Charles Sturt University

Higher Degree by Research and Honours Symposium 2020

26 August – 4 September

Faculty of Science
Charles Sturt University

Contents

Welcome to the first online Faculty of Science Higher Degree Research and Honours Symposium!

The online Symposium is an opportunity for research students in the Faculty of Science to present their research to their peers in a conference setting and to receive valuable feedback. It is also an opportunity to attend professional development workshops.

There is an extraordinary variety of research being undertaken within our Faculty and this breadth will be showcased during the Symposium. Our research investigates fundamental human needs such as food and water, through to the health of both humans and the environment. It is exciting to be able to present an online Symposium that offers such a diversity of both quantitative and qualitative research.

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Programme Summary

Day/Time	Session	Zoom link
Wednesday 26 August		
9:30am – 9:50am	Intro and Welcome	https://charlessturt.zoom.us/j/69686517663
9:51am – 11:00am	Student presentations – Session 1	https://charlessturt.zoom.us/j/69686517663
2:00pm – 3:30pm	Student presentations – Session 2	https://charlessturt.zoom.us/j/68063047135
Thursday 27 August		
9:30am – 11:00am	Student presentations – Session 3	https://charlessturt.zoom.us/j/69936709374
2:00pm – 3:30pm	Student Presentations – Session 4	https://charlessturt.zoom.us/j/62899821655
Friday 28 August		
9:30am – 11:00am	Student Presentations – Session 5	https://charlessturt.zoom.us/j/65605274772
2:00pm – 3:30pm	Student Presentations – Session 6	https://charlessturt.zoom.us/j/69635633906
Monday 31 August		
9:30am – 11:00am	Student Presentations – Session 7	https://charlessturt.zoom.us/j/69839321568
2:00pm – 3:30pm	Student Presentations – Session 8	https://charlessturt.zoom.us/j/67913431868
Tuesday 1 September		
9:30am – 11:00am	Student Presentations – Session 9	https://charlessturt.zoom.us/j/61365920823
2:00pm – 3:30pm	Student Presentations – Session 10	https://charlessturt.zoom.us/j/68512576362
Wednesday 2 September		
9:30am – 11:00am	Student Presentations – Session 11	https://charlessturt.zoom.us/j/62392346911
2:00pm – 3:30pm	Student Presentations – Session 12	https://charlessturt.zoom.us/j/68318697660
Thursday 3 September	**Workshops**	
9:00am – 10:30am	Who wants to hire researchers outside academia?	
11:00am – 12:30am	Use PostAc to find interesting jobs and potential career paths	
1:30pm – 3:00pm	Use intelligence from PostAc to develop a learning plan	
3:30pm – 5:00pm	Use PostAc to develop a networking strategy that will get a job lined up before you graduate	
Friday 4 September		
9:30am – 11:20am	Student Presentations – Session 13	https://charlessturt.zoom.us/j/69022352442
11:20am – 11:30am	Close	https://charlessturt.zoom.us/j/69022352442

Session 1 - Wednesday 26 August – 9:30am – 11.00am

Chair	**Sam Pant**	
Assessors	**Jennifer Manyweathers**	**Hayley Randle**
9:30am-9:50am	Introduction by A/Prof Sandra Savocchia, Sub-Dean Graduate Studies	
9:51am-10:06am	**Jess Wise** Interobserver and intraobserver reliability for two grading systems of Equine Gastric Ulcer Syndrome	
10:09am-10:24am	**Amy Bates** Understanding the knowledge and attitudes surrounding the decision-making processes of sheep producers regarding their ewe flock and management practices across different regions and production systems of New South Wales, Victoria and South Australia	
10:27am-10:42am	**Thomas Keogh** Understanding the constraints on lamb growth in intensive feeding systems	
10:45am-11:00am	**Marnie Hodge** Characterise the ovine spermatozoal transcriptome, and evaluate whether transcriptomic differences correlate with differences in breed or semen quality	

Session 2 - Wednesday 26 August – 2:00pm – 3:30pm

Chair	**Jack Cannon**	
Assessors	**Marta Hernandez-Jover**	**Ben Stodart**
2:03pm-2:18pm	**Grant Brechney** The effects of weight-cutting in combat sports on exercise and cognitive performance: A systematic review and meta-analysis	
2:21pm-2:36pm	**Tracey Gale** An examination of the lived experiences of Indigenous women in elite and sub-elite Australian rules football and rugby league	
2:39pm-2:54pm	**Ash Gallagher** Unstable ankle to unstable trunk? A potential role for the whole kinetic chain in chronic ankle instability	
2:57pm-3:12pm	**Gabbi Hotham** From the sideline to CEO: An investigation into women, leadership roles and Australian rugby league	
3:15pm-3:30pm	**Yazan Al-Hayek** The impact of Vertical off-centring, Tube Voltage and Phantom Size on CT numbers: A comparative phantom study	

Session 3 - Thursday 27 August – 9:30am – 11.00am

Chair	**Sandra Savocchia**	
Assessors	**Rylee Dionigi**	**Narelle Patton**
9:33am-9:48am	**Johnathan Hewis** What is the lived experience of distress during magnetic resonance imaging?	
9:51am-10:06am	**Sharon Hooge** Knowledge development of Type 1 Diabetes control: A Foucauldian focused ethnography	
10:09am-10:24am		
10:27am-10:42am	**Bridgette Logan** Verifying the production systems for grass and grain fed beef	
10:45am-11:00am	**Yin Liu** The link between cell vitality and potassium in grape berries	

Session 4 - Thursday 27 August – 2:00pm – 3:15pm

Chair	**Phil Eberbach**	
Assessors	**Richard Culas**	**Paul Prenzler**
2:03pm-2:18pm	**Jhoana Opena** Impacts of the winter pasture legume phase on the seedbank of barnyard grass in drill sown rice	
2:21pm-2:36pm	**Liang Jiang** Rapid assessment of grapes prior to harvest to quantify fungal off-flavours and product composition	
2:39pm-2:54pm	**Antony Stella** Botryosphaeria dieback in Australian walnut orchards: The Kraken wakes	
2:57pm-3:12pm	**Emily Thomas** Non-pollination drop of walnut from semi-arid growing regions in Australia	

Session 5 – Friday 28 August – 9:30am – 11.00am

Chair	**Kylie Murphy**	
Assessors	**Ashraf Shaweesh**	**Maree Bernoth**
9:33am-9:48am	**Rebecca Smith** Exploring the validity, clinical utility and cultural suitability of The Perceive, Recall, Plan and Perform Assessment when used to assess cognitive function of Aboriginal and Torres Strait Islander peoples	
9:51am-10:06am	**Olivia Beard** Factors influencing the use of lower limb robotic-assisted physiotherapy	
10:09am-10:24am	**Natasha Versi** Implementation details of simultaneous dual-task interventions in improving cognition for older adults	
10:27am-10:42am	**Annie Fardell Hartley** The use of social media to communicate suicidality by young people and its implications in rural and remote New South Wales	
10:45am-11:00am	**Holly McAlister** The acquisition of English speech sounds by Fijian children from different first language backgrounds	

Session 6 - Friday 28 August – 2:00pm – 3:30pm

Chair	**Kris Hughes**	
Assessors	**Allan Gunn**	**Leigh Schmidtke**
2:03pm-2:18pm	**Karly Liffen** Australian working horse welfare	
2:21pm-2:36pm	**Bec Barnewall** Current approaches to bovine respiratory disease diagnosis: limitations and advantages of quantitative molecular diagnostics	
2:39pm-2:54pm	**Emma Lynch** Canola meal a potential grassfed beef supplement for low quality roughages; steer production, meat and eating quality	
2:57pm-3:12pm	**Zahra Naqvi** Effect of injecting ginger protease on improving tenderness in *M. biceps femoris* from culled dairy cows	
3:15pm-3:30pm	**Cath Henshall** Arousal at encoding enhances memory consolidation in horses	

Session 7 – Monday 31 August – 9:30am – 11.00am

Chair	**Skye Wassens**	
Assessors	**Di Barton**	**Nick Nicholls**
9:33am-9:48am	**Dwi Atminarso** The impact of Perjaya Dam on biodiversity and livelihoods in the Komering river, Indonesia	
9:51am-10:06am	**Zakir Hassan** Managed aquifer recharge- An option for groundwater management	
10:09am-10:24am	**An Vu** Life history of Mekong fishes revealed by otolith microchemistry	
10:27am-10:42am	**Sangay Wangchuk** Gungtong preliminary findings from the case study of empty houses and drivers leading to it in Bhutan	
10:45am-11:00am	**Nyadoub Jok** Impact of sorghum-derived phenolic compounds on cancer development pathways	

Session 8 - Monday 31 August – 2:00pm-3:30pm

Chair	**Marta Hernandez-Jover**	
Assessors	**Sandra Savocchia**	**Shokoofeh Shamsi**
2:03pm-2:18pm	**Thiloka Kariyawasam** Effectiveness of saponin as a potential biosurfactant to remediate polycyclic aromatic hydrocarbon contaminated soil	
2:21pm-2:36pm	**Nan Wang** Modelling impact of climate and market variability on land use and profitability of Australian wheat growers	
2:39pm-2:54pm	**Claudia Macleay** The scoop on a scoping review: A scoping review on pregnancy loss in thoroughbred broodmares	
2:57pm-3:12pm	**Tabita Tan** Planning for a Q fever outbreak response	
3:15pm-3:30pm	**Bernard Higgins** Using co-design with Aboriginal and Torres Strait Islander peoples in remote communities, to create animated films that communicate animal health information as an educational resource for the community	

Session 9 – Tuesday 1 September – 9:30am – 11.00am

Chair	**Abishek Santhakumar**	
Assessors	**Hayley Randle**	**Kelly Spuur**
9:33am-9:48am	**Allister Clarke** Predicting rice whole grain yield	
9:51am-10:06am	**Camilla Donnelly** The host-virus protein interactome behind rabies infection in neurons	
10:09am-10:24am	**Borkwei Ed Nignpense** Cereal polyphenols – what is your gut telling you?	
10:27am-10:42am	**Bikshapathi Jagga** Structural and mechanistic basis for the nucleocytoplasmic shuttling of Sox transcription factors	
10:45am-11:00am	**Thilini Munasinghe** Structural analysis of the MERS coronavirus in complex with host proteins	

Session 10 - Tuesday 1 September – 2:00pm – 3:30pm

Chair	**Sandra Savocchia**	
Assessors	**Melanie Massaro**	**Jess Biles**
2:03pm-2:18pm	**Imtiaz Chowdhury** Persistence of atrazine in clay loam soil undergoing different temperature and moisture conditions	
2:21pm-2:36pm	**Esther Dada** Food knowledge, beliefs, attitudes, and behaviour among women of reproductive age group (18-49 years) in relation to consumption of green leafy vegetables in Delta State, Nigeria	
2:39pm-2:54pm	**Emily Schupfer** Growing healthier gut gardens	
2:57pm-3:12pm	**Jon Garner** Alpha Oscar Tango - are falls an issue in tactical personnel	
3:15pm-3:30pm	**Melissa Wales** A study of social norms and soil conservation	

Session 11 – Wednesday 2 September – 9:30am – 11.00am

Chair	**Julian Grant**	
Assessors	**Nidhish Francis**	**Kris Hughes**
9:33am-9:48am	**Mary McQuillan** Unlocking the keys to ewe survival	
9:51am-10:06am	**Shelley Williams** Parasites and other biosecurity hazards in imported edible seafood products	
10:09am-10:24am	**Jake Fountain** Modelling the effects of bovine viral diarrhoea virus on Australian beef cattle	
10:27am-10:42am	**Shafaet Hossen** Occurrence and abundance of zoonotic nematodes in a popular table fish snapper *Chrysophrys auratus* from the Australian and New Zealand waters	
10:45am-11:00am	**Megan Porter** Parasitism in the black-spotted croaker	

Session 12 – Wednesday 2 September – 2:00pm – 3:30pm

Chair	**Ashraf Shaweesh**	
Assessors	**Jen Bond**	**Jennifer Manyweathers**
2:03pm-2:18pm	**Thomas Munro** Effects of seed enhancement technologies on early life-stages of seedlings post-mining	
2:21pm-2:36pm	**Helenna Mihailou** Impacts of exclusion fencing on native and feral animal behaviours around savannah waterholes in northern Australia	
2:39pm-2:54pm	**Richard Segal** Small-scale species distribution model identifies restricted breeding habitat for an endemic island bird	
2:57pm-3:12pm	**Richard McLellan** Sandalwood (*Santalum spicatum*) is on course for extinction in the semi-arid rangelands of Western Australia. Why is it still being overexploited?	
3:15pm-3:30pm	**Liam Grimmett** Using virtual species to test species distribution models: Do we need to incorporate spatial and temporally stochastic processes?	

Thursday 3 September – Workshops

See page 11 - 13 for details

Session 13 – Friday 4 September – 9:30am – 11.30am

Chair	**Ben Stodart**	
Assessors	**John Blackman**	**Shaun Wang**
9:33am-9:48am	**Salma Akter** Landscape context mediates the effects of local vegetation on in-field abundance of pests and natural enemies	
9:51am-10:06am	**Nisansala Perera** Olfactory responses of selected dung beetle species to dung volatiles	
10:09am-10:24am	**Long Ma** Evaluating the effects of introduced dung beetles on pasture ecosystem structure and function	
10:27am-10:42am	**Pieter-Willem Hendriks** Competing Down Under: Does Above-Ground Vigour Modify Root Growth and Below-Ground Competitiveness?	
10:45am-11:00am	**Jordan Bathgate** The relationship of the wheat coleoptile and seed vigour to deep sowing establishment	
11:03am-11:18am	**Jack Maloney** How hot is too hot? Determining critical temperatures for devernalisation in wheat	
11:20am-11:30am	Close by A/Prof Sandra Savocchia, Sub-Dean Graduate Studies	

Professional development workshops

All four workshops today will be hosted by Dr Inger Mewburn otherwise known as 'the thesis whisperer'. Registration for these will be separate, please see links under the relevant headings.

Brief biography below:

My name is Dr Inger Mewburn. I was born on Nuenonne country, which is now known as Tasmania, Australia (always was, always will be, Aboriginal land). I have a background as a designer and a researcher, which was nurtured at the University of Melbourne and RMIT University.
Since 2006 I have worked exclusively with PhD students and early career academics. I help people finish complex research projects with (sometimes very) demanding stakeholders. I'm passionate about helping people reach their potential as researchers and helping to create a kinder, more inclusive academy. I strive to create spaces where people can do their best work and advance human knowledge for the good of all.

I am currently the Director of Researcher Development at The Australian National University where I run and curate professional development workshops and programs for all ANU researchers. Aside from creating the Thesis Whisperer, I write scholarly papers, books and book chapters about research student experiences, with a special interest in post PhD employability.

Who wants to hire researchers outside academia?

9:00am - 10:30am

Open to all candidates – register here

In this 1.5 hour session, A/Prof Mewburn will help you understand the size and extent of the job market for researchers outside academia and answer your questions.

We will cover:

- What kinds of research jobs are available outside of academia?
- What impact has Covid had on the size of the market for researchers?
- Where are the opportunities for people looking for work in Australia and New? Zealand at the moment?
- How to start looking for research intensive jobs.

This workshop is for PhD candidates and masters Students wondering what to do next.

It's also suitable for Research supervisors and masters co-ordinators who would like to better support their students' career aspirations.

Use Postac to find interesting jobs and potential career paths

11:00am - 12:30am

Max 40 people via Zoom

Suited to candidates in the mid to late stages of candidature - register here

This is a hands on workshop for PhD and masters candidates who are having trouble thinking of non-academic career paths that relate to their research. This workshop is also suitable for postdocs who are contemplating a career change.

Let's work on finding jobs you could do outside of academia - and find out how to put your feet on the path.

In this 1.5 hour session we will spend time:

- Figuring out the 'non academic you'.
- Identifying potential career paths using PostAc.
- Developing a strategic mindset about your research by using data to inform your actions.
- Thinking about how to put these strategies into action, including identifying possible barriers to success.

Use intelligence from PostAc to develop a learning plan

1:30pm – 3:30pm

Max 40 people via Zoom

Suited to candidates in the mid to late stages of candidature - register here

PhD and masters candidates who are looking to develop their own learning plan and take active steps to foster their non-academic career options while they are still enrolled. This workshop is also suitable for postdocs who are contemplating a career change.

In this workshop we will look at how academic skills do (and don't) translate outside of academia

During this session, we will work on:

- How to be 'so good they can't ignore you'.
- Doing a skills gap analysis to help you achieve your career goals.
- Use PostAc to construct a learning plan specific to you.

Use PostAc to develop a networking strategy that will get a job lined up before you graduate.

3:30pm – 5:00pm

Max 40 people via Zoom

Suited to candidates in the mid to late stages of candidature - register here

Did you know that most jobs opportunities are never advertised? In this session you will learn how to set yourself up for success in the 'black market' of employment possibilities.

During this session we will:

- Learn about the 'strength of weak ties' model of employability.
- Identifying potential companies as a 'cold call list'
- Approaching someone for an 'informational interview'
- Feeding the network so you 'earn the right to ask a favour' from it.

This workshop is suitable for anyone who wants to put their career plans in action and the more proactive about creating the career they want.

Abstracts

Session 1

Interobserver and intraobserver reliability for two grading systems of Equine Gastric Ulcer Syndrome

Jessica C. Wise[1]*, Edwina J.A. Wilkes[1], Sharanne L. Raidal[1], Gang Xie[2], Danielle E. Crosby[1], Josephine N. Hale[1], Kristopher J. Hughes[1]
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Grading of equine gastric ulcer syndrome (EGUS) is undertaken in clinical and research settings, however, the reliability of EGUS grading systems is poorly characterised. The objective of this study was to investigate the interobserver and intraobserver reliability of an established ordinal grading system and a novel visual analogue scale (VAS).

Six observers (three specialists, three non-specialists) graded 60 de-identified gastroscopy videos using the EGUS Council (EGUC) system and a VAS. Observers graded the videos three times for each system, using a cross-over design with ≥1 week between each study phase. The order of videos was randomised for each phase.

The EGUC system had substantial interobserver and intraobserver reliability for grading of both squamous and glandular mucosa, and reliability was minimally influenced by experience. The reliability of the VAS was more variable, including poor reliability for grading glandular mucosa, and was influenced by observer experience and familiarity with the system.

Understanding the knowledge and attitudes surrounding the decision-making processes of sheep producers regarding their ewe flock and management practices across different regions and production systems of New South Wales, Victoria and South Australia

A. L. Bates[1,2]*, S. R. McGrath[1, 2], S. Robertson[1,2], M. B. Allworth[1,2], G. Refshauge[3]
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[2]Graham Centre for Agricultural Innovation, Albert Pugsley Place, Wagga Wagga NSW, 2650, Australia
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The reproductive output of ewes is known to be affected by the season of joining, nutrition during critical times, region and breed. Reproductive response of the ewe flock to these influences may be impacting farm profitability. The Lifetime Wool recommendations are widely adopted but have not been broadly tested across different seasons of mating and region. Further, the variation in response to these factors warrants closer examination. The current project seeks to test these guidelines across multiple regions and production systems and determine whether further refinement is necessary to provide more targeted recommendations for breed, region and management, including optimum condition and season of joining.

Understanding the constraints on lamb growth in intensive feeding systems

T. P. Keogh[1,2]*, S. R. McGrath[1,2], V. H. Oddy[3], M. B. Allworth[1, 2]
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[2]Graham Centre for Agricultural Innovation, Charles Sturt University, Locked Bag 588, Wagga Wagga, NSW 2678, Australia
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Post-weaning growth rates of lambs are consistently less than potential despite the ability of intensive feeding systems to provide the necessary nutrients for unconstrained growth. The purpose of this study was to determine if nutritional management of lambs prior to entering an intensive system would allow better transition to the environment and a subsequent improvement in growth rates. Computed tomography (CT) scans of the lambs were taken at the commencement and conclusion of the feeding period to analyse the utilisation of energy intake for the deposition of lean or fat tissue. Lambs in this experiment did not utilise energy as would be expected based on current models indicating that the ability of an immature ruminant to digest solid feed is compromised or there is a decreased efficiency in the utilisation of digested nutrients for growth.

Characterise the ovine spermatozoal transcriptome, and evaluate whether transcriptomic differences correlate with differences in breed or semen quality

Marnie Hodge[1,2]*, Sameer Pant[1,2], Cyril Stephen[1,2]
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The exact extent to which spermatozoal RNA influences conception and embryonic development is not yet known but is hypothesised to influence fertilisation success, embryonic development and offspring phenotype. Semen was collected from merino, dohne and poll dorset rams (n = 48) which were matched for age, management conditions and location. Each ejaculate was assessed utilising a Computer Assisted Semen Analysis (CASA) machine to determine ejaculate quality. RNA was later extracted from each sample, with RNA sequencing analysis occuring, allowing for comparison of spermatozoal gene expression between three key Australian breeds of sheep. It is suspected that spermatozoal RNA transcripts will differ between the three breeds sampled. It is further expected to find transcriptional differences in RNA sequencing, both between breeds and high and low quality ejaculates. This will allow for further understanding of how semen contributes to reproductive outcomes, thereby ensuring accurate and thorough evaluation of male fertility prior to breeding.

Session 2

The effects of weight cutting on combat sporting performance: A systematic review and meta-analysis

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[2]School of Science and Technology, University of New England, Armidale, NSW 2351
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Weight-cutting in mixed martial arts and other combat sports is a prevalent practice whereby athletes voluntarily dehydrate themselves via various methods to reduce their body mass rapidly to qualify for a weight category lower than that of their natural mass. The intention behind this practice is to regain the lost body mass and compete heavier than allowed by the limit of the designated category thereby gaining a potential performance advantage. Until recently, this performance advantage has been assumed by athletes and coaches within these sports based on circumstantial evidence, but a number of studies have been conducted within the last decade to investigate the effect of weight-cutting on various domains of athlete performance including exercise, and cognitive performance. Unfortunately, much of this research reports equivocal results. Therefore, this study sought to compile a systematic review of the available literature and analyse the results via a meta-analytic methodology in order to elucidate the data around this investigation.

An examination of the lived experiences of Indigenous women in elite and sub-elite Australian rules football and rugby league

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Indigenous people account for just 3.3% of the total Australian population (ABS, 2016), yet the percentage competing at the elite level of the men's Australian rules football and rugby league competitions sits at approximately 11-12% ("AFL Community: Indigenous", 2018; Australian Rugby League Commission, 2017). Both sports have shared a long and unique history with Indigenous Australians and the recently introduced competitions for women – the AFLW and NRLW - also boast participation figures well above the national average for Indigenous Australians. This presentation will provide an overview of this history, with a specific focus on Indigenous women's participation in sport. An analysis of the themes currently emerging from the data will also be provided.

The importance of this research lies in its ability to provide an avenue for Indigenous women athletes to voice their journey, their struggles and triumphs and tell their story, their way.

Unstable ankle to unstable trunk? A potential role for the whole kinetic chain in chronic ankle instability

Ashley Gallagher[1]*, Kerry Mann[1], Jack Cannon[1]
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Chronic ankle instability (CAI) can have a considerable impact on quality of life, causing pain, activity limitations, and often, long-term disability. While CAI is highly prevalent in active adults, few studies into the biomechanics of adults with CAI have analysed the sports-specific movements that commonly provoke instability events and ankle sprains. Additionally, while abnormal trunk mechanics are a known risk factor for a range of lower-limb pathologies, there has been little research into the trunk mechanics of adults with CAI during sports-specific movements. Therefore, this study aims to examine the sports-specific trunk and lower-limb mechanics of adults with CAI using a gold-standard, three-dimensional biomechanical analysis. An improved understanding of the sports-specific biomechanics of adults with CAI may lead to further development of prevention and rehabilitation programs that aim to improve patient outcomes and reduce the high prevalence of the condition in active adults.

From the sideline to CEO: An investigation into women, leadership roles and Australian rugby league

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Although there has been an overall increase in female participation in sport, women are still significantly under-represented in management, coaching and officiating, particularly at the highest levels of sport. Little is known, about the experiences and perspectives of women carrying out these roles. As such, this research will analyse the experiences on women working in leadership roles and their position within Australian elite and sub-elite rugby league competitions. By understanding the experiences of leadership within rugby league from these women's perspectives, including the motivations and the barriers faced within these spaces, this research can contribute to the wider discussions relating to the gender equality in sport in Australia. As such, the aim of this research project is to study the lived experiences of female coaches, trainers, strappers, umpires, exercise scientists, administrators and managers involved in elite and sub-elite rugby league competitions in Australia.

The impact of Vertical off-centring, Tube Voltage and Phantom Size on CT numbers: A comparative phantom study

Yazan Al-Hayek[1,2]*, Kelly Spuur[1], Rob Davidson[3], Christopher Hayre[1], Khaled Albari[4], Dana Almousa[5], Xiaoming Zheng[1]
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Many algorithms for clinical decision making are operating based on assessment of the CT number. To our knowledge, however, few, if any, studies have published works concerning CT number variation as a function of the combined influence of vertical off-centring at different tube voltages and phantom sizes. This paper will compare these parameters as well as coincided with comparing two CT scanners. A CIRS Model 062 Electron Density and Combined Head and Body phantom underwent imaging using a Siemens Emotion 16-slice CT and GEMINI GXL scanners respectively. CT number uniformity will be evaluated. The average CT number was plotted against the phantom vertical shifting (20, 40, 60, and 80 mm) at each three tube voltages, using different phantom sizes and tube voltage. The CT images were evaluated using Fiji Image J software.

Session 3

What is the lived experience of distress during magnetic resonance imaging?

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Background: Despite significant improvements in Magnetic Resonance Imaging (MRI) equipment/environment and a plethora of medical interventions, many individuals undergoing MRI experience distress on a daily basis. Prior research examining this phenomenon has predominantly been underpinned by traditional, positivistic scientific methodologies with a bias towards investigating 'claustrophobia'. A deep and holistic understanding of the lived experience of distress while undergoing MRI is currently lacking.

Aim: To investigate the lived experience of adults who feel distress during a clinical MRI examination.

Methods: Hermeneutic Phenomenology is the philosophical framework and research methodology informing the study design.

Results: Presentation of preliminary data collection and analysis. Expected outcomes include highlighting the uniqueness of this everyday lived experience by describing and creating an understanding of the phenomenon in a manner that reflects the essence of each participant's story. This study provides participants with an opportunity to share their individual experiences and give a voice to their perspectives.

Knowledge development of Type 1 Diabetes control: A Foucauldian focused ethnography

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Type 1 Diabetes (T1D) is a type of Diabetes Mellitus that is incurable, nonpreventable and involves a complete lack of insulin production necessary to sustain life. Today, T1D contributes to life-altering complications, altered quality of life, and economic burden attributed to lack of glucose control. Attempts to achieve control evade both medical professionals and people living with T1D, making T1D an ever-present power within an individual's body. When juxtaposed to T1D, control is undefined and assumes the achievement of normal glucose values through the behaviour of people with T1D.

This research project examines the discourse between a) medical professionals who prescribe individuals to keep T1D under control, and b) people with T1D who tackle the daily task of keeping T1D under control. A focused ethnography methodology explores a cohort of healthcare professionals with T1D through Foucault's medical gaze*. This research provides transformations for health care praxis and practice and provides practical knowledge for people living with T1D.

*Ethics approval is in process.

The role of leadership in building, facilitating and sustaining a person-centred approach to working with residents, in the residential aged care environment

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Residential aged care has been in the news lately with the shocking impact of COVID-19 and, before that, with the Royal Commission highlighting systemic weaknesses. In the context of an ageing population and a growing need for quality aged care services, person-centred care has emerged as an increasingly important way forward. It is often considered as best practice in care. Definitions vary, but essentially, person-centred care involves taking an individualised approach to care as the guiding standard of practice, in contrast to the institutional and often dehumanising task-oriented model of care. But how does it come about? Yet to commence data collection (due to COVID-19), this research aims to gain insight into the role of leadership in building, facilitating and sustaining person-centredness in residential aged care, as applied to residents, families and staff. This involves exploring their lived experience of person-centredness whether receiving, providing, leading or witnessing it.

Verifying the production systems for grass and grain fed beef

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Australian grain-fed and grass-fed beef products garner premium market prices and processors market branded beef supported by production system claims. Given cattle nutrition alters the fatty acid composition of subcutaneous fat and grass and grain-fed cattle can be differentiated using Raman spectra, this study aimed to evaluate if Raman spectroscopy and chemometric modelling can differentiate grass fed cattle from various production systems. To this end, subcutaneous fat from 520 beef carcases with 130 from long-term grain-fed, short-term grain-fed, grass-fed and supplemented grass-fed beef cattle were measured. Classification of carcases using Partial Least Squares Discriminant Analysis demonstrated spectra were able to correctly classify long term grain-fed (96%), short term grain-fed (85%), grass-fed (83%) and supplemented grass-fed (83%) carcases. Spectral patterns that characterise fatty acids have been shown to underpin this classification. Overall, this study demonstrates Raman spectroscopy is a useful tool for the authentication of beef carcases from different production systems.

The link between cell vitality and potassium in grape berries

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Grapes are one of the main economic crops produced worldwide. To better understand the impact of climate change on grape berry development, the underlying physiological processes related to berry ripening are requiring further investigations at the cellular level. In the later stages of wine grape berry ripening, mesocarp (berry pulp) cell vitality and membrane integrity decrease, which coincides with the cessation of potassium ion (K^+) accumulation into the berries. Considering the importance of K^+ in solute translocation and cell membrane function, cell vitality may be associated with K^+ membrane transport during berry ripening. To exam this hypothesis, this project is investigating the potential regulators of cell vitality in grape berries, as well as the potential roles of membrane electrical potential in K^+ membrane transport in mesocarp cells during berry ripening.

Session 4

Impacts of the winter pasture legume phase on the seedbank of barnyard grass in drill sown rice

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Farmer anecdotes suggest that the inclusion of winter pasture legumes in rotation with rice can be used to suppress the barnyard grass seedbank. A study was conducted to determine the effects of different species of annual pasture legumes on the seed longevity, emergence, and growth of barnyard grass. Results of the study showed that the pasture legumes did not influence the seed longevity of barnyard grass although barnyard grass seed viability was reduced from 93-95% for 1 year burial to 46-66% for 2 years burial. Moreover, during the pasture legume phase, barnyard grass had reduced emergence by 75-100% and reduced growth by 90-100%. These results suggest that pasture legumes in the rotation can reduce barnyard grass seed bank by reducing seed deposits via suppressed emergence and growth during the pasture legume phase and increasing seed withdrawals via reduced seed viability in greater than 2 years of pasture legumes.

Rapid assessment of grapes prior to harvest to quantify fungal off-flavours and product composition

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Fungal related off-flavour in wine and grape production leads to huge economic loss[1-2]. To eliminate such loss, a method to identify infection from the grapes at an early stage is critical. Ideally, a rapid quality assessment of grapes prior to harvest or processing should done to establish objective measurement of the phytosanitary aspects of the crop. However, with present technology[3-4], the rapid identification of fungal infection on grape berries remains a challenge for various drawbacks *e.g.,* time-consuming process, accuracy, versatility, stability especially for the extraction and characterisation of specific biomarkers. A review of important technologies for rapid detection of metabolites on agricultural products will be presented. A propose ionisation source that has a multiple capability for various compounds will be discussed. This innovative approach would potentially provide a rapid fungal off-flavour identification with high sensitivity and reproductively. (Fig. 1)

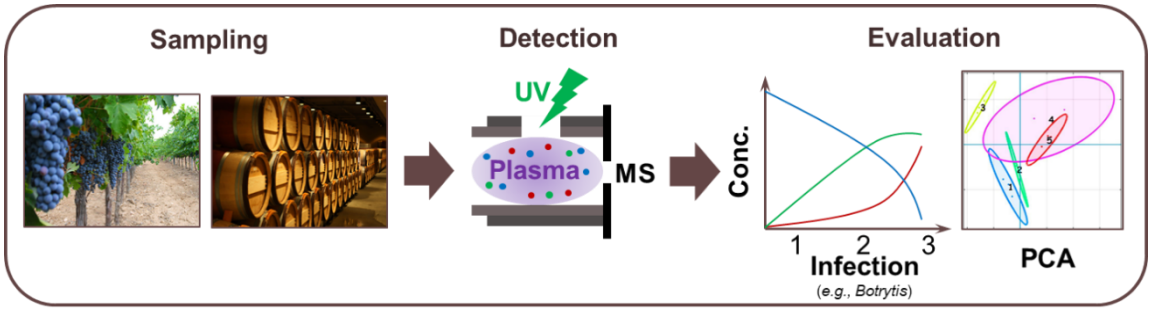

Fig.1 Research proposal schematic diagram

Botryosphaeria dieback in walnut orchards in Australia: The Kraken wakes…

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Fungi belonging to the family Botryosphaeriaceae pose an emerging risk to the productivity of the Australian walnut industry. Globally, Botryosphaeria dieback caused by these fungal pathogens has resulted in economic loss in almond, avocado, grapevine, macadamia, olive and pistachio. The dieback leads to reduced yield by killing fruiting spurs and infecting the fruit/nut. It is currently unknown which species of Botryosphaeriaceae are prevalent in walnut orchards in Australia. Furthermore, their behaviour under Australian environmental conditions, their host interactions, disease progression and management options have not been studied. In this context, this project aims to address some of the knowledge gaps in the Australian walnut industry. The results of a field survey conducted during the first year of the project will be presented and research plans for the next two years will also be detailed. The outcomes of this project are expected to provide a basis for identifying which control strategies are suitable for Australia.

Non-pollination drop and pollen viability of walnut from semi-arid growing regions in Australia

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Non-pollination drop (NPD) of walnut causes considerable crop loss in semi-arid growing regions of Australia. This study determined the impact of NPD and examined the viability of walnut pollen as a potential cause of NPD in major walnut cultivars from the Riverina region of NSW. NPD was greater in the later-flowering cultivars Chandler (21-27%) and Howard (6-27%); additionally the viability of pollen from these cultivars was very low (Chandler: 15-32%; Howard: 26-32%). A direct linear relationship between pollen moisture content and pollen viability explained 94% of the variability in pollen viability. Controlled temperature-relative humidity studies, mimicking environmental conditions during the flowering period, revealed that vapour pressure deficit (VPD) significantly reduced both the moisture content and viability of pollen; with pollen was non-viable at 3.3 kPa after 60 minutes. Staining with fluorescein diacetate (FDA) indicates that moisture loss disrupts membrane integrity in pollen affecting ability to maintain turgor pressure during germination.

Session 5

Exploring the validity, clinical utility and cultural acceptability of The Perceive, Recall, Plan and Perform Assessment when used to assess cognitive function of Aboriginal and Torres Strait Islander peoples

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Aboriginal and Torres Strait Islander peoples are at a significant disadvantage to other cultural groups when assessing cognitive function due to a lack of assessments, which are culturally acceptable, reliable and valid.

The Perceive, Recall, Plan and Perform (PRPP) System of Task Analysis is an occupational therapy cognitive assessment and intervention system. It is based in information processing theory and allows therapists to observe clients performing familiar, everyday tasks to measure task mastery and information processing strengths and weaknesses.

The PRPP System has demonstrated reliability and validity with a wide range of ages, cultures and diagnostic groups, however its effectiveness is yet to be explored with Aboriginal and Torres Strait Islander peoples.

This presentation will introduce both the mixed methods approach and preliminary findings in relation to concurrent validity, clinical utility and cultural acceptability of the PRPP Assessment when used with Aboriginal and Torres Strait Islander peoples in the Northern Territory.

Factors Influencing the Use of Lower Limb Robotic-Assisted Physiotherapy

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Background: Lower limb robotic-assisted therapy (LLRAT) is a form of robotic technology used to help improve mobility and function of the lower limb/s. This study explores the factors that influence LLRAT use in physiotherapy to potentially enhance its clinical implementation.

Methods: Physiotherapists and physiotherapy managers at a regional healthcare facility were recruited in the mixed methods design study. A medical record audit and focus groups were used to determine the use of LLRAT, and the factors influencing use amongst participants.

Findings: 140 medical records were audited, identifying no LLRAT use amongst physiotherapists over a period of 4 weeks in 2019. Nine physiotherapists and their managers participated in focus groups, also identifying LLRAT is underutilised at their facility. Participants identified barriers and enablers to LLRAT use, which were grouped into professional, organisational, or individual factors.

Conclusion: There are multifactorial and interrelated factors that influence LLRAT use at a regional healthcare facility.

Implementation details of simultaneous dual-task interventions in improving cognition for older adults

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Cognitive changes occur as an individual ages, and may lead to decreased cognitive function. Simultaneous dual task interventions are shown to be effective in improving cognitive function for older adults. These interventions are activities that require the person to engage physically and cognitively at the same time. This presentation is based on a scoping review conducted for an honours project, with the aim to analyse implementation-relevant details for effective simultaneous dual-task interventions. The purpose being to assist practitioners, and the wider community to apply relevant interventions to their particular context. The highest quality studies were included for data extraction, collation and analysis. Multiple types of simultaneous dual-task interventions were effective. Many studies failed to report on some implementation details. Future research is needed to establish optimal frequency, duration and intensity of these interventions. Raising awareness is vital to enable integration of these interventions into routines, to positively impact health outcomes.

The use of social media to communicate suicidality by young people and its implications in rural and remote New South Wales

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Suicide is the number one cause of death for young people (aged 15-24) in Australia. Identifying the warning signs of suicidality is an essential step for suicide prevention. In this study, using qualitative methodology, we have uncovered suicidal signs expressed in social media by this population. We find that: 1) when feeling vulnerable, young people with a history of chronic suicidality use social media to engage with 'friends' or peers, not adults they otherwise relate to; 2) communication of suicidality on social media takes forms of memes, 'stories' showing intended means of death, and comments pertaining to current mental state. These warning signs provide avenues to identify young people at risk and a window to intervene prior to an attempt taking place. Future research will analyse gatekeepers' contributions in intervening online with at risk youth and identify how to harness these findings to empower gatekeepers in suicidal prevention.

The acquisition of English speech sounds by Fijian children from different first language backgrounds

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The age at which children are able to correctly produce speech sounds in a language is an important element of assessment by speech-language pathologists (SLPs). However, assessment is complicated when multilingual children speak languages with non-identical sound repertoires, as sounds in one language may influence the production of sounds in another. Studies of multilingual speech sound acquisition aim to document cross-linguistic influences to assist in valid diagnosis of speech sound disorders. This study analysed English consonant acquisition patterns of 72 multilingual Fijian primary school students. Results revealed that the pattern of English consonant acquisition for these children was similar to that reported for English-speaking children in other parts of the world. Minor differences for later developing sounds were noted (e.g., 'th' was produced as 't' or 'f'). This study expands understanding of theoretical perspectives on linguistic multi-competence and multilingual speech sound acquisition and supports SLPs working with multilingual Fijian children.

Session 6

Australian Working Horse Welfare

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In Australia horses are still used as working animals. Generally, they are used in situations where motor vehicle access is difficult or in livestock farming situations where the animals need to be kept in a low stress environment. A high proportion of Australia's working horses are present in the cattle feedlot industry. There are currently no publications on Australian working horse welfare. The study focuses on assessing working horse welfare using the Five Domains Model framework examining 1. Nutrition, 2. Environment, 3. Health, 4. Behaviour and 5. Mental State. This abstract reports on initial findings relating to horse demographic information provided by the rider and an initial assessment of horse health.

Current approaches to bovine respiratory disease diagnosis: limitations and advantages of quantitative molecular diagnostics

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Bovine respiratory disease (BRD) remains one of the most challenging diseases impacting livestock systems globally. Currently, diagnosis of BRD is one of response, rather than prognosis and prevention. Generally, diagnosis is based on a combination of clinical signs and behavioural changes, often first identified by pen rider, not definitive pathogenesis or by specific pathogen identification. Diagnosis is often complicated by the multifaceted nature of the disease, where the proliferation of bacteria can be influenced by pre-exposure or active disease related to viral pathogens as well as several behavioural and environmental stressors. Accurate quantification analysis, using PCR can be adopted as a predictive tool that could enable determination of at-risk animals, disease progress and better inform on the pathogen causing disease. This will inform on management and treatment strategies thus changing the diagnosis of BRD from one of responsiveness to prognostic and preventative.

Canola meal a potential grassfed beef supplement for low quality roughages; steer production, meat and eating quality

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Managing variability in pasture quality and quantity is a challenge for beef producers supplying to certified grassfed markets. In southern Australia, the quality of pastures during the summer-autumn period is often below the maintenance requirements for growing and finishing livestock. Traditionally, producers would supplement livestock with grain or grain based pellet to enhance the energy and protein requirements for ruminants when grazing low quality pastures. However, grain/s are not approved for use under the Pasturefed Cattle Assurance System (PCAS). Canola meal is one protein supplement that has become more readily available, cost competitive and is an approved PCAS supplement. Currently, the effects of supplementing canola meal to steers and the subsequent meat and eating quality is largely unknown. Therefore, the aim of this experiment is to compare steer growth performance, meat and eating quality characteristics when supplemented with either grain or canola meal while grazing a low quality roughage.

Effect of injecting ginger protease on improving tenderness in *M. biceps femoris* from dairy cows

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The study investigated the effect of ginger protease on tenderness and juiciness of M. *biceps femoris* (BF) from culled cows. BF were injected with 1g/L, 2 g/L ginger powder solution, only water and no injection. Samples were cooked at 65°C and 75°C for 1, 8 and 18 h and tested for cooking loss, total water content (TWC), Warner Bratzler shear force (WBSF), collagen content and myofibrillar fragmentation index (MFI). Results revealved the significant interactions between enzyme treatment, cooking temperature and time on WBSF, TWC and cooking loss. WBSF reduced substantially by increasing ginger powder concentration at 65℃ but linear reduction was noted at 75℃ with increasing cooking time. Cooking loss increase while TWC decrease with increasing cooking temperature and time. Collagen solubility and MFI increased by increasing ginger powder solution concentration. The results demonstrated weakening of myofibrillar proteins and connective tissue contribute to denaturation of proteins and solubilisation of collagen.

Arousal at encoding enhances memory consolidation in horses

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To successfully produce trained behaviours horses must be able to remember what they have previously learned. Research has shown that arousal during learning can enhance memory consolidation. We exposed horses to a control, exercise or stress treatment prior to learning a locomotory task. The following day, the horses' memories were tested with a memory retrieval test (MRT). The MRT demonstrated that the majority of horses had consolidated and were able to retrieve the memory. There were no group differences in the number of correct responses in the MRT ($F_{(2,40)}$ =2.063, p=0.144), however five of 41 horses made no response during the MRT. When these horses were removed from the analysis, the exercise group performed significantly more correct responses than the control, but not the stress group ($F_{(2,40)}$ =4.151, p=0.027). These findings provide preliminary evidence in horses that moderate arousal prior to learning enhances consolidation of the memory compared to a lack of arousal.

Session 7

The impact of Perjaya dam on biodiversity and livelihoods in the Komering river, Indonesia

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The intensive development of dams has impacted fisheries productivity globally. Rapid human population growth has increased demand for water supply, food security, electricity and flood mitigation. To deal with these challenges, governments have invested in the expansion of water infrastructure. However, this infrastructure reduces fish population connectivity and can have a significant impact on the persistence of diadromous (those that move between freshwater and the sea) species because their migratory pathways are blocked by the barriers. Some potamodromous (those which migrate only in freshwater) species may survive in fragmented populations, but may still suffer from deleterious effects such as reduced genetic diversity. Thus, it is important that solutions to protect fish are considered in infrastructure design. This research project aims to better-understand the migration requirements of Indonesian inland fish and, to assess whether fishways are useful solutions to facilitate movement.

Keywords: Perjaya dam, biodiversity, livelihoods, Komering river

Managed aquifer recharge-an option for groundwater management

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Irrigation is vital for Pakistan's food security, but surface water availability is declining. Groundwater is increasingly accessed, but it is also declining in quantity and quality. Managed well, this groundwater can yield continued benefits for water stressed communities. Much research effort is focused on reducing demand management, but supply management through managed aquifer recharge (MAR) is also an option. An MAR experiment by the government of Punjab in Pakistan has an experimental site established to divert flood water. My PhD research project is assessing the feasibility of MAR at the case study site and studying the institutional arrangements influencing water management, to determine how MAR can contribute to the larger goal of sustainable management of groundwater in Pakistan. I am undertaking field observations on groundwater levels and quality, for impact modelling using MODFLOW. I have also undertaken stakeholder mapping and sought ethics approval to enable commencement of the Institutional analysis.

Keywords: groundwater, MAR, Institutional arrangements, Punjab, Pakistan

Life history of Mekong fishes revealed by otolith microchemistry

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Many Mekong fishes are associated with saline water and require movement between freshwater sections, the Delta and the East Sea. Our work has found that around 11% of Mekong fish species distribute in a wide range of environments (freshwater, brackish, marine). Dozens of Mekong species exhibit diadromous traits. Life history of some Mekong fishes revealed by otolith microchemistry. This study found that that some fish species live in marine water but migrate long distances up the Mekong River for breeding while others spend their lives in the river but spawn in the ocean. Interestingly, several species show variation in migration strategies. Our work is demonstrating that the life cycles of Mekong species are far more complex than previously thought. Mekong fishes need free access from freshwater and saline water to complete their life cycles.

Gungtong: Preliminary findings from the case study of empty houses and drivers leading to it in Bhutan

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Rapid rural-urban migration in Bhutan is leading to the total abandonment of a family house, termed as *Gungtong* in Bhutan. Increasing cases of *Gungtong* are reported across the country and it is turning out to be one of the most pressing social issues. Though the 2017 Population and Housing Census of Bhutan reported: moving with families; employment and education as the three most important reasons for migration, one widely claimed explanation, which finally leads to *Gungtong*, is human-wildlife conflict. This claim is often supported only by anecdotal reports, however, Bhutanese media has been claiming it as the primary driver. The questionnaire survey conducted in the two districts of the country revealed that the increasing incidences of human-wildlife conflict are the result of *Gungtong* and not the other way around. This calls for a much deeper analysis to determine the drivers leading to *Gungtong*.

Impact of sorghum-derived phenolic compounds on cancer development pathways

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Sorghum is primarily used as livestock feed in Australia. Sorghum phenolic extracts have been demonstrated to exhibit anti-proliferative activity in tumorigenic cells and despite knowledge on the synergistic effects on colon cancer cells, several cancer development pathways remain unexplored: genome instability and mutation, cellular metabolism, angiogenesis and metastasis. A simulated digestion model will be used to determine the effect on sorghum phenolic extracts and a human dietary intervention study will be conducted to determine biological levels of sorghum metabolites in serum and urine. Cell culture models will be utilised to determine the expression of apoptotic and metabolic genes. Chicken egg models will be used to determine the impact of sorghum extracts on angiogenesis and tumour migration. The bioactive properties of sorghum phenolic compounds, could potentially target pathways of cancer development and lead to an in increase in demand for the cereal crop for human consumption across Australia increasing grower profitability.

Session 8

Effectiveness of saponin as a potential biosurfactant to remediate polycyclic aromatic hydrocarbon contaminated soil

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Biosurfactants are biologically active compounds produced by microorganisms and plants, and are capable of enhancing the bioavailability of pollutants such as polycyclic aromatic hydrocarbons (PAHs) to soil microbes during bioremediation. This study investigated the effectiveness of a novel saponin biosurfactant, which was extracted from eucalyptus leaves, as a potential bioremediating agent for PAH contaminated soil. The surfactant demonstrated significant surface-active properties and high thermal and pH stability. Importantly, the extracted surfactant was more stable in high salinity conditions compared to rhamnolipid biosurfactant, which is the most prominent biosurfactant currently used in PAH bioremediation. High salinity conditions further decrease the accessibility of soil organic matter bound PAHs to the soil microbes. Hence the application of a biosurfactant with high surface active properties and that is stable under different soil conditions offers advantages over synthetic surfactants due to its low cost, biocompatibility and biodegradability.

Modelling Impact of climate and market variability on land use and profitability of Australian wheat growers

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The Australian wheat industry occupies an essential position in the Australian economy and agriculture sector. Wheat production, sales and exports play a significant role in increasing farmers' income. However, due to the risks involved in wheat production and marketing activities, wheat farmers face multidimensional challenges that ultimately affect the profitability (net revenues) of wheat farmers. Profitability is the primary goal of farm ventures. So measuring current and past profitability and projecting future profitability is important for farmers. Although some previous studies have analysed the impact of climate and price risks on wheat production, no studies have conducted to analyse Australian wheat producers' profitability (net revenues) indicators for wheat producers while incorporating the land use patterns and different risk factors that the wheat producers currently faced. Therefore, this research aims to estimate profitability (net revenues) indicators using the Ricardian method and to explore the production, marketing and trade policies needed for effective land use and profitability of wheat producers based on the results of the study.

The scoop on a scoping review on pregnancy loss in Thoroughbred Broodmares

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Pregnancy loss is a major cause of economic loss for Thoroughbred breeders due to reduced reproductive efficiency in the Thoroughbred mare. Mid to later-term pregnancy loss is particularly devastating as it means a year of production is lost. A scoping review is being conducted to explore the current literature on mid to late-term pregnancy loss in horses. The review will identify causes, syndromes and risk factors associated with pregnancy loss as well as the pathology and pathogenesis. It will highlight gaps in knowledge. Research databases were searched for terms related to the topic; 19900 records were identified. Duplicates were removed. 8735 records were screened based on title and abstract. Records not in English were excluded; 1413 records were identified as relevant and the full text was screened in level 2. The third level of reviewing will extract data on pathology and risk factors; improving our understanding of equine pregnancy loss.

Planning for a Q fever outbreak response

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Q fever is an important zoonotic disease that can cause severe and debilitating illness in people. Although livestock are frequently the source of human infection, people can be infected even in the absence of animal contact. Australia has the highest number of human cases reported in the world with the potential for a large and prolonged Q fever outbreak to occur. A response plan is required to provide guidance during outbreaks; mitigating negative effects on community health and minimising spread of infection from animal sources. Expert opinion workshops and surveys with key stakeholders will be used to address important components of the plan:

- characterising the nature of Q fever to determine the combination of factors that would drive an outbreak to occur
- measuring the ability for disease surveillance and improve early detection
- exploring favourable strategies for disease control
- collaboration across human and animal health with a One Health approach

Using co-design with Aboriginal and Torres Strait Islander peoples in remote communities, to create animated films that communicate animal health information as an educational resource for the community

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Remote communities in Far North Queensland have limited educational resources for residents about health management of their horse population. To address this, we are working with community residents to co-design an animation that will describe how to manage a sick horse. We will include information about what to expect from a disease such as Hendra virus, what veterinary staff and Environmental Health Workers (EHWs) will do, and other general best practices to limit the transmission of infectious diseases.

We aim to create a framework for future researchers to co-design educational animations to assist remote communities.

We will be holding discussion groups with community members and Elders in Yarrabah, EHWs, and school students aged 10 years and older. The data collected from these discussion groups will influence the creation of the animated film.

The final animated film will be used throughout Far North Queensland communities to assist in educating these communities.

Session 9

Predicting Rice Whole Grain Yield

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Rice whole grain yield (WGY), represents the percentage of grains that remain un-broken during the milling process. With broken grains receiving approximately half the price of whole grains, maximising WGY is critical to the returns of the industry. A critical issue is the inability to classify WGY as the rice is delivered, limiting in the ability to optimise post-harvest conditions that maximise WGY. This projects aims to develop variety specific predictive models able to classify the rice WGY at the delivery stand. In order to develop the models a historical dataset was constructed based on the key influencing factors. This datasets connects in crop data sources including grower management records, crop phenology dates, delivery and quality testing results and climate data. Preliminary model validation demonstrates strong predictive capability, however further testing is necessary to optimise predictive accuracy and to uncover the key factors that underpin the models.

The host-virus protein interactome behind rabies infection in neurons

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Rabies is a zoonotic infection caused by lyssavirus that invades the nervous system and leads to death. Although rabies is an ancient disease, the pathogenesis in human neurons is poorly understood. This study will examine the host-virus interactome to determine the molecular pathways involved in infection and immune antagonism. Structural approaches will be employed to investigate these interactions and to analyse differences between rabies strains.

Cereal polyphenols – what is your gut telling you?

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A wide range of health benefits have been attributed to cereal bioactive compounds known as polyphenols. However due to their low plasma concentrations after consumption there is controversy regarding the therapeutic benefits. Within the gastrointestinal tract, some cereal polyphenols are absorbed in the small intestine, with majority accumulating and metabolised by gut microbiota in the colon. The interactions between the cereal polyphenols and the gut is believed to promote gut health and modulate the concentrations and bioactivity in plasma. This project will employ simulated in vitro gastrointestinal digestion coupled with an intestinal monolayer cell culture model in order to investigate the impact on the metabolism, antioxidant activity and absorption of the polyphenols. The cytoprotective effects of cereal phenolic extracts will be evaluated in vitro followed by a human clinical trial in order to evaluate the impact of supplementation on the gut microbiome and the anti-inflammatory and antioxidant status of plasma.

Structural and mechanistic basis for nucleocytoplasmic shuttling of Sox transcription factors

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Sox proteins are transcriptional regulators that play indispensable roles in a range of organogenesis pathways. They act as “master” switches in embryonic development and drive cell differentiation. Regarding their role in development, mutations leading to diseases such as cancer and autoimmune disorders. In order for Sox proteins to perform their role as transcription factors, they must first be transported to the nucleus. Disruption of this nuclear import process has been shown to cause a range of diseases including genetic sex reversal, leukaemia, melanoma and multiple cancers. This study aims to investigate the nuclear localisation of the Sox proteins, with a specific focus on receptor binding specificity. This approach will utilise recombinant protein expression, purification, and high-resolution structural techniques including X-ray crystallography and cryoEM. Overall, the project will establish a structural and molecular basis for the cellular localisation of Sox proteins, and underlying diseases resulting from mis localisation.

Structural analysis of the MERS coronavirus in complex with host proteins

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Middle East respiratory syndrome-related coronavirus (MERS-CoV) is an emerging zoonotic coronavirus that causes severe pneumonia and acute respiratory distress syndrome in humans, with a case fatality rate of 36%. In my project, I am investigating the accessory proteins MERS-CoV in complex with host receptors. These interactions are important for suppression of innate immunity. The approach will be to clone specific genes of the virus and host proteins, express these proteins recombinantly in bacteria, purify the complex using a combination of chromatography methods, and to determine the structures at high resolution using the Australian synchrotron. The aims of this PhD project are to express and purify MERS-CoV accessory proteins in complex this with human proteins to determine the binding interface and potential novel sites for development of therapeutics.

Session 10

Persistence of atrazine in clay loam soil undergoing different temperature and moisture conditions

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Persistence of herbicide residues in soil can interfer with successive cropping rotations. To address the role of soil moisture and temperature on atrazine persistence, an experiment was established with clay loam soils, exposed to a concentration series of atrazine. Soils were adjusted to moisture levels of 40, 70 and 100% field capacity and incubated at 10, 20 and 30°C. Samples taken at 0, 7, 21, 42, 70 and 105 days after incubation were extracted using QuEChERS extraction, and analysed for atrazine content via GC-ECD. A gamma distribution model fitted to the data indicated temperature played the greater role on persistence of atrazine, with 30˚C treatment declining at a faster rate than either 10 or 20˚C. Atrazine half-life tended to double with every 10˚C decrease over the range tested. The model applied indicated that atrazine has the potential to persist in clay loam soil for several years under low temperature conditions (≤ 20˚C).

Food knowledge, beliefs, attitudes, and behaviour among women of reproductive age group (18-49 years) in relation to consumption of green leafy vegetables in Delta State, Nigeria

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Background: Consumption of green leafy vegetables contributes to the reduction of malnutrition. However, little is understood about decision making processes and behaviours influencing women of reproductive age, and Nigeria is a case in point.

Objective: To explore the factors (knowledge, beliefs, attitudes and behaviours) influencing women of reproductive age regarding consumption of indigenous green leafy vegetables in Ndokwa community of Nigeria.

Methods: Preliminary data were qualitative focus groups discussions. Volunteer participants comprised women of reproductive age including community leaders and policy makers.

Preliminary results: Four thematic factors influencing green leafy vegetable consumption include lack of

1. knowledge of some of these vegetable
2. understanding on the nutrition and medicinal importance of the vegetables
3. affordances – i.e. accessibility and affordability of some of these vegetables
4. time to cook the vegetables

Conclusion: Findings will be reviewed further alongside main quantitative survey data to enable development of policies and programs aimed at facilitating vegetable access and consumption.

Growing healthier gut gardens

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Each of us contains trillions of bacteria with the gut home to the highest microbial density. These microorganisms can be beneficial, neutral, or detrimental to our health. Beneficial bacteria can enhance our immunity, protect against infection, and even digest the food we eat. The food we intake, in turn, has a marked effect on the composition of gut bacteria and modulates the balance between beneficial bacteria and detrimental bacteria. When this balance is in favour of beneficial bacteria our guts are in symbiosis. When it swings towards detrimental bacteria it is in dysbiosis. Our diet is the key to how we can establish, maintain, and nourish this delicate balance. Just like a garden we need to provide the seeds, the right conditions, and the fertiliser necessary for their survival and maintenance. This study aims to determine whether a gut 'fertiliser' can aid in growing healthier gut gardens in healthy adults.

Alpha Oscar Tango – are falls an issue in tactical personnel?

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The term tactical personnel (sometimes referred to as tactical professionals, first responders or emergency responders) includes occupations whose role requires them to protect members of their community, property or country. [1,2] During the course of their work, tactical personnel face many dangerous conditions and are at risk of injury from a variety of mechanisms.[3] Data from across tactical populations suggest that falls appear to be a consistent and ongoing issue. The results of which can be substantial personal, social, economic and operational costs.

This presentation will explore the rates of falls within the tactical populations, known causes of these falls and present the challenges which relate to the current gaps in the literature.

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A Study of Social Norms and Soil Conservation

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In balancing both consumptive and environmental needs in the current epoch, there is a growing realisation that soil is a critical and finite natural resource. Sustaining functional, productive soil in the future will require significant adaptation measures from farmers, private sectors, the scientific community, governments, and international organisations. This research sets out to understand the contribution of social norms, an important but often neglected element of social capital, and their persuasive power on the behaviour of individuals and groups. My research will seek to identify and understand the social norms operating within Australian farming communities, and how they may be influencing perceptions of “good” and “bad” farming practices today, and in turn how this influences management and policy decisions.

Session 11

Unlocking the keys to ewe survival

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Reducing ewe deaths in Australian sheep flocks should be a high priority for the Australian sheep industry both in terms of animal welfare and improved profitability as ewes represent the most productive unit of a flock. It is thought that in a calendar year, ewes are most likely to die over the lambing period (when ewes are giving birth). This study aims to answer the following research questions;

1. What percentage of ewe losses occur over the lambing period in Australia?
2. What are the causes of ewe deaths over the lambing period in Australia?

Parasites and other biosecurity hazards in imported edible seafood products

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Edible seafood may be infected with many types of parasites including some that are zoonotic. At present, no additional tests for parasites are applied to imported edible seafood on entry to Australia. In this respect, Australia places significant trust in the quality control and inspection procedures for parasites employed by the exporting country and in the integrity of the global seafood supply chain. In this study, a risk scoring system was developed to identify countries which may be high risk for seafood supply chain breaches and as a result unintentional introduction of seafood products with uncertain safety into Australia. Parasites and other biosecurity hazards identified after inspection of 561 fish from 'Country 22', a high-risk country according to the scoring system, will be presented and recommendations provided for future consideration.

Modelling the effects of bovine viral diarrhoea virus on Australian beef cattle

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Bovine viral diarrhoea virus (BVDV) is responsible for significant economic losses in the Australian beef industry. Farm-level biosecurity can reduce the impact of endemic disease but implementation is dependent on individual producer values.

We are developing an individual-based, stochastic simulation model to predict and assess the effects of BVDV on a herd that represents a typical self-replacing extensive beef production system in south-eastern New South Wales (NSW). The model will be used to predict the effects of BVDV on production parameters such as pregnancy rate, calf mortality rate, live weight of sale animals and culling rate.

We describe the modelling process, and present preliminary results. Planned future studies will use this model to examine the influence of biosecurity practices on the predicted impacts of BVDV for different producer typologies in south-east NSW, to determine the role of producer values for decisions regarding on-farm biosecurity.

Occurrence and abundance of zoonotic nematodes in a popular table fish snapper *Chrysophrys auratus* from the Australian and New Zealand waters

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Snapper *Chrysophrys auratus* in Australia and New Zealand (NZ) is prized by recreational fisherman for its delicate white mild flavoured flesh and which is also commonly consumed as sashimi or in sushi. Snapper consume a variety of crustaceans and small fish which serve as intermediate host to larval nematodes and therefore, snapper have the potential to become parasitised by nematodes. The aim of this study was to investigate if snapper from Australia/NZ are infected with medically important nematodes and to accurately identify using combined morphological and molecular methods. A total of 112 snapper were purchased from the Sydney fish market, New South Wales, Australia and examined. The overall prevalence of infection was 30%. Parasites were initially identified as Anisakidae (*Anisakis* types I & III, and *Terranova* type II) and Cucullanidae (*Dichelyne* spp.). Based on the ITS sequences, the *Anisakis* types I & III were confirmed as *Anisakis pegreffii* and *A. brevispiculata*. The specific identification of *Terranova* type II remained unknown. Based on phylogenetic analyses the *Dichelyne* specimens were identified as *Dichelyne* cf. *pleuronectidis*, and an unknown species *Dichelyne* sp. 1. This study represents the first host record in the world for these Anisakid nematodes. The identification of *Dichelyne* spp. in the Australian/NZ waters are the first host record. These findings provide important basic information on the occurrence and infection of zoonotic and potentially zoonotic nematodes in this economically important marine fish. Further investigation is required to assess both of fish and human health risk these nematodes may pose in Australia/NZ.

Parasitism in the black-spotted croaker

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The black-spotted croaker, is the largest sciaenid occurring in northern Australian waters. It is commercially important and seriously over-sourced due to the high market value of swim bladders, and the species' predictable forming of fish spawning aggregations. Management practices to support the recovery of the species need to be developed but are currently hindered due to a lack of relevant research. It is with accelerated importance that parasitological research, environmental factors and resulting health implications are assessed so that sustainable biological and health practices can be implemented before the status of this fish species becomes critical. The research presented aims to assess the parasitism affecting the species and identify the population health implications as a result of this. Additional investigations will be made into the factors that potentially affect the spatial and temporal variation in component communities of parasitic organisms in populations of the black-spotted croaker in the Northern Territory.

Session 12

Effects of seed enhancement technologies on early life-stages of seedlings post-mining

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Invasive species create barriers to native species re-establishment in degraded lands. Post-emergent herbicides are preferred for restoration use (over pre-emergent) as they have no intended effect on seeds. However, recent studies found post-emergent herbicides persist in soils reducing native seedling performance. Seed enhancement technologies (SETs) containing activated carbon (AC) can protect seeds from pre-emergent herbicides, however they are yet to be tested with post-emergent herbicides. We explored effects of post-emergent herbicides on seedling emergence for five species native to Western Australia Banksia woodlands. We investigated if AC SETs could protect seeds/seedlings from negative effects caused by herbicide application. Roundup® significantly reduced seedling emergence of *Acacia pulchella*, *Banksia menziesii* and *Eucalyptus todtiana* compared to controls, whereas Fusilade® had no significant effects on emergence. Both herbicides significantly reduced the health of emerged *A. pulchella*, *B. menziesii* and *E. todtiana* seedlings. Activated carbon provided no significant protection from either herbicide for all species.

Impacts of exclusion fencing on native and feral animal behaviours around savanna waterholes in northern Australia

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Feral ungulates cause considerable damage to wetland areas in northern Australia. To assess the seasonal use of wetlands by cattle, buffalo and pigs and how their impacts affect the visitation of native macropods and dingos, we used remote triggered cameras at 20 ephemeral savanna waterholes in the Northern Territory. Fencing excluded cattle and buffalo from 10 of those waterholes. We found that in both years, the presence of cattle and macropods increased as the seasons got drier and the presence of all species, except dingoes, was greater during the year rainfall was lowest (drought). During the drought year, feral ungulates visited waterholes more often and in larger groups. Cattle and buffalo also spent more time drinking and wallowing. The exclusion of ungulates from waterholes did not the influence visitation rates or behaviours of native species. Our results suggest that native species have higher tolerance to drought conditions than introduced ungulates.

Small-scale species distribution model identifies restricted breeding habitat for an endemic island bird

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Island birds are particularly vulnerable to anthropogenic effects on their habitats, but few studies have investigated the suitability of remaining habitat for species restricted to small oceanic islands. Here, we developed a fine-scale species distribution model to investigate the breeding habitat of the Lord Howe currawong (*Strepera graculina crissalis*). We found that currawongs nest preferentially near gullies in the forested areas of the island. Distance to drainage was the main factor preventing currawongs from breeding across the island's forested areas. We estimated that the island can support a maximum number of 84 territories. This study shows that the currawong has a narrower ecological niche than was expected, lowering the carrying capacity for this species. As birds on remote islands are often unable to relocate to other suitable areas, it is important to determine the remaining habitat to ensure the continued persistence and conservation of threatened island species.

Sandalwood (*Santalum spicatum*) is on course for extinction in the semi-arid rangelands of Western Australia. Why is it still being overexploited?

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There were no Environmental Impact Statements conducted when the first Australian Sandalwood (*Santalum spicatum*) trees were commercially harvested and exported in 1845. Since then, an immeasurable number of trees have been pulled from the landscape to supply the sandalwood industry, which has continued for decades unchecked and unregulated, with unknown quantities illegally harvested.

Here, I review the impacts of over-extraction of Sandalwood; the current status of the species in the wild; and the implications of the multiple, integrated threats impacting the species.

As a result of this overexploitation, and the cumulative impact of an escalating suite of threats, Sandalwood is now facing extinction in the wild. While there has been considerable research associated with the species' commercial exploitation, there has been virtually no investigation of the ecological role that Sandalwood plays within its natural communities and ecosystems, and the implications of its gradual disappearance. What happens when it's gone?

Using virtual species to test species distribution models: Do we need to incorporate spatial and temporally stochastic processes?

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Species distribution models (SDMs) are an important tool for ecologists to understand species response to the environment and predict where species may occur. Many factors can affect the performance of correlative SDMs including modelling method, sampling method and collinearity. To better understand the impacts of these issues, virtual experiments are commonly used to test SDM performance. However, virtual SDM experiments typically simulate the species functional relationship with the environment, ignoring endogenous ecological processes like dispersal and population dynamics. To understand the consequences of not simulating these processes an agent-based model was used to simulate species abundance data in landscapes with varying spatial structure. This data was then analysed to investigate how this affected the observed relationship between species and the environment, as well as impacts on SDM predictions. Our findings demonstrate the importance of the interaction between landscape structure and endogenous processes in shaping virtual species response to the environment.

Session 13

Landscape context mediates the effects of local vegetation on in-field abundance of pests and natural enemies

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The numbers of pests and beneficial insects in crop fields are known to be affected by local factors (such as nearby shelterbelts) as well as by longer-range factors (such woodland patches) but little is known of how local and longer range factors interact. Accordingly, this study compared arthropod numbers in the centres of 24 brassica vegetable fields with numbers in the field margins to generate 'effect sizes' that expressed the influence of differing adjacent land uses. For example, woody vegetation reduced pest densities in the adjacent crop edges. Then, landscape properties were analysed to test for an influence on the strength of effect sizes among the 24 fields. This revealed that woody vegetation in the landscape strengthened the suppressive effect on the key pest species (diamondback moth) of woody vegetation adjacent to fields. Results will help guide land managers in management and restoration of vegetation to provide pest suppression.

Olfactory responses of selected dung beetle species to dung volatiles

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Volatile cues play a major role in locating sporadically distributed food resources and mates by dung beetles, but the underlying mechanism of olfactory responses associated with dung attraction remains largely unexplored. The aim of this study was to evaluate the olfactory preference of introduced *Bubas bison* (Coleoptera: Scarabaeidae) to various dung sources in a passive cage olfactometry bioassay and characterise dung volatiles attractive to this species. Adult beetles were more attracted to horse dung odours compared to cattle and sheep dung irrespective of the sex of the beetle. Headspace volatile sampling of dung was achieved through solid-phase micro-extraction and dynamic headspace followed by analysis via gas chromatography-mass spectrometry (GC-MS QToF). Preliminary results suggest the presence of numerous volatiles in dung headspace. Behaviourally active volatile compounds will be identified using GC coupled with electroantennography followed by formulation of identified VOCs as synthetic lures to improve the consistency of trapping of dung beetles.

Evaluating the Effects of Introduced Dung Beetles on Pasture Ecosystem Structure and Functions

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Introduction of domestic livestock once led to massive dung accumulation in pastures resulting in perturbation to Australian pasture ecosystems including reduced productivity and increased pest infestations. Dung accumulated due to a lack of efficient native decomposers of large herbivore dung, leading to a dung beetle introduction program initiated by CSIRO to fill this empty niche. To date, over 50 dung beetle species have been introduced, with 23 successfully established in major livestock production areas. However, their ecosystem functions have not been well characterized. To address this, we will conduct a series of field, lysimeter and laboratory experiments to evaluate the effects of dung beetles on pasture ecosystems. Changes in soil physical, chemical and biological properties as well as pasture growth following dung beetle activities will be measured.

Competing Down Under: Does Above-Ground Vigour Modify Root Growth and Below-Ground Competitiveness?

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The economic burden of weeds through their direct impact on yield and the high input costs associated with herbicides is an ongoing problem in wheat production. The dramatic increase in herbicide resistance in recent decades has highlighted a clear need for an integrated approach to weed management. Selection of wheat cultivars that are strongly competitive with weeds offers a cost-effective weed management option. CSIRO has developed wheat genotypes with increased above-ground vigour. However, how increased vigour modifies below-ground traits with respect to competitiveness has yet to be determined. A selection of commercial, historical and CSIRO developed high-vigour wheat genotypes were evaluated in both controlled environment and field experiments to assess the relationship between above-ground competitive traits and root architecture development. Certain historical cultivars and high-vigour genotypes were more competitive with weeds in-crop and possessed greater early vigour both above- and below-ground when compared to currently available commercial cultivars.

The relationship of coleoptile length and seedling vigour to deep seed sowing in wheat seedling establishment

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Changes in cropping technologies have led to the establishment of wheat crops earlier than traditionally practised. Often sowing coincides with a dry start to the season which may see farmers sowing seed deeper than traditionally practised to access soil moisture. Usually, this results in poor crop establishment due to short coleoptiles and/or low seedling vigour.

The coleoptile is a pointed protective sheath encasing the emerging leaf as it pushes to the soil surface. Short coleoptiles have been a feature of commercial wheat since the introduction of dwarfing genes *Rht-B1b* and *Rht-D1b*, which resulted in grain yield increases due to shortening of plant height. The downside with these genes are shortening of the coleoptile and reduction of seedling leaf area (i.e. seedling vigour).

Recently, new genes were identified with potential to replace *Rht-B1b* and *Rht-D1b*, but without reducing coleoptile length and seedling vigour. The influence of these alternative dwarfing genes on coleoptile length and seedling vigour to affect crop establishment is the objective of my Honours.

How hot is too hot? Determining critical temperatures for devernalisation in wheat

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The genes which control the rate of plant development (phenology) and their interaction with the environment largely determine crop adaptation. Wheat phenology progresses through a series of phases which align with the development of yield components. It is therefore critical to align these phases with optimal seasonal conditions. It is well established in the literature the importance of flowering time, whereby grain yield is maximised when genotype and sowing date are matched so that flowering occurs when the risk of early frost damage and later, heat and moisture damage, is low.

Understanding the basis of variation in flowering time can inform crop breeding strategies and influence management strategies for improved crop yield and production. The objective of this honours study is to identify the extent to which high temperatures interrupt genetic responses in the vernalisation pathway and the implications for crop development.