used to enable practitioners to design future resources that meet the specific needs of older adults. More detailed user-testing with older adults is recommended.

I would like to acknowledge my supervisor, Kelly Lambert, who has provided support and guidance throughout the entire research project.

Kira Simmons | Bachelor of Dietetics, University of the Sunshine Coast

Low vegetable intake in pregnancy and associated maternal factors: a scoping review

Healthy eating is identified as a priority in pregnancy. Vegetables are low energy, nutrient dense foods that support health. Needs of populations differ by demographics, as such there is a need to investigate vegetable intake (VI) in pregnant women of lower socio-economic status (SES). The aim of this scoping review is 1) To describe VI during pregnancy in serves/gram and compare VI to recommendations; and 2) To explore the relationship between VI during pregnancy and maternal SES characteristics. Using Arksey and O'Malley's framework and the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR), studies were identified in a search of electronic databases (MEDLINE, Web of Science, Global Health and Scopus) published up to July 2021. All observational studies assessing VI in pregnancy, written in English and conducted in an energy replete context (where diets provide adequate energy) worldwide, were included for review. Forty-seven publications met inclusion criteria. While VI of pregnant women varies across populations, this review found VI to fall below recommendations worldwide. Studies investigating older age (n=9), higher education (n=7), higher income (n=4) and VI, consistently found a positive association, whereas a negative association between food insecurity (n=4) and VI was identified. The evidence on other variables that may influence VI, such as BMI, parity and stress, is too limited and fragmented to generalise. Inconsistencies and possible inaccuracies in reporting VI may be related to the considerable variation in tools used for assessing VI. In conclusion, VI in pregnancy needs to be addressed through appropriate public health strategies, with review findings suggesting a particular focus on women of lower SES due to greater vulnerability to low VI.

I would like to acknowledge my supervisors Judith Maher, Nina Meloncelli, Lauren Kearney for their support, feedback and co-authorship.

Australian National University

Quantitative and Qualitative Data for Tomorrow | 17th September 12pm

Session ID: 17.12.4

Darby Liersch | Bachelor of Engineering (R&D)/Bachelor of Science, the Australian National University (ANU)

Identification and Analysis of a Bushfire Simulator Suitable for Use in the Australian Capital Territory

The escalating severity and length of bushfire seasons due to global warming is placing increased importance on the use of bushfire simulators to predict fires and help to mitigate their negative consequences. Fire simulators are used by fire agencies in many states and territories in Australia to support fire management planning and suppression operations. However, they are currently not used in the Australian Capital Territory despite their potential to help save lives and reduce property risk from bushfires. Therefore, this report selects the best simulator for use in the ACT by investigating the general modelling techniques of bushfire simulators and using this information to compare the capabilities and characteristics of current commercially available bushfire simulators to determine which one qualitatively ranks the highest in terms of required features. Using this method, SPARK is selected as the preferred simulator and its use is then demonstrated using a demo version of the software. This report concludes with suggestions for future work that will help to successfully apply SPARK to the Australian Capital Territory and therefore reduce the future impact of bushfires in the territory and surrounding regions.

I would like to express my sincere thanks to my supervisor A. Prof. Salman Durrani, who supported me throughout this research.

Xuyang Shen | Master of Computing (Advanced), the Australian National University (ANU)

Feature Selection on Thermal-stress Dataset

Physical symptoms caused by high stress commonly happen in our daily lives, leading to the importance of stress recognition systems. This study aims to improve stress classification by selecting appropriate features from Thermal-stress data, ANUstressDB. We explored three different feature selection techniques: correlation analysis, magnitude measure, and genetic algorithm. Support Vector Machine (SVM) and Artificial Neural Network (ANN) models were involved in measuring these three algorithms. Our result indicates that the genetic algorithm combined with ANNs can improve the prediction accuracy by 19.1% compared to the baseline. Moreover, the magnitude measure performed best among the three feature selection algorithms regarding the balance of

computation time and performance. These findings are likely to improve the accuracy of current stress recognition systems.

I would like to express my sincere gratitude to my supervisor Dr. Jo Plested and Prof. Tom Gedeon, for their patience, enthusiasm, and immense support throughout this project.

Amber Anderson | Bachelor of Philosophy (Honours), the University of Western Australia (UWA)

Those who can't do, teach: High achieving students' perceptions of becoming teachers

A significant challenge for Australia's future is the declining quality of our teachers. This challenge was recognised following the first release of the Programme for International Student Assessment (PISA) results, which caused concern over the decline of Australian students' academic outcomes. The quality of teachers is widely recognised as the driver of student outcomes. Hence, there has been a significant focus on boosting Australia's teacher quality.

A potential way to improve teacher quality is to attract more academic high achievers to teaching. There is no clear definition of a high achiever, however, high achievers are described in the literature as having in-depth content knowledge, excellent academic ability, and strong interpersonal skills. However, the profession has struggled to attract high achievers and has been perceived as a career of low status, requiring minimum skill — 'those who can't do, teach'. To attract high achievers to teaching, there is a need to understand how they perceive the teaching profession.

This case study aims to understand perceptions of teaching, from the perspective of high achieving students at a Western Australian university. The study explores how students view teaching as a potential profession (for example, their views on teachers' salary and status). An exploratory survey with 152 responses was conducted to inform the development of interview questions. Semi-structured interviews were then conducted with 30 participants.

The analytical method will be based on interpretivism, meaning that the focus will be on participant perceptions and meanings. Codes will be identified within the survey and interview data, which will then be grouped into similar categories. Finally, theoretical explanations for the emerging categories will be developed.

The results will give a valuable insight into how high achieving tertiary students perceive the teaching profession. These findings could assist the development of recruitment strategies to attract high achievers to study teaching.

I would like to thank my amazing supervisors, Professor David Sadler and Dr Glenn Savage, for their support, advice and guidance.

Australian National University

Complex Problems: Visualised | 17th September 1pm

Session ID: 17.13.1

Thy O'Donell | Bachelor of Arts (Honours), the Australian National University (ANU)

A Foucauldian Analysis of Nineteenth-Century Obituaries and Coronial Inquests from the Stamford Mercury (England, 1801-1841)

This research uses the Stamford Mercury as a cultural case study to investigate the ways in which social norms and impression management are enacted post-mortem through a critical discourse analysis (CDA) of obituaries and coronial inquest reports. As the Stamford Mercury is one of the longest still publishing periodicals (King 2005; Norris 1913; Walker 2006), a time constraint of 41 years (1801-1842) was enforced due to the extensive amount of material published since 1712. Questions regarding the hierarchy of various knowledges of death produced and enacted through obituaries and inquest reports guided this research and were inspired by Foucault's examination of sexuality. It does this through the critical discourse analysis of over six-hundred obituaries and fifty inquest reports sourced from the Stamford Mercury. Whilst obituaries and inquest reports differed in tone and function, the two forms of text worked within the same hierarchy to produce similar knowledges and power. This analysis, viewed through the theoretical lens of the repressive hypothesis, aided the development of a hierarchy of knowledge-power, which was used then to examine the historical meanings, truths, and values that were presented through these documents. The results from this analysis revealed strong values of community, geography, moral values and the 'dying well' among the citizens of Stamford (Lincolnshire County, Great Britain) during the 1800s. This analysis allowed for a better histo-sociological understanding of the function(s) that obituaries and inquest reports served in this period by comparing them to contemporary ones. Despite the difference in tone and structure the author concluded that the hierarchy of knowledge-power remains much the same across time.

Tawanrat Marit | Social Policy and Development Program, Faculty of Social Administration Thammasat University

Economic, Social, and Cultural Rights of Indigenous Peoples in Thailand

In Thailand, indigenous groups are accountable for 7.2% of the total population, numbering approximately 5 million people. For decades, they have been experiencing restrictions to land ownership and public services as many are not legally recognized as Thai citizens even though they have been living in Thailand for several generations. This has amounted to a human rights violation against the indigenous peoples of Thailand.

This research examines the impact of this human rights violation of the indigenous peoples of Thailand in the light of Economic Social Cultural (ESC) rights based on the framework of the UN's ICESCR and the Declaration on Rights of Indigenous Peoples in order to form policy recommendations for the Thai government. The analysis is based on desk study of various publications and case studies of the Karen in Phetchaburi and the Moken in Phuket, conducted by both local and international non-governmental organizations and researchers that have worked closely with these indigenous people through interviewing and focused-group study methods during the past 10 years.

The research concludes that land eviction of the indigenous peoples violated ESC rights according to the ICESCR as there was no adequate resettlement provided for those who were evicted. People have lost their ancestral lands and their traditional way of living, resulting in the need to adjust to new lifestyles outside the forest confines, and to seek employment in urban areas. The current changed circumstances have forced these indigenous peoples into economically vulnerable situations leading to poverty and lack of opportunity for decent work, a situation further exacerbated by the inability of many to speak Thai.

My abstract would't be completed without help from Dr.Sorasich Sawangsilp, Dr.Victor Prasad Karunun, and Mr. Pred Evans. I want to thank them all for their suggestions and guidelines for this abstract.

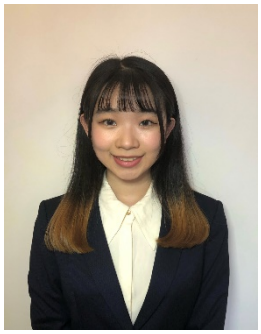
Isla Ford | Bachelor of Psychological Science (Honours), Australian Catholic University (ACU)

The Relationship Between Self-Efficacy and Performance in a Statistics Subject Among University Students: A Systematic Literature Review and Meta-Analysis

Objective: Statistics is a mandatory unit for many disciplines at university, however students tend to report low self-efficacy for this content and underperform in these units. The aims of this systematic review and meta-analysis were to estimate the strength of the relationship between self-efficacy and performance in university statistics units, and to establish if the relationship is different for undergraduate and postgraduate students. Method: Systematic searches were conducted on PsychINFO, ERIC and Academic Search Complete databases. Studies were included if they were peer reviewed journal articles that reported the relationship between self-efficacy and performance in a statistics subject in university students. Effect sizes were extracted from eligible studies and meta-analysed. Results: Twenty-one studies were included, with 20 studies meta-analysed. A random effects model found a significant, positive, and moderate estimated aggregate effect size for the relationship between self-efficacy and achievement in statistics (r = .35, 95% CI [.29, .42], p < .001, Fishers Z = .36 n = 4502). For postgraduate students the aggregated effect size was non-significant. Limitations: There was a large amount of heterogeneity found in the meta-analysis. However, most studies provided limited information on the relationship between self-efficacy and achievement so moderating and mediating variables could not be synthesised. Conclusions: Self-efficacy is positively correlated with performance in undergraduate statistics units. Implications: These findings shed light on why many students

underperform in statistics subjects and may help lecturers provide interventions where necessary. Future research needs to be conducted to assess interventions to improve self-efficacy.

A special acknowledgement to my supervisor Jodie Chapman who guided me throughout the study.



Shumeng (Emma) Lin | Bachelor of Finance, the Australian National University (ANU)

The Impact on The Australian Capital Territory's Local Businesses due to the Lack of Chinese International Students.

This research project studies how the lack of Chinese international students during the Covid-19 pandemic has influenced the local hospitality businesses in the ACT. During the Covid-19 pandemic, the Australian government border policy has prevented many international students from coming to Australia for their study, this decreasing international students' trend could post an additional negative economic demand shock due to the Covid-19 lockdown. The report examinates this issue from both qualitative and quantitative perspectives by analysing data from different sources and conducting interviews and surveys with 19 local businesses owners as well as case studies from existing literatures. The report discovers a downward trend of Chinese international student enrolment numbers and their continued lack of interest in study in Australia for the next few years. The report also discusses the positive contribution international students have towards local economic development. Hence, this decreasing trend of student numbers poses a negative impact on the local hospitality businesses, especially Chinese restaurants, as they are losing a large number of customers and having a hard time adjusting to new marketing strategies. The report wishes to emphasis the value international students bring to the local economic growth and provides recommendations to the government, universities and local businesses of how to better deal with this challenge the Covid-19 pandemic brought to us in the future.

Australian National University

Physics | 17th September 1pm

Session ID: 17.13.2

Flynn Linton | Bachelor of Advanced Science (Honours), the University of Queensland (UQ)

Precise treatment of the Bohr-Weisskopf correction to the atomic structure of heavy atoms

The Breit-Rosenthal and Bohr-Weisskopf corrections describe the effects of finite-sized nuclear charge and magnetisation distributions on the structure of atomic energy levels, respectively. The inclusion of both of these corrections is essential in constructing an accurate theoretical description of electron energy levels in heavy atoms that can be compared to current experimental precision to search for physics beyond the standard model. Previously, we investigated accurate models for computing the Breit-Rosenthal correction. However, current models are yet to include accurate nuclear wavefunctions in the calculation of the Bohr-Weisskopf correction, with most implementing a simple step-function. We aim to formulate a more precise total correction by considering electron-nuclear (spin-orbit) interactions and antisymmetry contributions, using an accurate model of the nuclear wavefunction determined by the Woods-Saxon potential. Initially, we derived the Bohr-Weisskopf correction using a step-nuclear wavefunction to compare with the literature to confirm the validity of our model. A more general model was then determined for any nuclear wavefunction. A numerically determined wavefunction could then be solved to evaluate the Bohr-Weisskopf correction. We have demonstrated that our expression for the total correction is consistent with the literature and is ready to be implemented in calculations of the Bohr-Weisskopf correction using numerically determined nuclear wavefunctions. The investigation will provide a more accurate theoretical description of the Bohr-Weisskopf correction than current models, allowing a direct comparison to precise experimental estimates to search for new physics. Furthermore, the model may be easily adjusted to implement alternate nuclear wavefunctions if more accurate nuclear models are developed.

I acknowledge the contributions of my colleague Lysander Miller and our supervisors Dr Benjamin Roberts and Dr Jacinda Ginges to this reserach project.

Martha Reece | Bachelor of Philosophy (Honours) - Science, the Australian National University (ANU)

Testing the limits of the nuclear shell model: Lifetime measurements of excited states of polonium nuclei in the vicinity of 208Pb

The atomic nucleus, the core of the atom, is made up of protons and neutrons which have an organised shell structure similar to electron orbits that exist in atomic systems. Lead-208 is a 'doubly magic' nucleus; it has full shells of both protons and neutrons, which brings added stability analogous to the noble gases. Other nuclei near 208Pb, with similar numbers of nucleons, are useful tests of the nuclear shell model which describes this phenomenon. In this investigation, we tested the limits of the shell model in this region by systematically examining the behaviour of polonium isotopes, which have two more protons than lead.

We used the ANU particle accelerator to create radioactive polonium nuclei with masses of 202, 204 and 206 in high-energy states. Gamma rays emitted from relaxation of the excited nuclei were measured using lanthanum-bromide detectors with state-of-the-art timing capabilities. We analysed these data to determine lifetimes of excited states on the order of 10 pico-seconds, some of the best results achieved from this relatively new setup. From these lifetimes we calculated 'transition strengths', which give an indication of how many nucleons are involved in transitions to lower energy states. Preliminary results show that "collective" motion of the nucleons increases as we remove neutrons to get further from the 208Pb neutron shell closure. We also performed calculations of transition strengths based on the shell model theory, and initial comparison with the data suggests that, unexpectedly, the polonium nuclei show more collectivity than the shell model predicts.

Neco Kriel | Bachelor of Science, the Australian National University (ANU)

Characteristic length scales of magnetic fields in the fluctuation dynamo

The turbulent dynamo, a process of converting kinetic energy of turbulence to magnetic energy, is a plausible mechanism that explains how weak magnetic fields that are produced in the early Universe are rapidly amplified and maintained at values that we observe in the Universe today. This process is inherently multi-scale because of the presence of turbulence, with many existing analytic theories predicting the peak magnetic field scale -- the scale on which magnetic energy is most concentrated -- either depending on the turbulent medium, or the magnetic field properties. Using direct numerical simulations of compressible magnetohydrodynamical turbulence, we simulate the turbulent dynamo over an unprecedented range of magnetic field and turbulence parameters, to explore the relevant scales in the problem and compare them with existing theories. We measure this peak magnetic field scale, and the scales where the turbulence and magnetic energy are dissipated in our simulations, and find that the peak magnetic field scale depends only on the magnetic dissipation scale, confirming previous theories for the turbulent dynamo. We also report a minimum critical Reynolds number for the turbulent

dynamo to take place, which has repercussions for both future numerical dynamo simulations, and our theoretical understanding of the dynamo process.

I would like to acknowledge the support and guidance provided by my thesis advisors, Professor Christoph Federrath, Dr Amit Seta, and James Beattie.

Rosemary Zielinski | Bachelor of Philosophy (Honours) - Science, the Australian National University (ANU)

Why do particles move under a temperature gradient?

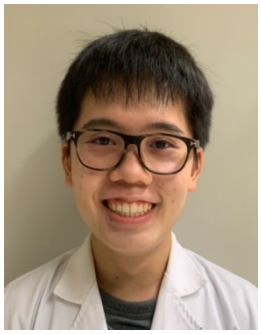
The tendency for particle migration under a macroscopic temperature gradient, termed thermophoresis, is a widely applied phenomenon which lacks a microscopic theoretical basis. This effect has been observed on many scales, including ionic solutions, gaseous mixtures, and colloidal suspensions. Contemporary research has focussed on bulk solution thermophoresis extensively, whilst studies investigating single molecule thermophoresis are presently limited. However, single molecule experiments have the potential to give new insight into the theoretical mechanisms for thermophoresis, in the absence of bulk solution effects. This study examines single-ion thermophoresis for aqueous sodium and chloride ions, using molecular dynamics (MD) and alchemical free energy perturbation (FEP) methods, to determine if single-ion thermophoresis occurs. The hypothesis that aqueous solution thermophoresis is driven by changes in solvation entropy is also tested. The results confirm single ions exhibit thermophoretic behaviour, dependent on average system temperature. However, poor convergence in the solvation entropy data obtained does not allow further insight into the role of solvation entropy in determining thermophoretic behaviour. Furthermore, purely thermophobic behaviour was observed for the chloride ion, whilst sodium recorded a slight inversion between thermophobic and thermophilic regimes. These results prompt continued research into single-ion thermophoresis, with the potential for new theoretical insight to emerge, particularly with respect to inversion points of single ions and their bulk solution counterpart.

I would like to warmly thank both Professor Ben Corry for his guidance throughout this project, and the Corry Research Group at ANU.

Australian National University

Climate and Natural Biology | 17th September 1pm

Session ID: 17.13.3



Sylvester Jian Ming Lim | Bachelor of Science (Hons), National University of Singapore

Improvement and utility of a Mass Allelic Exchange library of uropathogenic Escherichia coli

Sylvester Lim,†,‡, Varnica Khetrapal,†,‡,§, Liyana Ayub Ow Yong†,‡, & Swaine Chen*,†,‡

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Background: Mass Allelic Exchange (MAE) is a novel genetic tool we invented which allows different bacteria to mate and create hybrids called chimeras. A collection of these chimeric bacteria make up the MAE library, which can then be used to uncover unknown gene functions. However, the MAE library still lacks specific chimeras as the hybridization process is biased. We thus aimed to correct these biases by leveraging on advanced genomic techniques. We also showed that the chimeric library contains Escherichia coli bacteria which were initially non-pathogenic, but gained behaviours typical of pathogens especially when grown at 37°C.

Methods: We selected specific engineered bacteria strains and mated them to produce chimeras which have hitherto been elusive, this process is known as directed transfers. Pathogenic behaviour was screened through utilizing a chemical test that involves a violet dye which stains bacterial aggregates called biofilms.

Results: Through 10 directed transfers, we increased the MAE library hybridization coverage from 88% to 94.2%. Genes previously excluded in the original libraries can now also be potentially screened. We discovered clones in the MAE library which form elevated biofilm at 37°C — this behaviour suggests it could cause disease and resist antibiotics.

Conclusions: The improved hybridization coverage of the MAE library has increased its utility for screening other behaviours which can have complex genetic causes. Additional chimeras from the MAE library are also being utilised to identify specific genes responsible for the biofilm formation observed at 37°C.

I am immensely grateful to Liyana, who has been my most patient mentor, as well as Swaine and Varnica who have granted me the honor of presenting their splendid MAE technology to the world.

Veronica Padilla | Bachelor of Advanced Science (Honours), the University of New South Wales (UNSW)

Expression and Characterisation of a DNA i-Motif specific Nanobody

Abstract: The unique sequence of a DNA strand dictates its three-dimensional structure. Some regions of the human genome that are associated with aging, cancer and other diseases have the propensity to form a four-stranded structure known as the “intercalated motif” (i-Motif). The i-Motif is distinctly different from the Watson-Crick double-stranded helix model and is abundantly formed during rapid periods of cellular growth. Despite the strong characterisation of its physical properties, the i-Motif has yet to be attributed a precise biological role. Our research expands on a 2018 study that engineered an antibody fragment, called “iMab”, to detect i-Motifs inside cancer cells. Utilising recombinant protein expression and purification techniques, iMab was reformatted into a nanoscale design – re-named “iM-2B7-HF”. This nanoscale format presents the opportunity to increase stability and production yield as well as overcome size limitations of the larger original iMab. Antibody-binding assays were performed against a range of DNA structures to investigate the ability of iM-2B7-HF to detect i-Motifs. Our results determined that iM-2B7-HF retained specificity for i-Motifs while excluding other structures. When tested against another four-stranded structure native to human cells, our nanoscale design continually demonstrated the ability to differentiate i-Motifs. This important finding contributes to refining methods of i-Motif detection and visualisation, offering a novel tool for use in investigations of i-Motif formation and function. Our nanoscale probe could be applied to ongoing research within the fields of cancer genetics, aging and drug design, providing a new approach for the exploration of the i-Motif and its biological relevance.

Supervised by Professor Marcel Dinger and Dr Mahdi Zeraati, School of Biotechnology and Biomolecular Sciences (University of New South Wales).

Jemma Jeffree | Bachelor of Philosophy (Science), the Australian National University (ANU)

A shift in ENSO regime recorded by recharge oscillator dynamics

Every few years, the eastern Pacific Ocean shifts between two extreme states - a warm El Niño with weaker trade winds and a cool La Niña with stronger trade winds. This phenomenon, called El Niño Southern Oscillation (ENSO) affects rainfall and temperature patterns across the globe. The progression from El Niño to La Niña and back again can be approximated by a Recharge Oscillator Model, which describes the Pacific Ocean like a spring. Sea surface temperature of the eastern Pacific Ocean corresponds to position, and the average depth of

the warm surface layer in the equatorial Pacific Ocean corresponds to momentum. A new dataset, the CSIRO Climate retrospective Analysis and Forecast Ensemble system (CAFE60), was used to determine the parameters for this model and how they have changed since the 1970s. The distribution of the ensemble allows for uncertainty calculations of the parameters based on realistic past states. The resulting parameters agree with previous work using different datasets, in that the corresponding oscillation periods and decay rates have significant overlap with the 95% confidence intervals of the previous study. The multiple realisations also allow for parameters to be calculated for each year. Doing so shows a clear shift in ENSO dynamics around 2000/2001. Merely considering ENSO events cannot show this behaviour change, because there are too few events in this time period against a background of too much noise. In future studies, this regime shift should be verified using a different simplified model, and the underlying ENSO dynamics changes explored.

Thank you to my supervisor Courtney Quinn for supporting me throughout this project. Thank you also to the ARC Centre of Excellence in Climate Extremes for their Undergraduate Research Scholarship.

Jessica Tacey | Bachelor of Science (Honours), the University of the Sunshine Coast (USC)

A social distancing dilemma: Eastern water dragons do not modify their social behaviour to avoid a lethal fungal disease

Emerging infectious fungal diseases are considered responsible for 72% of disease-driven extinction events, with the proportion of documented fungal disease records increasing seven-fold in just 15 years. Group-living species often use social behaviour to avoid infection; diseased individuals isolate from the group, or healthy animals avoid those diseased conspecifics. However, there remains a lack of knowledge about social behaviour as a mechanism to avoid fungal infection. Here, we used a population of free-living eastern water dragons (Intellagama lesueurii) that are known to be impacted by an emerging infectious fungal pathogen (Nannizziopsis barbatae) as a study system, to better understand how species may modify their social behaviour to avoid fungal infection. Eastern water dragons are a large, long-lived reptile native to the east coast of Australia. They are highly social, preferentially associating with or avoiding certain individuals in their population. Within a single park located in Brisbane's Central Business District, we tracked social interactions between individuals over a five month period, and recorded the outcomes. Based on data collected from 647 observations of 126 unique individuals, our results suggested that (1) diseased dragons were not less social than their non-diseased conspecifics, and (2) non-diseased individuals avoided socialising with more severely diseased conspecifics. These findings warrant further investigation, given the implications for increased risk of disease spread and the potential for population decline if there are limited behavioural mechanisms to mitigate disease transmission.

The author acknowledges the advice and assistance provided by Associate Professor Celine Frere, Dr Barbara Class and Coralie Delme.

Australian National University

Drugs, Treatments and Healing | 17th September 1pm

Session ID: 17.13.4

Coco Huang | Bachelor of Science/Bachelor of Advanced Studies (Medical Science), the University of Sydney (USyd)

Developing a novel wound healing murine model of type 2 diabetes

Foot ulceration with delayed wound healing causes a significant disease burden for up to 34% of people with diabetes. How wound healing processes are impaired in type 2 diabetes (T2D) is unclear. We aimed to develop a novel mouse wounding model reflecting human diabetes with superadded cutaneous wounds.

T2D was induced in male (n=8) and female (n=8) C57BL/6 mice by high-fat feeding (initial 8 weeks) then combined with low dose streptozotocin injections (HFD+STZ) (10 weeks). After 18 weeks, four full-thickness dorsal skin wounds of 4mm diameter were created with a punch biopsy. Same-gender mice were either housed communally with a Tegaderm bandage (3-4mice/cage), or singly housed (SH) without Tegaderm. Male (n=6) and female (n=6) chow-fed mice (Chow) were controls. Weekly body weight, random blood glucose (BGL) and wound closure rate (WCR) by ImageJ were measured.

HFD+STZ mice had elevated BGL compared with Chow (males: 21.9mmol/L vs 10.8mmol/L, p<0.01; females: 13.4mmol/L vs 8.4mmol/L, p<0.001, respectively). At 4-days post-wounding in SH, HFD+STZ mice had lower WCRs than Chow (males: 82.7% vs 98.3%, p<0.05; females: 78.1% vs 97.1% closure, p<0.0001, respectively). Female SH HFD+STZ WCRs were also lower than Chow at 7-days (p<0.05). Although HFD+STZ female mice had lower BGL than males (p<0.01), SH females still exhibited delayed wound healing. Using Tegaderm did not impair WCR in HFD+STZ mice, likely due to poor Tegaderm retention, suggesting SH is most suitable for future studies.

Combined HFD+STZ demonstrated delayed cutaneous wound healing in our novel, two-gender model, now enabling further study of wound healing interventions.

Co-authors: Elisha Siwan, Sarah Fox, Matilda Longfield, Stephen M. Twigg and Danqing Min

Lily Kenchington-Evans | Bachelor of Science (Honours), La Trobe University (LTU)

New 'Trojan Horse' Antibiotics that Trick Gram-Negative Bacteria

Antibiotic resistance has arisen from the misuse and overuse of these drugs, in addition to intrinsic resistance factors. Gram-negative bacteria possess additional factors, including efflux pumps and the outer membrane bilayer, reducing drug uptake and efficacy of reaching internal targets. To overcome this permeability problem in drug development, we can mimic sideromycins – compounds excreted by bacteria composed of an antibiotic and a siderophore. A siderophore is an iron chelating compound produced during periods of iron starvation to obtain the essential element. As bacteria have dedicated transmembrane proteins to recognise siderophores, sideromycins and our synthetic equivalents hijack existing machinery, allowing for drug delivery through active transport, aptly called the Trojan Horse Approach. Previous studies in the field have used antibiotics with documented resistance i.e., beta-lactams. This project addresses the above issues by synthesising a novel metal containing antibiotic linked to a hydroxamic acid siderophore. Previous studies from our laboratory on similar compounds demonstrate that bacteria do not develop resistance to these metal antibiotics, as bacteria have not been exposed to this type of structure before. Herein I detail the synthetic procedure for our novel 'trojan horse' antibiotics, where either a gold or silver ion is bound to an N-heterocyclic carbene ligand coupled to a hydroxamic acid. Thus far, the synthetic strategy for the desired compound has been partly completed. Once a series of drugs have been prepared the capacity of these compounds to bind iron will be evaluated and antibacterial tests will then be carried out. The aim is to increase bacterial selectivity through optimisation of the compound structure. Our results highlight the successful strategy, synthesis, and characterisation using bioinorganic chemical techniques.

Siqi Chen | Bachelor of Advanced Studies (Honours), the University of Sydney (USYD)

Assessing the efficacy of herbal preparations in an animal model of inflammatory bowel disease

Inflammatory bowel disease (IBD) is characterised by relapsing and remitting abdominal pain, diarrhea, and the resulting malnutrition. There is no permanent therapeutic cure for IBD and most current interventions have severe adverse effects such as immunosuppression. This study aimed to compare the therapeutic potential for herbal preparation containing curcumin, Amomum Villosum or Oldenlandia Diffusa in comparison with a synthetic drug candidate AZD3241 known to inhibit IBD. Experimental colitis was induced in laboratory mice by addition of 2% dextran sodium sulfate (DSS) in drinking water or herbal tonic provided ad libitum for 9 days. Mice received either normal drinking water(control), DSS only, DSS and AZD3241 (30mg/kg) dispersed in peanut butter daily, DSS and curcumin (200mg/kg) mixed in peanut butter daily, DSS in Amomum Villosum tonic tea (with peanut butter control), DSS in Oldenlandia Diffusa tonic tea (with peanut butter control) ad libitum. All drugs improved IBD

clinical scores significantly (with Villosum reaching greatest statistical significance, p < 0.0001). Histological scoring showed that all treatments reduced colonic crypts loss and preserved the gut lining compared to mice receiving DSS alone. Immunofluorescence study on colon tissue showed drug treatments enhanced an accumulation of the cell signal protein Nrf-2. Marked decreases in colon calprotectin levels, an inflammatory marker of IBD, was noted in all drug treatment groups compared to DSS alone with Villosum reaching significance (p=0.04). Collectively, herbal candidates in the study ameliorated the course and severity of experimental colitis with similar if not better potency than the synthetic drug AZD3241. Therefore, these natural alternatives possess some potential as novel therapeutic agents for IBD with reduced side effects and enhanced safety and efficacy.

This project is supervised by Prof. Paul Witting, co-supervised by Dr. Gulfam Ahmad and collaborated with A/Prof. Ranglang Huang, with acknowledgement to the University fo Sydney Laboratory Animal Services in the Charles Perkins Centre.

Leyla Meharg | Bachelor of Science and Advanced Studies, the University of Sydney (USYD)

Strategies to mitigate or eliminate perfluoroalkyl and polyfluoroalkyl substances in vivo using a zebrafish model

Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are a family of chemicals that have been manufactured since the 1940s. Due to their water-resistant and fire-retarding properties, PFAS have a broad range of applications for both household and industrial use. This ranges from cookware coatings, food packaging materials and coatings for clothing to fire-fighting and aqueous film forming foams. Extensive PFAS use globally, has led to widespread PFAS contamination in the environment, where their chemical properties make them resistant to biodegradation. In Australia, PFAS have been found in groundwater and drinking water in areas near fire-fighting facilities and military sites. With a long half-life of up to 5 years in humans, PFAS bioaccumulate in various tissues, leading to disruption of endocrine function, including thyroid dysregulation and reproductive problems. Developing treatments to facilitate elimination of PFAS from human tissues is a high priority unmet need. This work aims to develop functional strategies to mitigate the effects of PFAS in-vivo using a zebrafish model. A high throughput screening system for post-exposure toxicity to PFAS was developed and used to identify potential therapeutics from an FDA-approved (United States Foods and Goods Administration) drug library. Under this post-exposure toxicity screening system, zebrafish embryos were exposed to PFAS, before the PFAS was washed from the embryos and replaced with drug screen compounds from the FDA-approved library. The morphology of each embryo was then evaluated as rescued, major deformity or dead, to identify potential hits for post-exposure detoxification of PFAS. From the 616 unique FDA approved compounds tested (of 1284 in our library), five primary hits were identified. In further validation assays, the reproducibility of these hits was confirmed, and the relative potencies were established to help prioritise future studies once the entire library has been screened. With no treatment currently available to eliminate PFAS from human tissues, this work has the potential to

be highly significant in providing insight for possible treatments for post-exposure detoxification of PFAS.

I would like to acknowledge the contributions of my supervsiors Dr Daniel Hesselson and Dr Stefan Oehlers. I would also like to extend my thanks to the Centenary Institute and the NHMRC.

Australian National University

Presenting Students | Alphabetical by first name

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Amna Rafiq	Reviewing the Literature on Cancer	15.13.2
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Bridget Smart	Insights from a Digital World	15.11.1
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Brittany Smith	The Power of Language and Discourse	15.15.1
Brooke Petre	Gender and Sexuality II	16.16.4
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Australian National University

Insights from a Digital World | 15th September 11am

Session ID: 15.11.1

Conor Patton | Bachelor of Philosophy (Honours), The University of Western Australia

"Lurk More": A digital ethnography exploring the emergence of identity through symbol on an anonymous website

Anybody can access /pol/, a sub-sub-board of popular website 4chan; all one requires is a computer and an internet connection. However, upon entering, one uncovers a digital place quite unlike any other. Here, political vitriol fuses with crude humour. Users casually deride one another, reprimanding anybody who fails to correctly participate in their unique cultural 'slang' of insults, nuanced references, and profanity. A highly insular community, /pol/ exists within a deceptively anarchic interface; there is no tailored 'news feed', users are anonymous, and posts expire rapidly. This ethnography explored how such a community maintains identity, finding that it did so not despite these ephemeral and discrepant links between users, but rather, because of them. Departing from the ethnographic archetype, I did not directly interact with users, but 'lurked', or participated only by observing. Most users engage with /pol/ in this way, and it presents a more viable means of approaching such online communities. The research suggests that identity on /pol/ is expressed both individually and collectively, and is established via two primary symbols: the sharing of memes solely comprehensible to /pol/ users, and the demonstration of fluency in a similarly impervious shared dialect. Together, these allow users to prove their identity as culturally valid members by adopting /pol/'s digital hexis - the way users interact online - posting content that conforms to communal expectations, and enthusiastically pillorying that which does not. This reflects and reinforces the broader habitus of distrust toward outsiders and presents a strange and fascinating subject of ethnographic inquiry.

Deeahn Sako | Graduate Diploma of Psychological Studies, Western Sydney University (WSU)

"Mummy, let's see Grandma again!": Facilitating inter-generational communication in video-calling formats

The COVID-19 pandemic and its associated restrictions have resulted in an unprecedented increase in video-calls. Video-calling platforms are both an excellent alternative to and a significant departure from face-to-face interaction, requiring interlocutors to adjust accordingly. The ease with which one adapts to video-calls is influenced by such factors as communicative style and technological capabilities. Older adults and young children are two demographics least equipped to adopt the sudden substitution of face-to-face with video-call interactions imposed by COVID-19 lockdowns and restrictions. A

recent article in The Conversation (Lam-Cassettari et al., 2020) reported their findings from an Australian survey, showing that many grandparents have relied on video-calls to remain in contact with their grandchildren throughout the COVID-19 pandemic. The responses to this survey inspired an investigation into the particular challenges video-calling poses for the grandparent-grandchild dyad and how such issues might be addressed.

A detailed literature review called focus to attentional, communicative and technological factors that pose particular barriers to older adults and young children when video-calling. Considerations such as the shorter attention span characteristic of young children and the limited interface literacy stereotypical of older adults, as well as the vastly divergent communication styles of these demographics, show how grandparent-grandchild communication is disproportionately disadvantaged by replacing face-to-face interactions with video-calls. However, by incorporating this knowledge into the design of a video-calling platform, an application or extension can be created to address the difficulties. Video-call features that cater to the specific needs of older adults and children can facilitate communication between grandparent and grandchild. Automated attention-getters for children, an interface that varies to reflect the technological capabilities of the user and built-in activities catering to different ages and interests are features that can enable a relationship to develop even when physically apart. A detailed description of video-calling features are given in this paper.

In order to further the current research and substantiate the value of attention-getters on video-calls, the current study investigates grandparent-grandchild engagement in Zoom calls in both filtered and normal conditions. Data on looking times, facial expressions and self-report measures are being collected.

Research has shown a wide variety of benefits resulting from grandparent-grandchild relationships, ranging from individual physical and mental health to broader societal security and economic benefits. In light of such evidence, and the “new normal” of societal changes the COVID-19 pandemic has caused, using technology to foster grandparent-grandchild relationship growth has never been more important.

Special thanks to Dr Tijl Grootswagers and Prof Paola Escudero, whose supervision and guidance were invaluable in this project.

Bridget Smart | M.Phil in Applied Mathematics and Statistics, The University of Adelaide (UoA)

How the online landscape impacted events during the 2021 Capitol Riots

In Washington, on the 6th of January 2021, a riot occurred which aimed to prevent the counting of the Electoral College votes, with rioters eventually breaching the Capitol Building. Online social networks had a large influence on the formation of ideas that led to these riots, and helped the rioters organise. More generally, online social networks are a large and growing factor in the formation of opinions around topics from politics to public health. Understanding influence online can be better captured and understood is key to developing strategies that support safety and security, counteract malicious activity and ensure productive dialogue in our online communities.

Using 1.8 million Tweets containing the keyword 'trump', this work develops a strategy to identify patterns of behaviour in the online landscape from the Capital riots, gauging public opinion and response to events both internal and external to the online network. The contribution is a framework capable of quantitatively identify users and events of interest, which were validated against real world events.

A lexicon and rule based sentiment analysis tool is used to analyse the large volume of qualitative data, identifying users who drove emerging sentiments toward key events and topics. The limitations of these tools are explored, and findings are combined with network analysis tools, including betweenness centrality, to provide a robust framework for identifying the critical users and events.

This work is the first step toward developing a generalised framework to identify sources of influence online, capturing features which contribute to the success of phenomena including disinformation campaigns and "echo chambers".

I would like to acknowledge the supervision of Associate Professor Lewis Mitchell.

Australian National University

Foreign Matters | 15th September 11am

Session ID: 15.11.2

Grace Lim | Bachelor of International Security Studies, the Australian National University (ANU)

Rational Actor and Behavioural Models of Decision Making on the UK's Decision to Join the 2003 Invasion of Iraq

This research uses the case study of UK's decision to join the 2003 invasion of Iraq to compare the rational actor (RAM) and behaviour models (BM) of decision-making. Although limited to open-source information about the UK government's decision-making and Prime Minister Blair's thought process, this research analyses how factors like individual bias, public opinion and alliance dependence brought about one of the most controversial British foreign policy decisions. It also demonstrates the importance of foreign policy analysis of identifying personal bias disguised as rational considerations. RAM finds that because of alliance dependence on the US, the UK had incentives to resist the myopic temptation to free ride and prioritise alliance maintenance over other rational considerations. RAM conceptualises the state as a unitary actor and ignores imperfect reasoning and bias; BM focuses on Blair's individual psychology. BM rejects the overemphasis of alliance maintenance - historically, the Anglo-American alliance has survived conflicting positions. Rather, Blair's personalisation of the alliance and his overestimation of his personal influence over the Bush administration contributed to increased privilege of alliance maintenance in decision-making. Finally, Blair's orientation to his political environment and confidence in challenging domestic political constraints like public and parliamentary opinion disposed him to prioritise strategic imperatives over domestic political constraints. Although findings from this research show that BM more accurately explains the UK's decision than RAM, BM has greater predictive ability in general. The cost-benefit analysis can be estimated but it is nearly impossible to measure the individual impact of different psychological factors.

Dorothy Mason | Bachelor of Philosophy (Honours), Asia and the Pacific (ANU)

Contested terrains: Land governance reform during Myanmar's democratic transition

Between 2011 and 1 February 2021, Myanmar began to move from authoritarian rule to quasi-democracy. This period was marked by intense social, economic and political change, including efforts to accommodate local demands for rights-based land reform and restitutions. But while the new regime set up some mechanisms to redress past injustices and return confiscated lands, the majority of reforms appear to have exacerbated landlessness and land insecurity for the

rural poor, especially in ethnic nationality-controlled areas. Drawing on library and archival research, along with interviews with practitioners working on land reform during this period, this thesis seeks to understand the motives behind the reform process and the key contestations over land it generated.

I argue that the land reforms were embedded in part of a broader neoliberal development agenda, driven by an influx of foreign investments in land, which sought to advance the commercial and political interests of Myanmar's military elites. Yet, while many military-affiliated businesses profited from the new legal framework, which formalised existing patterns of land appropriation of dispossession, the reforms also partly constrained the military's absolute exercise of power. In particular, the promotion of individual farmers' rights and the opening up of civil society carved out a political space to contest military dominance in the land sector. I argue that this process created new political subjectivities and produced new configurations of state-society relations, ultimately leading to a growing, and increasingly untenable, divergence between the military-state and rural civil society.

Olivia Nolan | Bachelor of International Security Studies and Bachelor Politics, Philosophy and Economics (PPE), the Australian National University (ANU)

An Investigation of the Third Taiwan Strait Crisis

The Taiwan Crisis (June 1995 - March 1996) was a crucial turning point in Sino-Taiwan-US relations. 25 years on, there continues to be wide-ranging debate over the nature of the crisis and what caused it. This study aims to examine the major causes leading to the crisis, key phases of the crisis and its implications. First, the study examines the background to the crisis. Despite burgeoning economic interaction and cross strait travel from 1987, political relations between the PRC and Taiwan have been tenuous. This case study argues that Taiwan's democratisation, power struggles within the Chinese Communist Party and America's ambiguous policy stance towards Taiwan have all but extinguished hope of Taiwan's reunification with the PRC and meaningful political cooperation. The study also highlights how Taiwan President, Lee Teng Hui's, trip to America in 1995 was the proximate spark that ignited Beijing's ire over international support for Taiwan's sovereignty. Endeavouring to undermine President Lee and legitimise its claim to Taiwan, Beijing undertook military exercises from July 1995 - March 1996. To maintain its reputation in the region and stave off criticism from Republican Representatives, the U.S. Congress agreed to deploy an aircraft carrier east of Taiwan in March 1996, escalating tensions to crisis point. The study finds that American might, deft diplomacy, and China's clear signalling diffused the crisis leading to an era of unparalleled Sino-U.S. detente. In conclusion, the study discusses the important lessons from the crisis including the necessity to address misperceptions and initiate confidence building measures.

Australian National University

Care and Patient Rehabilitation | 15th September 11am

Session ID: 15.11.3

Paige Goldman | Bachelor of Occupational Therapy (Honours), The University of Queensland (UQ)

Occupational therapy rehabilitation groups: understanding the patient experience

Inpatient rehabilitation patients often experience increased anxiety and levels of tension due to associated psychosocial adjustments, such as, loss of independence and physical capacity, uncertainty of prognosis and changes in self-esteem. Whilst research explores relaxation practice with specific population groups, there has been limited occupational therapy-specific relaxation group research in inpatient rehabilitation settings. This study aimed to understand patient's experiences in relaxation groups and the impact of relaxation participation on patient tension. Participants were urban metropolitan hospital rehabilitation inpatients who were participating in the relaxation group. This study used a mixed methods design. Quantitative data were collected from 48 participants who completed a self-rating of tension scale prior to and following group participation. This data were analysed using descriptive analysis. Qualitative data were collected using semi-structured interviews with 10 participants who attended a minimum of two relaxation groups. This data were analysed using content analysis. Following group attendance, 68% of participants reported a reduction in tension, with this being significant (z=-7.606; p less than 0.001) and no participants reported increased tension. Key themes that emerged from the interviews related to the mood and ambient environment of the group, and the outcomes of relaxation group, such as the impact of group participation on mood, sleep and ability to engage in rehabilitation. The findings of this study provide insights into patient experiences of relaxation group participation and recommendations for facilitation of relaxation groups in an inpatient rehabilitation setting. Further research warrants exploration into the long-term use and effectiveness of relaxation strategies post discharge.

With thanks to fellow co-researchers Mereki Collins, Freyr Patterson, Tammy Aplin and Brendan Issacs.

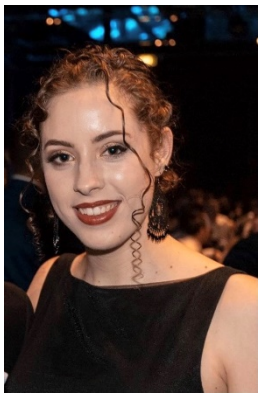
Sylvia Eugene Dit Rochesson | Bachelor of Arts (Honours), The University of Sydney

IMPROVING SEXUAL HEALTHCARE FOR LGBTIQ+ CANCER SURVIVORS: AN INVESTIGATION OF CHALLENGES FACED BY HEALTHCARE PROVIDERS

Although sexual health is important to the wellbeing of many cancer survivors, it is not routinely addressed by healthcare providers (HCPs). Existing barriers

which hinder communication about sexual health may be exacerbated when HCPs care for lesbian, gay, bisexual, transgender, intersex, and queer (LGBTIQ+) communities due to limited health education and training that they receive. As such, this study aimed to explore the experiences of Australian and New Zealand HCPs with LGBTIQ+ cancer survivors to uncover strategies to improve sexual healthcare. HCPs were recruited through advertisements distributed in (i) healthcare professional networks, (ii) social media posts, and (iii) emailed invitations to participate in an online survey and qualitative interviews exploring their knowledge, attitudes, and practices. Our survey revealed healthcare providers (n=60; oncologists=33%, radiation therapists=25%, nurses=20%, allied health/other=22%) had moderate knowledge of LGBTIQ+ healthcare on average. The majority felt uninformed about LGBTIQ+ healthcare (70%) and wanted more education (87%). Although most were comfortable discussing sexual health (68%), only half felt comfortable discussing this topic with LGBTIQ patients (53%). Qualitative analyses of interviews (n=11) yielded four main themes, indicating (1) HCPs' knowledge and values, (2) patients' needs, (3) organisational barriers, such as limited resources, and (4) systemic values, often prioritising curative treatment over general wellbeing, impacted decisions to discuss sexual health with LGBTIQ+ patients. These findings suggest that existing barriers to communicating about sexual health increase the complexity of delivering individualised cancer care for LGBTIQ+ survivors. LGBTIQ+ health education and structural support within healthcare systems is needed to improve HCPs' capabilities to care for LGBTIQ+ patients' sexual healthcare needs.

This research was made possible through the support and contribution of my co-authors: Associate Professor Haryana Dhillon and Dr Alana Fisher.



Courtney Muir | Bachelor of Psychology (Honours) with the degree of Bachelor of Human Sciences, Macquarie University

Anxiety in later-life: an examination of family accommodation

Family accommodation refers to the ways in which loved ones take part in a person's anxiety, such as providing excessive reassurance or facilitating avoidance. Although these behaviours are typically intended to reduce the individual's distress, they unintentionally maintain and exacerbate anxiety by reducing exposure to feared stimuli. Despite evidence documenting the almost ubiquitous nature of accommodation in families of children and young adults with anxiety, and the association with greater anxiety severity and poorer treatment outcomes, there is a paucity of research in later-life. Older adults can experience a range of physical, social, and cognitive changes that may affect the experience and impact of accommodation. For example, differentiating appropriate assistance and caregiving from anxiety-related accommodation may be more complex for older adults with physical limitations or health problems. Increased levels of late-life anxiety, potentially exacerbated by accommodation, can lead to a reduction in quality of life, increased risk of suicide, and earlier onset of disability. This study aimed to examine how older adults experience family accommodation, and the relationship between accommodation and anxiety severity. To examine this, older adults and their loved ones completed measures on accommodation, anxiety, depression,

reassurance-seeking, health, and functional ability. The dyad also completed two behavioural tasks designed to elicit accommodation from supporters, which was qualitatively coded on criticism, reassurance, avoidance, and intrusiveness. This methodology allows for the examination of factors contributing to accommodation, including anxiety, and the understanding of the types of accommodation portrayed in older adults. The results for the questionnaire and behavioural tasks will be presented. With previous research in pediatric anxiety highlighting the importance of reducing family accommodation in treatment, this study has implications for understanding the mechanisms of late-life anxiety and providing an insight into the future of treatment for anxiety.

Australian National University

Whose truth? | 15th September 11am

Session ID: 15.11.4

Benita Lee | Bachelor of Arts, The University of Texas at Austin

(Middle-Skill) Jobs are Going Away…Now What? Challenges and Key Considerations for Sector-Based Workforce Training Programs

Economic disruptions driven by automation and globalization have adversely affected low-skilled workers and catapulted labor issues to the top of the political agenda. Programs to retrain displaced workers have emerged as a popular policy response to address the plight of these workers. The US Department of Labor promotes sector-based programs through which local employers and educational providers collaborate to retrain and place displaced workers in jobs in new fields. Despite the heightened political salience of the problem and growing support for retraining programs, little is known about their effectiveness.

This study examines the challenges these programs face and identifies key factors that administrators should consider in order to improve program outcomes. It relies on interview data collected from twelve sector-based program managers. The study finds three key challenges beyond the obvious one of insufficient programmatic funding. First, program participants face structural barriers that transcend program mandates. Barriers include inadequate access to transportation, childcare, and housing as well as obstacles inflicted by criminal records. Second, administrators struggle to balance competing interests of employers and job-seekers. And third, they struggle to place workers in new jobs that offer terms of employment that match or exceed those of their previous positions. The study explains how these factors undermine participant program-completion rates and subsequent worker retention. It also identifies ways in which administrators can meet the challenges they face—such as by advocating locally for reforms that address structural barriers—while acknowledging the constraints within which administrators operate.

Project was supervised and guided by Dr. Rhonda Evans at The University of Texas at Austin.

Mark Wadsworth | Bachelor of Philosophy, University of Canberra

EQUITY AS FAIRNESS

In Kakavas v Crown Casino (2013), Harry Kakavas was known by Crown Casino (Crown) as a 'classic pathological gambler' yet it allowed him to continue gambling at its Melbourne premises. Kakavas subsequently claimed under equity law that he was unconscionably exploited by Crown. Equity can set aside contracts if a party can show unconscionable exploitation by a stronger party. The High Court unanimously denied Kakavas relief to set aside his gambling transactions with Crown. Denial was based on understanding him as a capable intelligent person who chose not to control himself whilst gambling rather than a victimised addict. The dissertation argues that the denial should be superseded on the basis that the Court did not properly understand Kakavas' addiction. The dissertation offers three arguments founded on law and political theory. Firstly, 'Rawlsian Equity' (considering unconscionability using Rawls' Veil of Ignorance Test) is a suitable theory for use within law to provide the 'ideal' conscience in addressing Kakavas' claim that he was unconscionably exploited. Secondly, a reasonable person behind that Veil would consider the background circumstances and make use of well-established scientific data about problem gambling. That data shows that problem gamblers are addicts, lacking volition in some circumstances and thus impermissibly exploited by entities aware of that disability. Lastly, equity should provide relief to Kakavas on basis of the mind of a reasonable person behind the veil of ignorance who considers background circumstances and use of scientific data.

Madeleine McGregor | Bachelor of Laws (Honours), Bachelor of Economics, the Australian National University (ANU)

WHAT GOOD IS THE TRUTH? The role of fact-finding for international disputes in a post truth era: Syria and Myanmar as case studies

The recent rise of 'alternative facts', polarisation, and appeals to emotion over objective information has been coined the 'post-truth' era. This calls into question the utility of Commissions of Inquiry (CoI) and Fact-Finding Missions (FFMs), which engage a third party to determine questions of fact, with the aim of resolving international disputes. The impact of 'post-truth' on international dispute resolution has received no previous academic attention, with post-truth studies focused on domestic socio-political consequences. This research essay asks whether post-truth conditions have rendered CoIs and FFMs pointless. This is assessed by identifying trends in the use of CoIs and FFMs by United Nations organs, and reviewing literature and international responses to the CoI into Syria and FFM on Myanmar. The paper argues that the conditions of the 'post-truth' era create unique opportunities for resolving disputes by CoIs and FFMs. First, CoIs and FFMs can bypass political impasses and requirements of state consent to reduce international inaction in response to disputes. Second, fact-finding can unravel complexity in modern conflicts and provide a credible basis for further action by states or international organisations. Third, the versatility of CoIs and FFMs allows for adaption to changing dimensions of a conflict or evidentiary requirements of accountability bodies such as the International Criminal Court. The opportunities identified support an increased role for CoIs

and FFMs in the resolution of modern international disputes. These findings are significant to ensuring international dispute resolution adapts to best maintain international peace and security, and promote the rule of law.

Australian National University

Hope and Resilience | 15th September 12pm

Session ID: 15.12.1

Tina Marie Sheil | Bachelor of Anthropology, Western Sydney University

Living the Pandemic: people, community, and resilience in the upper Blue Mountains, NSW, 2020-2021.

This research project is a case study focusing on the community of the upper Blue Mountains, NSW, Australia. It explores the extent to which immobility, imposed as a government response to COVID-19, changed people's perceptions of their immediate social and geographic community. The upper Blue Mountains was chosen because it hosts a diversity of neighbourhood organisations, has few transitory peoples, and the residents have a strong sense of community, evidenced in the response to the bush fires of 2019-2020. The research was conducted via observations and interviews with residents and neighbourhood organizational staff during the summer of 2020/21. Desktop surveys of local media, Facebook and government websites were also conducted. What emerged strongly was 1) 'Gratitude' for local leadership and for the beauty and relative freedom of the local environment; 2) 'Preparedness' - interviewees felt that they had already been mobilized as a consequence of their collective response to previous bushfires; 3) 'Real Community' - there is a strong sense of the 'Mountains' as a separate and more 'authentic' community (than Sydney). Given the world is expected to face an ever-increasing array of man-made and environmental challenges, research in the area of community resilience is of vital important. The three themes explored; Gratitude, Preparedness and Community Connection, are all indicators of the upper Blue Mountains community's level of resilience. This case study can teach us more about what types of communities will be successful in combating the negative impacts of crisis, which consequently, will contribute to future crisis management strategies.

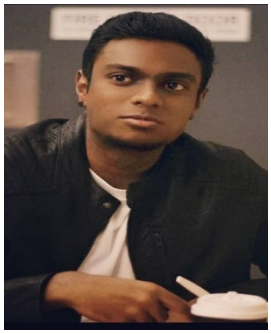
Research project was supervised by Profession Mary Hawkins and Dr Helena Onnudottir, School of Social Sciences, Western Sydney University

Toni Hassan | Bachelor of Visual Arts (Honours) - the Australian National University

Good grief: Conversation Pieces in the wake of Black Summer and Canberra's severe hailstorm

My Honours project in the ANU School of Art and Design taps into the emerging topic of environmental grief and storytelling; mourning and sharing as a starting point for transformative change and the possibilities of hope. Australia's Black Summer of 2019-20, which included encroaching bushfires, a devastating hail

storm and near unbreathable air in Canberra, heightened consciousness about climate change and the depleted biosphere. The smoke that enveloped the capital region had impacts on body and breath. I knew this as a person who has lifelong asthma. The ecological crisis moved me deeper into a lament which prompted questions about how I can engage narrative storytelling and visual art to process my grief and provide a conduit for other people who feel the same, and, at the same time, celebrate and showcase what might be spiritually sustaining? A key research question emerged: How can I make artwork that cathartically engages my grief and moves climate change from the abstract to the embodied? The research fed a social art practice project; a set of interviews with women called Conversation Pieces that focussed on the impacts of the Black Summer and the hailstorm on the body and on the breath. It led to a number of multimedia responses (using the materiality and language of paint with found canvas as well as video) that bear witness to the idea of stories as cathartic and protective. Among the eclectic works, in the end phase of the project, is the curation of an 'act of meaning', a multimodal, sensory and participatory event collaborating with musicians to create a space for shared climate grief (changes in an assumptive world) and to support existing and new relationships (with the self, planet and others).



GARY DEEBAN FERNANDEZ | Bachelor of Psychology (Honours), Macquarie University (MQU)

Effects of Brief Mindfulness and Self-compassion Meditations on Psychological Well-Being

Mindfulness and Self-compassion meditations are beneficial interventions in enhancing psychological wellbeing and mental health among clinical and non-clinical populations. Mindfulness and Self-compassion interventions, namely Mindfulness-Based Stress Therapy and Compassion-Focused Therapy, have been largely effective in alleviating psychological distress by attenuating anxiety, stress, depression and negative affect and cultivating positive affect. However, several studies accredit self-compassion in promoting psychological wellbeing rather than mindfulness. Yet, research exploring such propositions remains scarce. Furthermore, despite proliferations in meditation research, few studies have accounted for expectancy effects, rendering mechanisms underlying the positive effects associated with mindfulness and self-compassion interventions unclear. The current study examines the effects of brief mindfulness and self-compassion meditations on stress, anxiety, affect and depression amongst first-year and second-year psychology undergraduates. Further, it investigates whether participants' expectations enhance any benefits of the meditations. The current study utilises a randomised experimental single-factor between-subjects design with one independent variable (type of meditation) with three levels; mindfulness meditation, self-compassion meditation and a control. It is hypothesized that self-compassion meditation will be the most effective in mitigating stress, negative affect, depression and anxiety as well as promoting positive affect followed by mindfulness meditation and lastly the control condition (H1) and; treatment expectancy will play a moderating role wherein the positive effect of meditation condition on mean change scores in stress, negative affect,

depression and anxiety as well as the negative effect of meditation condition on mean change scores in positive affect will be larger for those higher on treatment expectancy (H2). On completion of data collection, a one-way ANOVA will be employed to detect the potential presence of a significant effect of type of meditation on measures of psychological wellbeing from pre to post treatment. Findings will clarify the role of self-compassion meditations in promoting psychological wellbeing as well as the influence of expectancy effects. Clarifying the underlying mechanisms underscoring meditations in improving wellbeing will inform clinical interventions used to bolster everyday mental health in clinical, organisational and home contexts, which is especially pertinent in the time of the novel coronavirus (COVID-19) pandemic.

I would like to acknowledge my esteemed supervisors A/Prof Naomi Sweller and Dr. Elizabeth Austin for their continuous support, guidance, and extensive feedback they have provided me throughout the preparation of this thesis.

Australian National University

Cancer and the Immune System | 15th September 12pm

Session ID: 15.12.2

Natalie Smith | Bachelor of Science/Bachelor of Advanced Studies, The University of Sydney (USyd)

Metabolic changes alter immune cell signalling to define immunotherapy outcomes in lung cancer.

Immunotherapies targeting the negative regulator of T cell activation, programmed-death protein-1 (PD1) have gained significant clinical interest in recent decades. These treatments have potential to revolutionise the standard of care for cancer patients due to their potent anti-tumour activity and limited toxicity profile, however generating a durable response remains a significant problem. Patients who fail to respond to anti-PD1 show immunosuppression of cellular populations critical for anti-cancer defence, namely T and natural killer (NK) cells. Investigation of the mechanisms underlying this immunosuppression could identify novel therapeutic interventions that could prime these patients to anti-PD1. Several lines of evidence point to the involvement of a crucial T and NK cell signalling component, CD3ζ, in this immune dysfunction. Increased activity of arginase, an immune regulating enzyme, is known to correlate with decreased T and NK cell expression of CD3ζ. Despite this, a link between increased arginase activity, decreased CD3ζ expression, and response to anti-PD1 is yet to be made. To address this, a high-throughput colorimetric microplate assay was designed, allowing accurate measurement of plasma arginase activity. Future work will involve the determination of arginase enzymatic activity in a cohort of lung cancer plasma samples. Matched immune cells from patients with high or low plasma arginase activity will then be chosen to perform single-cell cytometric analysis. This colorimetric assay will be used to find a relationship between arginase activity, downregulation of CD3ζ and clinical outcome, with potential to provide evidence for considering arginase inhibitors as a potential adjuvant therapy to anti-PD1.

Thank you to Dr Helen McGuire, whose guidance and support throughout my honours project has been invaluable.

Tamara Bock | Bachelor of Science and Bachelor of Advanced Studies (Advanced), the University of Sydney (USyd).

Understanding the role of CD300 molecules in COVID-19.

In the ongoing coronavirus disease pandemic (COVID-19), tools to detect molecules in the blood that predict disease severity are invaluable. CD300 molecules are bound to the surface of immune cells and regulate immune responses. CD300 molecules were reported to be detectable in blood samples of

COVID-19 patients. Within a small study cohort, the death or survival of COVID-19 intensive care patients was positively correlated with their levels of CD300 molecules. As cell surface molecules, a fast and widely available tool to detect their presence in soluble form in the blood did not exist. The mechanism by which they become detached from immune cells and the implication of this in immune responses is poorly described. We designed a tool that allows for rapid detection of soluble CD300 molecules in blood samples that can be used to determine their role in COVID-19. We hypothesise that in healthy individuals, soluble CD300 molecules will be at low levels in the blood but elevated in diseased states. Increases in CD300 molecules in the blood may be from immune stimulation. Upon stimulation, the level of CD300 molecules expressed on the surface of immune cells was shown to be decreased. We did not find that immune cells released CD300 molecules from their surface. Taken together, stimulated immune cells may be responsible for soluble CD300 molecules in the blood, but cell-cell interactions are likely required. This tool provides a framework to measure blood concentrations of immune molecules. Moving forward we aim to confirm the presence of CD300 molecules in the blood of COVID-19 patients and their association with intensive care outcomes.

I would like to thank my supervisors A/Prof Georgina Clark and Dr. Pablo Silveira, as well as the Dendritic cell research group for their support and contributions.

Luke Waldie | Bachelor of Science, the University of Queensland (UQ)

Distinct methylation profiles for lung cancer

Background: We investigated the potential for DNA methylation (reversible DNA modification) signatures to identify novel biomarkers for lung cancer, allowing more accurate diagnosis. Methylation gene inactivation of tumour suppressor genes underlies several human cancers, and hence novel biomarkers may assist in diagnosis.

Methods: Lung tissues were sampled from lung cancer tumours (LC) or normal (NL), and 27000 probes were sequenced for methylation status (HumanMethylation27 BeadChip array) and analysed with Biometric Research Branch (BRB) Array Tools. Paired sample (n=52, both NL and LC) comparison found 10457 differentially methylated genes (p>0.01). Prediction analysis was performed, finding the most predictive genes for diagnosis (n=158) (variation p >0.01, sig = p<1e-7). This was validated against thirteen external significant probe sets from literature (>4 matches) to create a 24 probe (14 gene) set. This 24-probe list was used to create a predictive algorithm for diagnosis based on accuracy, specificity, and sensitivity. This was internally validated against six unpaired 21 LC and NL sample (6 by 21; same NL used in all).

Findings: A final 24 probe set was created with predictive properties for determination LC/NL status of a lung tissue sample (88% accuracy), with internal validation performed on its predictive capacity as quantified by average sensitivity (0.873) and specificity (0.875).

Interpretation: This 24-probe set has predictive capacity of lung cancer status, allowing examination of methylation markers for cancer status. This allows examination of factors contributing to lung cancer pathology and aid in the diagnosis of cancer samples.

Funding: supported by NHMRC, TPCH Foundation

This presentation acknowledges the assistance of Casey M Wright PhD, Mitchell Stark BSc (Hons), Kylie Parsonson BSc (Hons), Santiyagu Savarimuthu PhD, Gerwin Heller, Sabine Zochbauer-Mueller, Nicholas K Hayward PhD, and Henry Marshall BM PhD, with special thanks to Ian A Yang MBBS PhD, Rayleen V Bowman MBBS PhD and Kwun M Fong MBBS PhD.

Australian National University

The Natural Environment | 15th September 12pm

Session ID: 15.12.3

Charmaine Howie | Bachelor of Arts, the University of Queensland (UQ)

Reconstructing environmental changes in the Kimberley

The Kimberley region, WA, contains some of the oldest evidence of human occupation in Australia, and some of the highest concentrations of rock art in the world. People have occupied this region for the past 50 000 years, and many of the Aboriginal populations who live there today continue to maintain meaningful connections to country. However, despite the region's cultural significance, there is a stark lack of reliable climate and environmental records. By examining past evidence of environmental changes in the region, we can better interpret the context in which the rock art was produced, especially during periods of severe climatological change, such as the Last Glacial Maximum (~18-21 000 years ago). Here, we present the initial key findings from marine sediment core U4183, collected from offshore the Kimberley. We provide a climate and environmental reconstruction for the past 20 000 years, based on terrestrial vegetation changes, as indicated by the amounts of different pollen species in the sediment. This will be accompanied by micro-charcoal concentrations, which are charcoal fragments that have been counted from the same sediment as the pollen, and reflect burning frequency and intensity on the adjacent landscape. These proxies combine to inform a detailed picture of changing landscapes over time, based on the preferred climate conditions of each species. Further constrained by oxygen isotope dating, which provides broader global changes in sea level and temperature, these proxies provide an excellent foundation on which to better contextualise changes in rock art styles and context.

I wish to acknowledge my supervisors, Professor Patrick Moss and Associate Professor Helen Bostock Lyman, who have provided invaluable guidance and support throughout my honours year.

Sabrina Morrison | Bachelor of Science (Honours), the University of Queensland

Verticillium Wilt: Using jellyfish genes and sea anemone proteins to understand a very nasty mould

Verticillium dahliae is a fungal pathogen that causes a devastating disease called Verticillium Wilt in upland cotton (Gossypium hirsutum). Recently, two novel, pathogenic V. dahliae strains, VCG 1A and VCG 2A, have been discovered in Australian regions of cotton production. The sudden emergence of these new strains, coupled with recent increases in field disease incidence, threaten

Australia's multi-billion-dollar cotton industry. We need a more comprehensive understanding of how these strains are transmitted between fields, and how they interact with other hosts commonly found in areas of cotton production. Specifically, this study investigates the potential for VCGs 1A and 2A to infect, and thereby be transmitted by cotton seed, as well as their capacity to colonise and multiply in weed species common to Australian cotton fields. To study infection patterns and pathogen localisation, VCG 1A and VCG 2A strains were transformed with the mCherry and Green Fluorescing proteins from Dicosoma spp. and Aequorea victoria, respectively. Upland cotton plants and various weed species were inoculated with the transformant strains, and transformant fluorescence was then visualised within plant hosts using confocal laser-scanning microscopy.

The VCG 2A isolate was recovered from asymptomatic weeds from the species' Sonchus oleraceus and Urochloa panicoides. This outcome suggests that V. dahliae VCG 2A has the capacity to colonise alternate hosts that are present in Australian cotton fields. Neither of the V. dahliae strains were detected in seeds from inoculated cotton plants, suggesting that cotton seed is an unlikely source of pathogen transmission. We expect that this study will provide a better understanding of V. dahliae dissemination and persistence in cotton fields, and thereby feed into management approaches in the Australian cotton industry.

I would like to acknowledge my supervisor, Professor Elizabeth Aitken, and my co-supervisor, Dr Donald Gardiner, for their continual support throughout my Honours program.

Eleanor (Nellie) Pease | Bachelor of Science (Honours), the University of Queensland

Reconstructing the marsupial tapir (Palorchestes parvus): an ecological study of a bizarre marsupial giant from prehistoric Queensland

Understanding how past ecosystems developed, functioned and evolved can provide crucial insights for understanding modern ecological communities, and predicting how these might respond to current and future environmental challenges. The Pliocene period (5.2-2.6 million years ago) is a particularly informative theoretical testing-ground for future models of climate change, as it represents the last time in Earth's history when temperatures and atmospheric carbon concentrations approached those predicted for 2100. However, in Australia, the usefulness of this analogy is hampered by a poor understanding of Pliocene ecosystems, largely due to limited data on the flora and fauna of this period. With this project, we aim to conduct the first detailed ecological study of Palorchestes parvus, a particularly bizarre and poorly-understood giant marsupial from Pliocene Queensland. We have employed a multiproxy approach, combining tooth-wear analysis with stable isotope geochemistry of fossil tooth enamel. While quantitative data is still undergoing collection (available by August 2021), preliminary observations suggest that Palorchestes was a specialised herbivorous leaf-browser that inhabited open-canopy forests. Linking this data with Palorchestes' large size and unusually robust body-form, we suggest that it may have acted as a keystone herbivore in its Pliocene

ecosystem, clearing vegetation and opening habitats around itself in a manner similar to modern elephants. This study will provide the most detailed and robust information to date on this bizarre and charismatic member of the Australian megafauna, and will also serve as an important first step towards understanding the ecosystems of this critical period in Australian prehistory.

Thanks to Gilbert Price for supervising this project, Larisa Desantis for microwear data collection & processing, and Kim Baublys for assistance with isotopic analysis.

Australian National University

Mental health and wellbeing | 15th September 12pm

Session ID: 15.12.4

Katie Clark | Graduate Diploma in Psychology, Murdoch University

Assessing Anticipatory Anxiety to Graded Painful Stimulus Exposure in Healthy Participants

This study used an experimental pain model to investigate whether graded exposure therapy inadvertently increases anticipatory anxiety in healthy participants. Graded exposure therapy uses classical fear conditioning models to encourage habituation by increasing the intensity of exposure to the feared stimulus in graded steps. However, the anticipation of painful or distressing stimuli might interfere with habituation by increasing the subjective perception of pain and triggering emotional responses. The pupil dilation response (PDR) is a measure of the human stress response which indicates sympathetic nervous system activation as well as cognitive and emotional arousal. Thus, it was expected that the PDR before painful stimulation would vary in proportion to the degree of anticipatory anxiety/distress. Participants immersed their hand in painfully cold water (the cold pressor test) for three intervals of 20 seconds, 40 seconds, and 60 seconds while the PDR was monitored. The ascending condition began at 20 seconds, increasing to 40 seconds, then to 60 seconds. In the descending condition this order was reversed. Three 60 second exposures were used in the control condition. It was hypothesized that the PDR and pain intensity ratings would be larger in the ascending than the descending condition, as expecting stimulus intensity to increase across trials would cause a larger stress response. Additionally, it was expected that anticipatory anxiety would be lower in the control condition than at maximum stimulus intensity in the ascending and descending conditions as stimulus exposure was held constant. It was also hypothesized that pain and PDR would decrease over the course of the three exposures in the control condition due to habituation. These hypotheses will be investigated in condition (ascending, descending, control) by trial (the three immersions) repeated measures ANOVAs. The findings may have clinical implications for the administration of graded exposure therapy to painful stimuli in chronic pain patients.

I would like to thank my supervisor Professor Peter Drummond for his patience and guidance, and those who helped make the data collection possible, Alex, Cait, Daisie, Emma, Jess, and Lachlan.

Yimeng Cheng | Bachelor of Psychology (Honours), the Australian National University (ANU)

Hikikomori (Long-Term Social Withdrawal) and Re-employment Seeking

Yimeng Cheng, Junwen Chen, Diana Cardenas, Motohiro Sakai

Long-term social withdrawal in young adults has become a major concern in Japanese society, a phenomenon known as 'hikikomori'. Withdrawn individuals are more anxious in workplace and refuse to attend work-related events, which leads to great loss in the labour market. Empirical evidence shows that job-searching self-efficacy (JSSE) plays a vital role in re-establish one's confidence in job-related events, as well as increasing one's effort and satisfaction in searching for jobs. This study aimed to investigate how people with hikikomori differ in employment-related psychological constructs, and the mediation role of JSSE in the relationship between hikikomori and employment anxiety, job-search satisfaction and efforts.

The study used secondary data collected in Japan with 81 participants with current and past hikikomori, matched with 100 participants without Hikikomori by age and gender. MANOVAs and Tukey's HSD demonstrated that the current hikikomori group had significantly lower job-searching satisfaction ($p = .043$) and JSSE ($p = .019$) than the control group. Regarding mediation effects, hikikomori had a negative significant indirect effect on job searching satisfaction and efforts. Furthermore, hikikomori had a positive significant indirect effect on employment anxiety through JSSE. Although the past-hikikomori group does not significantly differ from both groups, its scores were closer to the control group in all variables except for employment anxiety, demonstrating a certain level of recovery in their job-related wellbeing.

Future research should consider enhancing self-efficacy in Hikikomori individuals to encourage their re-engagement in employment activities.

I would like to thank Dr Junwen Chen, my primary supervisor for this research, for her thorough and patient guidance over the past year. I would also like to thank Dr Diana Cardenas for her critical comments and warm encouragement in accomplishing this project. Lastly, thanks to Dr Motohiro Sakai from Japan, whose collaboration made this study possible.

Australian National University

Gender and Sexuality I | 15th September 1pm

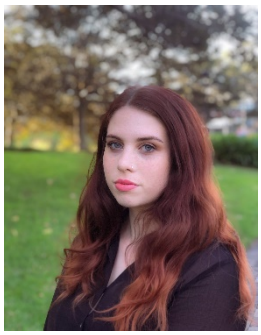
Session ID: 15.13.1

Freya Langley | Bachelor of Media (Honours), the University of Adelaide (UofA)

Fangirls to the Front: Camp Cope as an identity-shaping fan object

This research explores female (and gender non-binary) fans' identity shaping experiences with a feminist fan object. Using Australian indie-rock trio Camp Cope as a case study, this project is an in-depth exploration of how non-male fans, or 'fangirls'[1] form their ideas and identity through engaging with a female fan object. Historically, literature and mainstream conceptions of fangirls have been critically marginalising. While there has been significant work that challenges this, literature on female objects of fandom and their non-male fans is lacking. Using a combination of social constructivist theories, guided by principles of feminist standpoint theory, this study explores the ways fangirls' use relational and experiential interaction with a fan object to forge and activate identities in a smaller field of cultural production. In semi-structured interviews, three female and one non-binary fangirls detailed their experiential and emotional connections to the band. The findings highlight how Camp Cope has helped them in affirming and empowering individual and collective feminist identities, defining their morals, values and goals through social learning and feminist consciousness raising, and healing from abuse and assault. By foregrounding fangirls' voices in the research, this study challenges mainstream conceptions of fangirls as silly or hysterical and demonstrates the real and lasting impact of Camp Cope on their identities. This study brings fangirls' voices to the front of broader discussions of representation and accountability within the Australian music industry as it reckons with its #MeToo moment.

[1] I use "fangirls" throughout this study to describe a fan who is marginalised for both their gender identity and fandom, rather than as a 'fan who is a girl'.



Isabelle Yates | Bachelor of Arts (Honours)/Bachelor of Laws (Honours), the Australian National University (ANU)

Citizens on the margins: a socio-legal history of relations between the gay community and state institutions in Sydney, 1980-1997

The history of police antagonism and repressive practices towards the Sydney gay community has become notorious. Recent documentaries, public inquiries and police reinvestigations have promoted an accompanying story of how police-gay relations developed, conveying an impression of steady, linear improvements in this relationship since the dark chapter of criminalisation. I challenge the assumptions of this 'progress narrative', arguing that it obscures the multiplicity of relationships between state institutions and the gay community in late twentieth century Sydney. Although the legal and social status of the gay community undoubtedly advanced over the 80s and 90s, this progress was neither steady nor secure. My research reveals that marginalisation remained the rule rather than the exception during this period. By incorporating insights from socio-legal theory, criminology and social movement theory, I offer a novel perspective on this topic. Applying this approach, I analyse primary materials from gay activists and community members, police, and popular media, many of which have evaded prior academic scrutiny. These sources demonstrate how positive advances in gay rights existed simultaneously with both continuing and fresh practices of social exclusion and marginalisation. Through this process, I formulate a holistic narrative of police-gay relations in 1980s and 90s Sydney, showing how inclusive and repressive practices coexisted, renewed and reemerged. This alternate story prompts us, as historians, to reflect on how we understand 'progress', and whether the teleological appeal of forward movement can blind us to shifts in all other directions.

I acknowledge with gratitude the invaluable guidance and mentorship offered to me by my thesis supervisor, Professor Carolyn Strange, as well as Ms Sue Thompson generously giving her time to be interviewed for my research, and Annalise Humphris for kindly sharing her insights on the topic area.

Australian National University

Reviewing the Literature on Cancer | 15th September 1pm

Session ID: 15.13.2

Amna Rafiq | Doctor of Pharmacy, Institute of Pharmaceutical Sciences, University of Veterinary & Animal Sciences.

Prevalence and etiology of breast cancer in Asia: a systematic review

Background: Breast cancer is the most prevalent disease, with only 1% prevalence in men. This review aimed to explore the prevalence, incidence, and mortality rate of breast cancer and identify the risk factors of breast cancer in Asia.

Methods: A search was carried out from PubMed, Science direct, PLOS ONE, and Biomed Central with data entries from 1990 to April 2021. Search terms included breast cancer, epidemiology, Asia, etiology, risk factors, and a combination of these terms. Full text, English, observational (case-control, cohort, and cross-sectional studies) that referred to various etiological risk factors were included in the study. The quality of selected studies was assessed according to New Castle Ottawa Scale.

Results: Overall, 56 articles were included which met the inclusion criteria. 40 studies met the good quality, 15 met the average quality, and only 1 study met the poor quality requirements of the New Castle Ottawa scale. Based on the published studies, the increased risk factors have led to an upward trend in the incidence of breast cancer in Asia. This study show that the incidence rate is higher in developed countries, and the mortality rate is more in under-developed countries. The findings of this study show that obesity, low parity, smoking, family history, and BRCA1 mutations are significant risk factors of breast cancer.

Conclusion: This review provides significant evidence about breast cancer in Asia. Considering the increasing burden of breast cancer in Asia, preventive measures, early detection, and control of risk factors seem significant.

For the completion of this research project, I am highly grateful to my supervisors (Dr. Tahir Mehmood & Dr. Allah Bakhsh) and my co-authors (Amna Abdul Qayyum, Fiza Ayub, Quratulain, Maria & Amara Shabir).

Kayla Jaye | Master of Research, the Western Sydney University (WSU)

A systematic literature review on the link between gut microbiota and the most prevalent cancer types

Gut microbiota plays a vital role not only in the maintenance of health, but also in the onset, treatment, and prognosis of cancer. The link between gut microbiota and cancer is a rapidly evolving field of oncology research. However, comprehensive reviews on the link between gut microbiota and the five most prevalent cancer types, colon, lung, breast, prostate, and stomach cancers, are limited. In this review, we draw a comprehensive summary and assessment of the recent research performed to elucidate the direct and indirect role of gut microbiota in five prevalent cancers. A total of 9401 articles were screened from different scientific databases, with 137 relevant articles included, which were further analysed based on different aspects of our systematic literature review. In the five common cancers, the immunomodulatory and anti-tumoural effects of gut microbiota was observed. Gut microbiota was reported to have clinical implications in these cancers in addition to regulating the efficacy of chemotherapy and natural anticancer agents. Notably, Bifidobacterium spp. and Akkermansia muciniphila were correlated with favourable anticancer immune responses in both animal models and humans. Additionally, Lactobacillus spp. was found to enhance the efficacy of standard chemotherapy against colon, breast, lung, and stomach cancers. In contrast, Escherichia coli, Helicobacter pylori, Clostridium leptum, and Clostridium coccoides were found to have pro-tumoural effects. This review will directly inform future in vitro, in vivo, and clinical studies to further investigate the complex role of gut microbiota in different cancer types. Findings from these studies will define gut microbiota-focused preventative and therapeutic interventions for cancer.

I would like to acknowledge Professor Chun Guang Li and Dr Deep Jyoti Bhuyan, from the NICM Health Research Institute, Western Sydney University.

Pranujan Pathmendra | Bachelor of Science/Bachelor of Advanced Studies (Including Dalyell Scholars), The University of Sydney (USYD)

Wrongly identified reagents in original research papers from high impact factor cancer research journals.

With exponentially increasing numbers of research publications, studies that inform the reliability of published research are important to maintain high standards of research integrity and public trust in science. Nucleotide sequence reagents can provide a measure of biomedical research reliability, as these reagents are widely used in genetics assays and their identities can be reliably fact-checked. Previous studies have focused on fact-checking nucleotide sequence reagents published in cancer and genetics journals with impact factors of 2-3, where unreliable research findings could be viewed to have limited influence on future research. We are now fact-checking all nucleotide sequences in original articles published in 2014, 2016, 2018 and 2020 in a cancer research journal with a 2018 impact factor greater than 10. In 2018, 72/110 original articles described nucleotide sequences. Fact-checking the identities of

these reagents by querying sequence databases with Blastn and BLAT algorithms found that 6.0% (104/1,716) of these reagents were wrongly identified. Most incorrect sequences were claimed targeting reagents that were verified to be non-targeting in human (46%, 48/104), or to target different human genes from those claimed by the authors (40%, 42/104). The 36 papers with wrongly identified reagents described between 1-14 incorrect sequences/paper. These results predict that unreliable research papers could be unexpectedly frequent in high-impact cancer journals. In summary, high-impact cancer research papers with nucleotide sequence identity errors could pose a serious problem for future research, potentially leading to research waste through the pursuit of irreproducible findings, and through the reuse of wrongly identified reagents.

I would like to thank Prof. Jennifer Byrne and Mr Yasunori Park for their supervision, guidance and assistance with this project.

Australian National University

Natural Sciences: Visualised | 15th September 1pm

Session ID: 15.13.3

Amy Lu | Bachelor of Science (Advanced), the University of Adelaide

The Secret Life of Poo: A Study of Kangaroo Island Echidna Health After the 2019-20 Bushfires

In 2019 and 2020, Kangaroo Island experienced the largest bushfires in its history - putting the iconic and endangered local echidna subspecies at risk and in need of a bushfire recovery plan. Although echidnas are generally well adapted to bushfires, the severity of the 2019-20 event on the already threatened population left unknown consequences for this iconic Australian species. Previous studies have shown that gut bacteria have a strong influence on the health and fitness of animals. This study specifically looks to address the impact of the bushfires on the health and wellbeing of echidnas. To do this, echidna scats (faeces) were collected before and after the fires by researchers and citizen scientists through the project EchidnaCSI. Scats underwent DNA extraction and bacterial DNA was targeted, sequenced and identified. The results reveal a dramatic shift in bacterial communities seen in scats after the fires in comparison to before the fires. The change in bacterial communities is likely related to the destruction of echidna habitat and food sources as a result of the fire, where the altered gut environment may impact on echidna health through loss of beneficial bacteria. This is the first study to assess bushfire impacts on the gut microbiome for any mammal species. The results provide preliminary research to determine the impact of bushfires on echidna health. Future work will focus on the long-term impacts of gut microbiome changes in echidnas as bushfire recovery continues, in order to aid in conservation efforts for the Kangaroo Island echidna.

I would like to thank Professor Frank Grützner and Dr. Tahlia Perry for their constant guidance, support, and feedback throughout this project, as well as Dr. Peggy Rismiller for her inspiring efforts on Kangaroo Island and to EchidnaCSI.

Te Wai Pounamu Telena Hona | Bachelor of Biomedical Science (Honours), the University of Queensland (UQ)

Infra-Cranial Radiographic Comparison for Human Identification: The Influence of Radiographic Image Quality and Superimposition

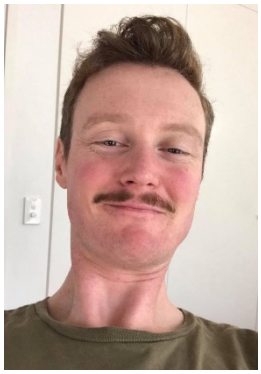
Radiographic comparisons involve visual assessment of skeletal morphology between antemortem (AM) and postmortem (PM) radiographs to determine if they originated from the same individual. While many studies have explored the utility of different skeletal features, few have systematically investigated the influence of factors determining bone visibility on these radiographs. Since the correct identification of unknown remains is paramount, investigations into such factors like image quality and hard tissue-shielding (e.g., superimposed bones) are important for the continued use of radiographic comparison. In this study, thirty-six identification arrays (using clavicles or vertebra) were constructed. Each array contained five radiographs: one X-ray of a single dry-bone (PM skeletal image) and four simulated AM radiographs (radiographs taken pre-skeletization e.g., tissue-encased). One AM radiograph in each array represented the correct match to the PM radiograph (=25% rate of randomly selecting the correct match). Radiographs were digitally manipulated, so that four varieties of quality (Gaussian blur = 12–0pr across 24 arrays), and four varieties of hard tissue-shielding (opacity of 40–0% across 12 arrays) existed. Arrays were evaluated for their correct PM/AM pair, by 8 anthropologists competency certified in chest radiograph comparison (CXR), 28 current American Board of Forensic Anthropology diplomates and 30 novices. Analysts' correct classification rates (CCRs) substantially improved with higher quality images (55% CCR at >10pr blur versus 89% for <10pr). On average, tissue-shielding increased CCRs by +10% for each -10% reduction in tissue-shielding opacity. To maximise CCRs in forensic casework, high quality radiographs should be preferentially sourced; body regions with decreased tissue-shielding should be awarded higher priority; and analysts should undergo competency training prior to conducting radiographic comparisons.

I would like to acknowledge the contributions of my Honours supervisor Associate Professor Carl Stephan.

Australian National University

Neurological Insights | 15th September 1pm

Session ID: 15.13.4



Callum Ormonde | Doctor of Medicine, University of Wollongong (UOW)

Perioperative clinical practices in Postoperative Delirium in Older People

Introduction: Postoperative delirium (POD) is a major complication of surgery in older people. Perioperative nurses play an integral role in the detection and management of POD in the post-anaesthesia care unit (PACU). Differences in POD presentation in patients presents challenges in diagnosis and management for nurses. Moreover, misdiagnosis and mismanagement of POD may lead to poorer clinical outcomes for patients.

Aims and Methods: This study aimed to assess the knowledge and clinical practice of Australian nurses delivering delirium care in the PACU. An online survey of 336 perioperative nurses assessed confidence, competence in delirium care against their level of delirium education. Respondents were categorised by the level of delirium care education they had received; ranging from their undergraduate training, post-graduate training, as part of their continued professional development or never received any delirium training.

Results: Results showed that with increased delirium care education, respondents were significantly more confident in detecting hyperactive delirium ($X2 = 17.634$, $p = 0.024$). There was a significant relationship between respondents' level of delirium care education and their perceived competence in detecting and managing hyperactive delirium ($X2 = 12.727$, $p = 0.048$ and $X2 = 14.791$, $p = 0.022$ respectively). However, there was no significant difference in the relationship between delirium education and respondents' confidence and perceived competence in detecting and managing hypoactive delirium. Data were analysed using IBM SPSS Statistics. Frequencies and descriptive statistics of respondent characteristics were performed. Normality of continuous variables was assessed by Shapiro-Wilk tests. Parametric data was assessed via a one-way ANOVA. For non-parametric data, Kruskal Wallis-H tests were used.

Conclusion: Nurses' practice of delirium care is multifactorial however a gap in knowledge exists. Targeted education sessions should combine practical multilevel strategies that are guided by evidence-based practices to ensure best outcomes for patients and professionals.

Ezinne O Igwe (PhD)1,3, Jessica Nealon (PhD)2,3 Victoria Traynor (PhD)1,3

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2 School of Medicine, Faculty of Science, Medicine and Health, U

Max Kirkby | Bachelor of Philosophy (Science) (Honours), the Australian National University (ANU).

The effect of voluntary exercise on light-induced retinal degeneration

Retinal degeneration is a leading cause of morbidity in the Western world. For many types of retinal degenerative disease, including age-related macular degeneration (AMD), many of the molecular mechanisms leading to vision loss remain poorly characterised and therapeutic options limited. Recent studies in comparable neurodegenerative diseases within the central nervous system, including Parkinson's and Alzheimer's, have demonstrated that physical exercise may mediate neuroprotection via inflammatory and neurotrophin signalling pathways. In this study, we explored the effect of voluntary exercise on mice subjected to photo-oxidative induced retinal degeneration, an animal model of AMD. Using electroretinography and optical coherence tomography we identify that mice with access to a voluntary treadmill for 4 weeks display preserved retinal function. Additionally, using terminal deoxynucleotidyl transferase dUTP nick-end labelling (TUNEL) and immunohistochemistry, we demonstrate that these same mice exhibit reduced inflammatory markers and improved photoreceptor survival. Further qPCR analysis of a similar mouse model of light-induced retinal degeneration reveals that these improvements may be mediated by non-coding microRNA able to regulate gene expression. Together, this study suggests that voluntary exercise is protective against retinal degenerations. Therapeutic usage of similar forms of physical activity may offer an exciting avenue for the non-invasive, inexpensive prevention of retinal degeneration. However, further studies are required to elucidate the molecular mechanism by which exercise acts to protect retinal function.

The author thanks Dr. Joshua Chu-Tan and Associate Professor Riccardo Natoli for their assistance with this work.

Vrinda Jain | Doctor of Medicine, Western Sydney University (WSU)

Development of the dopaminergic system in the mammalian retina

The neuromodulator dopamine (DA) plays an important role in body processes such as movement, memory, and motivation. In the retina specifically, it is thought to play a significant role in light adaptation, development, and modulation of neuronal circuitry. Dopaminergic amacrine cells, found in the mammalian retina, release dopamine in response to light, however, the pattern of activation of these cells has never been evaluated over the course of neural development. Through the implementation of immunohistochemistry techniques in mice retinae across various postnatal ages from newborn to adult, this study examined the distribution, activity, and development, of dopaminergic amacrine cells in the mammalian retina to gain a better physiological understanding of the development of the dopaminergic system. Antibodies against tyrosine hydroxylase (TH), an enzyme essential for dopamine production, as well as c-Fos, a marker of neuronal depolarisation were applied to fixed postnatal retinal

tissue at the following ages: p3, p4, p6, p8, p14, p19, Adult. Dopaminergic amacrine cells were found to be uniformly distributed across the retina with density decreasing following eye-opening (~P12) until weaning. DA cell light activation (c-fos expression in TH+ cells) was only observed following eye-opening suggesting classical photoreceptors (rods or cones) drive this activation. Furthermore, this data suggests that light-induced dopamine release in the retina is a process important for image-forming vision rather than development of the retina/eye. Overall, these results provide insight into the development of the dopaminergic system and the mechanisms underlying its release.

I would like to thank my supervisor Dr Morven Cameron for her exceptional support, guidance, and helping make this research project a reality.

I would also like to thank Sushmitha Raja, and Dr Sindy Kueh for all of their support throughout the project.

Australian National University

Cognition and psychology | 15th September 1pm

Session ID: 15.13.5

Dot Pagram | Bachelor of Psychology (Honours), the Australian National University (ANU)

Measuring cognitive dysfunction in ME/CFS and 'Long-Covid': highly sensitive neuropsychological tasks

Myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) comprises debilitating fatigue, post-exertional malaise (crashes after physical or cognitive exertion), unrefreshing sleep, neurocognitive problems and/or orthostatic intolerance. ME/CFS is commonly triggered by infectious illnesses. Covid-19 is expected to substantially increase worldwide prevalence, with some 'Long-Covid' sufferers already presenting ME/CFS-like symptoms. Determining levels of ME/CFS cognitive dysfunction typically relies on patient self-report, however, performance on neuropsychological tasks exists as an alternative assessment method. This review critically evaluates ME/CFS literature (Jan 1988-Apr 2021) to systematically determine sensitive tasks measuring cognitive dysfunction in patients. Relevant databases were selected and search terms including 'chronic fatigue syndrome' and 'cognition', applied. Inclusion criteria were: (a) ME/CFS diagnosed by CDC criteria (past or current), Canadian Consensus Criteria or International Consensus Criteria, (b) healthy control group included, (c) adult participants (18+), (d) utilised objective tests, (e) cognitive assessment conducted prior to treatment. This review included 52 studies and 81 different neuropsychological tasks. Results indicated cognitive impairment in ME/CFS is widespread across functional domains, and identifies many previous studies only tested the mildest-illness patients (not housebound/bedbound) on their 'good' days (ignoring post-exertional malaise crashes). The Stroop task (naming word 'red' written in green ink) which involves attention, executive function, and speeded processing, was identified as the most sensitive for detecting cognitive deficits. This review suggests that administering the Stroop task to ME/CFS patients may prove beneficial for patient care by validating objective functional impairments for support services applications, legitimising clinical ME/CFS treatment trials, and assisting clinician/patient tracking and management of symptoms.

I acknowledge the exceptional guidance and support from Professor Elinor McKone who has transformed my undergraduate research dreams into a reality.

Georgia Acutt | Bachelor of Psychology (Honours), University of the Sunshine Coast (USC)

"And 5, 6, 7, 8": Comparing the Differences in Psychological Outcomes Between Pole and Other Recreational Dancers

Recreational pole dancing or pole fitness—affectionately known as "pole"—has burgeoned in popularity despite being often stigmatised, incorrectly linked to the sex industry. This study was the first to explore whether polers experience higher positive psychological outcomes than other dancers, whether pole is a form of serious leisure—an activity that is more than a hobby, less than an occupation but creates a unique social identity—as well as whether pole engagement is explained by self-determination theory. A community sample of recreational dancers (N = 282) aged 18 to 71 years (95% female) voluntarily completed an anonymous online survey regarding their dance experiences, self-esteem, subjective wellbeing, and body image. Of the sample, 64% were pole dancers and 23% were dancers (i.e., ballet, jazz, contemporary, hip hop, ballroom, folk dance, and Irish dance). Unexpectedly, 12% of participants stated they identified as dancers because they engaged in Zumba or burlesque recreationally; these participants comprised a unique grouping others. Regarding self-determination theory, results revealed pole was no better at meeting basic psychological needs than other recreational dance forms. Although all participants reported high scores on all measures where high scores were beneficial, and all participants perceived their dance engagement as serious leisure, the only statistically significant differences between groups were others reported higher self-esteem, lower negative affect, and higher overall perceived benefits of dance than polers and dancers. Overall, consistent with positive psychology perspectives, this study highlights the importance that engagement in any exercise perceived enjoyable tends to produce substantial positive outcomes.

I would like to acknowledge Dr. Rachael Sharman and Jessica Blower for their supervision over my research project.

Nan Chen | Bachelor of Science (Psychology)(Honours), the Australian National University (ANU)

Investigating the effects of training using caricatured faces on other race-face recognition

Research aim: The present study seeks to investigate whether the training program using caricatured faces improves people's ability in recognizing other-race faces. This is the first study to examine the benefit of caricatured images in reducing ORE.

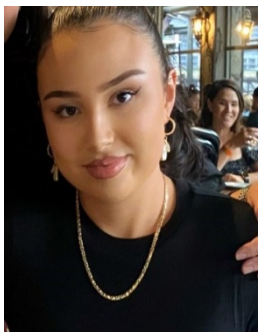
Background: The other-race effect (ORE) refers to the phenomenon that people have difficulty in recognising and identifying people with other-race faces. The ORE can lead to negative outcomes including false criminal arrests and misidentifications by passport officers. Therefore, it is essential for us to investigate how to reduce the ORE.

Caricaturing exaggerates distinctive features of natural faces compared with average faces.It can improve the facial recognition based on theoretical and empirical evidence. Previous researchers mainly used natural images in their intensive training to reduce ORE, yet few of them are effective. Therefore, it is really important to test whether training with caricatured faces can reduce ORE.

Methods: The whole study was laid out as four parts: pre-screening, pre-test, training and post-test. After the pre-screening, twenty Asian university students who were poor at recognising White faces were eligible for the following experiment. The pre-test and post-test both included a perceptual discrimination task and a similarity rating task. Between the pre- and post-test, participants completed five sessions of face-name learning tasks (i.e. ORE training). They needed to learn the names of caricatured White faces through feedback. These caricatured faces used in the training sessions were from different people in the pre- and post-test.

Results: The comparisons of pre- and post- test performance show that participants performed significantly better in both tasks. A within-subject t-test of the accuracy of perceptual discrimination tasks was significant [t(18)= -2.667, p=0.016]. A repeated measures ANOVA of similarity rating tasks showed the significant main effect of both the race of faces (Asian, White) [F (1,19) = 6.966, p=0.016] and the test time (pre-test, post-test) [F (1,19) = 16.427, p=0.001]. The significant interaction effect showed that White faces were rated as much more different than Asian faces after the training [F (1,19) = 4.628, p=0.045].

Conclusion: Results suggest that training with caricatured faces can reduce ORE. Importantly, both tasks in the pre- and post-test used completely novel identities from training. This shows the transfer of the training effect. By improving other-race facial recognition, participants become more confident in interacting with people from other races in the real world, which in turn improves their mental health and well-beings.



Olivia Rose Maurice | Bachelor of Psychology, Macquarie University

'Straya, We Have a Problem: Evaluating Neuropsychological Assessment Approaches for Diverse Populations

Neuropsychological assessment (NA) denotes the process of evaluating brain-behaviour relationships and subsequent intervention (Brickman et al., 2006). NA has predominantly normed Western, educated, industrialised, rich and democratic (WEIRD) populations' functioning, thus omitting culturally and linguistically diverse (CALD) backgrounds from test development (Casaletto et al., 2015; Sayegh, 2015). This has produced bias, misdiagnosis, and poor representativeness (van de Vijver, 1997). Current Australian demographic shifts have heightened demand for inclusive neuropsychological services providing accurate diagnoses, identifying treatment needs and tracking clients' progress (Berry et al., 2019). The current essay aims to evaluate approaches adopted by clinicians for diverse populations, and the factors influencing their validity.

The review examined 35 peer-reviewed publications, and found that tailored NA

(including the International Shopping List Test) consistently demonstrated robust test-retest reliability, and construct and cross-cultural validity for diverse samples (Lim et al., 2012). This owes to translatability, universally relevant stimuli, and reduced verbal items to mitigate translation difficulties. CALD-adjusted norms for batteries including the Wechsler Memory Scale also demonstrated robust criterion, factorial, convergent, discriminant, and concurrent validity (Walker et al., 2010). This owes to rectifying prevalent limitations of WEIRD-normed NA, including non-representative norms, item bias, intracultural variance, poor accessibility and limited CALD training (Carstairs et al., 2006; Cory, 2020; Lim et al., 2012).

NA approaches can thus be enhanced by increasing CALD-inclusive administration, test design, and clinical training (academically and professionally), thus facilitating increased cross-cultural fluency for Indigenous, multiracial, migrant and acculturated groups (Berry et al., 2018; Brickman et al., 2006). Through such action, CALD NA can improve diagnostic accuracy and intervention efficacy.

Australian National University

The Power of Language and Discourse | 15th September 3pm

Session ID: 15.15.1

Moeko Reilly | Bachelor of Arts (Hons), the University of Queensland (UQ)

Japanese heritage language learners: Considering family language policy and home literacy practices

This study investigates the undertaking of language and literacy activities by families in Brisbane who have a heritage link to Japan. By surveying Japanese mothers, this research aims to reveal the most common practices and determine in what way mothers' beliefs and frequency of activity completion are related, when developing and maintaining Japanese as a heritage language for their children. While previous studies have considered family language policy and home literacy practices separately, there is yet to be extensive research that brings the two concepts together and focuses on Japanese heritage language learners in Australia. I developed an online questionnaire by referring to studies such as Sénéchal and LeFevre's Home Literacy Model and newer, alternative conceptualisations of the framework. The questionnaire asked participants about demographical information, their child's Japanese writing, vocabulary and reading habits, as well as participant beliefs surrounding Japanese language education. The findings, aligned with those from previous studies, revealed that there was not a considerable relationship between mothers' beliefs and frequency of practices. Instead, select demographical data such as participant age, education and employment had a stronger link to home literacy practices. In light of this, I argue that the quality or undertaking a wide variety of practices to acquire varied skills is more important than frequency of activity completion. The findings also suggested that language use between family members was connected to the frequency of home literacy practices. The most common practice being undertaken was "Correcting pronunciation", which targets oral language and teaching skills.

Thank you to my supervisor, Dr. Sanako Mitsugi.

Keira Mullan | Bachelor of Arts/Bachelor of Languages, the Australian National University (ANU)

Documenting the Kufa Language: the number and gender of nouns

Of the estimated 6000 languages that are spoken in the world today, at least 43% are endangered and at risk of disappearing within the next century (Moseley, 2010). Kufa is a vulnerable language (according to criteria outlined in 'UNESCO Atlas of the World's Languages in Danger' [2010]) from the Nuba Mountains in Sudan and is part of the Kadugli-Krongo group. The only substantial study done previously on a language of this group is Reh's Die

Krongo-Sprache (1983). So by being the first description of the noun system of Kufa, this research provides vital information needed to understand the broader affiliations and history of the Kadugli-Krongo group, as well as adding to the typology of the relatively rare number system Kufa displays. More importantly though, this study, as part of a larger documentary project to produce a grammar, dictionary, and collection of texts, preserves precious knowledge about the Nuba Mountains' culture and landscape, knowledge that is currently under threat from continued conflict in the area. This research uses data gathered through linguistic elicitation with a diasporic Kufa speaker located in Australia, and analysed at the level of morphology, as in the following:

(1) nari kalu

na-ri ka-lu

plural-river masculine.plural.subject-be.good

the rivers are good

The research describes Kufa nouns as displaying four genders, or classes, and describes both singular and plural number inflections.

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I would like to thank Haroun Kafi, Abdallah Mongash, and the Kufa people for sharing their language, and my LING3012/LING6009 classmates and lecturers for collaboration, feedback and guidance.

Brittany Smith | Honours Degree of Bachelor of Psychological Science, the University of Adelaide.

Eco-Anxiety: A Discourse Analysis of Media Representations of the School Strike for Climate Movement

Introduction: Eco-anxiety has been described as worry (heightened concern), which may encompass various types and degrees of distress (physical and/or psychological) about the present environment/climatic crisis, and the future state of the health of ecosystems.

Aims: The main objective of the study was to analyse how young climate change protesters, eco-anxiety and climate change, were constructed by the Australian newspaper press in relation to the climate crisis. At present, no discursive research has explored how eco-anxiety, climate change and young climate change protesters are represented in the Australian media by newspaper

publications. The significance of this research is that young people have been shown to be substantially psychologically impacted upon by climate change, and no discursive research has explored this in relation to eco-anxiety, in Australian newspaper publications. Thus, an understanding of these aspects of these phenomena will advance psychological knowledge of this subject. Further, the media play a vital role in documenting this impact, positively or negatively, and shaping public opinion. Hence, the present research is important in understanding how the mainstream media construct the youth climate change protesters, in respect to eco-anxiety and climate change by newspaper print.

Methodology: This study used Wetherell's approach to critical discourse analysis to identify rhetorical strategies, repertoires and modes of argumentation. A search was conducted from NewsBank and from eight main Australian newspapers websites focusing on articles published during 2018-2019. A subsample of nine extracts from 100 opinion/commentary newspaper articles were utilised to illustrate the main recurring themes found in the data set.

Results: The findings suggest that articles published by News Corp (e.g. The Australian) gave negative portrayals of the School Strike for Climate movement, while Nine Entertainment Co. (e.g. Sydney Morning Herald) generally framed the school strikes positively, including all regional newspapers, irrespective of the media outlet.

Conclusions: The present study had shown that conservative leaning newspaper publications presented the School Strike for Climate movement utilising negative language, whilst progressive newspaper publications portrayed the young climate change protesters in a positive light, highlighting the significance of their climatic concerns, and the importance of the phenomenon of eco-anxiety. The significance of this research is that there is no other discursive research examining young people's psychological experience with climate change in relation to eco-anxiety, as represented in newspaper discussions, and thus this study has filled a gap in existing knowledge. Hence, the ongoing existential threat of climate change will ensure that eco-anxiety is an ongoing problem, so further research will need to investigate its longer-term significance, as well as public and media representations of the school strikers.

I would like to acknowledge my supervisor, Professor Martha Augoustinos from the School of Psychology, at the University of Adelaide, for her contribution/collaboration in designing this research project.

Australian National University

Education Matters | 15th September 3pm

Session ID: 15.15.2

Avni Bharadwaj | Bachelor of Psychology (Honours) with a Bachelor of Laws, Macquarie University

A Hands-On Approach to Learning: Gesture Production During Encoding and its Effect on Narrative Recall

Research has shown that gesture production supports learning across a number of tasks. It is unclear, however, whether gesture production during encoding can support narrative recall, who gesture production benefits most, and whether certain types of gestures are more beneficial than others. This study therefore investigated the effect of gesture production during encoding of a narrative on subsequent narrative recall, and whether individuals' levels of verbal and non-verbal memory moderated this effect. This study further investigated whether certain types of gestures were more beneficial than others during encoding. Ninety participants, ranging from 17 years to 32 years (Mage = 20.43), read aloud a narrative whilst under instruction to produce gestures, under no specific instruction to produce gestures, or were required to keep their hands behind their back to prevent them from gesturing. While gesture production during encoding benefitted narrative recall (as measured through specific questions), verbal memory moderated the effect, such that gesture production was more beneficial for individuals with higher than lower verbal memory. However, non-verbal memory did not moderate the effect of gesture production during encoding on narrative recall. Furthermore, producing representational gestures during encoding benefitted recall of points in the narrative at which those gestures were produced, whilst beat gestures had no effect. Findings have implications for understanding the mechanisms underlying the links between gesture and learning, as well as practical implications in instructional settings.

I would like to acknowledge my co-authors Associate Professor Naomi Sweller, and Dr Nicole Dargue for their constant guidance, support and encouragement as my amazing supervisors.

Suzannah Keene | Bachelor of Engineering Honours (Chemical and Biomolecular Engineering) and Bachelor of Music Studies (Cello Performance), The University of Sydney

Improving the Learning Process Through Understanding Fundamentals in Thermodynamics and Reaction Kinetics

This paper examines learning as a process and applies chemical principles, namely laws in thermodynamics and reaction kinetics, to create a novel, interdisciplinary paradigm to improve the effectiveness of learning. The

conditions that are conducive to effective learning are not always understood by learners or facilitated by teachers. When either a teacher attempts to improve the learning environment or a student attempts to improve their learning, the pathway to achieve this change can be obfuscated by bias or inexperience, with no formal mechanisms to adjust the exploration process. This paper overlays the pattern of the performance equation of a reactor, i.e. that output is a function of input, contacting between particles, and kinetics, onto the learning process. The mind of a learner, the site of a potential learning process, is characterised as comparable to the site of a chemical reaction. The performance equation of the reactor is thus appropriated to construct the paradigm, which is expressed as: learning is a function of ideas, accessibility, and rate. The research is theoretical and exploratory in nature. Literature outlining key phenomena in chemical processes, various texts on pedagogical best practice, and interdisciplinary work that applies scientific knowledge to the study of other disciplines including social systems and economics, guided the creation of connections between chemical processes and learning. Concepts in chemical processes are translated to a series of definitions that can be utilised to understand learning. A selection of scenarios in the learning environment where the paradigm can be applied is discussed. This work provides a crucial stepping-stone for learners and teachers to improve their engagement with the learning process.

I would like to acknowledge Dr Peter Cafe, my academic supervisor, for his guidance and support throughout the creation of this work.

Shuo Li | Bachelor of Science, the Australian National University (ANU)

The Role of University Support in Low-SES Students' Challenging Experience: A Qualitative Research with Two Cases

Students from low-SES (Socioeconomic Status) backgrounds are regarded as underrepresented in Australian higher education. Although one in four Australian citizens are recognized as coming from a low-SES community, only 15% have enrolled in university education. Worse still, low-SES university students are more likely to be affected by financial, academic and health stress than other students. Among all the universities in Australia, The Australian National University (ANU) has one of the lowest number of low-SES students. Past research has focused on the personal experience of low-SES students or government policies. However, few studies have investigated the role of university support in low-SES students' experience in an elite institution like ANU, which is consistently ranked as one of the best university and has the lowest acceptance rate in Australia.

To better meet the needs of low-SES students, university support is indispensable as teacher characteristics and institutional support have been identified as the most helpful factors in supporting students from low socioeconomic backgrounds. Current university student service and staff support do not have the capacity to fully scaffold any student's experience, including those from equity backgrounds such as low-SES students, leaving them to navigate the systems and find their own support. The present research focused on the challenges of low-SES students at ANU and their expectations

of university support. A case study design was constructed to collect qualitative data from interviews with two low-SES students in ANU and code the data with NVivo 12. The challenges discussed by these students could be grouped into three dimensions: financial, interpersonal and academic challenges. Through analysing their experiences the following recommendations could provide the required additional support to students like them: providing additional scholarships and funds for first-year low-SES students; give special consideration on class arrangements to students who have part-time jobs; and increasing the involvement of low-SES students in official organizations such as ANUSA (the ANU Students' Association), and the voice of the students with the university.

This research was conducted under the supervision of Dr Olivia Evans from the School of Psychology and Sarah Walker from the Engagement and Success team at ANU.

Australian National University

Cancer research: Visualised | 15th September 3pm

Session ID: 15.15.3

Yongyan Xia | Bachelor of Biomedicine (Degree with Honours), The University of Melbourne

Understanding dendritic cell immune checkpoint proteins in cancer immunotherapy

Immune checkpoint is a self-regulatory process of the body's immune system for avoiding hyperactive immune responses. Programmed death-ligand 1 (PD-L1) is one of the most well-studied immune checkpoint proteins that expressed in various types of cancer. It is a co-inhibitory protein expressed on antigen-presenting cells, such as dendritic cells and macrophages. Binding to its receptor programmed cell death protein 1 (PD-1) on T cells mediates T cells deactivation. Cancer cells also utilise this mechanism to suppress immune activation and escape from the host immune system. Hence, targeting immune checkpoint proteins with antibodies has been an important approach for recent cancer immunotherapy. However, non-responders to this therapy remains a major hurdle for effective immune checkpoint blockade therapy. Researching ways of improving immune checkpoint blockade therapy efficacy is the key to improve immunotherapy and achieve optimal clinical benefit. The use of bacteria polyhydroxyalkanoates (PHA) nanoparticles as an immunogenic adjuvant is a rapidly evolving field in drug and vaccine designs. We have demonstrated that blocking of T cell PD-1 improves PHA nanoparticle vaccination in mice. Furthermore, using genome-wide CRISPR/Cas9 knockout screening, we have identified B-cell lymphoma 6 protein (BCL6) and BCL6 corepressor as regulators of PD-L1 expression. BCL6 is a transcriptional factor that can recruit other proteins to inhibit gene transcription. Loss of function of BCL6 leads to increase expression of surface PD-L1 in dendritic cells as assessed by flow cytometry. Understanding genes that are involved in PD-L1 regulation may serve as future cancer immunotherapeutic targets.

I would like to thank A/Prof Justine Mintern, Dr. Christophe Macri and all members from the Villadangos and Mintern lab for all their support that provided for my honours project this year.

PALAK

PALAK | Bachelor of Science Honours in Zoology, Sri Venkateswara College, University of Delhi, India

ESTABLISHMENT OF PATIENT-DERIVED XENOGRAFT OF CHOROIDAL MELANOMA ON THE AVIAN CHORIOALLANTOIC MEMBRANE

This research highlights the use of avian chorioallantoic membrane (CAM) to monitor the growth and invasion of patient-derived Choroidal Melanoma (CM) xenograft (PDX). Despite the advancement in therapeutics, the median survival of patients with Choroidal melanoma is less than a year rendering it the second most predominant form of malignant tumors. The current cellular molecular research on Choroidal Melanoma often relies on matrigel invasion assay. However, it is extensively attributed to variability and does not layout true environment of a basement membrane for the tumor development like the chicken chorioallantoic membrane. Moreover, this study utilizes patient-derived xenograft and hence provides a more authentic representation of tumors compared to cell lines. To carry out the research, fertilized chicken eggs were procured, windowed and their CAM layers were dropped. On embryonic development day (EDD) 10, freshly chopped patient-derived Choroidal melanoma xenograft was implanted on the CAM layer and the setup was incubated for 7 days. Invasion of Choroidal Melanoma to CAM mesoderm was visualized in the form of pigmented nodules and significant changes were also observed in the vascularity around tumor indicating angiogenetic environment. High-reproducibility, short incubation time, simple set-up, and cost-effectiveness of CAM assay make it more ideal to conventional techniques. This research presents a viable in vivo model for studying tumorigenicity and invasiveness of aggressive ocular tumors like Choroidal melanoma. Moreover, this model can further be utilized to develop a potential future approach to their metastatic potential.

I am grateful to my advisor Dr. P. Jayaraj for his expert advice and constant support, encouragement throughout this research project as well as Sri Venkateswara College and AIIMS, New Delhi for providing us with the best lab facilities to carried out this research.

Nohad Maroun | Bachelor of Medical Science (Honours), the University of Sydney

Analysing the function of F-actin in telomerase recruitment to telomeres.

Replicative immortality allows for the uncontrolled proliferation of cancer cells. Telomeres normally limit cell lifespan; however, extension by telomerase can counteract this and lead to continuous cell division. However, the way in which telomerase is localised or recruited to telomeres is not well studied. Recently, our laboratory has demonstrated that telomerase recruitment to telomeres involves the DNA damage response and replication stress. Furthermore, preliminary evidence has been generated showing a link between nuclear actin fibres and telomerase recruitment. Hence, the aim of this project was to investigate the role of nuclear actin and actin-related proteins in the telomerase recruitment pathway. The pathway was studied utilising fluorescence in situ

hybridisation (FISH) paired with chemical inhibitors and siRNA treatments. Inhibition of actin-related proteins resulted in reduced telomerase presence at telomeres, further suggesting that actin and its regulators are important for telomerase recruitment. Ultimately, this study will aid in unravelling unknown components along the telomerase recruitment pathway and will contribute to the understanding of telomerase function in cancer cells.

Australian National University

Vaccines and Medicines | 15th September 3pm

Session ID: 15.15.4

Lucinda Bek | Doctor of Medicine, the University of Wollongong

Attitudes of medical students and junior doctors towards the therapeutic use of psychedelic and psychoactive substances to treat mental illness

The therapeutic use of psychedelic and psychoactive substances (PPS) to treat mental illnesses including mood and substance use disorders is an emerging field of research. Although doctors play a key role in informing policy changes and implementing new medicines, the opinions of Australian medical students and junior doctors on the use of, and research into, PPS to treat mental illness is unknown. As medical students and junior doctors are likely to be at the forefront of prescribing these potential medicines, we aimed to explore their attitudes towards the use of PPS to treat mental illness, and the factors influencing those attitudes. We surveyed 207 medical students and junior doctors from eight medical schools and seven hospitals in seven Australian states and territories.

Approximately 50% of participants agreed with the statement that PPS could be effectively used to treat mental illness, and participants who had tried a PPS were significantly more likely to agree with the statement than those who had not (p < 0.001). Similarly, participants who had been diagnosed with a mental illness were significantly more likely to agree with the statement than those who had not (p = 0.0485). Over one-third of participants believed that PPS are harmful and addictive. These participants were significantly less likely to agree that PPS could be effectively used to treat mental illness than those who did not believe that PPS are harmful and addictive (p < 0.001). The majority of participants supported further research into the potential therapeutic effects of psilocybin (86.5%), LSD (84.2%), ketamine (83.6%) and MDMA ('ecstacy') (76%) to treat depression, anxiety, post-traumatic stress disorder and substance use disorders. Understanding emerging doctors' attitudes towards the therapeutic use of PPS to treat mental illness may help to identify barriers PPS research in Australia.

I acknowledge my supervisor, Dr Jessica Nealon, for her guidance and support with this research project.

Yastika Banerjee | University of Queensland

Construction of a Herpesvirus vector Expressing Net B of Clostridium Perfringens using Transposon Mutagenesis.

The bacterium Clostridium perfringens produces a toxin called NetB which is responsible for causing Necrotic enteritis (NE). Another disease affecting poultry flocks is Mareks Disease (MD) which causes paralysis in poultry. Contrastingly NE is able to be treated by antibiotics whereas MD is controlled by vaccination of flocks with Herpesvirus of Turkey (HVT).

The aim of my project was to make a herpesvirus based live bivalent viral vaccine vector that could be used to treat both Mareks Disease and Necrotic enteritis. This was to be achieved by transposing the HVT genome maintained as a bacterial artificial chromosome (BAC). However, here as well as prior research has shown HVT is highly refractile to transposition and the large size of the MuA-NetB transposon (3.8kb) resulted in no recoverable HVT clones. To obtain proof of concept that a bacterial toxin gene can be expressed in a herpesvirus vector backbone, we alternatively transposed a BAC of Bovine herpesvirus 1 (pBACBHV-37) with MuA-NetB. Four putative MuA-NetB-O-pBACBHV-37 clones were recovered when transposition reactions were electroporated in DH10B cells. PCR, restriction endonuclease digestion and sequencing was conducted to confirm putative recombinant clones. Recombinant clones were subsequently attempted to be reconstituted by transfection into Madin-Darby Bovine Kidney (MDBK) cells where expression of NetB from the transposed herpesvirus clones was assessed by Western Blot. In conclusion, this study showcases that bacterial toxin gene can be expressed in a herpesvirus vector backbone, proving that there is a possibility to design a vaccine for both MD and NE in the future.

My supervisor- Dr. Karl Robinson

Prof Neena Mitter and Prof Timothy Mahony for allowing me to do this project

Australian National University

Wellbeing and the Self | 15th September 4pm

Session ID: 15.16.1

Christine Hill | Bachelor of Occupational Therapy (Honours), Western Sydney University (WSU)

The feasibility and acceptability of a self-regulation and mental imagery program to enhance everyday functioning for people with Parkinson's Disease: A pilot study

Background: Self-regulation is an active learning approach that enhances self-awareness and self-reflection to overcome daily challenges. Mental imagery assists a person to focus their attention on the task requirements, promoting a goal-directed action and overcoming the difficulties with the initiation and execution of movements seen in Parkinson's disease (PD).

Objective: This study examines the feasibility, acceptability and preliminary outcomes of the 'Self-Regulation and Mental Imagery program for Parkinson's disease' (SReMI-PD) to improve everyday activity performance.

Methods: Using a single-group, pre- and post-intervention design, 11 participants with mild to moderate PD attended a six-week intervention program. Attendance rate was recorded to indicate feasibility. A questionnaire was administered post-intervention to collect feedback on the program's acceptability. Outcome measures were conducted to evaluate performance of everyday activities, motor and cognitive function.

Results: 72.7% of participants attended all face-to-face sessions and 63.6% completed all home programs. Most participants 'agreed' or 'completely agreed' that the duration, schedule and content of the program was acceptable. All participants 'completely agreed' (54.5%) or 'agreed' (45.5%) they would recommend the program to other people with PD. The perceived performance of an important everyday task ($p = 0.011$) and cognition, including attention and mental flexibility ($p = 0.010$), were found to improve significantly post-intervention.

Conclusion: Preliminary results show 'SReMI-PD' is feasible and acceptable for use with people with mild to moderate PD to improve everyday activity performance. This preliminary evidence indicates combining attentional strategies to address difficulties with initiation and execution of movements may assists people with PD overcome daily challenges.

I would like to thank Associate Professor Karen Liu, Renai Pillay and Concord General Repatriation Hospital for all their help making this research possible.

Peta Bowler-Bowerman | Bachelor of Psychology (Honours), The Cairnmillar Institute

Predicting Stressor Appraisals Through the Lens of the Self

The experience, response, and outcomes of stress are informed by an individual's subjective interpretations of a stressful situation (termed stressor appraisals). Given that stress is experienced by everyone daily and poses inherent risks to mental and physical wellbeing (e.g., depression, coronary incidence), it is important to know what informs stressor appraisals. One possibility is that how critical or compassionate we are toward ourselves may influence how we appraise stressful situations. The present research examined whether stressor appraisals were associated with self-compassion and self-criticism, two personality traits known to relate to stress more broadly but yet to be directly associated with stressor appraisals. 193 general population participants completed an online survey containing demographic information, momentary stress, and measures of self-compassion and self-criticism forms (inadequate self, hated self, and reassured self) and functions (self-correction and self-persecution). Participants then read and imagined themselves to be in a stressful scenario before answering momentary stress and stressor appraisal measures about the scenario. Regression analyses highlighted that self-compassion and self-criticism significantly predicted stressor appraisals. Challenge appraisals ('this stressor is good') were positively predicted by greater self-compassion (β = 0.45, p < .05), self-correction (β = 0.40, p < .05) and the reassured self (β = 0.25, p < .05). Greater threat appraisals and primary appraisals ('this stressor is bad') were predicted by higher inadequate self (β = 0.60, p < .001; β = 0.48, p < .001) and lower hated self levels (β = -0.35, p < .05; β = -0.25, p < .05). Finally, secondary appraisals ('I can cope with this stressor') were weakened by self-persecution (β = -0.31, p < .05) and strengthened by the reassured self (β = 0.44, p < .05). These findings highlight the need for experimental intervention research into self-compassion and self-criticism to assess whether improving these variables will help individuals to perceive stressful situations more adaptively and facilitate better outcomes.

I would like to extend my sincere appreciation to co-author and Honours supervisor, Dr Chris Kilby, whose expertise was invaluable in formulating this research project.

Shanara Visvalingam | Master of Research (Psychology), Macquarie University (MQU)

Reducing the Consequences of Perfectionism in University Students: A Feasibility Study

Perfectionism, characterised by the pursuit of unattainable high standards accompanied by critical evaluations of the self and/or others, has been linked to various psychological disorders. Prior research with university samples have found perfectionism to predict psychological distress, poor academic performance, and burnout. Guided by the Perfectionism Social Disconnection Model, the purpose of the current feasibility study was to evaluate the efficacy

and acceptability of a newly developed educational intervention specifically designed to target the negative consequences of perfectionism in university students. Seventy university students (83.9% female; M = 19, SD = 5.41) reporting moderate to extreme levels of perfectionism completed the two hour 'Intentional Imperfection Program' (IIP). Participants completed self-report measures at baseline and at a two-week follow-up. Quantitative data showed statistically significant small to moderate reductions in self-oriented perfectionism, socially-prescribed perfectionism, hostility, rejection sensitivity, depression, and anxiety and also a small increase in perceived social support. Thematic analyses of qualitative data indicated that participants found the IIP feasible, enjoyable, and useful. However, given the absence of a control group the observed outcomes should be considered with caution. We concluded that the IIP shows promise in helping university students manage their perfectionism and a randomised control trial is warranted to further evaluate its efficacy.

This research was co-authored with Hannah L. McHardy, Susanne J. Norder, Natasha R. Magson, and Melissa M. Norberg and was funded by the Research Training Program Scholarship awarded to Shanara Visvalingam.

Australian National University

Government and the Law | 15th September 4pm

Session ID: 15.16.2

Abby Gallagher | Bachelor of Laws and Bachelor of Arts, the Australian National University (ANU)

Healthy Prisons are an Oxymoron

The Australian Capital Territory (ACT) Government touted the Alexander Maconochie Centre (AMC) as Australia's first 'human rights compliant' prison. The Government denounced punitive prison norms in asserting the AMC would operate under the 'Healthy Prisons' Philosophy, which protected detainee human rights and encouraged their rehabilitation. The prison cell windows would not have bars, and the doors would be brightly coloured, as physical representations of their human rights commitment. However, with a pattern of human rights breaches, riots, and a death in custody, alongside rising incarceration rates and several prison expansions, the AMC has experienced most milestones expected to occur at prisons. This paper analyses the disconnect between the AMC's human rights vision and its operational reality. It uses discourse analysis to reveal the role of the ACT Government's rhetoric in attempts to validate their human rights approach to incarceration. The paper engages abolition theory to explore the tension between human rights and carceral institutions, and asks the question: can a prison be compliant with human rights at all? The analysis demonstrates how notions of human rights and reform are implicated in prison propagation and expansion. The paper supports the abolitionist position that these reforms will not only fail in carceral institutions, but ultimately distract from the harm institutional punishment creates, as a site of violence and control. The major implication of this research is that abolition, not normative notions of reforms or human rights, must be the future of correctional practice in the ACT and beyond.

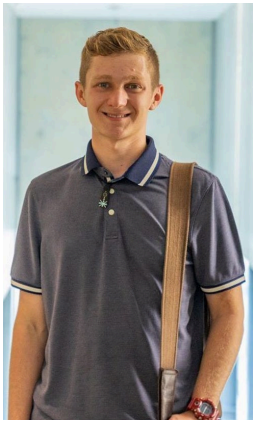
Mark Werner | Bachelor of Government, the University of Texas at Austin

Legislative Success in the Australian Parliament: Comparing the Passage Rates of Bills Over Time and Across Policy Areas

Contemporary Australian politics is frequently characterized in academic and popular discourse as constantly gridlocked, strongly divided, and inefficient. Critics claim that governments increasingly struggle to legislate effectively. But has actual legislative output declined over time? Have some policy areas experienced greater rates of legislative success than others? More specifically, are bills concerning materialist policy issues — i.e., economic or physical security and financial well-being — more likely to pass than bills in other policy areas? This paper uses a novel dataset of all bills introduced in the Federal Parliament between 2002 and 2009 to answer these questions. Each bill is coded by policy

issue according to the Australian Policy Agendas Project's codebook and by whether it was ultimately enacted into law. In addition to presenting a rich, descriptive account of trends in the federal legislative agenda, the paper analyzes the legislative success rates for bills across policy areas. It finds that overall rates of legislative success have declined over time and thus confirms popular perceptions of legislative ineffectiveness. The paper also finds that some bills — namely those concerning civil rights, immigration, and the environment, all of which are considered postmaterialist issues — were far less likely to pass than were bills concerning the materialist policy areas of macroeconomics and labor relations. The paper explores the political dynamics that might explain this disparity in outcomes and proposes avenues for future research that might deliver more insight.

Special thanks to Dr. Rhonda Evans and Dr. Andrew Gibbons.



Dylan James Woodhouse | Bachelor of Arts in Law, the University of Waikato

'Far from the mark? Evaluating New Zealand's changing firearms regulation in the context of growing gun crime rates'

'Truth is incontrovertible. Panic may resent it, ignorance may deride it, malice may distort it, but there it is.'

– Winston Churchill

This research employs a legal doctrinal methodology – a 'black letter law' approach and determines an inconvenient truth behind soaring gun crime rates in New Zealand and the legislative response to them. It is challenging to avoid political perspective when discussing firearms offences, as merely mentioning the problem, evokes memories of terrorism in Christchurch and an expanding catalogue of crimes. Altogether, these burgeoning crime rates amount to the worst recorded in New Zealand in a decade, despite firearms legislation becoming more restrictive. These circumstances make it difficult to present a balance of views regarding the successfulness of changes to New Zealand's firearms law. Instead, this paper finds and justifies an unfortunate, yet incontrovertible truth: legislative efforts have failed to improve public safety and curb criminal misuses of firearms. This paper identifies that policy has developed a hasty response to terrorism and has left ordinary criminality and gangs – which are the source of the current issue – unaddressed. It is suggested that Police be relieved of their administrative duties concerning the Arms Act 1983, enabling them to place greater emphasis on enforcement. Correspondingly, administration and licensing could be overseen by a new independent authority, responding to concerns around vetting consistency in findings. Ultimately, enforcement rather than regulation, is found to be the preferred means of responding to soaring firearms crime, addressing a contemporary gap in the discourse surrounding this issue.

Australian National University

Conservation | 15th September 4pm

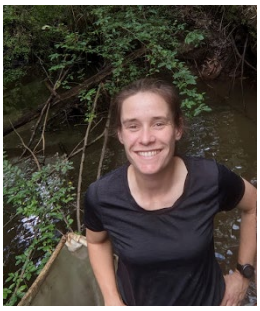
Session ID: 15.16.3

Alexander Hendry | Bachelor of Advanced Science (Honours), the University of Queensland (UQ)

The marbled cat (Pardofelis marmorata) is positively associated with large, intact forests and negatively associated with oil palm plantations in Southeast Asia.

Southeast Asia supports the greatest diversity of felids globally. However, this diversity could be threatened by the extensive forest loss and degradation occurring in Southeast Asia. Different felids may respond to anthropogenic disturbances in different ways. While the largely terrestrial leopard cat (Prionailurus bengalensis) appears to thrive in forest edges near oil palm plantations, due to the inherent difficulties in studying semi-arboreal species, our understanding of how the sympatric, semi-arboreal marbled cat (Pardofelis marmorata) responds to degraded habitat remains poor. The marbled cat is currently listed as Near Threatened on the IUCN Red List due to a suspected declining population. It is hypothesised that this species is adversely affected by deforestation as it relies upon tree connectivity for traveling and hunting. To investigate the marbled cat's habitat associations, as well as update its extent of occurrence, a large dataset of camera-trapping studies and marbled cat occurrence records was collated then analysed. The marbled cat was found to be positively associated with large, intact forests and high forest cover and negatively associated with oil palm plantations. The updated estimate of the marbled cat's extent of occurrence was found to be approximately 35% smaller than that estimated for its most recent IUCN Red List assessment, due to increased precision and deforestation. In view of the marbled cat's positive association with intact forest, apparent inability to adapt to oil palm plantations, and the continuous degradation of suitable habitat, the marbled cat's population decline is likely to be more severe than currently appreciated. Therefore the marbled cat's IUCN Red List conservation status should be upgraded from Near Threatened to Vulnerable. These findings suggest that semi-arboreal felids are likely to be more greatly threatened by habitat degradation than their terrestrial relatives, and that other semi-arboreal felids should have their conservation statuses urgently reviewed.

Co-authors of this research are Dr. Matthew Luskin, Zachary Amir, Henri Decoeur, Ilyas Nursamsi, Calebe Mendes, Jonathan Moore, and Adia Sovie. They are all thanked for their invaluable assistance and encouragement.



Breony Webb | Bachelor of Science (Zoology), Western Sydney University (WSU)

The effect of water quality and habitat suitability on the distribution of Platypuses; a pilot study in Cattai Catchment, North West Sydney

The platypus (Ornithorhynchus anatinus) continues to persist in urban waterways with high pollutant concentrations, altered flow regimes, channel morphology, and degraded stream substrate and bank vegetation cover. The purpose of this study was to determine whether water quality, specific habitat features, and macro-invertebrate assemblage influences the distribution of platypus as inferred by environmental DNA (eDNA) detection in a selection of 13 sites within the Cattai catchment, in North West Sydney. Sampling took place on two separate occasions: June 2020 and December 2020. Platypus DNA was detected in 9 of the 18 sites and 5 of the 9 waterways surveyed. The effective conservation of this iconic species in peri-urban and urbanised catchments such as that of Sydney requires ongoing monitoring of population status and health, and prevention of further habitat damage by informed local population management strategies. This study indicates that the loss of bank vegetation, an increase in aquatic weeds, high salinity and increased sedimentation are important urban stream factors to consider in developing local stream management improvements to sustain the population of platypus in the Sydney basin.

This pilot study is part of a broader research project led by Dr Michelle Ryan - Western Sydney University, with contributions and collaborations with community group - Cattai Hills Environment Network.

Nur Hanifah | Undergraduate of Conservation of Forest Resources and Ecotourism, the IPB University

COMMUNITY PERCEPTIONS AND ENVIRONMENTAL IMPACTS IN TOURISM DEVELOPMENT IN KELAPA DUA ISLAND, KEPULAUAN SERIBU, INDONESIA

Kelapa Dua Island is the smallest residential island in the Kepulauan Seribu National Park, Indonesia. The island with an area of 1.9 hectares are populated by 463 people. Apart from being a settlement, this island is also a tourist destination for domestic and foreign tourists. As a tourism area as well as a conservation area, the environmental impact is one of the important things that must be considered. The Kepulauan Seribu Government has determined environmental conservation as one of the priorities in making policies in Kelapa Dua island. So far, research on environmental impacts on Kelapa Dua Island has only been limited to the condition of coral reefs. There has been no research on island's condition, especially based on the community's perspective. Therefore, this study aims to identify public perceptions of environmental impacts in tourism developments that occur on Kelapa Dua Island. The environmental impacts studied are in the form of biophysical impacts, including impacts on terrestrial vegetation, ecosystem animals, and living ecosystems. Impacts that are not considered are soil erosion, noise, and decreased comfort. Impacts that are considered without sufficient data are living ecosystems. The method used

in this research is the distribution of questionnaires, field observations and literature studies. Questionnaires were distributed to obtain data on public perceptions to 90 people in Kelapa Dua Island aged 20-80 years. Respondents include local government officials, youth, community leaders, housewife, fishermen, tourism actors, janitors, fish farming actors, IPAL officers, and employees. Field observations were carried out in the form of exploration by visiting and circling the island to obtain data on environmental impacts. Data collection was carried out in June 2021. Literature study were carried out to obtain facts on the condition of Kelapa Dua Island based on relevant past studies. The literature study uses the scoping review technique because it's ability to synthesize various relevant research results, so that the facts presented to policy makers become more comprehensive and balanced. Analysis of public perception data was descriptive quantitative, environmental impact data was analyzed descriptively, and the relationship between public perception and environmental impact was analyzed descriptively. Data analysis was carried out thematically in order to be able to identify patterns and find factors through the data collected so as to find the relationship between each factor. The results of this study are as many as 77.5% of respondents agree that tourism has a positive impact on plant sustainability, 71.9% of respondents agree that tourism has a positive impact on ecosystem animals, and 75.3% of respondents agree that tourism has a positive impact on ecosystems. This study found the fact that local communities on Kelapa Dua Island still gave a positive response to environmental impacts (biophysical impacts) in their area. However, this is not in accordance with the actual conditions. Based on the literature study on the condition of the ecosystem on Kelapa Dua Island, it shows a decrease in fish catches, a decrease in water quality, a low index of marine biota diversity, and a decline in the abundance of reef fish. Meanwhile, field observations show that it is difficult for people to find fish so that they need to go further when sailing, the presence of chunks of coral in every resident's house, piles of garbage around the house and public toilets, the least number of residents who have MCK (washing toilets), and models of houses on stilts. which does not have a sewer. This research provides information to the local government that the community have no high consideration about environmental changes that occur because the level of public education tends to be low and the community is used to such conditions. Therefore, it is necessary to carry out more intensive environmental awareness to the community so that the community is able to cooperate in protecting the environment so that environmental impacts do not get worse.

In arranging this abstract, a lot of people have provided motivation, advice, and support for me. In this valuable chance, I intended to express my gratitude and appreciation to all of them. First, the deepest appreciation goes to my beloved parents, my mother, Susanah for the endless love, pray, and support, and my father, Torikhin for the phone call every week in order to remind me to keep going and never giving up. Also this abstract would not have been possible without the help, support and patience of my beloved advisor, Eva Rachmawati, PhD for her supervision, advice, and guidance from the very early stage of this research as well as giving me extraordinary experiences throughout the past few years.

Australian National University

Astrophysics | 15th September 4pm

Session ID: 15.16.4

Jocelyn Ware | Master of Science (Advanced) in Astronomy and Astrophysics, The Australian National University (ANU)

Radio Detected Galaxies are more Obscure than optically Selected Galaxies

Dust in galaxies has long been recognised as a key element of the astrophysical processes associated with star formation. Dust acts to obscure emission preferentially at bluer wavelengths, hampering analyses of star formation unless suitable corrections are made.

With the growth and variety of radio surveys being pursued using the Square Kilometre Array (SKA) pathfinder telescopes, it is timely to revisit the utility of radio-selected samples in probing star forming galaxy populations, and their sensitivity to dust obscured systems. This issue was explored by combining data from the Galaxy And Mass Assembly (GAMA) survey with early science data taken using the Australian SKA Pathfinder (ASKAP) telescope for the Evolutionary Map of the Universe (EMU) survey. Galaxies that were both detected in radio wavelengths and spectroscopically measured by GAMA were used to investigate the advantage radio detection may have over optical detection. The optical spectra from GAMA was used to probe interstellar reddening and subsequently calculate the Balmer decrement (H_α/H_β). Star formation rates in these galaxies were estimated from the H_α emission, as well as radio luminosity.

It was determined that galaxies with radio detections from the optically-selected G23 sample typically showed higher levels of obscuration than the optical sample in isolation. This result was used to explore the benefit of radio selection in probing heavily dust obscured galaxy populations as a function of redshift.

Neil Lu | Bachelor of Philosophy (Science)

Probing neutron stars with continuous gravitational waves

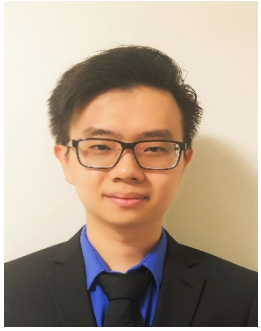
Neutron stars are extremely compact, dense astrophysical objects and are physically interesting because of the high pressures and densities in their interiors. In particular, the densities in the core of a neutron star are significantly higher than what can be achieved in terrestrial laboratories and offer a way to probe a density regime that otherwise cannot be explored. However, very little is known about the interior physics of neutron stars. In particular, the equation of state describes the relationship between density and radius inside a neutron star but is not currently known. Continuous gravitational waves are a type of

gravitational waves that have not yet been detected but should be observable using future gravitational wave detectors. This project explores how the successful detection of continuous gravitational waves would be able to constrain the neutron star equation of state. This was done by simulating different possible continuous gravitational wave signals and calculating neutron star properties from these signals. These calculations were then compared to different mechanisms by which neutron stars emit continuous gravitational waves. By comparing the theoretical predictions with the simulated calculations, the properties of a neutron star emitting a specific continuous gravitational wave signal were calculated. It was found that the successful detection of continuous gravitational waves would impose constraints on the neutron star equation of state and provide information about the likely physics that occurs in their interior.

Sophia Ridolfo | Bachelor of Science (Advanced) (Honours), the Australian National University (ANU)

Chemical Evolution of Spiral Galaxies: Investigating the Interstellar Medium of NGC628 with SIGNALS

The study of the interstellar medium and ionised gas components in galaxies is key to understanding the mechanisms that drive star formation and galaxy evolution. Most commonly used to trace star formation in galaxies are regions of ionised gas known as HII regions. These regions emit copious amounts of radiation which we observe as emission lines, or radiation at optical wavelengths. Analysing the properties of these regions can provide important insights into how stars form. In this study, I use optical IFU data obtained from the SITELLE instrument as part of the SIGNALS (Star-formation, Ionised Gas and Nebular Abundances Legacy Survey) program to study these highly-resolved star-forming regions in the local spiral galaxy NGC628 (M74). Using the largest and most complete sample of HII regions ever catalogued for this grand-design spiral galaxy, I derived properties of the interstellar medium and compared them to previous observations. I determined a negative radial oxygen abundance gradient and flat radial gradients for ionisation parameter. These radial profiles of oxygen abundance inform us of the chemical enrichment of the galaxy and the radial outflow of metals from the enriched inner region of the galaxy disk to the outer regions of the disk. Finally, I used new theoretical models to derive the interstellar medium pressure and electron density throughout the HII regions and find no radial profile for either pressure or density, suggesting there is no visible structure to the spatial distribution of pressure and electron density in the galaxy.



Jia Wei Teh | Bachelor of Science (Advanced) (Honours), The Australian National University (ANU)

The Mystery of Orphan H II Regions: Where are the Ionising Star Clusters?

H II regions are visually spectacular bubbles of ionised hydrogen gas typically found encompassing newly formed star clusters. They are created by high-energy radiation from the hottest and most massive stars in the cluster. By studying how interstellar gas processes this radiation, we can measure its properties (e.g. pressure, density) and the chemical history of the galaxy. We would like to understand the correlation between these properties and the properties (e.g., mass, age) of the star clusters enclosed in the region, ideally by matching star clusters with the H II regions they create. However, this task is proven to be surprisingly difficult: our observational study of a nearby spiral galaxy, NGC 628, shows 62% of H II regions lack corresponding star clusters. In this work, we critically examine possible explanations for these "orphan" H II regions using a combination of statistical analysis and synthetic observations of 100,000 simulated star clusters. After ruling out a number of other possibilities such as the uncertainty in observed positions of H II regions and star clusters, we determine that the orphan H II regions likely result from a difference in the sensitivities of the H II region and star cluster observations, where a star cluster can create an H II region bright enough to be seen, yet itself remain undetected. Based on this understanding, we vary the cluster detection criteria on a sample of simulated clusters, and show that increasing the sensitivity of cluster detection by allowing inspection of fainter clusters can, in theory, recover the majority of the orphan H II regions. Our work will provide important guidance for the design of future surveys intended to study correlations between properties of H II regions and star clusters.

Australian National University

Historiography: Visualised | 15th September 4pm

Session ID: 15.16.5

Georgia Hayes | Bachelor of Secondary Education, the University of Notre Dame Australia (NDA)

The Death Penalty in America and the New History of Experience

This paper aims to critique Andrea Lyon's text The Death Penalty: What's Keeping it Alive (2014), through the lens of the new History of Experience (HEX). The death penalty is a phenomenon which only 56 countries in the world continue to practice, many apparently with increasing frequency as noted by the International Observatory of Human Rights. It is striking to note that countries including Mongolia, Guinea, Bosnia and Herzegovina, Chad and Kazakhstan have recently abolished the death penalty yet the USA, arguably the leader of the free world, continues to use it. In fact, Lyon's text demonstrates that the use of capital punishment in America has a strong racial and socio-economic bias which seeks to control and suppress certain 'undesirable' classes and people.

In her book, Lyon focuses on the wrongfully convicted, their defence attorneys and the prosecutors but chooses to overlook the perspectives of other affected parties such as the families of both the victims and the offenders, other inmates, prison workers and society at large. The HEX methodology offers a way to address this, through a holistic critical examination of both collective and individual lived realities. By considering multiple perspectives and temporal, geographic, socio-cultural, and emotional contexts, a more powerful assessment of the practice and its various implications on all those involved can be undertaken. The paper ultimately argues that by employing a HEX lens, Lyon's anti-death penalty stance could be reinforced offering a stronger argument for diminishing or possibly abolishing the practice within the American justice system.

I would like to acknowledge the immeasurable help, guidance and wisdom given by my university lecturer and mentor, Dr. Karen McCluskey, Senior Lecturer and Discipline Head of History and A&S HDR Co-ordinator at the University of Notre Dame Australia.

Stefanie Krieg | Bachelor of Secondary Education (Religious Education)/Bachelor of Arts

The Lived Religious Experience of Rome's Vestal Virgins

The study of ancient Rome has traditionally focused on male-dominated narratives that emphasise masculine power and male spheres of action. Even today, Roman history remains predominantly the history of 'great' men. With

some notable exceptions, the intricate and personal experiences of other societal members continue to be sidelined in studies of Rome. The Vestal Virgin priestess cult, for instance, was once one of the most influential groups to operate within Rome, yet the study of their lives, and especially their socio-political roles, is greatly lacking in scholarship. Their lives are often reduced to trivial facts with these women hardly recognised for the decisive role they played in the maintenance of the Roman state. In using the History of Experience (HEX) methodology, this presentation aims to examine the lived religious experience of the Vestals and to interrogate what it meant to be a woman at the centre of the Roman Empire. Through my research of primary narrative accounts, especially Livy's recount of the trial and execution of two virgins, Opomia and Floriana, it has become clear that the lived religious experience of the Vestal priestesses was not straight forward. The variety of secondary sources reviewed showed a clear inconsistency in interpretation, with evidence often used sparsely and to support a modern understanding of gender. The HEX lens offers a more holistic appreciation of the Vestals' situated contexts, demonstrating that their lives were not merely framed by pure devotion to the goddess, Vestal, and duty to Rome, but may also have been characterised by feelings of fear, oppression, and coerced obligation. Implementation of the HEX methodology evokes a new path of history that is yet to be truly conquered and explored. It's person-centred focus aims to get into the crux of the individual experience, offering new perspectives overlooked by many traditional scholarship.

To my lecturer Karen McCluskey, who dedicated so much of her time to supporting our class throughout our entire research period, continuously checking up on us, and going above and beyond to give us access to all the resources we could ask for.

Soriya Farah | Bachelor of Secondary Education and Arts, the University of Notre Dame Australia (UNDA)

Teaching History through the Lens of Experience.

The current NSW History curriculum fails to meaningfully engage senior students with the emotional and sensorily experiences of everyday historical actors. This poster presentation argues that teaching history through the new History of Experience methodology (HEX) will address this issue. HEX examines the political, intellectual, and social structures of a given society at a fixed time and place, while seeking to understand how they are perceived by the groups or individuals who encounter them. The proposed study asks, 'how can HEX be utilised in a NSW Year 11 Modern History classroom to deepen a student's understanding of history through experience?' The test case invites students to explore the experiences of the Chinese in Australia during the White Australia Policy, specifically focusing on their attitudes towards the Dictation Test. The success of the proposed study will be assessed through the class' ability to engage with the emotional and sensorily experiences of Jan See Chin, one of the first Asian immigrants to be granted Australian citizenship. By analysing this case through the HEX methodology, it is hoped that senior students come to a more thorough understanding of the deep divisions in colonial society and the

dominant prejudicial attitudes of the Australian government. The poster ultimately argues that teaching history through a HEX lens disrupts the homogenised view of historical experience and thus, offers students a more varied and accurate account, not of historical facts, but of how people perceived and experienced historical situations.

I would like to acknowledge Karen McCluskey for all her support throughout this study and Pamela Wong for inspiring me to investigate the experiences of Jan See Chin, my great great grandfather.

Callum McKenzie | Bachelor of Secondary Education, the University of Notre Dame Australia (UNDA)

Video Games, History of Experience and Student Engagement

The paper explores the effectiveness of using war-themed video games and the History of Experience in engaging secondary school students in history. Recent scholarship has found that student engagement fell on average by 25% within two years of starting high school including in history. This may seem surprising given that video games have seen an increase in historical themes and settings over the same period, with 83% of children aged 15 - 18 playing video games. Their popularity strongly suggesting their success in offering an authentic historical experience.

The paper therefore proposes a novel way to retain and possibly enhance student engagement by bringing together video game technology and history in secondary schools to engage students. The case study will focus on teaching war experience using Call of Duty: WWII's presentation of the Canadian D-Day landings in combination with the History of Experience (HEX) methodology. The methodology seems best suited to the aim given its staunchly objective approach. HEX seeks critical, holistic, and situated explanations of the past by emphasising how the past was perceived and embodied individually through the senses and emotions. Thus, the paper asks can student engagement in understanding historical experience (of war, in this case) be enhanced through a holistic sensory approach offered by integrating HEX and war-themed video games?

Although it is expected that student engagement will positively shift using such an approach, such findings can only be ascertained once the theoretical justification is further refined. Thus, this paper proposes an approach for which a pilot study in the New South Wales school system will be undertaken in the future.

I would like to thank my lecturer Dr Karen McCluskey, Discipline Head of History at the University of Notre Dame, Australia, for challenging my understanding of history and supporting me through this process.

Australian National University

Philosophy | 16th September 9am

Session ID: 16.09.1

Evelyn Richards | Bachelor of International Relations and Bachelor of Arts, the Australian National University (ANU)

Hobbes and Rousseau: Identical or Opposite? Towards a comprehensive critique of Social Contract Theory

Social contract theory (SCT) holds that the legitimacy of government stems from the multitude contractually consenting to particular social and political arrangements. Most scholars of SCT agree that the classical social contract theorists Thomas Hobbes and Jean-Jacques Rousseau employ SCT to argue in favour of distinctive kinds of government. Specifically, Hobbes is regarded as wielding SCT in support of authoritarianism and Rousseau of democracy. However, there has been little attempt to understand whether SCT can, as an overarching framework, function to constrain the authors' accounts of government legitimation and dissolution. I address this question by arguing that there are three essential structural elements necessary to any SCT account, which could substantiate a renewed understanding of SCT as more restrictive. These are that 1) the state of nature prevents cooperation; 2) the social contract enables cooperation by legitimising government; and 3) collapse of government qua return to the state of nature occurs automatically. To explain how these logical constraints limit the possibility of meaningful differentiation between varying SCT accounts of government legitimacy, I present a comparative analysis of Hobbes's Leviathan and Rousseau's Two Discourses and The Social Contract. I find that the authors present structurally equivalent theories, whereby government is both formed, and can be dissolved, under the same conditions. My findings challenge the conventional understanding that the Hobbesian and Rousseauian accounts of SCT are substantially distinct by disputing that the authors' preferred regime type can be supported by SCT alone. If correct, further research should be undertaken concerning the extent to which SCT can comprehensively justify individuals' conceptions of political legitimacy.

Aidan Shaw Riley | Bachelor of Philosophy (Humanities and Social Sciences), the Australian National University (ANU)

The Temporal Cognition: How may we interpret Kant's fundamental theory of cognition in the Critique of Pure Reason?

In 1781, German philosopher Immanuel Kant published the Critique of Pure Reason, a major philosophical text that investigates the possibility and limits of human knowledge and reason. The text's theory, referred to as 'Transcendental Idealism', proposes that the experienced world is fundamentally structured by

the human mind and consciousness. Its implications have effected much of following metaphysics and epistemology. Despite this impact, it remains disputed how Kant justifies his argument for 'Transcendental Idealism', a dilemma that needs to be addressed given the Critique's enduring influence. In my research I analyse the Critique's central chapter, known as the 'Transcendental Deduction', to form a possible reconstruction and explanation of Kant's argument. I first consult commentaries by modern analytic philosophers Robert Paul Wolff and James Van Cleve on their analyses of the Deduction. I take Wolff's syllogistic exegesis as my starting point, which I critique with Van Cleve's lucid insight of placing Kant's 'Unity of Apperception' as the foremost principle. I then integrate this insight into my own interpretation. I argue that Kant builds his theory around how human consciousness and self-consciousness interact to create our basic qualities of experience and knowledge. Kant emphasises that the 'Unity of Consciousness' shared by both is the key factor in this mechanism of creation. I finally speculate that Kant holds this process to be intimately related not only to the existence and behaviour of our experience, but to the origin of space and time as well. Appreciating this reading of Kant has value not just to the Critique, but to contemporary debates about the mind and its relationship to the world.

Australian National University

Democracy and Governance | 16th September 9am

Session ID: 16.09.2

Brindy Donovan | Bachelor of Arts, the University of Western Australia (UWA)

The neoliberal student union?: The contradictory social worlds of elected student representatives

This critical ethnography investigates the social and structural forces that shape why students run for a role in their university student union, and their experiences once in the organisation. The political habitus students develop in their time in elected office ought to be of concern not only to the present student-body they are meant to represent, but also to the future communities they may potentially lead. I conducted this ethnography using an extended case method of 16 in-depth semi-structured interviews. I also utilised what Holmes and Marcus (2006; 2007) term a 'para-ethnographic' approach, which asks that we reimagine the researcher-informant relationship to take seriously the theorising of participants. Neoliberalism has affected not only the structure and functioning of Australian universities, but also students unions. Student representatives must navigate an increasingly bureaucratic and competitive environment both pre-election and once in the organisation. In response, many appear to adapt in ways seemingly contradictory to their stated goals. Most participants cited well-intentioned reasons for running. However, the high dependence on their own social capital and the need to navigate intra-organisational politics meant that students felt they needed to become increasingly partisan and self-interested to find success in their role. Any inclinations students had towards cooperation were quickly replaced with partisan-based competition, the desire for genuine connection became superseded by what participants referred to as "transactional relationships", and the personal and the professional often converged.

Thank you to Associate Professor Martin Forsey for coordinating the Anthropology and Sociology capstone unit, and for the support and feedback that made this research possible.

Natalien Isenia | Bachelor Security Studies, Leiden University (The Netherlands)

The Threat Perception of Social Movements against Police Brutality

The Black Lives Matter movement in the United States and the End SARS movement in Nigeria were both perceived as a threat to their respective governments. Protesters of both movements were met with excessive force during the 2020 protests. Protesters of the End SARS movement in Nigeria were met with excessive force from the very beginning of the protests, whilst

demonstrators of the Black Lives Matter movement in the United States were met with excessive force in a much later stadium of the protests. The goal of this thesis is to explain how a variation in threat perception of social movements against police brutality result in different government responses. This study is a qualitative research, making use of a comparative case study approach. By applying Walt's Threat Perception Theory, the researcher argues that four factors determine the level of threat of social movements. Namely, aggregate power, geographic proximity, offensive capabilities, and aggressive intentions. The paper found that although a movement's aggregate power and geographic proximity are sufficient factors for a movement to be perceived as threatening, some governments will not engage in repressive behavior until there is an increase in the movement's aggressive intentions. This disparity in threat perception explains the difference in government response. This research demonstrates that Walt's threat perception theory, although being a state-centric approach, is applicable to protests and social movements as well.

I would like to thank my thesis supervisor, professor Graig Klein, for the endorsement and for guiding me through every step of my thesis process.

Rochelle Schoff | Bachelor of Arts (Honours), the Australian Catholic University (ACU)

Imagining Region and the Nation: The Interwar Riverina New States Movement

After the First World War, several towns and cities throughout the Riverina imagined a future where separation from New South Wales might allow a new inland region to be admitted to the Commonwealth as an independent state. The interwar New States Movements responded to national anxieties over Australia's so-called 'empty spaces,' specifically the need to populate Australia's rural regions, which the movement argued could be achieved through smaller, locally governed states. The Albury New States League articulated their sense that the Riverina region shared a distinct area of interest that was connected by its ties to the Murray River, pioneer history of Hume and Hovell's journey through New South Wales and Victoria in 1834, and shared goals for a populous and prosperous future for agricultural communities. Benedict Anderson has famously understood nationalism in terms of an 'imagined community', where citizens imagine themselves connected by a sense of shared, geography, history, and print vernacular. Considering this, how did the New States Movements negotiate local and national identities? And how did the movement use interest in pioneer history and the rural automotive boom to articulate a distinct sense of local identity? Through a combination of archival research of local newspapers and souvenir materials related to the interwar New States Movements and Hume and Hovell centenary celebrations, I show how the Riverina imagined local and national identities through connections to past pioneer journeys and imagined a shared future as an independent state.

Yiting Luo | Bachelor of Sociology (Honours), the University of Sydney (USYD)

Is the Chinese Government Really that Violent: Rethinking of the 2019-2020 Hong Kong Protest Analysis

From March 2019 to the 2020, the Fugitive Offenders Bill promulgated by the mainland Chinese government sparked a series of social movements in Hong Kong. In response to the Anti-Extradition Law Amendment Bill Movement, much of the comments in Western and Hong Kong societies has focused criticism on the supposedly violence behaviours of the Mainland China Government. Through a review of the Hong Kong historical resources and the development process of the movements, supplemented by Bourdieu' Symbolic power & Arendt's Violence theories, as the analytical tools. I analysed why the Mainland Government would be criticised as arbitrary and violent and reveal other possible factors that have made negative influences on people's impressions on Chinese Government's behavior. The results contain three main focuses. Firstly, the Mainland Government is considered arbitrary because Hong Kong's unique social system have led to differences in habitus between Hong Kong and Mainland China, which weakened the Mainland Government's authority in socially constructing Hong Kong society. Secondly, the high dissemination rate of social media, the political emotions' inflammatory associated with pictorial messages, and the accumulated social and economic pressures of Hong Kong youth have together created the possibilities for government behaviors to be distorted. Thirdly, the above factors also created a destructive stimulus to the power dynamic between the Mainland Government and the Hong Kong masses, which further influenced the movements' development. Based on the study scale's limitation, the results are undoubtedly one-sided. However, I hope it can provide a new perspective for more researchers to allowing for more objective evaluations of the Mainland China Government.

Australian National University

Sleep | 16th September 9am

Session ID: 16.09.3

Neha Bal | Bachelor of Advanced Studies (Honours), the University of Sydney (USYD)

Metabolic Consequences of Obstructive Sleep Apnoea on the Liver: Links between OSA and Cardio-metabolic Disease

Obstructive Sleep Apnea (OSA) is a chronic respiratory disorder that affects more than 1 billion people worldwide. OSA patients experience repetitive collapse of the upper airway during sleep which causes pauses in breathing. This leads to intermittent periods of low oxygen in the blood (intermittent hypoxia) which is considered a key driver for the cardio-metabolic comorbidities, such as type 2 diabetes and cardiovascular disease, typically seen in the OSA population. To study the effects of intermittent hypoxia in isolation from other OSA sequelae, a gas model was used to expose Sprague Dawley rats to short- and long-term intermittent hypoxia mimicking rapid oxygen fluctuations experienced by OSA patients. We used a multidisciplinary approach including physiology, molecular biology and –omics techniques, to study both the acute and chronic effects of intermittent hypoxia on metabolism in the liver. The liver helps to regulate whole-body energy homeostasis and metabolite levels in the circulation and we hypothesized that intermittent hypoxia would cause metabolic dysregulation in the liver, altering metabolites circulating in the plasma. Preliminary metabolomic analysis of liver tissue collected from the Sprague Dawley rats revealed a dramatic shift in global metabolism in response to a single night of intermittent hypoxia, which continued to change following weeks of night-time intermittent hypoxia exposure. A number of metabolites altered in the liver, including ketones, were also altered in the plasma. While further study is needed, the observed metabolic changes may represent adaptive or maladaptive processes involved in the development of cardio-metabolic diseases seen in patients with OSA.

I would like to acknowledge the contributions and co-authorship of my supervisor Dr. Kristina M Cook, co-supervisors Dr. Melissa MJ Farnham and A/Prof John F O'Sullivan, and fellow lab members Dr. Polina Nedoboy, Dr. Yen Chin Koay, Chloe-Anne Martinez and

Edward Hootman | Bachelor of Science/ Bachelor of Advanced Studies (Advanced) (Honours), University of Sydney (USYD)

PAC1R knockout mice show inhibited metabolic responses to 50 days of chronic intermittent hypoxia exposure

Obstructive sleep apnoea (OSA) is estimated to affect over a billion people worldwide and characterised by repeated upper airway collapses during sleep which affects their ability to breathe, exposing them to intermittent decreases in blood oxygen, known as intermittent hypoxia (IH). This activates the sympathetic nervous system – the fight or flight response which alters whole body metabolism to maintain energy supply, mainly to the brain. The neuropeptide Pituitary Adenylate Cyclase Activating Polypeptide (PACAP) acting through its receptor (PAC1R) is necessary for the sympathetic activation in response to acute IH. Chronic exposure to IH (CIH) causes a persistent activation of our fight or flight response which is implicated in the onset of a range of metabolic diseases. Yet given the importance of PAC1R in this activation, its role in the potentially pathological metabolic adaptations to CIH has never been investigated.

To study this, male wild type (WT) and PAC1R knockout (PAC1R-/-) mice were exposed to 50-days of CIH (35-seconds 6% O2, 60-seconds 21% O2 cycles for 8 hours) or SHAM (21% O2) condition (n=5 per group). Non-fasting blood glucose and bodyweight were measured fortnightly, and mice underwent glucose and insulin tolerance tests (ITT) after 5- and 6-weeks of treatment exposure respectively. These tests are used clinically to assess whole body glucose regulation in the diagnoses of a range of metabolic diseases.

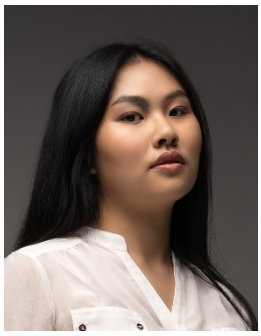
WT CIH had significant decreases in bodyweight and blood glucose after 2 weeks which did not significantly change in subsequent weeks. These changes did not occur in the SHAM controls nor CIH treated PAC1R-/-. CIH did not significantly alter glucose tolerance in either WT or PAC1R-/- relative to controls. PAC1R-/- were unable to complete the ITT due to severe hypoglycaemia, suggestive of a lack of the sympathetically mediated counterregulatory response, independent of CIH treatment. The PAC1R is involved in the metabolic responses to long-term CIH and may play a role in the onset of OSA related metabolic disease.

A big thanks to my supervisors Dr Melissa Farnham and Dr Polina Nedoboy for their guidance and assistance in carrying out this research.

Australian National University

History | 16th September 12pm

Session ID: 16.12.1



Cherry Zheng | Bachelor of Philosophy (Honours) - Asia and the Pacific, the Australian National University

Provincialising the Present: A Historiography of Deep History

The surfacing of Mungo Lady's cremated remains in 1968 doubled previous estimates of Aboriginal habitation in Australia. This shifted not only national frames of history, but also global understanding of humanity's origins. For Ann McGrath, Mungo Lady was key inspiration for the compilation of Long History, Deep Time, a 2015 volume edited with Mary Anne Jebb. The work represents a conceptual turn from McGrath's longstanding study of Indigenous history to a critique of the discipline's basic assumptions about time. This historiographical essay traces McGrath's inspiration and influences before analysing the book's most important contribution: the concept of 'deep history'. I find that deep history comprises an at times contradictory double task. At a disciplinary level, deep history opens up history's single timeline to the unarchived millennia of human experience. At an interdisciplinary level, deep history destabilises the authority of that timeline by communicating other ways of experiencing the past. These tasks straddle pluralities within and beyond the academy, building upon diverse literatures not limited to Australian history, postcolonial theory, and the natural sciences. To me, its most interesting problems exist at the higher, interdisciplinary level, where it dovetails with critical scholar Dipesh Chakrabarty's proposal to 'provincialise Europe'. Though history is in the title, the book represents a nascent effort to reconfigure the history discipline — starting with Australia, with global ambitions. If deep history succeeds at gathering itself into a coherent practice, its most interesting contribution will be a provincialisation of the present, questioning "why we place walls between the imaginative history of 'ourselves' and other peoples and times".

Nicholas Herriot | Honours Degree of Bachelor of Arts (History), the University of Adelaide

"The Best Way to Help Vietnam is to Make Revolution in Your Own Country": South Australian Student Radicalism in the Long 1960s

Australian student activists are rarely considered part of the political upheavals that engulfed the world during the 'long 1960s'. Yet, by the early 1970s, Flinders University had acquired a nationwide reputation as a hotbed of rebellion. My research identifies a significant opportunity to present new information about the local, national and international dimensions of political radicalisation at a South Australian university.

Despite enduring popular interest in the 1960s, few histories of Australian student activism during this period have been written. Against the master

narrative of a social democratic 'Dunstan Decade', my research re-centres students and their revolutionary politics in South Australian history. As a new suburban institution lacking established traditions, Flinders University provided a unique backdrop for the emergence of protest and dissent. Students made extensive use of the written word to gain influence and express their globally conscious ideas. My project draws on extensive document analysis of student print culture. But yellowing leaflets in an a library archive can only go so far in constructing an account of political radicalisation from the perspective of participants themselves. To further understand how real historical actors constructed their own transnational subjectivities, I am currently recording oral history interviews with former student activists.

I aim to test the extent to which local activists can be drawn into a transnational narrative of Sixties radicalism. In what ways did South Australian students encounter international rebellion and how did they 'translate' global ideas into local actions? Preliminary findings suggest that overseas rebellions, particularly anti-imperialist struggles in Vietnam and China, were a key reference point for activists at Flinders who hoped to perform a revolution in their own country.

Stefan Subasic | Bachelor of Arts (Honours), Australian Catholic University

No Quiet on the Eastern Front: Austria-Hungary's Serb Dilemma, 1911-16

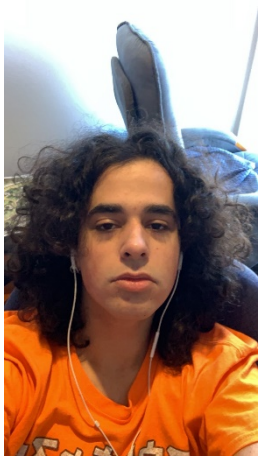
My thesis aims to directly challenge revisionist historiography of Austria-Hungary's relations with its ethnic minorities. While by no means a consensus, the revisionist theory argues that Austria-Hungary's ultimate collapse was not a foregone conclusion as a result of decades of decline; instead, the empire was a stable, if not always thriving, multi-national state that broke down mainly due to the duress of world war. My historical investigation will test the modern consensus through the prism of Austria-Hungary's Serbs, who were considered one of the most controversial and potentially disloyal ethnicities within the empire. Examining the years 1911-1916, my thesis will investigate events that fall within two themes – the military and law and order – which, together, will show the empire's troublesome relations with its Serb subjects predated the war. My main primary sources will be the newspapers, pamphlets and books published by the 'Jugoslav Committee', a political interest group which sought to promote the cause of South Slavs who lived within the Dual Monarchy's borders; and a collection of personal notes by Oskar Potiorek, Governor of Bosnia-Herzegovina from 1911-1914. This collection, compiled by the Bosnian Academy of Sciences and Arts, illustrates how Bosnia's provincial government adopted increasingly harsh and excessive measures in order to combat separatist and nationalist sentiment, which only intensified after the outbreak of war in 1914. My hypothesis is that the suspicion shown towards the Serbs was frequently unjustified and excessive; and that, especially in Bosnia-Herzegovina, these practices had their precedents many years before World War I.

I would like to acknowledge my thesis supervisor Nick Carter, who has helped me throughout my research in ensuring that I keep my topic focussed and that I am consulting as wide a range of sources as possible.

Australian National University

Culture and Identity: Visualised | 16th September 12pm

Session ID: 16.12.2



Benjamin Lamb | Bachelor of Asian Studies, the Australian National University (ANU)

How elements of Korean culture are displayed in hip hop

This paper aims to explore how Korean culture has been displayed and fused within the foreign art from of hip hop. In recent years, Korean hip hop has cemented itself as a unique genre within the global culture of hip hop, which originates from the US. In the past two to three decades, it has gone from being completely unheard of in South Korea to permeating mainstream media in almost every aspect. However, this popularity represents Korean and American cultures mixing in a distinct case of glocalization. This is important to explore in Korean and popular culture studies to grasp a better understanding of the factors that push both globalization and glocalization in our modern world, namely the individual identities and self expression of youth. The importance of global and local trends is linked to identity politics, and is exemplified through giving voices to the under represented, which may be missed in larger fields of study. By understanding this, we are able to contribute to the study of anthropology and sociology by examining the ways in which society might change. It is also important in order to understand the effect a foreign influenced pop culture has on societal and cultural trends in Korea. Within this relevance, the exploration of Korean hip hop yields its importance to studies of culture (both Korean and global), pop culture, media, music, and art. The methodology of this paper involves drawing upon previous studies of not just Korean hip hop, but Korean culture, globalization theory, and music history. Evidence is drawn from previous literature as well as individual analysis of artists and consumer trends and opinions spanning several decades. This is used to form the conclusions that hip hop in Korea has a strong basis in telling personal and otherwise unacceptable messages in collective Korean society, and that the mixing of two cultures (Korean and American) creates a platform for people on any spectrum within these cultures to express themselves, which further develops the genre of Korean hip hop.

I would like to acknowledge Dr Roald Maliangkaij for his help in mentoring the formulation of the research methodology and research topic itself.

Hadassa Gitau | Bachelor of Music (Musicology), Sydney Conservatorium of Music

Identity Formation through Worship Music among the South Sudanese Diaspora in Australia

This paper explores the process of identity formation among diasporic communities, specifically South Sudanese Australians, who have had to recreate a new national identity after leaving their war-torn home country. By focusing on music as a culturally significant phenomenon, this paper takes on an ethnomusicological approach to the study of migration. Studies in the field of ethnomusicology have only recently begun looking at the role of music in Australian immigrant life, with scholars such as Sorce Keller and Barwick (2012) focusing the music of Italian-Australian immigrants. On the other hand, experts on the African diaspora, such as Adogame (2013), emphasise the importance of religion to the lives of African migrants around the world. The South Sudanese diaspora in Australia take up a large portion of the African population in this country, and yet there is a significant gap in the field about the significance they place on music in their lives. The aim of this study is to fill that gap by exploring how South Sudanese Christians use worship music to reflect on these experiences and re-affirm their identity in a new environment. The research methods employed include interviews and participant-observation, in which the author takes part in the music-making and the church life in order to gain a more authentic understanding of the topic. The findings of this paper have shown how religion and national identity intermingle for the people of South Sudan, a discovery that has the potential to extend the discourse on immigrant life in Australia.

I would like to acknowledge my Honours supervisor, Catherine Ingram, as well as South Sudanese musician Mary David Mamour, both of whom I'm grateful to for their help and insights when writing this paper.

Hannah Ahmad | Bachelor of International Relations/Bachelor of Development Studies, the Australian National University (ANU)

Has the production of Ghanaian cuisine in the United Kingdom allowed Ghanaian migrants to build a sense of diasporic identity and Ghanaian identity in the context of migration?

This study presents an analysis of Ghanaian migration and Ghanaian cuisine in the United Kingdom (UK) through the lenses of postcolonialism, identity and social recognition. The Ghanaian population in the UK increased five-fold between the 1950's and 2000, to approximately 55,000. Foodways of this diaspora have played a crucial role in reproducing Ghanaian culture overseas, and have been key to ethnic identity formation. The two distinct approaches to migrant foodways, food and the politics of racism, and incorporation in host nations, are discussed. Parallels and comparisons are drawn from well-known and well-established foodways in Britain such as those of South Asian diasporas. As a result of the shared colonial history of Ghana and the United Kingdom, the foodways of Ghanaians have undoubtedly been shaped by prior

exposure to British customs, culture, and institutions. At the same time, the practice of communal sharing of dishes and the continuation of other Ghanaian traditions reinforces Ghanaian identity and strengthens communal identity in diaspora. Unlike their South Asian counterparts, Ghanaians in the UK opened few public food outlets to cater to UK patrons Rather, Ghanaian cuisine in diaspora has been a largely non-commodified, communal affair – but has nevertheless undergone transformations reflecting the process of settlement and incorporation of this diaspora into the UK.

I would like to acknowledge Dr Ashley Carruthers for his assistance and continued support.

Australian National University

Materials Engineering | 16th September 12pm

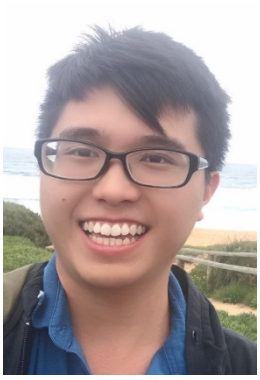
Session ID: 16.12.3

Michael R Gee | Bachelor of Science in Civil and Environmental Engineering, the University of California Berkeley (UCB)

Enhanced Adsorption of Perfluorooctanoic Acid (PFOA) from Aqueous Solution by Oak Sawdust Derived Activated Carbon

Perfluorooctanoic acid (PFOA) is a typical compound belonging to the Perfluoroalkyl Substances (PFAS). PFOA has been widely used in vast applications of various products, including everyday items, namely nonstick cooking appliances and fast-food wrappers because of its strong chemical stability and resistance to water and oil. However, decades after PFOA's initial production, researchers began linking PFOA exposure, especially from PFOA contaminated drinking water, to serious health impacts in humans such as cancer, thyroid disease, ulcerative colitis, and congenital disabilities. Hence, the United States Environmental Protection Agency established health advisory levels which currently stand at 70 parts per trillion. In this study, oak sawdust derived activated carbon (OSAC) was used as an adsorption agent to remove PFOA from an aqueous solution. Oak was selected because it is eco-friendly and a common waste product of the Oak industry. The pore structure of OSAC was optimized through carbonizing under different temperatures (500℃-1100℃). The surface was chemically functionalized by adding modifying compounds: boric acid, urea, and polyethyleneimine. The maximum adsorption capacity of OSAC, prepared at 900℃, was found to be 83.7mg/g. In addition, kinetic and isotherm studies were conducted to evaluate the adsorption behavior. Various background ions effects on the adsorption were also studied to explore the adsorption mechanism. Moreover, this adsorbent's high effectiveness, abundance, and potential low cost may provide a more sustainable, widespread solution to remove PFOA contamination at wastewater treatment plants to reduce human and ecological exposure to PFOA.

Xiaobo Lei, William Holmes, Pubali Sarker, Mark Zappi Ph.D., P.E., and Daniel Gang Ph.D., P.E.



Phan Quoc Khang Nguyen | Bachelor of Engineering (Honours), Western Sydney University

Fabrication and Evaluation of Polymeric Nanocomposites Using Additive Manufacturing

Phan Nguyen (1), Nima Zohdi (2), and Richard (Chunhui) Yang (3)

School of Engineering, Design and Built Environment, Western Sydney University, Penrith, NSW 2751, Australia.

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The use of additive manufacturing technology, e.g., 3D printing, for fabricating polymer materials was first introduced in 1986. This new technology created great opportunities to rapidly produce components with complex geometry but at low cost, lightweight and minimise manufacturing wastes. At present stage, most of 3D-printing products are commonly used as prototypes rather than mass production since there are still some technical issues needed to be solved. Recent studies showed that material properties of additively-manufactured polymers can be enhanced by adding nano additives to make them become nanocomposites.

In this study, polymeric nanocomposites are fabricated by using additive manufacturing and evaluated for improvements 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 main material (matrix) in this research for improvement. A nano additive - Multi-walled Carbon Nanotubes (MWCNT) is chosen as the additive material to the ABS matrix. According to ASTM Standard, tensile testing samples of pure ABS and ABS/MWCNT nanocomposites at a 0.5% weight fraction of MWCNT are both fabricated by using a typical additive manufacturing technology – Fused Deposition Modelling (FDM). Thereafter, the samples are tested and evaluated to extract their mechanical and thermal properties. Results obtained show significant improvements in both material properties. The materials are also modelled and simulated by using Digimat software for validation and verification. Research outcomes from this research can be employed in various engineering applications such as prolonging service life of 3D-printed ears and scaffolds in biomedical field, fabricating electronic sensors in one-off 3D printing process, using this new nanomaterials in state-of-the-art small satellites at low costs for aerospace engineering, etc.

Author woud like to express special thanks to Prof. Richard Yang, Mr. Nima Zohdi for their wholehearted instructions and supports; Western Sydney University for providing us with fundings and access to school facilities.

Oliver Hervir | Bachelor of Philosophy {Honours} - Science, the Australian National University (ANU)

Fabricating and Testing Dual-Carbon Batteries to Investigate their Electrochemical Properties and Performance Characteristics

Dual-carbon batteries (DCBs) have emerged as a potential replacement for rechargeable lithium-ion batteries (LIBs), in certain applications, because they can attain higher cell voltages. Batteries function due to the movement of ions between the electrolyte (an aqueous solution of the ions) and the electrode (a solid). Whereas LIBs rely solely on the movement of lithium cations, DCBs use both cationic (positive) and anionic (negative) ions, allowing them to achieve a higher cell voltage. Despite this, LIBs have excellent energy and power density, making them the most dominant battery in the market. They are, however, limited by their high fiscal and environmental production costs. Hence, the further development and refinement of rechargeable batteries, such as DCBs, is an important aspect of solving pressing energy crises. In 2014, Power Japan Plus released a DCB to market, claiming superiority to other batteries. Therefore, this study aims to determine whether their battery may be useful in the future, by first fabricating a comparable DCB, and then evaluating its performance characteristics, namely: (i) energy density; (ii) rate capability, ability to deliver high currents; and (iii) cyclic stability, consistency in energy deliver over time. Our DCB was fabricated in an argon glove box as a three-electrode Swagelok system, with optimised electrodes and electrolyte that matched those used by Power Japan Plus. Our results suggest that our DCB has an energy density of 164 Wh/kg (slightly smaller than LIBs), a moderate rate capability, and likely cyclic stability. We postulate as to why these findings are the case and suggest that DCBs are a good option for grid integration and electrical storage due to its low cost, sustainable design, and aforementioned performance characteristics.

I would like to acknowledge A/Prof Alexey Glushenkov and Dr. Thrinath Reddy Ramireddy for their guidance, advice and assistance in this project.

Australian National University

Nursing and Caregiving | 16th September 12pm

Session ID: 16.12.4

Elissa Price | Bachelor of Nutrition and Dietetics (Honours)(Deans Scholar), the University of Wollongong

Student Nurses' Perceptions of their Knowledge, Role and Experiences in Nutrition Care and Education

The high burden of chronic disease in Australia results in a significant demand on our health systems. Poor nutrition is a known modifiable risk factor impacting long-term health outcomes. Nurses are in a unique position to provide elements of nutrition care, given their availability across the healthcare system and high patient exposure. Nutrition education for student nurses may ensure Australian nurses are equipped with relevant knowledge and skills. Understanding student nurse perspectives regarding a role in nutrition care may inform nutrition education to support this role.

To explore student nurses perception of their nutrition knowledge adequacy, the nutrition education in their undergraduate studies, and gain insight into their confidence to deliver nutrition care in practice.

Semi-structured interviews were conducted with second- and third-year students in a Bachelor of Nursing degree. Interviews were audio recorded, electronically transcribed verbatim, and semantically coded, applying an inductive approach to theme generation.

Participants (11 female/2 male) identified their role in nutrition care as an element of holistic nursing. However, students provided insight to their limited knowledge and skills to support this role and could provide few examples of nutrition education in their university content. Participants emphasised the responsibility of the entire interprofessional team to support the delivery of nutrition care, including dietitians.

Student nurses value nutrition care as part of the holistic care of individuals, and recognise the role of professionals, specifically dietitians. Establishing minimum competency standards may be necessary to ensure nutrition education is included in university nursing curricula.

I would like to thank and express my deepest appreciation to my academic supervisors Mrs Lorraine Fields and Professor Eleanor Beck for their ongoing support with my Honours research.

Natalie Tuckey | Honours Degree of Bachelor Psychological Science, University of Adelaide.

Using an international online forum to explore the experiences of caregivers of patients with chronic kidney disease

Background: Burden is a major concern for caregivers of patients with chronic kidney disease (CKD), which is a progressive and debilitating chronic illness resulting in irreversible loss of kidney function. Online forums provide an important platform to caregivers of patients living with CKD for peer connection and expression of perspectives and concerns, but have not been used in research about consumer experiences. Research has addressed the psychosocial impacts for patients living with CKD, however psychological and physiological impacts on the patient's caregivers have been overlooked. Social support can improve caregivers' quality of life, with emerging research exploring online social support. Method: This study employed qualitative content analysis to examine 159 posts on an online international forum: Caregivers of Patients with Kidney Disease. Low risk ethics was granted with the stipulation of participant anonymity. This study examined the experiences and concerns raised by caregivers of patients with CKD. Posts were coded using verbatim words and phrases, then arranged into three overarching themes, 12 categories, and 71 sub-categories. Results: The three overarching themes were: Impact to Carer Wellbeing, Use of Online Social Support and Caregiver Knowledge. Online posts highlighted the psychological and physical challenges for caregivers of patients with CKD including social isolation, helplessness and the impact to paid employment. Participants used online social support to connect with peers and seek advice from the forum community on topics including: the patient's diet; clinical management; CKD symptoms; and how to support the patient to adhere to diet and medications. Conclusion: This study provides valuable insight into gaps in caregiver knowledge and their need to seek online peer support. Caregiver forums can inform support strategies from healthcare professionals to increase caregiver involvement in treatment and education options, as well as tangible assistance to support caregivers' and patients' needs such transportation services for dialysis.

I would like to acknowledge Professor Anna Chur-Hansen, Emily Duncanson and Shilpa Jesudason with the supervision of this research.

Brandon W Smith | Bachelor of Nursing (Honours), Western Sydney University (WSU)

Hidden (dis)advantages: Professional success of men in nursing

Abstract: In Australia, men represent 11.4% of the nursing workforce. In contrast to women, who are reported to experience social barriers that impede career progression, men in women-dominated professions are purported to experience the reverse – structural and societal advantages that accelerates their professional success. To examine the accuracy of this assertion, it was necessary to identify and summarise evidence of objective achievements and subjective indicators of professional success for men in nursing. An integrative

review was performed, guided by the PRISMA reporting guidelines for review articles. Seven electronic databases were accessed in January 2021 which identified six quantitative and six qualitative studies relevant to the professional success of men in nursing. These 12 studies revealed that men's minority status was a double-edged sword. Although two quantitative studies identified that men have increasingly occupied senior nursing positions and remained concentrated in high-status nursing specialties despite their consistently low representation in the total nursing workforce, seven studies identified obstacles to professional success arising from gender stereotyping, prejudice, and discrimination which included negative imagery about men in nursing, feminisation of nursing care, refusal of nursing care from men, and the disproportionate allocation of 'masculine' tasks. These findings highlighted the need for further exploration of men's contemporary experiences to elucidate issues related to professional success and gender dynamics in the nursing profession.

Acknowledgements: Professor Yenna Salamonson, Ms Jacqueline Rojo, Associate Professor Bronwyn Everett, Dr Jed Montayre, and Mr John Sierra.

Australian National University

Group Presentations I | 16th September 12pm

Session ID: 16.12.5

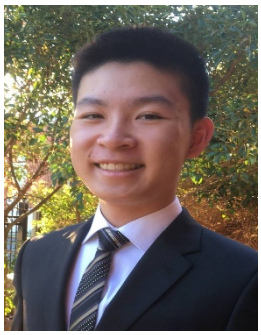
Daniel O'Connor, Patrick Capaldo and Jason Huynh |

Extending Sensor Capabilities with Unmanned Aerial Vehicles

The project involves the development of an Unmanned Aerial Vehicle (UAV) and a small sensor payload. The UAV will collect, transport, and communicate with the sensor payload. The primary objective is to support future capabilities in sensing by providing flexibility over conventional, large, and cumbersome sensor platforms in terms of range, positioning, and cost. One potential application may involve utilising numerous expendable sensors placed to form a versatile coverage capability. This would enable low-cost bushfire monitoring with minimal risk to human operators.

Using an integration-driven approach, commercial-off-the-shelf components are assembled to deliver the desired capabilities. The UAV's physical specifications and the ability to transport a sensor payload are benchmarked against existing designs. The communication system is prototyped through electronic experimentation and computer programming. Planned trial flights will verify the aerial payload transportation capability.

The preliminary results demonstrate the proposed design's reconnaissance capabilities. From initial testing, it is indicated that a wireless Bluetooth communication approach minimises cost and maximises sensor versatility. The UAV performance characteristics are verified through the utilisation of flight simulation software, thus improving confidence in its safety and reliability. Further developments are being investigated in the physical design of the UAV, particularly around a mechanical system to collect the sensor payload.



This UAV-sensor system's integration of commercially available components is a demonstration of a low cost solution within a bushfire monitoring context. Furthermore, the modular nature of the sensors is intended to allow for continual compatibility with the UAV transportation platform, enabling configurability for diverse future applications.

I acknowledge that my fellow project members, Patrick Capaldo and Daniel O'Connor, have made significant contributions to the project development and that we will present as a group in the ACUR Conference.

Darsiha Balakirishnan and Nibras Jasim

Effects and mechanisms of Tai Chi on dementia risk factors and early-stage dementia: A scoping review

Background: Dementia is associated with a decline in cognition and mobility, often co-occurring with depression. Early-stage dementia is characterised by cognitive decline that does not correspond to the age nor learning level of individuals. As there is no cure for dementia, interventions to support health and wellbeing are crucial. Although previous studies have documented the benefits of Tai Chi on health outcomes in people with early-stage dementia, none have systematically investigated these effects and their underlying mechanisms.

Aims: To identify the neurocognitive and psychological outcomes of Tai Chi on people with early-stage dementia and to explore the underlying mechanisms behind its effects.

Methods: We searched systematic reviews (SRs) and randomised control trials (RCTs) on Tai Chi for adults aged 50 years and older with early-stage dementia in MEDLINE, PubMed, Cochrane Library, EMBASE, and major Chinese databases, from their inception to December 2020. No language or publication restrictions were applied.

Results: The results from eight SRs with meta-analyses and seven RCTs revealed that Tai Chi had a mix of significant and non-significant effects compared to the control groups with regards to neurocognitive outcomes, including global cognition and visual span, memory, executive function and language, and perceptual-motor function. However, there were no significant between-group differences in attention and depressive symptoms. No studies of early-stage dementia investigating the underlying mechanisms of Tai Chi were identified.

Conclusion: Although Tai Chi shows promising effects on neurocognitive outcomes in people with early-stage dementia, further trials, and mechanistic studies are needed to fully appreciate these benefits.

Shannon Campbell and Zoe Chandler | Shannon Campbell: Graduate Diploma of Legal Practice, Bachelor of Laws, Bachelor of Health and Medical Science, the University of Adelaide

"That's just like, your expert opinion, man:" Evaluating the Credibility of Expert Evidence in Legal Contexts

The admission of expert opinions carries significant evidentiary value to assist the justice system. Recent research has revealed expert evidence is seldom supported by scientific rigor, and without requisite expertise to scrutinise, judges and juries presume such evidence is credible. Concerningly, each discipline defines credibility differently, preventing credibility from being translated between fields. Therefore, this research builds upon scientific and legal notions of expert credibility by comparing formal definitions with perceptions of lay people to create a uniform expert credibility assessment standard. This study aimed to encourage transparency of forensic evidence and to examine to what extent popular beliefs about expert credibility are reflected by scientific and legal notions of credibility. To do this, participants (n=142) were surveyed to first state characteristics of credible experts (n=426), then rate 36 variables in order of importance. The ranked variables were reduced into 4 broad factors (reliable, rigorous, confident, conservative). Three examiners compared the qualitative responses with these variables. These results are largely consistent with theoretical notions of credibility. 'Reliability' was the most influential factor on expert credibility with transparency being the most valuable characteristic. Based on our findings, a credibility assessment tool containing 14 items was created. This tool reduces discrepancies in definitions of 'credibility' by incorporating scientific, legal and general understandings of reliability into a single assessment. This encourages transparency and allows for in-depth scrutiny of expert evidence. Additionally, this study allows for a general understanding of public perception on expert credibility to use as a baseline for future research.

Australian National University

Multidisciplinary Perspectives on the Environment | 16th September 3pm

Session ID: 16.15.1

Jessica Tacey | Bachelor of Science (Honours), the University of the Sunshine Coast (USC)

A social distancing dilemma: Eastern water dragons do not modify their social behaviour to avoid a lethal fungal disease

Emerging infectious fungal diseases are considered responsible for 72% of disease-driven extinction events, with the proportion of documented fungal disease records increasing seven-fold in just 15 years. Group-living species often use social behaviour to avoid infection; diseased individuals isolate from the group, or healthy animals avoid those diseased conspecifics. However, there remains a lack of knowledge about social behaviour as a mechanism to avoid fungal infection. Here, we used a population of free-living eastern water dragons (Intellagama lesueurii) that are known to be impacted by an emerging infectious fungal pathogen (Nannizziopsis barbatae) as a study system, to better understand how species may modify their social behaviour to avoid fungal infection. Eastern water dragons are a large, long-lived reptile native to the east coast of Australia. They are highly social, preferentially associating with or avoiding certain individuals in their population. Within a single park located in Brisbane's Central Business District, we tracked social interactions between individuals over a five month period, and recorded the outcomes. Based on data collected from 647 observations of 126 unique individuals, our results suggested that (1) diseased dragons were not less social than their non-diseased conspecifics, and (2) non-diseased individuals avoided socialising with more severely diseased conspecifics. These findings warrant further investigation, given the implications for increased risk of disease spread and the potential for population decline if there are limited behavioural mechanisms to mitigate disease transmission.

The author acknowledges the advice and assistance provided by Associate Professor Celine Frere, Dr Barbara Class and Coralie Delme.

Ruby Olsson | Bachelor of Politics, Philosophy and Economics, the Australian National University (ANU)

An Inquiry of Reviews: International Conventions and Water Governance in the Murray-Darling Basin

Water allocation in the Murray Darling Basin is a hugely conflicted space in Australia, which the Commonwealth sought to address through the 2007 Water Act and 2012 Basin Plan. The Commonwealth's intervention in water allocations,

traditionally the domain of the states, relies on international environmental conventions for constitutional legitimacy. However, many scholars argue Australia is not fulfilling its obligations under these conventions, which include the Ramsar Convention on Wetlands and the Convention on Biological Diversity. This paper examines existing reviews and inquires of the Murray Darling Basin to assess recommendations on the implementation of international environmental conventions. As a crucial vehicle for adapting water governance, it is the role of reviews and inquiries to identify if Australia is failing to fulfil its obligations under international conventions and make recommendations to amend this deficiency.

This paper involved the qualitative coding of recommendations from reviews and inquiries on water governance in the Basin published between 2003-2021. To assess the implementation of international environmental conventions, recommendations relating to ecosystems were coded into the categories of explicit mention of the conventions, language of the conventions, and convention intent. This paper found that only two reviews identified that the Basin Plan was not fulfilling its obligations under the conventions, and that three recommendations undermined rather than realised the intent of the conventions. The failure of reviews to recommend action to sufficiently meet Australia's international obligations hinders progress towards protecting the Murray-Darling Basin's environment and jeopardises the constitutional legitimacy of the Basin Plan.

Australian National University

Dark Histories, Critical Eyes | 16th September 4pm

Session ID: 16.16.1

Ginger-Rose Harrington | Bachelor of Ancient History, Macquarie University (MQU)

Death on the Nile: the Tomb of Hesi in Saqqara

Emerging from beyond the veil of conspiracy and murder, the ancient Egyptian tomb of Hesi is a fascinating – albeit under-discussed – monument. This mastaba is located in the Teti Cemetery at Saqqara, where it was initially dedicated to the Sixth Dynasty vizier, Hesi. However, due to his suspected involvement in King Teti's assassination, the vizier's name and image were quickly erased from the monument, after which it was allocated to another official. Today, due to its almost total lack of publication, the tomb affords still greater resistance to the task of disentangling the life and crimes of its owner. The present work, therefore, comprises two simultaneous focuses. The first is cataloguing the tomb's architectural and artistic profile, noting any state-sanctioned graffito with which it is scarred. Comparing these findings with the broader cemetery's later treatment demonstrates how some heinous crime was, indeed, perpetrated against the king – an offence for which several officials, including Hesi, were severely punished. The charge of regicide is henceforth argued, corroborating the findings of several Egyptological studies of late-Old Kingdom biographical literature. The second focus is reconstructing the political landscape upon which this offence was perpetrated. By statistically analysing the distribution of official titles throughout the cemetery, this work demonstrates how King Teti had tried – and ultimately failed – to decentralise the growing power of the vizier. Identifying a hitherto unrecognised correlation between the tombs' extent of defacement and the official titulary with which they are inscribed, it suggests that Hesi's assault was agitated by restrictive political reforms.

RACHEL TAN SUE WIN | Bachelor of Laws and Arts, the University of Adelaide

Please listen to us: Upholding Honest and Respectful Consultation with Aboriginal and Torres Strait Islander Communities in Australia

The legacy of colonisation in Australia has effectively silenced Aboriginal communities, even until today. The catalyst for this research is the importance of authentic and culturally appropriate consultation with Aboriginal communities as opposed to the common formulaic or tokenistic consultations with Aboriginal people whose voices are often ignored.

Legally sound consultation is governed by the Gunning principles, but is incomplete for Aboriginal consultation. The research question formulates a template of good practice for appropriate consultation with Aboriginal communities. There is no single model that defines 'honest and respectful' consultation and partnering closely with Aboriginal communities to determine what promotes their well-being, beliefs and traditions is crucial.

This research investigates conventional consultation protocols, which inadequately cater to diverse Aboriginal customs and practices. The progressive steps taken by Canada and New Zealand regarding consultation with their First Nations people are examined in contrast. Finally, examples of both good and poor practices of consultations from Australia are considered.

The first step is to acknowledge and validate the injustices Aboriginal communities have and still endure. Aboriginal communities understandably want honest and respectful consultation, to be properly heard without being imposed with fixed questions, checklists or predetermined solutions. Meaningful consultation requires continuous relationships and rapport, uninterrupted and unrushed time.

Law reform and policy is not just for lawyers, experts and governments. Legally sound consultation is insufficient and principles for honest, respectful and culturally appropriate consultation with Aboriginal communities should be a template for modern essential practice, entirely discarding the common perfunctory consultations with Aboriginal communities.

I would like to extend my deepest gratitude to David Plater for his unwavering support and profound belief in my abilities.

Arabella Hall | Bachelor of Arts (Honours), the Australian National University (ANU)

Responding to the Silences of Australia's Archives through Coleman's Terra Nullius

The archive constitutes a well-established site of immense political power yet its involvement in the legitimisation of the logics and operations of racial privilege has proved difficult to disrupt, leading many to despair at their persistence. Indeed, since its inception in the 1970s, critical race theory has laboured to see such institutionalised racism both acknowledged and condemned. In an Australian context haunted by a colonial past, racial injustices certainly endure as a result of the concurrent silence and violence of its colonial archives and these injustices continue to be felt many Indigenous communities, albeit, in diverse manners as well as measures. Yet, in their applications of critical race theory to this context, Aileen Moreton-Robinson, Lisa K. Hall and Natalie Harkin consistently hail Indigenous scholarship and Indigenous voices as uniquely qualified for the interruption of problematic practices of knowledge production premised on and invested in white privilege. Based on Moreton-Robinson, Hall and Harkin's contributions to critical race theory, this paper critically examines Claire G. Coleman's 2017 novel Terra Nullius insofar as it

represents a rupturing insertion into Australia's colonial archive which markedly infers it with possibilities for healing and empowerment. This reading of Terra Nullius not only substantiates the subversive potentials of Indigenous voices as they are espoused by the likes of Moreton-Robinson, Hall and Harkin but also reiterates how crucial the promotion and encouragement of Indigenous voices and scholarship are to addressing Australia's enduring confrontations with racial injustice.

Australian National University

Body Image and Eating Disorders | 16th September 4pm

Session ID: 16.16.2

Emma Brown | Bachelor of Psychology (Honours), University of the Sunshine Coast (USC)

Personality as the missing piece in the body image puzzle.

While there is consensus that online environments like social media can threaten body image, research demonstrates personality traits also influence body image and appreciation. Body appreciation is an emerging construct defined through respect and acceptance of one's body. It warrants ongoing concern, as in its absence, research suggests negative body image is associated with higher risks of eating disorder onset, poor self-esteem and symptoms of depression.

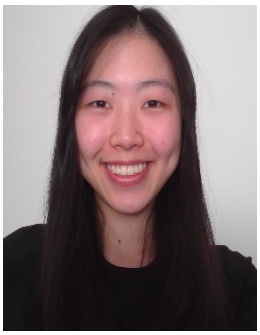
For this cross-sectional correlational study, it was hypothesised that the trait of extraversion would be positively related to body appreciation and neuroticism would be negatively associated with body appreciation. Neuroticism, also termed emotional instability is one of the big five personality traits. It is characterised by the experience of negative emotions, anxiety, and impulsiveness. Individuals who score higher on this dimension have a greater disposition to self-consciousness and perfectionism. Extraversion, or how outgoing a person is, is seen through sociability, positivity, assertiveness and excitability. To understand the extent these variables were related to body appreciation, 74 University students participated by completing an online survey drawn from reliable, extensively validated assessment tools including the Body Appreciation Scale and the Big Five Inventory of Personality. Based on participants self-reported ratings on a 5-point Likert-scale, scores were totalled and divided across the item categories, allowing mean scores to be calculated for each dimension. Pearson correlations using an alpha level of .05 showed a positive mild correlation ($r = .34$, $p = .003$) between extraversion and body appreciation. A large effect size was observed through the statistically significant negative correlation ($r = -.74$, $p <.001$) between neuroticism and body appreciation. These alarming statistics show individuals scoring higher on neuroticism report having very limited body appreciation. The findings from this study reaffirm the importance of developing intervention strategies to foster body appreciation. It was recommended that delivering programs to increase media literacy would promote critical thinking in the context of media consumption. This, in turn would aim to reduce internalization of unrealistic yet unfortunately prevalent beauty and weight ideals expressed throughout the media and society.

Laura Mobbs | Bachelor of Psychology (Honours) Macquarie University (MQ)

Does Paying Attention to Muscular Bodies Make Us Feel and Look Less Muscular?

Body image disturbance (BID) is a cause of distress amongst the population and is associated with the development of disorders such as anorexia nervosa and muscle dysmorphia. BID has two principal components. The attitudinal component involves feelings of body dissatisfaction (BD), while the perceptual component involves misperceiving oneself as higher in body fat or lower in muscle. While attention to idealised bodies in the media has been blamed for BID, similar effects have been demonstrated in the laboratory. Prolonged exposure – known as "adaptation" – to extreme (e.g. low fat or high muscularity) bodies makes subsequently seen bodies seem opposite in appearance (i.e. higher in fat, or lower in muscle). While attention to high- or low-adiposity bodies has been shown to influence body adaptation, it is not known whether attention also affects muscularity adaptation. The current study aims to answer this question through a 2x2 mixed experimental design analysed using two 2x2 mixed method ANOVAs. Participants adjusted 'test' bodies to a size they perceived as 'normal' and completed a body dissatisfaction questionnaire before and after simultaneous exposure to images of high- and low-muscularity bodies. Participants were instructed to either attend to the high- or the low-muscularity body. If attention is important in the development of BID, participants who attend to the high-muscularity body (low-muscularity) should exhibit an increase (decrease) in BD and a decrease (increase) in perceived muscularity. This is significant as it may help to explain why only some people develop BID, despite similar exposure to idealised bodies. Therefore, the results of this study are of importance as they could be used to inform the development of future treatments for BID.

This project was supervised by A/Prof Kevin R. Brooks and A/Prof Ian D. Stephen.



Shi (Tina) Lin | Bachelor of Nursing, Western Sydney University (WSU)

Developing and piloting oral health promotional resources for people with eating disorders

Introduction: Research has demonstrated close links between people with eating disorders (ED) and their oral health, including an association with tooth erosion. Given the risk of dental problems among individuals with ED and their risk of poorer oral health outcomes, it is important to consider the promotion of oral health in this population. There is limited evidence of adequate oral health resources to assist in the promotion of oral health in ED, and therefore a need to develop specific evidence-based resources.

Aim: This project aimed to collaborate with stakeholders to develop and pilot test a resource to support oral healthcare among individuals with ED.

Methods: A systematic search of peer-reviewed and grey literature was conducted across multiple electronic databases to retrieve information related to the impact of ED on oral health and key messages. Data were collated with the use of EndNote and evidence-based oral health messages were synthesised and recorded in Word.

Results: A preliminary health promotion brochure was designed in consultation with the study team with images and relevant oral health messages. We sought feedback from stakeholders, including ED organisations, local health district representatives, dental associations, and academics, on content, readability, and layout. The next stage involves piloting the resource with consumers to obtain feedback on acceptability before seeking endorsement from NSW Health and a peak professional ED organisation.

Conclusion: This brochure offers consumers sound advice on healthier choices, education about the effects of poor oral health, how to prevent further damage and where to access further support.

I would like to thank Lucie Ramjan, Ajesh George, Tiffany Patterson-Norrie, Jacqueline Rojo and Mariana Sousa for allowing me to take part in this project and for giving me this opportunity to grow in my academic career as a student.

Australian National University

Neurodegenerative Diseases | 16th September 4pm

Session ID: 16.16.3

Sanyukta Singh | Bachelor of Science (Honours), University of Sydney

Brain-derived cell-free DNA as a potential blood biomarker to differentiate behavioural-variant frontotemporal dementia from primary psychiatric diseases

Behavioural-variant frontotemporal dementia (bvFTD) is the second most common type of dementia in adults aged 45 to 64. The symptoms of bvFTD, which include changes in behavioural and emotional responses, overlap with those of primary psychiatric disorders (PPD) such as schizophrenia and bipolar disorder. This overlap results in a misdiagnosis and an average diagnostic delay of 6 years. There is a need for a reliable and economic test to diagnose bvFTD, particularly sporadic bvFTD in which cases lack genetic underpinning. Cell-free DNA (cfDNA) are DNA fragments that are deposited in blood plasma following cell-death. Our group identified the presence of brain-derived cfDNA within blood plasma following neurodegeneration. We hypothesise that the neurodegeneration that causes dementia will result in an increase in brain-derived cfDNA. The aim of this research project is to evaluate brain-derived cfDNA as a potential blood biomarker for the diagnosis and differentiation of bvFTD and PPD. We have assessed the levels of brain-derived cfDNA within 96 dementia patients and 15 age matched controls by sequencing analysis of cfDNA DNA methylation and are currently performing statistical analysis. In addition, we have used neuropsychiatry, brain imaging and genetics to identify 73 bvFTD and 33 PPD patients for inclusion in an ongoing multinational collaboration to develop diagnostic methods for bvFTD and PPD. Brain-derived cfDNA has the potential to diagnose bvFTD early and prevent the misdiagnosis of PPD.

Sarah Rosolen | Bachelor of Science (Medical Science), The University of Sydney (USYD)

Effect of exercise on metabolic activity in astrocytes in the 5xFAD mouse model of Alzheimer's Disease

Alzheimer's Disease (AD), a progressive neurodegenerative disease and second most common cause of death in Australia (ABS 2019), is an increasingly prominent societal issue, exacerbated by an ageing population and absence of effective disease-modifying treatments. Hence, focus has shifted to targeting modifiable lifestyle factors to slow or prevent AD onset and progression, such as exercise. Adiponectin, an anti-inflammatory adipokine, regulates energy metabolism and is associated with metabolic pathways potentiated following exercise. Animal and human studies have consistently demonstrated increased serum adiponectin levels following various exercise regimes. However, the

ability of adiponectin to cross the blood brain barrier and thus mediate neuronal metabolism is contentious. Yet, expression of adiponectin receptors within neuronal cells implies adiponectin holds an important function within the brain. We investigated cortical expression of adiponectin receptors, AdipoR1 and AdipoR2, in the aged 5XFAD mouse model of AD following an exercise intervention. Immunohistochemical techniques were applied to double stain brain tissue for adiponectin receptor and astrocyte expression. We observed neuronal AdipoR1 and AdipoR2 expression throughout the cortex of both exercised and sedentary control mice, however, neither receptor expression was significantly altered in the exercised mice relative to controls. Extensive expression of activated astrocytes was similarly observed throughout the cortex. Colocalisation analysis suggests astrocytes may utilise adiponectin receptors to fuel their metabolic activity in degrading toxic amyloid plaques within the AD brain. Although our preliminary results do not show altered metabolic activity between exercised and sedentary mice, the complex interrelationships between adiponectin receptor expression, exercise and AD require further investigation.

The completion of this research project would not have been possible without the expertise, support and dedicated involvement of my research supervisors, Dr Damian Holsinger and Quy-Susan Huynh.

Tabitha Singer | Bachelor of Occupational Therapy (Honours), Western Sydney University (WSU)

The Efficacy of Imagery in the Rehabilitation of people with Parkinson's Disease

Background: Parkinson's disease (PD) is characterised by a slowing of body movements, decreased balance, and difficulty initiating movements, thereby affecting everyday activities. Imagery may be a suitable treatment for such decline. Currently, there is no evaluation of the literature regarding the efficacy of imagery in PD.

Objective: To gather and synthesize research on the use of imagery in PD, and determine its efficacy in improving rehabilitation outcomes as classified by the components of the International Classification of Functioning, Disability and Health (ICF): body structure and function, activity, and participation.

Methods: A computer-aided literature search was conducted from inception to June 2021 in MEDLINE, EMBASE, Web of Science, Cochrane, PsycInfo, CINAHL, and Scopus. Search terms included "Parkinson's Disease", "Hypokinesia", "Guided Imagery", and "Mental Imagery". Randomised controlled trials were included. Characteristics related to participants, intervention, and results were extracted. Methodological quality was assessed using the PEDro scale.

Results: 281 individuals with PD from 11 studies were included. The methodological quality of the included studies was high (median PEDro score: 7/10). Six studies reported improvements in at least one component of body structure and function evaluated (cognition, balance, and gait), and four reported improvements in activity and participation (mobility).

Conclusions: Imagery was shown to promote improvements in some categories of the ICF. Based on the present findings, imagery can be recommended for individuals with PD when used in conjunction with other therapies. The current evidence pertains to cognition, balance, gait, and mobility. Further studies are recommended to review its effects on everyday activities.

I wish to thank my Honours supervisor, Professor Karen Liu, as well as Mr Paul Fahey for their contribution to this work.

Australian National University

Gender and Sexuality II | 16th September 4pm

Session ID: 16.16.4

Weifeng Tao | Bachelor of Arts, the Australian National University (ANU)

Sex consent: not nearly enough to regulate respectful relationships

Associations between sexual consent and ethical sex relationships have long been examined and subjected to debates. While consent is believed to be a key criterion in constructing respectful sex relationships, it is also seen as a controversial concept and criticised in a number of feminism literature. This paper argues that sexual consent is a 'cruel optimism' in both heterosexual and homosexual male relationships, which tends to reflect gender inequality and facilitate sexual violence rather than alleviate them.

The research is literature-based. This research finds that 1) consent only servers as a formal minimum requirement for legally acceptable sex, but not moral sex or desired sex; 2) The universal failure of consent in constructing moral and desired sexual relationships, firstly, results from its inherent ambiguity in conception and measurement. The general request-and-consent-or-refusal model itself also unfairly reflects women's passivity and assumed submissiveness; 3) Women's actual sexual consent communication ability is often restricted by patriarchal social and gender norms. Women in relationships tend to face the risk of date rape and martial rape due to the implied consent; and 4) Beyond heterosexual relationships, the failure of consent in regulating respectful homosexual relationships among gay men is also notable. This is associated with assumed gay men's hypermasculinity and hypersexuality, weak consent communication and implied consent within the gay community.

This research aims to respond to the debates and contribute new perspective on the effectiveness of sex consent. This report also contributes literature to feminism and queer theory, gender studies and relevant areas.

Brooke Petre | Bachelor of Arts (Sociology), Massey University, New Zealand

An LGBTIQA+ Hall: the exploration of resident perspectives on inclusion and support.

Current literature promotes the cultivation of safe spaces on university campuses for marginalised communities to build strong, supportive connections among their peers (Fetner et al., 2012). However, residential halls as a locale of safe spaces is considerably contested, particularly from those who cite re-segregation concerns (Hope & Hall, 2018). In 2021, Massey Halls provided the opportunity for those who identified as LGBTIQA+ to opt into an LGBTIQA+ inclusive hall. This mixed methods study explores residents' perceptions within

this hall and compares this with perceptions of LGBTQIA+ residents in other halls through an anonymous survey. The survey found that the LGBTIQA+ residents' hall was an affirming space for students; 100% of respondents from the LGBTIQA+ inclusive hall strongly agreed that their hall peers were accepting of their identity, compared with 57% of LGBTIQA+ in other halls. The thematic analysis of this study highlighted connectedness, privacy, education, relevance, and safety as key themes within resident's perspectives and saw the evidence of two distinct opinions. One group signalled the space lacked relevance, the other group deemed it a safe place of inclusion and acceptance. It is argued that providing LGBTIQA+ residents the opportunity to opt into residential safe spaces is a positive resolution to the argument of whether such spaces should exist. For LGBTIQA+ residents who determine these spaces are valuable to them, such spaces might just be life changing.

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With thanks to my research supervisor, Dr Alice Beban.

Kip Hay | Bachelor of Social Science (Honours), The University of Newcastle.

Trans and Gender Diverse People's Experiences in Australia

Feminism has a history of exclusion, shaped by ongoing frictions over the core goals of the feminist movement and in what ways to incorporate the needs of marginalised groups whose experiences of patriarchy are not fully articulated within mainstream feminist politics – such as women of colour, disabled women, and trans people of various genders. 'Trans Exclusive Radical Feminists' (TERF's) antagonism towards transgender and gender diverse people's inclusion within feminism is a key example of this. While TERF ideology is not shared across all of feminism, it still has a pervasive influence. This research utilised semi-structured qualitative interviews drawing upon Bourdieu's theory of practice to investigate the experiences of transgender and gender diverse individuals' experiences in feminist spaces within NSW and ACT, Australia. It also explored their strategies for navigating their participation in these spaces. Participants engaged in a range of what they classified as feminist spaces both online and offline: including women's spaces, activist spaces, and queer and trans spaces. Feminist spaces were categorised by participants as those where the individuals engaged with them are feminists, with shared values and progressive leaning political views, and with feminist principles directly shaping group dynamics. Participants had a range of experiences in these different spaces with some facing transphobia and bullying, while others experienced

support and positivity. These experiences were shaped by a combination of individuals' gender identity and presentation, their strategies for choosing and navigating spaces, and particular group dynamics and politics.

Rebecca Marie Hetherington | Bachelor of Laws / Bachelor of Arts (Social Justice) (First Class Honours), The University of Notre Dame Australia (Sydney) (NDA)

Governing Through Self-Care: Neoliberalism and Gendered Labour in the Lorna Jane Brand

My thesis explored how Lorna Jane (LJ), an Australian women's fitness fashion brand, encourages self-regulation of women's bodies and minds, and how this represents a novel form of gendered labour in modern times. Using a combination of Foucauldian and feminist theory and Critical Discourse Analysis, I analysed three sites within the LJ brand: the retail website, the "Move, Nourish, Believe" blog, and the Active Living App. The LJ brand represents an intersection of postfeminist media culture, discourses of healthism, and neoliberal forms of regulation. It presents itself as empowering and health-focussed, yet covertly contributes to the maintenance of beauty ideals. Importantly, it reflects what feminist scholars have identified as the "psychic dimension" of neoliberalism, whereby subjects are encouraged to, and regulated through, continual refashioning and improvement of one's mind. "Postfeminist media culture" represents the evolving yet contradictory discourses that characterise contemporary gender relations. Recent feminist scholarship has turned to these phenomena, exploring a range of sites within popular culture and discourse. My research found that the LJ brand, while premised broadly on health and wellbeing and presenting an image of feminine empowerment, nonetheless contributes to the enduring regulation of female bodies — and increasingly minds — promoting an array of "self-care" practices. In particular, the brand encourages a range of "psychic" self-care practices that constitute new forms of gendered labour. My research explores the role and implications of postfeminist media culture, and demonstrates the capacity of popular discourse to evolve with critique, and the ongoing need for critical feminist analysis.

I would like to acknowledge my Honours Supervisor, Dr Denise Buiten, for her incredible support, guidance, and feedback.

Australian National University

Physical Chemsitry | 16th September 4pm

Session ID: 16.16.5

Fletcher Howell | Bachelor of Science (Advanced) (Honours), The Australian National University (ANU)

Unidirectional motion of a [2]-catenane molecular machine

Molecular machines use repeated directional motion to perform work. A key application for molecular machines is the conversion of one form of energy to another, like how a car converts chemical potential energy from fuel to kinetic motion of the wheels. Despite being a candidate design atomic-scale engines, no [2]-catenane system that can perform work has been conclusively defined in synthesis nor in simulation.

A [2]-catenane is a molecule comprising two interlocked rings. The smaller, minor ring can move freely around the major ring. When a [2]-catenane is dissolved in a solvent, like water, random collisions with vibrating solvent molecules cause the minor ring to move. These collisions equally move the minor ring forwards and backwards, so it experiences no net directional displacement. To behave as a molecular machine the chemistry of the [2]-catenane must be manipulated to provide a force that directs minor ring motion into repeated cycles in one direction.

This research has developed a simplified simulation of a [2]-catenane in solvent to define a scenario that optimises unidirectional minor ring motion. A forcefield is defined that imparts variable force on the minor ring as it moves. An asymmetric forcefield, with greater resistance to motion in one direction, is shown to achieve unidirectional motion in the less resistant direction. Sequentially removing and restoring the forcefield improves the unidirectionality, achieving on the order of 103 unidirectional cycles in 12 hours. The simulation model and optimised results are the first step in helping guide chemical design to synthesise a real-world [2]-catenane molecular machine.

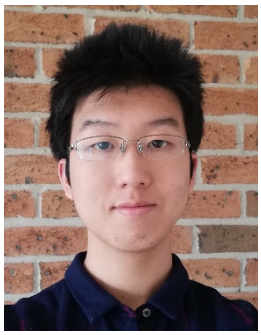
The author would like to acknowledge the support of Prof. Edie Sevick for her guidance and support throughout this project.

Tiarne Mitchell | Bachelor of Science (Advanced), the University of Sydney (USYD)

A click chemistry approach towards a new triazole-based self-immolative polymer.

Self-immolative polymers (SIPs) are a special class of macromolecule capable of complete degradation upon the stimulus-directed cleavage of its end-cap. While the unique behaviours of such “smart” polymers are highly promising for applications in sensing, drug delivery and degradable plastic technologies, only a handful of self-immolative backbones have been successfully synthesised to date due to the limited known mechanisms by which self-immolation can occur. As such, there is value in developing new self-immolative backbone motifs to expand the chemical and physical properties that may be expressed by SIPs. Herein we describe the synthesis and characterisation of a new type of SIP design based on a poly(triazolyl urethane) backbone. This was achieved by first synthesising a monomer containing both azide and alkyne terminal functionality. Monomers were then polymerised via the copper(I)-catalysed azide–alkyne "click" reaction, where the azide end of one monomer reacts so quickly with the alkyne end of another it appears as though they simply click together. To establish proof-of-concept, we prepared and studied oligomers (short polymers) of between 4 and 20 units long, controlling the average chain length by the rationed addition of terminal end-caps capable of cleavage via palladium catalysis. In situ NMR time course experiments confirmed successful degradation of these SIPs, and provided insights into both polymerisation and self-immolation mechanisms. Overall, this work establishes a new method for preparing self-immolative polymers using ‘click’ chemistry, and opens avenues for future work including the exploration of longer chains based on this structure, as well as investigating possible alterations to the current design to expand its chemical functionality.

Ms Annmaree Kenny assisted with syntheses; Mr Yuan C. Luong collected SEC data; Dr D. A. Roberts conceived and supervised the project, and collected NMR kinetics data.



Ziqi Yuan | Bachelor of Philosophy (Honours) - Science, the Australian National University (ANU)

The Galactic Helium-to-metal Enrichment Ratio from Low Main-sequence Stars

The chemical elements produced during the Big Bang consisted of almost entirely hydrogen and helium. Subsequent generation of stars produce helium as well as heavier elements (metals), with mass abundances denoted by Y and Z respectively. Hence, the helium-to-metal enrichment ratio, $\Delta Y/\Delta Z$, is one representation of the chemical evolution of the universe.

Stellar helium content required to derive the enrichment ratio is difficult to directly measure, where it is subject to effects of stellar evolution. However, parameters of low mass stars can be assumed to be dependent only on helium and metal abundances. I use a sample of approximately 25,000 low-mass stars observed by the Australian GALAH spectroscopic survey, with highly accurate

measurements of parameters and distances. Comparison against stellar models computed for various helium abundances allow me to indirectly derive helium abundances and hence $\Delta Y/\Delta Z$. I derive a helium-to-metal enrichment ratio of $\Delta Y/\Delta Z \approx 2.1$ along the entire range of the sample, consistent with theoretical estimates.

I identify shortcomings in the methodology currently used to derive helium abundances around solar metallicity, which I suggest to be a primary area of focus for future studies. As the GALAH survey comprises stars belonging to different populations of stars in our Galaxy, the methods I am developing will be able to applied to, and provide insights on the chemical evolution of such populations.

Australian National University

Computer Vision Models | 17th September 9am

Session ID: 17.09.1

Vincent Zhang | Bachelor of Engineering Honours (Mechatronic), Bachelor of Science (Computer Science), the University of Sydney

The effectiveness of object-based saliency models for making 360° video streaming more efficient and lightweight

360° video streaming has received significant interest over the past few years with streaming providers such as Facebook delivering 360° video content in higher resolutions and frame rates. Saliency models are visual representations of interesting areas within a 360° video frame. They plan an important role in efficient video streaming. Traditional saliency models rely on low-level features such as colour to highlight salient regions. However, these methods can perform badly in complex scenes where there are multiple regions of interests. This is because low-level saliency models do not take the context of a scene, created by the scene's objects, into account. To bridge this gap, this paper proposes an object-based saliency model that considers the contextual relationships between objects within a scene. We examine the effectiveness of this model in predicting the distribution of salient areas (saliency prediction) and user viewpoints within a scene (field of view prediction). Our results show that the addition of an object-based saliency component to low-level and motion-based saliency maps results in superior performance for both saliency and field of view prediction. These findings can be used to inform further research into alternative context-based saliency models for efficient 360° video streaming.

I would like to thank my co-authors: Chamara Kattadige, Amaya Dharmasiri and Prof. Kanchana Thilakarathna for their feedback and support with refining the manuscript.

Xinqi Zhu | Bachelor of Advanced Computing (Honours), the Australian National University (ANU)

Including occlusion in Human Pose Estimation benchmark - a photorealistic synthesis approach

Human Pose Estimation (HPE), defined as the problem of localization of human joints (also known as keypoints, e.g., neck, elbows, ankles, etc.) given images or videos in the wild, is the fundamental problem in all human-centric tasks in computer vision. Current research commonly relies on two public datasets, MPII and COCO. The performance on these datasets has been almost saturating despite the numerous novel methods proposed in recent years. However, most State-Of-The-Art (SOTA) models suffer huge degradation when testing on data with an occluded person (i.e., part of the human body not visible from the

viewpoint), and this problem has not been well studied in this field. The lack of large-scale datasets that specifically include occlusion is the main barrier to related studies. To solve this problem, this research designs a synthesis pipeline to generate samples under occlusion scenarios by animating 3D human models in a modern graphics engine. The finalized pipeline, named as PoseX v1.0, has been through multiple evolutions, guided by assessing different designs on 3 key dimensions – diversity, flexibility, and photorealism. Compared to manual collecting and annotating samples, our approach has a much lower level of cost regarding time, labor and funds. Furthermore, the synthetic dataset is free of the privacy concerns of identifiable persons. We conduct plenty of experiments and demonstrate that our synthetic datasets can boost SOTA model performance and with hyper-parameter for synthesis being controllable, inspire insights into influencing factors in human pose estimation.

I would like to thank Mrs. Xiaoxiao Sun, who has provided lots of guidance about the data synthesis pipeline and experiment design and has also provided valuable suggestions in polishing the thesis and this abstract.

Australian National University

Soil | 17th September 9am

Session ID: 17.09.2

Dejun Cai | Bachelor of Philosophy (Honours) - Science, the Australian National University (ANU)

Model calibration of a satellite data assimilation system for soil moisture prediction using Metropolis-Hastings Markov Chain Monte Carlo algorithm

Accurate estimation of soil moisture (SM) informs water resources management, agricultural planning and weather prediction. A data assimilation system uses satellite data from Soil Moisture Active Passive (SMAP) to optimally correct SM estimates from Antecedent Precipitation Index (API) model towards satellite observations. This study investigated the use of SMAP data in model calibration as another model improvement approach by identifying parameter values that help API model simulate the behaviour of SM variations more realistically. A Bayesian statistical algorithm, Metropolis-Hastings Markov Chain Monte Carlo (MH-MCMC) algorithm, was designed and implemented at 13 study sites in Australia to calibrate two parameters characterising SM memory in API model against SMAP data. Parameter distributions obtained from MH-MCMC were used to produce a collection of possible calibrated model states (ensemble). Uncalibrated estimates, estimates with MH-MCMC calibration and with assimilation were evaluated by linear correlation with in-situ cosmic-ray SM measurements (CosmOz network) within the same 5-year experiment period. Results showed that calibrated parameter values showed clear heterogeneity across sites and their spatial variations were linked to site-specific aridity conditions and seasonal rainfall patterns. MH-MCMC calibration improved model performance by as much as 105% for 11 sites. Data assimilation generally attained better performance than calibration, but there were two sites where some members in the calibrated ensemble improved SM estimation more evidently. These results demonstrated merits of site-specific model calibration and highlighted the prospect of complementing data assimilation with MCMC-based calibration. This would help maximise model accuracy for SM estimation and ultimately support various hydrological, agricultural and meteorological applications.

Mikayla Hyland-Wood | Bachelor of Advanced Science (Honours), the Australian National University (ANU)

Closing Agricultural Nutrient Gaps with Human Waste Streams: Case Study of Tongatapu

Global soil quality is declining with the depletion of nitrogen, phosphorus and potassium (NPK) macronutrients and soil organic carbon (SOC) as a result of human activity. Reduced soil health has stagnated farming productivity in Pacific Island Countries (PICs) such as Tonga, forcing high importation of expensive chemical fertilisers (~$500,000 per annum). This study uses Tonga's largest island, Tongatapu, as a case study for modelling human waste repurposing for agriculture. Human waste streams present an alternative to chemical fertilisers as a cheaper, domestic nutrient source and have associated environmental, social and economic benefits for the people and soils of Tonga. This research takes a literature review methodology to determine the nutrient breakdown on human waste streams, existing conversion methods and crop rotation recommendations. Perennial crops have been found to assist in NPK and SOC storage and final estimates suggest 100-200 ha of taro, legumes and coconut crops can be sustainably farmed with biosolid fertilisers on Tongatapu. This is a 1.2% reduction in chemically fertilised land. Additional benefits are identified in the environmental sphere, including diminished disease risk and lagoon pollution from human waste. Further research is required to gage social uptake and consider whether this intervention is economically feasible in a Tongan context.

Thank you to Prof. Jamie Pittock, Dr. James Quilty and Dr. Ben Macdonald for their support in bringing this project to life.

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Tori-Lee Monk | Bachelor of Science, Western Sydney University (WSU)

The role of fungi in allelopathy

Soil fungi contribute substantially to plant health and community structure, through their own community structure and functional diversity. Microbes are increasingly being recognised for their role as enhancers and mediators in biochemical plant-to-plant communication known as allelopathy. Allelopathy is classically defined as an exchange in which the production of secondary metabolites from donor plants typically inhibits the growth or productivity of target plants, thereby modifying the structure of plant communities. Interestingly, plants with close associations with fungi are suggested to be more sensitive to the effects of allelopathy. In this project, we investigate potential drivers of stunted commercial pine plants (Pinus radiata), showing inhibition by a native Australian heath plant known as nana (Allocasuarina nana). Our site is located in the Bombala region of NSW, and is characterised by three vegetation types identified by the density of pine and nana plants; "dense pine", "medium nana" and "dense nana" respectively. Rhizospheric soil samples (collected from the top 10cm of soil) were taken from six plots within each vegetation type, for use in amplicon sequencing for fungal community analysis and un-targeted metabolomic analysis for the detection of soil metabolomic

features. Community analysis indicates distinct functional differences by vegetation type, seen in relative abundance and classification of taxonomy and putative lifestyle. Similarly, trends observed in metabolomic analysis suggests biochemical gradients consistent with vegetation density. Overall, our findings revealed that the above-ground differences in community structure are reflected below-ground, both in fungal communities and soil metabolomic profiles, showing a unique perspective in allelopathy.

I would like to thank my supervisors, Jonathan Plett and Krista Plett for their support and encouragement throughout this project.

Australian National University

Group presentations II | 17th September 9am

Session ID: 17.09.3

Jessica Turner[1] and Narelle Jones[2] | [1]Bachelor of Science (Honours), the University of Adelaide; [2]Honours (Animal Science), the University of Adelaide

Cold blooded, but not unfeeling

Welfare assessment tools are used in zoos to monitor animal welfare. Reptiles are increasingly being held in zoos, however, most assessment tools developed primarily focus on mammals and rely heavily on resource- based indicators, with little research existing on the use of animal- based measures for reptile welfare assessment. The project aims to develop and validate a reptile specific welfare assessment tool and compare the outcome with that generated by a generic assessment tool through observational studies of 5 Tortoise collections (n=20) across 2 locations. 17 animal-based indicators including physical condition, relaxed movement and feeding, environmental exploration, co-occupant aggression and the occurrence of stereotypic behaviours, were identified as having potential for inclusion in a tortoise-specific welfare assessment tool through expert consultancy, and a pilot study was conducted to develop a testable prototype. Observations will occur before and after an environmental change designed to improve the animal's welfare, and the welfare scores generated using both assessment tools will be compared. It is expected that the use of reptile specific indicators will produce an assessment tool that is more sensitive to changes in behaviours indicative of the welfare of captive tortoises when compared to the use of non-reptile-specific assessment tools. Preliminary results indicate that variation in welfare scores exists, with the prototype producing lower scores than the currently implemented tool, however, it has not yet been determined if the difference is statistically significant. A validated reptile-specific welfare assessment tool that is more sensitive to changes in behaviours indicative of welfare will provide a foundation for future research with the aim of improving the welfare of captive reptiles by improving the accuracy of zoological welfare assessments.

We would like to acknowledge our supervisors Dr. Alexandra Whittaker and David McLelland, ZooSA and ZooVic for their contributions.

Asha Clementi[1] and Rebecca Crisp[2] | [1]Master of Diplomacy, the Australian National University; [2]Bachelor of Laws (Honours) and Bachelor of Politics, Philosophy, and Economics, the Australian National University

Reality or rhetoric: The role of education in achieving gender equality in Myanmar

United Nations Secretary-General António Guterres recently declared gender equality to be 'the unfinished business of our time'.1 Equality of opportunity, regardless of sex, seems a clear and accepted goal for policymakers. However, in most countries, progress remains slow. This report explores how, and why, some strategies for pursuing gender equality are failing to achieve progress.

For decades, education has been promoted as an invaluable tool for promoting gender equality.2 However, research into education in Myanmar challenges this assumption. Women outnumber men at every stage of education, yet remain economically repressed and politically underrepresented. Our research explores why traditional education reform is failing the women of Myanmar. Through policy analyses and interviews conducted in schools, communities, and political arenas, we investigate the disjunction between increased participation of women in education and improvements in post-education outcomes. By affirming existing gender inequality, the current education system is creating an unbroken cycle of discriminatory attitudes and outcomes.

We recommend integrated reform of Myanmar's school curriculum, examination structure, teacher training, and resourcing. By redefining children's experience in school, Myanmar's government can transform education into a tool to empower, not repress, the women it shapes.

We would like to acknowledge the contributions of the course convener, Ben Hillman, tutors Anthea Snowsill and Dinith Adhikari, along with our Burmese translators, guides, and interviewees who made this research possible.

Australian National University

Brain Research | 17th September 9am

Session ID: 17.09.4

Andrew Quattrocchi | Bachelor of Science and Bachelor of Advanced Studies (Advanced) (Honours), the University of Sydney

Alzheimer's Disease: Perivascular Macrophages and the Blood-Brain Barrier

In Alzheimer's Disease (AD), blood-brain barrier (BBB) dysfunction and vascular leak are early preclinical pathologies. The BBB is comprised of endothelial cells, pericytes and astrocytes, and is further supported by the highly connected populations of monocytes, microglia, perivascular macrophages (PVMs) and vascular smooth muscle cells - collectively known as the neurovascular unit (NVU). Loss of BBB integrity is seen as a driver of neurodegeneration, allowing for the infiltration of circulating immune cell populations, the entry of potentially damaging antigens and the accumulation of aggregated proteins within the central nervous system. However, within this complex microenvironment, the nuanced role of PVMs still remains unclear. PVMs are scavenger cells able to sample both the blood and interstitial fluid due to their exclusive location. We aimed to investigate the role of PVMs in maintaining the integrity of the endothelium of the BBB in AD. The APP/PS1 mouse model of AD was assessed, where amyloid plaque formation, the primary AD pathology, is observed at 6 months of age followed by gliosis and global neuronal loss. Immunofluorescence staining and confocal microscopy showed a significant increase in blood vessel-associated macrophages (BVAMs) in these mice compared to age-matched WT controls. Importantly this increase in BVAMs was observed before the formation of plaques, suggesting early changes in the NVU occur independent of the presence of amyloid plaques. Our findings suggest that one of the earliest observable changes in the BBB, in a mouse model of AD, is an increase in BVAMs, potentially implicating them as an important cell of interest in future studies of AD pathogenesis.

These findings are based on the preliminary research conducted by Dr Ka Ka Ting.

Cynthia Jia Ying Feng | Bachelor of Psychology (Honours I), the University of Sydney

Generality of the Forward Testing Effect and the Role of Metacognition

The forward testing effect occurs when repeated testing enhances future learning of untrained materials. Metacognitive explanations, involving "thinking about thinking", propose that this effect is driven by increased effort following metacognitive insight provided by testing. Generality of the forward testing effect across levels of learning (category-based inductive learning, paired associate "rote" learning) and devices (smartphones, computers) was tested to investigate metacognitive mechanisms. Category-based inductive learning is a higher level of learning involving categorisation of novel exemplars using rules abstracted from studied exemplars. Smartphones were compared to computers because smartphone users exhibit more shallow processing and higher metacognitive confidence. Calibrations (the correlations between predicted judgment-of-learning (JOL) and actual performance) were calculated to examine whether testing enhanced metacognitive performance awareness. Using a mixed design (N=74), with medium and training as between-subjects conditions and level of learning within-subjects, participants were tested on Swahili-English word pairs (paired-associate learning) and bird images (inductive learning). Performance and metacognition measures were assessed and analysed using ANOVAs and other analyses. The forward testing effect was not replicated – interim tests did not enhance performance more than restudy. Learning generalisation was not found. However, there was a testing effect on metacognitive measures: for test groups, encoding times were higher. JOLs were lower overall. Findings suggest metacognitive contribution to the forward testing effect. Metacognitive differences indicated testing-induced strategy change, but this alone was not sufficient for enhanced performance. Implications, such as reconsidering a pedagogical emphasis on strategy selection, are then explored, alongside other contributing factors and limitations, such as unequated materials.

Acknowledgements go to my supervisor Emeritus Professor Sally Andrews for her incisive suggestions and for guiding this research project from inception to submission in an uncertain year.

Arjayeeta Samadder | Bachelor of Advanced Studies (Honours), The University of Sydney (USYD)

Overcoming Radio-Resistance by Reducing Oxygen Consumption in DIPG

Diffuse Intrinsic Pontine Glioma (DIPG) is a rare and fatal paediatric brain tumour. It typically affects children between 4 and 11 years old and survival is typically only one year from diagnosis. DIPG tumours are located in the brainstem, making surgical removal impossible. Radiotherapy is the only treatment. However, DIPGs typically reoccur following treatment due to radio-resistance. Radiotherapy uses oxygen to be effective and hypoxia, or low oxygen, is a typical phenomenon in the tumour microenvironment. Hypoxia is therefore a common cause of radio-resistance. Hypoxia can be caused by both poor supply and high demand of oxygen by the tumour cells and if oxygen levels in the tumour could be increased by either increasing supply or decreasing demand, it may be possible to enhance radiotherapy. Previous studies have shown that biguanides like metformin and phenformin decrease oxygen consumption in tumour cells, leading to increased tumour oxygenation and enhanced radiosensitivity. Our aim was to identify more potent drugs that increase radiosensitivity by reducing tumour cell oxygen consumption. We screened a panel of 1963 FDA-approved drugs using the Seahorse assay which measures tumour cell oxygen consumption rate (a marker of mitochondrial respiration) and extracellular acidification rate (a marker of anaerobic respiration or glycolysis), before and after drug injection. We have identified multiple compounds that enhance tumour cell oxygenation in DIPG cells which will be further tested using in vitro and in vivo orthotopic pre-clinical DIPG models, aiming to move into clinical trials. This treatment strategy may prolong survival in children with DIPG.

I would like to acknowledge the co-authorship, contribution and support of my supervisor, Dr Kristina M Cook, co-supervisors Dr Han Shen and Dr Eric Hau, the contributions of Dr Harriet Gee and fellow colleagues, Cecilia Chang and Faiqa Mudassar.

Australian National University

Values, Cultures and Norms | 17th September 12pm

Session ID: 17.12.1

Sophie Hogg | Bachelor of Asian Studies, the Australian National University (ANU)

Banning Bushmeat - The Science and Ethics of Cultural Fearmongering

Since the onset of globalisation, there have been many questions surrounding the prevention of zoonotic disease outbreaks, and how to stop such outbreaks from quickly spreading across the world. Particularly since the coronavirus (COVID-19) outbreak in December of 2019, inquiries into the consumption of wild animals have become increasingly popular among both scholars and the general public. Many analyses have been done to investigate the dangers and possibilities of zoonotic disease outbreaks, both before and since COVID-19. However, very few of these analyses have combined this investigation with research into the biases present in such discussions. When does the Western term “game” become the foreign and fearful term “bushmeat”? What differentiates the Italian and Palauan practices of eating bats? What makes European food clean and safe in opposition to African and Asian food? This presentation seeks to clarify these questions, based on a 2020 essay submitted to ASIA2302, Culture and Modernity in Asia: Anthropological Perspectives. This essay used a combination of a qualitative and analytical research methodology, analysing largely anthropological evidence of interviews, news articles and observations. This essay concluded that the discussion surrounding the consumption of wild animals was often clouded with bias and without a sufficient understanding of cultural or dietary importance. These discussions are particularly stilted due to the “anthropology of disgust”, where the perception of what is dirty or unsafe is more important than realistic health risks.

Bridget Mac Eochagàin | Bachelor of Arts (Honours), the Australian Catholic University (ACU)

Radicalising Rape on Stage: A theoretical framework for subverting ‘the gaze’ and dismantling rape culture

In contemporary discourse, movements such as the Women’s March and ‘Me Too’ have underlined the urgency and topicality of rape culture in society. Their impact has inspired a discussion on how problematic representations of rape in the arts sector feed into a problematic rape culture, that reinforces and privileges the sexual exploitation of women. The purpose of my research was to isolate the contemporary rape plays that challenge these structures. In doing so I identified a trend of theatrical devices that were employed across numerous plays to challenge the idea that rape is sexually gratifying or titillating for audiences. Pulling influence from Feminist Theory and Political Theatre practitioners Antonin Artaud and Aleks Sierz, I created the theoretical framework ‘Radical Rape Theatre’. This framework sets a benchmark against

which to assess rape plays as tools to critique and analyse the prevalence of rape culture in contemporary society. The objective of Radical Rape Theatre is to dismantle the idea of 'the gaze' and facilitate a collective responsibility to challenge the way we view, understand and process representations of rape on stage. My research posits that there are three key theatrical devices that qualify plays as part of the 'Radical Rape Theatre' paradigm. Sarah Kane's Blasted is an apposite example of this genre, and can be considered the earliest contemporary rape play to radicalise and politicise rape for the purpose of subverting 'the gaze'. Blasted is consequently positioned in my research as the cornerstone of this new subgenre of political theatre.

Carmine B Buss | Bachelor of Psychology (Honours), the University of the Sunshine Coast (USC)

Climate Change Scepticism: A Randomised Intervention Using Value-based Messaging

It is well established that climate change is human-caused and that a unified approach to mitigate greenhouse gas emissions should be implemented to limit adverse impacts. Yet climate change scepticism is a major barrier to mitigation efforts. Right-wing orientation and associated values are found to be robust predictors for climate change scepticism. To encourage pro-climate attitudes and mitigation behaviours, traditional education-based communication strategies are largely ineffective due to cognitive and social identity biases. Social identity is one's self-concept based on social group membership, such as political orientation. Value-based communication strategies which align with one's identity may be more persuasive, although minimal research has been conducted. This study investigated the effectiveness of an education-based message and a right-wing value-based message on climate attitudes and behavioural willingness to support mitigation efforts. Using a pre-post and one-week follow-up experimental design, participants (N = 189) were randomly allocated to an education-based or value-based message and self-reported their values, climate attitudes, behavioural willingness, and perceived identity alignment with the message. Results confirmed that climate change scepticism and low behavioural willingness are strongly associated with right-wing political orientation and values. While no significant difference in climate attitudes or behavioural willingness between messages was found across time, message alignment was associated with greater pro-climate attitudes and behavioural willingness. The findings provide an understanding of contributors to climate change scepticism and highlight the importance of social identity in climate communication. Future studies should focus on creating specific value-based messages that align more strongly with one's identity.

I would like to acknowledge my supervisor's, Dr Karina Rune and Professor Patrick Nunn, for their guidance, mentorship, and ongoing support throughout the research project.

Australian National University

Cardiovascular Research | 17th September 12pm

Session ID: 17.12.2

Emma Sinn | Bachelor of Advanced Studies (Honours) (University of Sydney)

The Role of Normal Aging in the Development of Stiff Heart Failure

Heart failure (HF) disproportionally affects older adults (65+ years old) and is the leading cause of hospitalisations for this age group. Heart failure with preserved ejection fraction (HFpEF), or "Stiff Heart Failure", is the most common form of heart failure, describing impairment in the heart's ability to relax (diastolic dysfunction), whilst maintaining healthy pumping capacity as described by ejection fraction.

It has been postulated that age-related depletion of nicotinamide adenine dinucleotide (NAD+) underpins cardiac stiffening and diastolic dysfunction seen in the elderly. Other potential mechanisms of cardiac aging leading to decline in diastolic function are not well characterized. Furthermore, model systems thus far have studied HFpEF induced in young mice.

Therefore, we aimed to determine if replenishing myocardial NAD+ using the precursor Nicotinamide Riboside (NR) for 6 weeks can reverse murine cardiac aging, including reversal of diastolic dysfunction in aged hearts. We compared healthy 20-24-month-old C57BL/6J mice (60-70 human years equivalent) with or without NR-supplementation, to healthy 15-week-old mice (20-30 human years) without NR-supplementation.

Age-induced reduction in cardiac function, indicated by strain analysis from transthoracic echocardiography, was improved in NR-supplemented aged mice compared to non-supplemented aged mice. Fasting blood glucose was significantly lower, and the age-induced increase in insulin resistance was reduced in NR-supplemented aged mice. Together, this suggests NR-supplementation may induce improvements in cardiometabolic health of aged mice. Further study of cardiac energetics and NAD+ metabolism using enzymatic assays and LC-MS/MS metabolomics analysis will significantly improve our understanding of cardiac aging, and whether replenishing NAD+ can improve cardiometabolic health during aging.

Dr John O'Sullivan and Dr Yen C. Koay (Supervisors)

Yashaswat Malhotra | Master of Science in Biological Sciences, the University of California San Diego (UCSD)

Reprogramming Macrophages to Resist Atherosclerosis

Atherosclerosis cardiovascular disease (CVD) is one of the leading causes of vascular disease worldwide, accounting for 18 million deaths every year. Atherosclerosis is the narrowing of blood vessel that obstructs proper blood flow. Macrophages, a.k.a 'big eaters' are key cells in the innate immune system which play an important role in the development of atherosclerosis. During hyperlipidemic conditions, macrophages scavenge harmful oxidized low-density lipoproteins (ox-LDLs) that accumulate in the aortic wall and transform into 'sticky' foam cells to ultimately promote atherosclerosis. Here we present a novel atherogenic signaling pathway in macrophages which can provide a hitherto unforeseen avenue to manipulate atherosclerosis. The pathway is initiated by the multi-modular G protein activator and a potent inhibitor of cAMP, GIV (a.k.a Girdin). With the knowledge that cAMP is a versatile anti-atherogenic second messenger, we show that GIV plays a proatherogenic role. GIV stimulates macrophage foam cell conversion by significantly reducing the expression of genes involved in cholesterol efflux. In vitro studies revealed that ox-LDL stimulated macrophages rapidly increased cellular cAMP to process and clear up the lipid in the absence of GIV but transformed into lipid-laden foam cells in its presence. Using immunofluorescence and lipid staining, we demonstrated that WT mice fed with Western diet developed significant plaque formation, while mice lacking GIV in their macrophages were protected. This study might help dissect the molecular mechanisms underlying the pro-atherogenic role of GIV which could be a potential pharmacological target to reduce the occurrence of atherosclerosis.

I would like to thank Dr. Gajanan Katkar and Dr. Pradipta Ghosh for mentoring and guiding me during the course of this project.

Australian National University

Reviewing and Theorising Health | 17th September 12pm

Session ID: 17.12.3

Claudia Goodman | Bachelor of Nutrition and Dietetics (Deans Scholar, Honours)

A Scoping Review on the Preferences of Older Adults for Education Materials

Key Issue: As the population ages there is an increasing need for health professionals to provide health education for older adults. Dietitians are one group of health professionals who devote many hours each day to health education both within hospitals and in community settings. No reviews to date have systematically characterised or synthesised the existing literature on the preferences of older adults for education materials.

Objectives/Methods: This study aimed (i) to map and synthesise literature on the preferred mode and format of delivery of patient education materials to older adults, and (ii) to provide recommendations to support the development of future education materials for older adults. Studies were included if participants were >65years, lived in a high-income country, and if they were written in English. Studies in other languages or in other geographic locations were excluded.

Key findings: Overall, 20 studies were identified. One quarter of studies were on older people with an impaired ability to understand or produce speech (aphasia) (n=5 studies). Older adults preferred to receive information at the time of health visit and to use the internet to supplement knowledge. Written materials were the preferred format for health advice and apps and audio resources the least preferred format. Images to enhance the key messages were preferred as opposed to those used for decoration.

Conclusion/Implications: The findings can be used to enable practitioners to design future resources that meet the specific needs of older adults. More detailed user-testing with older adults is recommended.

I would like to acknowledge my supervisor, Kelly Lambert, who has provided support and guidance throughout the entire research project.

Kira Simmons | Bachelor of Dietetics, University of the Sunshine Coast

Low vegetable intake in pregnancy and associated maternal factors: a scoping review

Healthy eating is identified as a priority in pregnancy. Vegetables are low energy, nutrient dense foods that support health. Needs of populations differ by demographics, as such there is a need to investigate vegetable intake (VI) in pregnant women of lower socio-economic status (SES). The aim of this scoping review is 1) To describe VI during pregnancy in serves/gram and compare VI to recommendations; and 2) To explore the relationship between VI during pregnancy and maternal SES characteristics. Using Arksey and O'Malley's framework and the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR), studies were identified in a search of electronic databases (MEDLINE, Web of Science, Global Health and Scopus) published up to July 2021. All observational studies assessing VI in pregnancy, written in English and conducted in an energy replete context (where diets provide adequate energy) worldwide, were included for review. Forty-seven publications met inclusion criteria. While VI of pregnant women varies across populations, this review found VI to fall below recommendations worldwide. Studies investigating older age (n=9), higher education (n=7), higher income (n=4) and VI, consistently found a positive association, whereas a negative association between food insecurity (n=4) and VI was identified. The evidence on other variables that may influence VI, such as BMI, parity and stress, is too limited and fragmented to generalise. Inconsistencies and possible inaccuracies in reporting VI may be related to the considerable variation in tools used for assessing VI. In conclusion, VI in pregnancy needs to be addressed through appropriate public health strategies, with review findings suggesting a particular focus on women of lower SES due to greater vulnerability to low VI.

I would like to acknowledge my supervisors Judith Maher, Nina Meloncelli, Lauren Kearney for their support, feedback and co-authorship.

Australian National University

Quantitative and Qualitative Data for Tomorrow | 17th September 12pm

Session ID: 17.12.4

Darby Liersch | Bachelor of Engineering (R&D)/Bachelor of Science, the Australian National University (ANU)

Identification and Analysis of a Bushfire Simulator Suitable for Use in the Australian Capital Territory

The escalating severity and length of bushfire seasons due to global warming is placing increased importance on the use of bushfire simulators to predict fires and help to mitigate their negative consequences. Fire simulators are used by fire agencies in many states and territories in Australia to support fire management planning and suppression operations. However, they are currently not used in the Australian Capital Territory despite their potential to help save lives and reduce property risk from bushfires. Therefore, this report selects the best simulator for use in the ACT by investigating the general modelling techniques of bushfire simulators and using this information to compare the capabilities and characteristics of current commercially available bushfire simulators to determine which one qualitatively ranks the highest in terms of required features. Using this method, SPARK is selected as the preferred simulator and its use is then demonstrated using a demo version of the software. This report concludes with suggestions for future work that will help to successfully apply SPARK to the Australian Capital Territory and therefore reduce the future impact of bushfires in the territory and surrounding regions.

I would like to express my sincere thanks to my supervisor A. Prof. Salman Durrani, who supported me throughout this research.

Xuyang Shen | Master of Computing (Advanced), the Australian National University (ANU)

Feature Selection on Thermal-stress Dataset

Physical symptoms caused by high stress commonly happen in our daily lives, leading to the importance of stress recognition systems. This study aims to improve stress classification by selecting appropriate features from Thermal-stress data, ANUstressDB. We explored three different feature selection techniques: correlation analysis, magnitude measure, and genetic algorithm. Support Vector Machine (SVM) and Artificial Neural Network (ANN) models were involved in measuring these three algorithms. Our result indicates that the genetic algorithm combined with ANNs can improve the prediction accuracy by 19.1% compared to the baseline. Moreover, the magnitude measure performed best among the three feature selection algorithms regarding the balance of

computation time and performance. These findings are likely to improve the accuracy of current stress recognition systems.

I would like to express my sincere gratitude to my supervisor Dr. Jo Plested and Prof. Tom Gedeon, for their patience, enthusiasm, and immense support throughout this project.

Amber Anderson | Bachelor of Philosophy (Honours), the University of Western Australia (UWA)

Those who can't do, teach: High achieving students' perceptions of becoming teachers

A significant challenge for Australia's future is the declining quality of our teachers. This challenge was recognised following the first release of the Programme for International Student Assessment (PISA) results, which caused concern over the decline of Australian students' academic outcomes. The quality of teachers is widely recognised as the driver of student outcomes. Hence, there has been a significant focus on boosting Australia's teacher quality.

A potential way to improve teacher quality is to attract more academic high achievers to teaching. There is no clear definition of a high achiever, however, high achievers are described in the literature as having in-depth content knowledge, excellent academic ability, and strong interpersonal skills. However, the profession has struggled to attract high achievers and has been perceived as a career of low status, requiring minimum skill — 'those who can't do, teach'. To attract high achievers to teaching, there is a need to understand how they perceive the teaching profession.

This case study aims to understand perceptions of teaching, from the perspective of high achieving students at a Western Australian university. The study explores how students view teaching as a potential profession (for example, their views on teachers' salary and status). An exploratory survey with 152 responses was conducted to inform the development of interview questions. Semi-structured interviews were then conducted with 30 participants.

The analytical method will be based on interpretivism, meaning that the focus will be on participant perceptions and meanings. Codes will be identified within the survey and interview data, which will then be grouped into similar categories. Finally, theoretical explanations for the emerging categories will be developed.

The results will give a valuable insight into how high achieving tertiary students perceive the teaching profession. These findings could assist the development of recruitment strategies to attract high achievers to study teaching.

I would like to thank my amazing supervisors, Professor David Sadler and Dr Glenn Savage, for their support, advice and guidance.

Australian National University

Complex Problems: Visualised | 17th September 1pm

Session ID: 17.13.1

Thy O'Donell | Bachelor of Arts (Honours), the Australian National University (ANU)

A Foucauldian Analysis of Nineteenth-Century Obituaries and Coronial Inquests from the Stamford Mercury (England, 1801-1841)

This research uses the Stamford Mercury as a cultural case study to investigate the ways in which social norms and impression management are enacted post-mortem through a critical discourse analysis (CDA) of obituaries and coronial inquest reports. As the Stamford Mercury is one of the longest still publishing periodicals (King 2005; Norris 1913; Walker 2006), a time constraint of 41 years (1801-1842) was enforced due to the extensive amount of material published since 1712. Questions regarding the hierarchy of various knowledges of death produced and enacted through obituaries and inquest reports guided this research and were inspired by Foucault's examination of sexuality. It does this through the critical discourse analysis of over six-hundred obituaries and fifty inquest reports sourced from the Stamford Mercury. Whilst obituaries and inquest reports differed in tone and function, the two forms of text worked within the same hierarchy to produce similar knowledges and power. This analysis, viewed through the theoretical lens of the repressive hypothesis, aided the development of a hierarchy of knowledge-power, which was used then to examine the historical meanings, truths, and values that were presented through these documents. The results from this analysis revealed strong values of community, geography, moral values and the 'dying well' among the citizens of Stamford (Lincolnshire County, Great Britain) during the 1800s. This analysis allowed for a better histo-sociological understanding of the function(s) that obituaries and inquest reports served in this period by comparing them to contemporary ones. Despite the difference in tone and structure the author concluded that the hierarchy of knowledge-power remains much the same across time.

Tawanrat Marit | Social Policy and Development Program, Faculty of Social Administration Thammasat University

Economic, Social, and Cultural Rights of Indigenous Peoples in Thailand

In Thailand, indigenous groups are accountable for 7.2% of the total population, numbering approximately 5 million people. For decades, they have been experiencing restrictions to land ownership and public services as many are not legally recognized as Thai citizens even though they have been living in Thailand for several generations. This has amounted to a human rights violation against the indigenous peoples of Thailand.

This research examines the impact of this human rights violation of the indigenous peoples of Thailand in the light of Economic Social Cultural (ESC) rights based on the framework of the UN's ICESCR and the Declaration on Rights of Indigenous Peoples in order to form policy recommendations for the Thai government. The analysis is based on desk study of various publications and case studies of the Karen in Phetchaburi and the Moken in Phuket, conducted by both local and international non-governmental organizations and researchers that have worked closely with these indigenous people through interviewing and focused-group study methods during the past 10 years.

The research concludes that land eviction of the indigenous peoples violated ESC rights according to the ICESCR as there was no adequate resettlement provided for those who were evicted. People have lost their ancestral lands and their traditional way of living, resulting in the need to adjust to new lifestyles outside the forest confines, and to seek employment in urban areas. The current changed circumstances have forced these indigenous peoples into economically vulnerable situations leading to poverty and lack of opportunity for decent work, a situation further exacerbated by the inability of many to speak Thai.

My abstract would't be completed without help from Dr.Sorasich Sawangsilp, Dr.Victor Prasad Karunun, and Mr. Pred Evans. I want to thank them all for their suggestions and guidelines for this abstract.

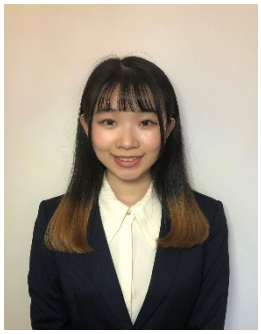
Isla Ford | Bachelor of Psychological Science (Honours), Australian Catholic University (ACU)

The Relationship Between Self-Efficacy and Performance in a Statistics Subject Among University Students: A Systematic Literature Review and Meta-Analysis

Objective: Statistics is a mandatory unit for many disciplines at university, however students tend to report low self-efficacy for this content and underperform in these units. The aims of this systematic review and meta-analysis were to estimate the strength of the relationship between self-efficacy and performance in university statistics units, and to establish if the relationship is different for undergraduate and postgraduate students. Method: Systematic searches were conducted on PsychINFO, ERIC and Academic Search Complete databases. Studies were included if they were peer reviewed journal articles that reported the relationship between self-efficacy and performance in a statistics subject in university students. Effect sizes were extracted from eligible studies and meta-analysed. Results: Twenty-one studies were included, with 20 studies meta-analysed. A random effects model found a significant, positive, and moderate estimated aggregate effect size for the relationship between self-efficacy and achievement in statistics (r = .35, 95% CI [.29, .42], p < .001, Fishers Z = .36 n = 4502). For postgraduate students the aggregated effect size was non-significant. Limitations: There was a large amount of heterogeneity found in the meta-analysis. However, most studies provided limited information on the relationship between self-efficacy and achievement so moderating and mediating variables could not be synthesised. Conclusions: Self-efficacy is positively correlated with performance in undergraduate statistics units. Implications: These findings shed light on why many students

underperform in statistics subjects and may help lecturers provide interventions where necessary. Future research needs to be conducted to assess interventions to improve self-efficacy.

A special acknowledgement to my supervisor Jodie Chapman who guided me throughout the study.



Shumeng (Emma) Lin | Bachelor of Finance, the Australian National University (ANU)

The Impact on The Australian Capital Territory's Local Businesses due to the Lack of Chinese International Students.

This research project studies how the lack of Chinese international students during the Covid-19 pandemic has influenced the local hospitality businesses in the ACT. During the Covid-19 pandemic, the Australian government border policy has prevented many international students from coming to Australia for their study, this decreasing international students' trend could post an additional negative economic demand shock due to the Covid-19 lockdown. The report examinates this issue from both qualitative and quantitative perspectives by analysing data from different sources and conducting interviews and surveys with 19 local businesses owners as well as case studies from existing literatures. The report discovers a downward trend of Chinese international student enrolment numbers and their continued lack of interest in study in Australia for the next few years. The report also discusses the positive contribution international students have towards local economic development. Hence, this decreasing trend of student numbers poses a negative impact on the local hospitality businesses, especially Chinese restaurants, as they are losing a large number of customers and having a hard time adjusting to new marketing strategies. The report wishes to emphasis the value international students bring to the local economic growth and provides recommendations to the government, universities and local businesses of how to better deal with this challenge the Covid-19 pandemic brought to us in the future.

Australian National University

Physics | 17th September 1pm

Session ID: 17.13.2

Flynn Linton | Bachelor of Advanced Science (Honours), the University of Queensland (UQ)

Precise treatment of the Bohr-Weisskopf correction to the atomic structure of heavy atoms

The Breit-Rosenthal and Bohr-Weisskopf corrections describe the effects of finite-sized nuclear charge and magnetisation distributions on the structure of atomic energy levels, respectively. The inclusion of both of these corrections is essential in constructing an accurate theoretical description of electron energy levels in heavy atoms that can be compared to current experimental precision to search for physics beyond the standard model. Previously, we investigated accurate models for computing the Breit-Rosenthal correction. However, current models are yet to include accurate nuclear wavefunctions in the calculation of the Bohr-Weisskopf correction, with most implementing a simple step-function. We aim to formulate a more precise total correction by considering electron-nuclear (spin-orbit) interactions and antisymmetry contributions, using an accurate model of the nuclear wavefunction determined by the Woods-Saxon potential. Initially, we derived the Bohr-Weisskopf correction using a step-nuclear wavefunction to compare with the literature to confirm the validity of our model. A more general model was then determined for any nuclear wavefunction. A numerically determined wavefunction could then be solved to evaluate the Bohr-Weisskopf correction. We have demonstrated that our expression for the total correction is consistent with the literature and is ready to be implemented in calculations of the Bohr-Weisskopf correction using numerically determined nuclear wavefunctions. The investigation will provide a more accurate theoretical description of the Bohr-Weisskopf correction than current models, allowing a direct comparison to precise experimental estimates to search for new physics. Furthermore, the model may be easily adjusted to implement alternate nuclear wavefunctions if more accurate nuclear models are developed.

I acknowledge the contributions of my colleague Lysander Miller and our supervisors Dr Benjamin Roberts and Dr Jacinda Ginges to this reserach project.

Martha Reece | Bachelor of Philosophy (Honours) - Science, the Australian National University (ANU)

Testing the limits of the nuclear shell model: Lifetime measurements of excited states of polonium nuclei in the vicinity of 208Pb

The atomic nucleus, the core of the atom, is made up of protons and neutrons which have an organised shell structure similar to electron orbits that exist in atomic systems. Lead-208 is a 'doubly magic' nucleus; it has full shells of both protons and neutrons, which brings added stability analogous to the noble gases. Other nuclei near 208Pb, with similar numbers of nucleons, are useful tests of the nuclear shell model which describes this phenomenon. In this investigation, we tested the limits of the shell model in this region by systematically examining the behaviour of polonium isotopes, which have two more protons than lead.

We used the ANU particle accelerator to create radioactive polonium nuclei with masses of 202, 204 and 206 in high-energy states. Gamma rays emitted from relaxation of the excited nuclei were measured using lanthanum-bromide detectors with state-of-the-art timing capabilities. We analysed these data to determine lifetimes of excited states on the order of 10 pico-seconds, some of the best results achieved from this relatively new setup. From these lifetimes we calculated 'transition strengths', which give an indication of how many nucleons are involved in transitions to lower energy states. Preliminary results show that "collective" motion of the nucleons increases as we remove neutrons to get further from the 208Pb neutron shell closure. We also performed calculations of transition strengths based on the shell model theory, and initial comparison with the data suggests that, unexpectedly, the polonium nuclei show more collectivity than the shell model predicts.

Neco Kriel | Bachelor of Science, the Australian National University (ANU)

Characteristic length scales of magnetic fields in the fluctuation dynamo

The turbulent dynamo, a process of converting kinetic energy of turbulence to magnetic energy, is a plausible mechanism that explains how weak magnetic fields that are produced in the early Universe are rapidly amplified and maintained at values that we observe in the Universe today. This process is inherently multi-scale because of the presence of turbulence, with many existing analytic theories predicting the peak magnetic field scale -- the scale on which magnetic energy is most concentrated -- either depending on the turbulent medium, or the magnetic field properties. Using direct numerical simulations of compressible magnetohydrodynamical turbulence, we simulate the turbulent dynamo over an unprecedented range of magnetic field and turbulence parameters, to explore the relevant scales in the problem and compare them with existing theories. We measure this peak magnetic field scale, and the scales where the turbulence and magnetic energy are dissipated in our simulations, and find that the peak magnetic field scale depends only on the magnetic dissipation scale, confirming previous theories for the turbulent dynamo. We also report a minimum critical Reynolds number for the turbulent

dynamo to take place, which has repercussions for both future numerical dynamo simulations, and our theoretical understanding of the dynamo process.

I would like to acknowledge the support and guidance provided by my thesis advisors, Professor Christoph Federrath, Dr Amit Seta, and James Beattie.

Rosemary Zielinski | Bachelor of Philosophy (Honours) - Science, the Australian National University (ANU)

Why do particles move under a temperature gradient?

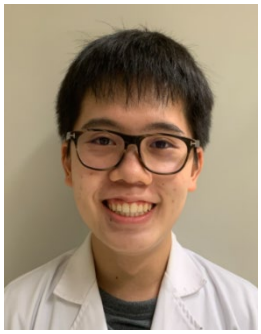
The tendency for particle migration under a macroscopic temperature gradient, termed thermophoresis, is a widely applied phenomenon which lacks a microscopic theoretical basis. This effect has been observed on many scales, including ionic solutions, gaseous mixtures, and colloidal suspensions. Contemporary research has focussed on bulk solution thermophoresis extensively, whilst studies investigating single molecule thermophoresis are presently limited. However, single molecule experiments have the potential to give new insight into the theoretical mechanisms for thermophoresis, in the absence of bulk solution effects. This study examines single-ion thermophoresis for aqueous sodium and chloride ions, using molecular dynamics (MD) and alchemical free energy perturbation (FEP) methods, to determine if single-ion thermophoresis occurs. The hypothesis that aqueous solution thermophoresis is driven by changes in solvation entropy is also tested. The results confirm single ions exhibit thermophoretic behaviour, dependent on average system temperature. However, poor convergence in the solvation entropy data obtained does not allow further insight into the role of solvation entropy in determining thermophoretic behaviour. Furthermore, purely thermophobic behaviour was observed for the chloride ion, whilst sodium recorded a slight inversion between thermophobic and thermophilic regimes. These results prompt continued research into single-ion thermophoresis, with the potential for new theoretical insight to emerge, particularly with respect to inversion points of single ions and their bulk solution counterpart.

I would like to warmly thank both Professor Ben Corry for his guidance throughout this project, and the Corry Research Group at ANU.

Australian National University

Climate and Natural Biology | 17th September 1pm

Session ID: 17.13.3



Sylvester Jian Ming Lim | Bachelor of Science (Hons), National University of Singapore

Improvement and utility of a Mass Allelic Exchange library of uropathogenic Escherichia coli

Sylvester Lim,†,‡, Varnica Khetrapal,†,‡,§, Liyana Ayub Ow Yong†,‡, & Swaine Chen*,†,‡

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Background: Mass Allelic Exchange (MAE) is a novel genetic tool we invented which allows different bacteria to mate and create hybrids called chimeras. A collection of these chimeric bacteria make up the MAE library, which can then be used to uncover unknown gene functions. However, the MAE library still lacks specific chimeras as the hybridization process is biased. We thus aimed to correct these biases by leveraging on advanced genomic techniques. We also showed that the chimeric library contains Escherichia coli bacteria which were initially non-pathogenic, but gained behaviours typical of pathogens especially when grown at 37°C.

Methods: We selected specific engineered bacteria strains and mated them to produce chimeras which have hitherto been elusive, this process is known as directed transfers. Pathogenic behaviour was screened through utilizing a chemical test that involves a violet dye which stains bacterial aggregates called biofilms.

Results: Through 10 directed transfers, we increased the MAE library hybridization coverage from 88% to 94.2%. Genes previously excluded in the original libraries can now also be potentially screened. We discovered clones in the MAE library which form elevated biofilm at 37°C — this behaviour suggests it could cause disease and resist antibiotics.

Conclusions: The improved hybridization coverage of the MAE library has increased its utility for screening other behaviours which can have complex genetic causes. Additional chimeras from the MAE library are also being utilised to identify specific genes responsible for the biofilm formation observed at 37°C.

I am immensely grateful to Liyana, who has been my most patient mentor, as well as Swaine and Varnica who have granted me the honor of presenting their splendid MAE technology to the world.

Veronica Padilla | Bachelor of Advanced Science (Honours), the University of New South Wales (UNSW)

Expression and Characterisation of a DNA i-Motif specific Nanobody

Abstract: The unique sequence of a DNA strand dictates its three-dimensional structure. Some regions of the human genome that are associated with aging, cancer and other diseases have the propensity to form a four-stranded structure known as the “intercalated motif” (i-Motif). The i-Motif is distinctly different from the Watson-Crick double-stranded helix model and is abundantly formed during rapid periods of cellular growth. Despite the strong characterisation of its physical properties, the i-Motif has yet to be attributed a precise biological role. Our research expands on a 2018 study that engineered an antibody fragment, called “iMab”, to detect i-Motifs inside cancer cells. Utilising recombinant protein expression and purification techniques, iMab was reformatted into a nanoscale design – re-named “iM-2B7-HF”. This nanoscale format presents the opportunity to increase stability and production yield as well as overcome size limitations of the larger original iMab. Antibody-binding assays were performed against a range of DNA structures to investigate the ability of iM-2B7-HF to detect i-Motifs. Our results determined that iM-2B7-HF retained specificity for i-Motifs while excluding other structures. When tested against another four-stranded structure native to human cells, our nanoscale design continually demonstrated the ability to differentiate i-Motifs. This important finding contributes to refining methods of i-Motif detection and visualisation, offering a novel tool for use in investigations of i-Motif formation and function. Our nanoscale probe could be applied to ongoing research within the fields of cancer genetics, aging and drug design, providing a new approach for the exploration of the i-Motif and its biological relevance.

Supervised by Professor Marcel Dinger and Dr Mahdi Zeraati, School of Biotechnology and Biomolecular Sciences (University of New South Wales).

Jemma Jeffree | Bachelor of Philosophy (Science), the Australian National University (ANU)

A shift in ENSO regime recorded by recharge oscillator dynamics

Every few years, the eastern Pacific Ocean shifts between two extreme states - a warm El Niño with weaker trade winds and a cool La Niña with stronger trade winds. This phenomenon, called El Niño Southern Oscillation (ENSO) affects rainfall and temperature patterns across the globe. The progression from El Niño to La Niña and back again can be approximated by a Recharge Oscillator Model, which describes the Pacific Ocean like a spring. Sea surface temperature of the eastern Pacific Ocean corresponds to position, and the average depth of

the warm surface layer in the equatorial Pacific Ocean corresponds to momentum. A new dataset, the CSIRO Climate retrospective Analysis and Forecast Ensemble system (CAFE60), was used to determine the parameters for this model and how they have changed since the 1970s. The distribution of the ensemble allows for uncertainty calculations of the parameters based on realistic past states. The resulting parameters agree with previous work using different datasets, in that the corresponding oscillation periods and decay rates have significant overlap with the 95% confidence intervals of the previous study. The multiple realisations also allow for parameters to be calculated for each year. Doing so shows a clear shift in ENSO dynamics around 2000/2001. Merely considering ENSO events cannot show this behaviour change, because there are too few events in this time period against a background of too much noise. In future studies, this regime shift should be verified using a different simplified model, and the underlying ENSO dynamics changes explored.

Thank you to my supervisor Courtney Quinn for supporting me throughout this project. Thank you also to the ARC Centre of Excellence in Climate Extremes for their Undergraduate Research Scholarship.

Jessica Tacey | Bachelor of Science (Honours), the University of the Sunshine Coast (USC)

A social distancing dilemma: Eastern water dragons do not modify their social behaviour to avoid a lethal fungal disease

Emerging infectious fungal diseases are considered responsible for 72% of disease-driven extinction events, with the proportion of documented fungal disease records increasing seven-fold in just 15 years. Group-living species often use social behaviour to avoid infection; diseased individuals isolate from the group, or healthy animals avoid those diseased conspecifics. However, there remains a lack of knowledge about social behaviour as a mechanism to avoid fungal infection. Here, we used a population of free-living eastern water dragons (Intellagama lesueurii) that are known to be impacted by an emerging infectious fungal pathogen (Nannizziopsis barbatae) as a study system, to better understand how species may modify their social behaviour to avoid fungal infection. Eastern water dragons are a large, long-lived reptile native to the east coast of Australia. They are highly social, preferentially associating with or avoiding certain individuals in their population. Within a single park located in Brisbane's Central Business District, we tracked social interactions between individuals over a five month period, and recorded the outcomes. Based on data collected from 647 observations of 126 unique individuals, our results suggested that (1) diseased dragons were not less social than their non-diseased conspecifics, and (2) non-diseased individuals avoided socialising with more severely diseased conspecifics. These findings warrant further investigation, given the implications for increased risk of disease spread and the potential for population decline if there are limited behavioural mechanisms to mitigate disease transmission.

The author acknowledges the advice and assistance provided by Associate Professor Celine Frere, Dr Barbara Class and Coralie Delme.

Australian National University

Drugs, Treatments and Healing | 17th September 1pm

Session ID: 17.13.4

Coco Huang | Bachelor of Science/Bachelor of Advanced Studies (Medical Science), the University of Sydney (USyd)

Developing a novel wound healing murine model of type 2 diabetes

Foot ulceration with delayed wound healing causes a significant disease burden for up to 34% of people with diabetes. How wound healing processes are impaired in type 2 diabetes (T2D) is unclear. We aimed to develop a novel mouse wounding model reflecting human diabetes with superadded cutaneous wounds.

T2D was induced in male (n=8) and female (n=8) C57BL/6 mice by high-fat feeding (initial 8 weeks) then combined with low dose streptozotocin injections (HFD+STZ) (10 weeks). After 18 weeks, four full-thickness dorsal skin wounds of 4mm diameter were created with a punch biopsy. Same-gender mice were either housed communally with a Tegaderm bandage (3-4mice/cage), or singly housed (SH) without Tegaderm. Male (n=6) and female (n=6) chow-fed mice (Chow) were controls. Weekly body weight, random blood glucose (BGL) and wound closure rate (WCR) by ImageJ were measured.

HFD+STZ mice had elevated BGL compared with Chow (males: 21.9mmol/L vs 10.8mmol/L, p<0.01; females: 13.4mmol/L vs 8.4mmol/L, p<0.001, respectively). At 4-days post-wounding in SH, HFD+STZ mice had lower WCRs than Chow (males: 82.7% vs 98.3%, p<0.05; females: 78.1% vs 97.1% closure, p<0.0001, respectively). Female SH HFD+STZ WCRs were also lower than Chow at 7-days (p<0.05). Although HFD+STZ female mice had lower BGL than males (p<0.01), SH females still exhibited delayed wound healing. Using Tegaderm did not impair WCR in HFD+STZ mice, likely due to poor Tegaderm retention, suggesting SH is most suitable for future studies.

Combined HFD+STZ demonstrated delayed cutaneous wound healing in our novel, two-gender model, now enabling further study of wound healing interventions.

Co-authors: Elisha Siwan, Sarah Fox, Matilda Longfield, Stephen M. Twigg and Danqing Min

Lily Kenchington-Evans | Bachelor of Science (Honours), La Trobe University (LTU)

New 'Trojan Horse' Antibiotics that Trick Gram-Negative Bacteria

Antibiotic resistance has arisen from the misuse and overuse of these drugs, in addition to intrinsic resistance factors. Gram-negative bacteria possess additional factors, including efflux pumps and the outer membrane bilayer, reducing drug uptake and efficacy of reaching internal targets. To overcome this permeability problem in drug development, we can mimic sideromycins – compounds excreted by bacteria composed of an antibiotic and a siderophore. A siderophore is an iron chelating compound produced during periods of iron starvation to obtain the essential element. As bacteria have dedicated transmembrane proteins to recognise siderophores, sideromycins and our synthetic equivalents hijack existing machinery, allowing for drug delivery through active transport, aptly called the Trojan Horse Approach. Previous studies in the field have used antibiotics with documented resistance i.e., beta-lactams. This project addresses the above issues by synthesising a novel metal containing antibiotic linked to a hydroxamic acid siderophore. Previous studies from our laboratory on similar compounds demonstrate that bacteria do not develop resistance to these metal antibiotics, as bacteria have not been exposed to this type of structure before. Herein I detail the synthetic procedure for our novel 'trojan horse' antibiotics, where either a gold or silver ion is bound to an N-heterocyclic carbene ligand coupled to a hydroxamic acid. Thus far, the synthetic strategy for the desired compound has been partly completed. Once a series of drugs have been prepared the capacity of these compounds to bind iron will be evaluated and antibacterial tests will then be carried out. The aim is to increase bacterial selectivity through optimisation of the compound structure. Our results highlight the successful strategy, synthesis, and characterisation using bioinorganic chemical techniques.

Siqi Chen | Bachelor of Advanced Studies (Honours), the University of Sydney (USYD)

Assessing the efficacy of herbal preparations in an animal model of inflammatory bowel disease

Inflammatory bowel disease (IBD) is characterised by relapsing and remitting abdominal pain, diarrhea, and the resulting malnutrition. There is no permanent therapeutic cure for IBD and most current interventions have severe adverse effects such as immunosuppression. This study aimed to compare the therapeutic potential for herbal preparation containing curcumin, Amomum Villosum or Oldenlandia Diffusa in comparison with a synthetic drug candidate AZD3241 known to inhibit IBD. Experimental colitis was induced in laboratory mice by addition of 2% dextran sodium sulfate (DSS) in drinking water or herbal tonic provided ad libitum for 9 days. Mice received either normal drinking water(control), DSS only, DSS and AZD3241 (30mg/kg) dispersed in peanut butter daily, DSS and curcumin (200mg/kg) mixed in peanut butter daily, DSS in Amomum Villosum tonic tea (with peanut butter control), DSS in Oldenlandia Diffusa tonic tea (with peanut butter control) ad libitum. All drugs improved IBD

clinical scores significantly (with Villosum reaching greatest statistical significance, p < 0.0001). Histological scoring showed that all treatments reduced colonic crypts loss and preserved the gut lining compared to mice receiving DSS alone. Immunofluorescence study on colon tissue showed drug treatments enhanced an accumulation of the cell signal protein Nrf-2. Marked decreases in colon calprotectin levels, an inflammatory marker of IBD, was noted in all drug treatment groups compared to DSS alone with Villosum reaching significance (p=0.04). Collectively, herbal candidates in the study ameliorated the course and severity of experimental colitis with similar if not better potency than the synthetic drug AZD3241. Therefore, these natural alternatives possess some potential as novel therapeutic agents for IBD with reduced side effects and enhanced safety and efficacy.

This project is supervised by Prof. Paul Witting, co-supervised by Dr. Gulfam Ahmad and collaborated with A/Prof. Ranglang Huang, with acknowledgement to the University fo Sydney Laboratory Animal Services in the Charles Perkins Centre.

Leyla Meharg | Bachelor of Science and Advanced Studies, the University of Sydney (USYD)

Strategies to mitigate or eliminate perfluoroalkyl and polyfluoroalkyl substances in vivo using a zebrafish model

Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are a family of chemicals that have been manufactured since the 1940s. Due to their water-resistant and fire-retarding properties, PFAS have a broad range of applications for both household and industrial use. This ranges from cookware coatings, food packaging materials and coatings for clothing to fire-fighting and aqueous film forming foams. Extensive PFAS use globally, has led to widespread PFAS contamination in the environment, where their chemical properties make them resistant to biodegradation. In Australia, PFAS have been found in groundwater and drinking water in areas near fire-fighting facilities and military sites. With a long half-life of up to 5 years in humans, PFAS bioaccumulate in various tissues, leading to disruption of endocrine function, including thyroid dysregulation and reproductive problems. Developing treatments to facilitate elimination of PFAS from human tissues is a high priority unmet need. This work aims to develop functional strategies to mitigate the effects of PFAS in-vivo using a zebrafish model. A high throughput screening system for post-exposure toxicity to PFAS was developed and used to identify potential therapeutics from an FDA-approved (United States Foods and Goods Administration) drug library. Under this post-exposure toxicity screening system, zebrafish embryos were exposed to PFAS, before the PFAS was washed from the embryos and replaced with drug screen compounds from the FDA-approved library. The morphology of each embryo was then evaluated as rescued, major deformity or dead, to identify potential hits for post-exposure detoxification of PFAS. From the 616 unique FDA approved compounds tested (of 1284 in our library), five primary hits were identified. In further validation assays, the reproducibility of these hits was confirmed, and the relative potencies were established to help prioritise future studies once the entire library has been screened. With no treatment currently available to eliminate PFAS from human tissues, this work has the potential to

be highly significant in providing insight for possible treatments for post-exposure detoxification of PFAS.

I would like to acknowledge the contributions of my supervsiors Dr Daniel Hesselson and Dr Stefan Oehlers. I would also like to extend my thanks to the Centenary Institute and the NHMRC.