Charles Darwin University
Higher Degree by Research Futures Conference 2019

HDR Candidate Presentations Abstracts

KEY PROGRAM CHANGES THIS WEEK

– Traditional Medicine and Plants is no longer a session.

Presenters Adam Thomson and Elnaz Saki have been moved to difference sessions.
See highlighted below for details.

Book Tickets for the Conference here

Conference website:
Thursday 5th September – Morning Session (10:30 – 12:30)

HDR Candidate presentations

Sustainable communities 1

Yellow 1.1.39

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Small-scale fisheries make essential contributions to food security and coastal livelihoods. While there has been much previous research on the importance of tropical coral reef fisheries in the Asia-Pacific region, less attention has been paid to small pelagic fisheries. Yet these fisheries are by their nature, more productive and more resilient to fishing than reef fisheries, and can be as, or more important for income and the supply of nutritious food. This study is investigating small-scale sardine fisheries in Timor-Leste with the overall aim to identify potential opportunities for delivering and sustaining greater benefits from this social-ecological food system. Fish landing surveys, semi-structured discussions with fishers and fish traders, and observations, have been undertaken in communities using two river-associated fishing locations along Timor-Leste’s north coast. Preliminary findings show that sardines are seasonally important as income and food. Fishers use small-mesh gillnets nearshore from both motorised and non-motorised canoes. Fish are transported to inland communities and district centres by fish traders or sold directly to consumers on the roadside. Most sardines are sold fresh; only surplus (unsold) fish are dried, which was uncommon during the reportedly poor seasons in 2016-2018. Sardines are commonly eaten by fishers, fish traders and their families, and are a popular food among Timorese as they are more affordable than large fish. Fishers in some locations report that fisher numbers are increasing, and sardines are becoming more difficult to catch, suggesting such fisheries would benefit from management, ideally designed and implemented by the local communities.

Keywords: small-scale fisheries, livelihoods, food security, nutrition

Thursday 5th September – Morning Session (10:30 – 12:30) – Sustainable communities 1 - Yellow 1.1.39
Mujiburrahman

Doctor of Philosophy

College of Indigenous Futures, Arts and Society

Speed Presentation

Towards a sustainable multi-hazard early warning system in Indonesia

Indonesia tsunami early warning system is scrutinising for its failure to protect lives and unsustainable in nature. In the past, various proposed methods to measure the sustainability at the macro and micro level focus on single hazard early warning system. However, ever since the sustainable development goals, a need to measure the sustainability of multi-hazard early warning system (MHEWS) become urgent. The research employs a mixed methodology using both qualitative and quantitative approach. A decade of data is collected from secondary sources between 2008 to 2018 from World Bank data sets for indicators to measure the factors that influence the sustainability of early warning systems. Furthermore, this research adopts a proposed comprehensive framework for the principles of assessing an MHEWS which initially intended for the Tsunami EWS based on Effectiveness, Efficiency, Equity and Legitimacy as part of understanding sustainability.

The results indicate that the transition of a single hazard towards an MHEWS still poses challenges. Definite improvements after a decade of development at the macro level, whereas at the micro level, the MHEWS has yet to show its effectiveness. The current system focuses on Hydro-meteorological hazards and in the process of integrating the earthquake, tsunami and volcano hazards. The concentration of investment of the MHEWS is at the national level and have not been enough investment at the local government levels. Issues of equity and legitimacy persist. The research recommends that a robust legal framework at the national and local level to ensure the sustainability of MHEWS in the future.

Keywords: Sustainability, Multi-Hazard, Early Warning Systems, Indonesia

Thursday 5th September – Morning Session (10:30 – 12:30) - Sustainable communities 1 - Yellow 1.1.39
Most people in rural Thailand still depend on agriculture. The rural areas are undergoing changes in their demographic structures with an increasing older population and a shifting away from the agricultural sector of the younger people. These changes may lead to a decline in agricultural productivity and food security issues for the older farmers and the country. This research aims to examine how older farmers change their farming practices in response to their ageing and what affects these changes. The data were collected through a household survey with 368 farmers in the Prachin Buri province in central Thailand, a main area for agricultural production. Results of estimated multivariable logistic regression models revealed that most farmers intend to make changes to their farming, particularly to reduce their own labour intensity, by transferring farmland to children (41%), giving farmland to others (e.g. selling, leasing out) (28%) or changing crops, employing additional labours and/or applying new technologies (24%). Being of good health and having a potential farm successor were positively associated with the probability of transferring the land to the children. Farmers with a successor were also less likely to give the land to the others. Age was negatively associated with the likelihood of changing crops, employing additional labours and/or applying new technologies. The results indicate that farmers try to keep the land within their family which has implications for policy-making to improve the quality of life of the ageing farmers and to sustain the agricultural sector of Thailand.

Keywords: Rural demographic change, older farmer, farming practice, transferring farmland, employing additional labours, Thailand
Stephen Sutton  
Doctor of Philosophy  
College of Health and Human Sciences  

Full Presentation  

Developing Sustainable Disaster Resilient Communities: Lessons from Some Survivors  

In a world where disasters impacts are growing, sustaining communities is becoming increasingly difficult. The UN Sustainable Development Goals include 25 targets within 10 of the SDGs “firmly establishing the role of disaster risk reduction as a core development strategy.” However, despite starting in the 1990s “decade of DRR” improvement in community disaster resilience is slow. In the US, FEMA indicates that there has been no improvement in 20 years.

This project examined a DRR process on the island of Simeulue in Indonesia which was sustained for 100 years, saving the entire population of 80,000 lives in 2004. The research involved extensive interviews with tsunami survivors in villages around the island. A combination of Grounded Theory and narrative theory analyses revealed a pattern of cultural practices that engendered strong personal commitments to appropriate disaster response behaviours.

The findings indicate a ‘soft power’ strategy where highly influential family and village members sustained a narrative tradition about ‘smong’ – (tsunami in Simeulue’s language). These influential people are not village potentates but rather respected older citizens and especially grandmothers. The narrative is combined with music including lullabies and ‘nandong’ folk songs.

The net effect of these practices is to provoke sustained emotional connection with past disasters and clear risk perceptions of possible future events.

All of this lay hidden ‘under the radar’ and despite the ‘Simeulue strategy’ being known to authorities in Indonesia and elsewhere, government risk communications continue with the same ‘top down’ broadcast model. Some alternative approaches derived from Simeulue are suggested.

Keywords: tsunami, drr, sustainable, narrative, risk communication, soft power

Thursday 5th September – Morning Session (10:30 – 12:30) - Sustainable communities 1 - Yellow 1.1.39
Indigenous disaster risk resilience through community-based approaches for sustainable future: Evidence from Pakistan

The socio-economic dipartites as a result of colonisation have significantly influenced the disaster risk resilience (DRR) of the Indigenous communities of the world. Since 2002, an increased emphasis on the inclusion of Indigenous communities in disaster management planning through Community Based Disaster Risk Resilience (CBDRR) has identified a need for systematic research into Indigenous CBDRR and the historical and contemporary factors that help or hinder their (re)development and application. In this backdrop, this qualitative study is a comparison between Australian and Pakistani Indigenous communities and focuses on understanding the social, environmental, economic, cultural and political factors, and the interconnections between them, that influence Indigenous DRR and how they can be addressed through CBDRR approach for sustainable Indigenous future. The comparative study will help to develop a template with standardised information in broad categories of preparedness which can be applicable to the Indigenous communities of the world. The research employs Indigenous research methodologies. In the first phase, data was collected through one-to-one conversations, sharing circles and observations from 19 Indigenous participants from a remote Indigenous community in Northern Pakistan in 2018. Findings reveal different political, social, cultural, economic, structural and geographical variables which negatively or positively influence DRR of the community. Based on the findings, this paper proposes a CBDRR theory to address these variables for greater DRR of Pakistani remote Indigenous communities. In the second phase, the process will be replicated in a remote Indigenous community in the NT, to build a universal CBDRR theory based on the common variables.

*Keywords: Indigenous disaster risk resilience, Pakistani Indigenous communities, community-based approaches, sustainable future*
Jaemie Page

Master by Research

College of Indigenous Futures, Arts and Society

Full Presentation

Role of Rangers in the Thamarrurr region

Indigenous ranger programs are increasingly being recognised as successful models for land management and community development, providing meaningful employment that embraces cultural knowledge and aspirations with scientific, environmental and conservation goals. With increasing recognition, success and funding comes more expectations from external agencies about work priorities, what needs doing, and the role of rangers.

External perspectives of what is needed, what problems need fixing, may not be what Indigenous landowners see as priorities. Issues like feral buffalo, late season fires, hunting marine mammals may be a ‘problem’ from a western conservation perspective, but it cannot be assumed landowners share these as priorities.

Western conservation often takes an ‘outside looking in’ approach. Environmental assessment, and resulting management plans, are based on quantifiable indicators such as areas burnt or weedy, population numbers of threatened species or ferals, water quality. Built into such an approach are layers of assumptions about the world and relationships; the idea that elements of the environment are separated from people, can be universally generalised, mapped, counted. The end justifies the means. Processes are not always recognised as central to outcomes and change regularly with policy, funding, staff. Landowner perspectives, governance, authorities are only recognised where they fit a western worldview.

My Masters research explores narratives and perspectives from rangers and elders of the Thamarrurr region to gain insights into their practices and priorities for living on Country, and what they see as the role of rangers to support traditional knowledge systems and build capacity to meet emerging challenges.

Keywords: Indigenous Rangers, Thamarrurr, savanna fire, narrative, healthy country

Thursday 5th September – Morning Session (10:30 – 12:30) - Sustainable communities
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Thursday 5th September – Morning Session (10:30 – 12:30) HDR Candidate presentations

Respect and Equity

Red 9.1.48

| Student Chair: Wayne Pollock |
| Academic mentor: Birut Zemits |
| Technical assistant: Tanya Kalinowsky |

- **Barbara Morris**
  - Full Presentation
  - Mobility and Career Progression as a partner of an Australian Defence Force member

- **Hannah Taino-Spick**
  - Full Presentation
  - The ANZAC narrative: helping or hindering our contemporary Australian veterans?

- **Jean Borlagdan**
  - Full Presentation
  - Flower portraits as images of movements, memories and materiality

- **Lillyana Toushek**
  - Full Presentation
  - Windscapes. Stories of winds and seas. Seeing the mythology through photography

- **Sarah Ajowi**
  - Full Presentation
  - The journey of the African born women from Intimate Partner Violence to seeking help
Barbara Morris

Doctor of Philosophy

College of Education

Full Presentation

Mobility and Career Progression as a partner of an Australian Defence Force member

Partners of serving military members often experience challenges in attaining, maintaining or retaining employment. This workshop will focus on the findings of my research which investigates the relationship between tied migration and the career progression of partners of Australian Defence Force members. Tied migration is described as the movement of an individual whose partner or family have migrated to a new country or distant location but who would not have chosen to move if they possessed sufficient personal agency and decision-making skills. Career progression is not mere employment but a planned, upward moving, status building activity usually with financial benefits. Partners of serving military members in Australia often have no say in when or where they move.

This research sought to understand the implications of being a civilian partner of a member of the Australian Defence Force and whether this had a bearing on the career progression and achievements of individuals. This research was underpinned by narrative theory which informed the methodological design; research conversations from thirty participants gathered through snowball recruitment formed the core data collected in this research. Australian military policy documents and literature reviews from American, British and Canadian military studies triangulated with the research conversation data were used to develop the recommendations and conclusions contained in this research.

By listening to the stories of the these participants today, presents possibilities to change the future by providing partners with opportunities to work in their chosen careers, ensuring a strong and resilience identity within the community and assisting in maintaining good morale in the ADF.

Keywords: career progression, tied migration, partners, Australian Defence Force

Thursday 5th September – Morning Session (10:30am – 12:30pm) - Respect and Equity - Red 9.1.48
The Australian Imperial Force and the New Zealand Expeditionary Force was formed under the banner of the Australian and New Zealand Army Corps (ANZAC) during the First World War. In an age of empire, this singular campaign, through defeat and huge losses, bore an Australian national identity and entrenched an enduring Australian legacy. 100 years later, from the end of the First World War, Australia continues to commemorate this battle, every 25th April, nationwide, with public support not dwindling, but increasing. The battles from Gallipoli, and its legacies – such as courage and mateship, are taught to the youngest and newest of Australia’s, and continued by generations before, and after, them. Australia’s own Australian Defence Force carries this narrative as traditional bearers and custodians of ANZAC. Yet upon closer inspection, how much of this narrative rings true for Australia’s current and contemporary veterans? My current research, through qualitative one on one interviewing, is showing an emerging and growing disconnect between the Australian ANZAC identity, and of the Australian contemporary veteran multi-faceted identity/ies. Motivated by ‘post-truth’ and future discourses, I, as researcher, and as a contemporary veteran, have begun to question the sustainability of an enduring narrative: is the story of ANZAC helping or hindering the emerging post-warrior discourse of Australia’s modern-day veterans?

*Keywords: Australian Defence Force, veteran, ANZAC, post-warrior narrative*
Flower portraits as images of movements, memories and materiality

Migration as a phenomenon implies movements and changes. It affects domains of migrant life regardless of the motivations for a move. Artists are not only among the most mobile members of a community, but they are also often outriders of transformations of ideas. This practice-based research aims to reflect the way relocation affects an artist’s work, with particular note on one artist’s interpretation.

In visual arts, themes of displacement, attachment, loss, home/homeland, identity, sense of belonging, repossessing of memory are commonly exemplified with images of people, modes of transport, occurrences but seldom with images of flowers. Similarly, studies on material culture often examine man-made objects instead of aspects of the natural environment such as plants and flowers. Self-reflexive evaluation and exploration of material relating to conditions of migration are used to explore accounts on environmental memories, emphasising the manner in which people invest places with meaning and significance. Hence, this research extends knowledge on how people act in ways that reflect their bonding and linkages with places through art. It focuses on flowers in diaspora to demonstrate reflections of a migrant using art as an important practice in resettlement and upholding well-being.

Keywords: art practice, migration & resettlement, mobility, material culture, environmental memories, materiality

Thursday 5th September – Morning Session (10:30am – 12:30pm) - Respect and Equity - Red 9.1.48
Placed in a ‘world of increased communication, travel and migration’, the artist becomes ‘homo viator’, one crossing through signs and formats to relate to the contemporary traits of mobility in society. A traveling artist in an unfamiliar environment, instead of collecting postcard views, has a more specific focus, seeking to represent an engagement in the decentralization of the self. As a photographer, one can explore the disturbance of the habitual placement of personality by being enveloped by the unfamiliar as a means of expression. This can be linked to the experience of the place itself and the mythologies that are connected to its history.

This presentation will show, through discussion of images, a search through encounters of winds and seas in different places, to find social and personal affinities with the environments represented. Using abstract landscape photography, a visual translation of what can be described as the ‘quality of being ‘honey-eyed’ becomes the discovery of being embroiled in an external experience. This is a view opposed to the touristic brushing against the surface, questioning the ways the world is to be experienced through the liminal spaces of the travel encounter, seeking where the body is lingering between the unfamiliar and the habitual, getting deeply involved in the space itself. The narrative derives from readings and commentaries on art, as well as on travel and perception, searching for solid links between travel and visual representation of mythology through contemporary art and theory.

*Keywords: Windscapes. Stories of winds and seas. Seeing the mythology through photography*

*Thursday 5th September – Morning Session (10:30am – 12:30pm) - Respect and Equity - Red 9.1.48*
Sarah Ajowi

Doctor of Philosophy

College of Indigenous Futures, Arts and Society

Full Presentation

The journey of the African born women from Intimate Partner Violence to seeking help

This PhD study investigated how the African-born women in Australia are seeking help to end the Intimate partner Violence (IPV). The Northern Territory (NT) served as the fieldwork location. The study was motivated by a lack of recent evidence in the NT and Australia more broadly on help-seeking behaviours among women immigrants, particularly, among the African-born women.

The study involved interviews with professionals from support agencies in Darwin and IPV survivors, with cases resolved. It investigated if, and what is the link between incidence of help-seeking to address IPV among the African-born women and the interplay of intersectional factors, and the cultural sensitivity of the professional support services they accessed.

Focused ethnographic research methods involving semi-structured interviews, observation, and field notes were used. The study was theoretically framed by intersectionality.

This presentation summarises the final results from my study. A social-ecological model (Bronfenbrenner, 1979) provided an in-depth analysis and interpretation of the professionals’ and the women survivor’s accounts of their journey to seeking help. Seven factors- individual, family, community, and socio cultural, organisational, policy and African socialisation emerged at different overlapping levels. The overlap reflects how factors at one level influence and interact with factors at another level and how they influence attitudes and help seeking behaviours among the African women. This framework offered an ample base to make suggestions for future strategies that need to be developed and deployed to address causal factors at multiple levels simultaneously.

Keywords: Intimate partner violence, help-seeking, focused ethnography, intersectionality framework, Social ecological model, migrants

Thursday 5th September – Morning Session (10:30am – 12:30pm) - Respect and Equity - Red 9.1.48
Thursday 5th September – Morning Session (10:30am – 12:30pm)

HDR Candidate presentations

Indigenous health (including youth and child)

Red 9.1.45

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<td>Matilda Lyons</td>
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Hongqi Niu

Doctor of Philosophy

College of Engineering, IT and Environment

Full Presentation

Latent Class analysis among Aboriginal and/or Torres Strait Islander children hospitalised with bronchiolitis from the Northern Territory

Bronchiolitis is a significant health burden in infants globally, particularly among Indigenous populations. In this study, we aimed (1) to identify severe bronchiolitis profiles for this high-risk population by using a clustering method Latent Class Analysis (LCA). (2) to determine whether LCA could identify distinct clinical profiles for infants at-risk for bronchiectasis.

The demographic and clinical data for 164 Indigenous infants were included in this study. Severe Bronchiolitis profiles were determined by LCA based on the viral clinical factors chosen from Multiple correspondence analysis (MCA).

Five clinical classes of severe bronchiolitis were identified. Class 2 (24%) was the group more likely to prolong hospital stay for the old infants. Infants were characterized by 100% requiring oxygen (along with class 5), marked accessory muscle use (48%), LOS 72-96-hours (48% vs 0-30% in other classes). Class 5 was identified the most severe group (7%) of infants who mostly live remotely (100% vs 74-87% for other classes); have moderate accessory muscle use (85% vs 0-52%); bacteria detected (93% vs 55-71%); and had bronchiectasis (96% vs 0-35%). All infants in class 5(as per class 2) required oxygen vs 23-79% from the remaining classes.

By using LCA, severe bronchiolitis profiles were identified for older infants and younger infants hospitalized with bronchiolitis. Accessory muscle use was identified as a key factor for old infants with prolonged hospital stay. Any bacteria detected was the key factor in our LCA model for older infants from the remote area to develop future bronchiectasis.

Keywords: Latent Classic Analysis, Bronchiolitis severity, Bronchiectasis, Accessory muscle use
Renal (Kidney) diseases in Indigenous Australians result in a substantial number of hospitalisations and high health care expenditure. Despite all Australians being entitled to health rights, as set out in the Australian Charter of Healthcare Rights (2008), renal health is a significant area where health disparities exist between Indigenous and non-Indigenous Australians (Northern Territory Renal Service Strategy, 2017-2022). A human rights-based approach is used for this research to understand the causes of renal health disparities.

This qualitative study aims to explore the extent to which Indigenous health rights are recognised and realised, as envisaged by the Australian Charter of Healthcare Rights, in the context of renal care, in the Northern Territory. The study is carried out in two parts: document analysis of renal health policies guiding service delivery, and interviews with Indigenous renal patients and renal nurses.

The early findings indicate there are significant gaps in the three main attributes of health rights: access to safe and quality care, communication and participation in care, and cultural safety of care. Access to safe and quality health care, as a fundamental right, is not realised in terms of availability, acceptability and accessibility of renal care for Indigenous patients in the NT. Lack of open, clear, two-way communication, between Indigenous patients and health professionals, affect all aspects of renal care; and cultural safety and cultural respect are not an integral part of health care delivery.

The findings will inform recommendations to support the recognition and realisation of health rights for Indigenous patients in renal care policy and practice.

*Keywords: health rights, Indigenous health disparities, renal health, access to care, cultural safety*
Bronchiectasis is a progressive respiratory condition characterised by permanent airway damage. The prevalence of bronchiectasis in Northern Territory Indigenous children is estimated to be one of the highest in the world. S. pneumoniae is an important respiratory pathogen associated with bronchiectasis. Early-life pneumonia is a risk factor for development of bronchiectasis and S. pneumoniae is often isolated from the lower airways of children with bronchiectasis. Understanding the immunological risk factors associated with lower respiratory infection with S. pneumoniae may lead to novel management strategies for bronchiectasis in children.

There are over 90 serotypes of S. pneumoniae. The current vaccine covers 13 types. Rate of invasive pneumococcal disease in Australia has declined since the introduction of the National Immunisation Program however; rates of respiratory infections due to S. pneumoniae remain disproportionally high in Northern Territory Indigenous children. The primary aim of this project is to identify features of the immune system of children with bronchiectasis that contribute to lower respiratory infection with S. pneumoniae. Blood mononuclear cells from Northern Territory children with bronchiectasis, and healthy control children were cultured in vitro with vaccine and non-vaccine types of S. pneumoniae. Early inflammatory and adaptive immune responses were compared using immunoassays and flow cytometry.

*Keywords: Bronchiectasis, Streptococcus pneumoniae, Flow cytometry, ELISA, adaptive cellular immune response*
Thursday 5th September – Morning Session (10:30am – 12:30pm) - Indigenous health (incl youth and child) - Red 9.1.45

Will Cuningham

Doctor of Philosophy

Menzies School of Health Research

Full Presentation

Understanding current antimicrobial prescribing practice in remote Aboriginal primary healthcare across northern Australia

The high burden of infectious disease and associated antibiotic use contribute significantly to the emergence of antimicrobial resistance (AMR) in remote Aboriginal communities. A better understanding of antimicrobial use in this setting is needed to inform decision-making at both a policy and clinical level.

This pilot informs the longer-term aim of reporting on antimicrobial prescribing behaviour in this type of community setting with an audit plan that is relevant, feasible and sustainable.

We adapted the National Antibiotic Prescribing Survey tool to audit current antimicrobial prescribing practice in Aboriginal Medical Services across northern Australia. Trained auditors reviewed clinic records at each clinic over a 1-3 week period recording data on the prescriber, treatment, indication and appropriateness of the prescription.

668 antimicrobial prescriptions were audited. Skin and soft tissue infections (SSTI) dominated as a reason for antimicrobial prescribing (WA: 35%; NT: 29%; QLD: 40%), with substantially more co-trimoxazole prescribed in far north Queensland. Compared with other settings in Australia, the appropriateness of prescriptions was mostly high. We found that this auditing process was technically difficult and time-consuming due to lack of existing framework, however, future developments in electronic prescribing and IT infrastructure will increase the feasibility of antimicrobial stewardship in this setting.

This cross-jurisdictional collaboration supported emerging local stewardship programs and enabled identification of common priorities for Aboriginal & Torres Strait Islander health settings across northern Australia. Antimicrobial prescribing patterns clearly differ compared to other primary care settings. Context-specific antimicrobial stewardship tools and recommendations are needed to support best clinical practice and address rising AMR rates.

Keywords: antimicrobial resistance, antimicrobial stewardship, infectious diseases, Aboriginal and Torres Strait Islander communities
‘Anything they dagat’: food provisioning in a remote Aboriginal community

Food and eating practices formed in childhood have lasting consequences for health and development, establishing the foundation for food preferences, and, through the types and quantities of foods consumed, chronic disease risk. There is little contemporary research into how Aboriginal children are fed and develop their food and eating practices. There is often little consideration for the various meanings of food and eating practices in the lifeworld’s of Aboriginal children and their families, and the historical, social, cultural and material contexts that have produced these practices.

Drawing on ethnographic work in a remote Aboriginal community, this presentation will explore the: children’s socialisation to food and eating practices; meanings and relationships of food within families; and socio-cultural-historical shaping of children’s food and eating practices.

From this research I found that children in this remote community are socialised to eating patterns that fluid and opportunistic, constrained by social obligations, economics and availability. Aboriginal people positioned their eating practices in opposition to munanga (non-Aboriginal) eating patterns. There is ambivalence about the salience of these munanga types of eating patterns in the Aboriginal domain. What children eat and how children are fed is a complex and contested space constructed through contingent and conflicting discourses and embodied experiences.

A more thorough understanding of these complexities and experiences today may provide insight into limits and possibilities of future nutrition improvement strategies.

**Keywords:** Aboriginal health; nutrition; qualitative research; food
Globally there is an upcoming interest in drugs derived from plants sources as well as huge industry development of natural products containing oils and herbs, because of its promising medical benefits with less or no side effects compared to pharmaceutical drugs.

However, the great challenge of using crude herbs/plants (various plant parts and exudates) for dermal application as biomedical compounds include low absorption and inability to cross the lipid membranes of the cells resulting in loss of bioavailability and efficacy. Also, the extraction of phytochemicals mostly involves organic solvents that could be expensive and toxic for both human and environment.

My PhD project aims to identify an alternative way to administering two Australian native plants found in the Northern Territory with the prospect of increasing the efficiency of probable biomedical properties by green synthesizing nanoemulsion (NE) from their oils and water extracts.

As a result, different nanoemulsions are synthesized by varying the composition of the lipophilic phase which is a combination of non-ionic surfactants (different types of Tween), and oil extract and the hydrophilic phase, the plant water extract. For optimization of NE, droplet size, polydispersity index, and zeta potential are measured. The optimized formulations are subjected to thermodynamic stability study to get the most stable nanoemulsions.

Optimization of conditions for the synthesis of NE is in progress and the results will be presented.

Keywords: Australian native plant, nanoemulsion, topical drug delivery
Thursday 5th September – Morning Session (10:30 – 12:30)

HDR Candidate presentations

Integrity, diversity, and social justice in education

Mal Nairn Auditorium

| Student Chair: Faisal Badar  
Academic: Sue Shore  
Technical assistant: Irina Harbeck |
|---|
| **Anita Rijal**  
Speed Presentation  
Nepalese students' perceptions of education agent services |
| **Christine Pheeney**  
Full Presentation  
Innovative Teacher Learning Approach for Sustainable Social Peace |
| **Greg Williams**  
Full Presentation  
Hope and a Decolonising Pedagogy |
| **Gusti Agung Ayu Pramitasari**  
Full Presentation  
Rural Youth 21st Century Workforce Ready |
| **Ian Dinning**  
Speed Presentation  
Enhancing Cultural Work Awareness |
| **Mostafa Hamadi**  
Full presentation  
A systematic review of the use of SM as pedagogical tools: comprehensive framework for SM’s integration as teaching and learning tool |
International education in Australia is the third largest export industry, contributing AUD$35 billion to the economy in 2018. One of the largest growing source countries for Australian education is Nepal, with 6% of the market. To reach students in the Nepalese market, Australian universities utilise education agents, whose role is to provide information about universities and courses and to assist with the university application process. For many Nepalese students, the agent may provide the only contact point between the university and the student. Therefore, education agents represent Australian universities and contribute to their reputation, as they provide the first impression of Australian education to students. However, some unethical practices have been identified with education agent services. These include providing misleading information and fabrication of documents. Such practices can affect the reputation of Australian universities and prevent the country from becoming a global leader in education, one of the goals of the National Strategy for International Education 2025. Therefore, to gain a better understanding of unethical practices and their impact on Australia’s reputation as a higher education destination, this study will investigate Nepalese students’ perceptions of education agent services. The study will use a qualitative approach incorporating one-to-one interviews and focus group discussions with Nepalese students at Australian universities. The findings will provide insights for universities and policy makers with regards to the ethical conduct of education agents. Such findings can help to better manage the relationship between Australian universities, education agents and students and support future growth strategies.

Keywords: International education, education agents, Australian universities, unethical practices, students’ perception, Nepalese students
Social peace and sustainability typically require intentional effort engaging people and groups with distinct characteristics toward a common social purpose. In pursuit, top level Indonesian Governance directs Education Institutions animate the Pancasila (Indonesian national principles précised as 'Unity in Diversity') to build aligned character in classroom learning. However, current education practices are described as too abstract, influenced by typical professional development conducted in regional hubs with mostly homogenous enclaves, as constrained by aspects of decentralisation and perceived remote logistics. It is apparent that teachers of the populous, dispersed and diverse nation require innovative support towards directive achievement. In research underway, twenty-three teachers of diverse cultural, religious, age and geographic backgrounds were recruited to an Online Interregional Collaborative Inquiry (OICI) of the Pancasila. The teachers used personal digital devices to engage in synchronous small group video conference sessions, asynchronous forums and individually respond to open ended reflective interview and survey questions. Study of the interactions presents teachers’ cooperative readiness along with facilitator and content scaffolding, enabled united inquiry focus. This led to conversational ‘storying’ of abstract concepts, relational connections and lived ‘unity in diversity’ experience that now guides nurturing aligned classroom practice. This presentation explores OICI innovative teacher learning design and applicability to ‘what can we do today for tomorrow’ to advance global hopes of peaceful sustainability.

*Keywords: Unity in Diversity, Education, Teacher Professional Learning, Indonesia*
Hope and a Decolonising Pedagogy

The current analytic frames that are enacted within the work of the academy often make it difficult to engage honourably in intercultural contexts—both in teaching and in research. As a non-indigenous person working in an interesting corner of the academy where other ways of knowing, including those of Indigenous Australians, are valued and sometimes privileged, I am confronted with an important disconnect this causes on a regular basis. Academics (and many others in the broader community) are empowered by these frames to hold positions and make powerful and authoritative claims. This institutionally positions them as colonising agents in the effecting their knowledge work, often despite their best intentions.

Knowledge making at work in the academy and in our broader community both enables, and condemns simultaneously, the colonising work I perpetuate in the classroom and in my day-to-day interactions with difference. I seek to enact a ‘methodology of hope’ to reorientate the analytical frame for my work as a way of addressing (and holding onto) the disconcertment that I encounter, making it central to the processes of knowledge-making in intercultural spaces. As an academic, I want to know how this could play out in the classroom. I aim to examine the ways in which this different analytic frame, a methodology of hope, might support sustainable and decolonising pedagogic practices – the ways we engage with and do difference in the academy and the ways in which we also sensitize others to do the same.

Keywords: decolonising pedagogy hope intercultural
Indonesia still has considerable areas for improvement in developing its human capital. The education system still faces significant quality and access challenges, while unemployment remains a real concern. The pace of employment growth is much slower than population growth, with the highest unemployment rate being among youth, who are encountering difficulties finding their place in the national workforce. Moreover, the workforce is undergoing significant change because of the burgeoning of information communications technologies. With this change rural youth will potentially experience an increased risk of workforce ‘drop out’, as ‘traditional employment categories, are replaced by those grounded in new digital technologies. Rural youth are thus susceptible to being doubly disadvantaged in terms of securing employment.

In 2007, the non-formal education center, called the Slukat Learning Center (SLC), was established in rural Gianyar, Bali to improve employment opportunities and facilitate empowerment by providing educational opportunities for rural children and youth. This research project explores how the curriculum at the learning center has been able to develop youth empowerment. Drawing upon data from interviews of the SLC Chairman, students, parents, teachers, staffs and alumni, this research is focused upon how the curriculum has been able to empower rural Balinese youth, in ways that have enabled them to become future workforce ready.

Aiming to contribute to the research in the field of youth empowerment through non-formal education, the data were analyzed using Bourdieu’s Social Reproduction Theory. The preliminary analysis indicates that SLC can be considered a field within which the curriculum facilitates youth empowerment through supporting the construction of a new habitus and acquisition of a range of economic, cultural and social capitals.

Keywords: Youth Empowerment, Non-formal Education, 21st Century Skills, Social Reproduction Theory, Bourdieu

Thursday 5th September – Morning Session (10:30am – 12:30pm) - Integrity, diversity, and social justice in education - Mal Nairn Auditorium
Ian Dinning
Master by Research
Asia-Pacific College of Business and Law

Speed Presentation
Enhancing Cultural Work Awareness

In the presenter’s HDR study, cultural work is being approached as a vital but weakly recognised dimension of many social roles. While the term cultural work is neither widely used nor used with consistent definitional scope, it is used in ways that uniquely connect formative action; rich human engagements; deep order; deep belonging; dignifying dynamics; and respect for practitioners’ social roles.

The study is seeking to illuminate processes associated with cultural work and to develop a cultural work awareness strategy. Such awareness has profound future-making functions. It affects the maintenance of deep order; discerning and creative resourcefulness in immediate settings; the navigation of lifestyle influences; and social justice discernment.

The study is being undertaken as transdisciplinary practitioner research. The presenter has previously applied cultural work emphases in diverse practice fields and settings. Situational demands and developmental responses have generated a richly grounded array of practice sensibilities and process-naming habits. Some of the naming innovations and their generative events are being reviewed within the study. This presentation will introduce one of these process-naming areas, namely modes of formative articulation. It will give attention to the interplay of relational, deliberative and compositional dynamics; and to projects as loci of formative and ethical action.

Keywords: cultural work; transdisciplinarity; practitioner research; resourcefulness; social justice

Thursday 5th September – Morning Session (10:30am – 12:30pm) - Integrity, diversity, and social justice in education - Mal Nairn Auditorium
A systematic review of the use of Social Media as pedagogical tools: comprehensive framework for Social Media’s integration as teaching and learning tool

Social Media’s (SM) integration within educational institutions, universities in particular, has generated great interests in recent years. Namely, SM’s use as formal pedagogical tools has attracted the attention of many researchers from different disciplines. While most universities have progressed to include social learning sites (Blackboard Learn, Moodle, etc..) as essential instruments in their teaching and learning methods, few attempts were made to adopt popular SM platforms (such as Facebook, YouTube, twitter, etc.) as principal educational tools. Despite the many existing studies investigating the practicality of using selected SM platforms as teaching tools in singular classrooms, little has been made to develop a common framework for integrating SM platforms within a classroom environment. This paper presents a comprehensive review of current major scholarly on SM’s use as pedagogical tools, then analyses and identifies common practices and findings in the online literature. Findings of the review are used to support the development of a comprehensive framework for integrating SM as teaching and learning tools in a classroom environment. This framework can be used to facilitate the adoption of SM as a formal pedagogical tool, the development of SM implementation processes, and will assist in studying the effects of SM on education. The research outlines major findings in current literature, providing valuable insights on SM’s use in education and further forming the basis of future quantitative and qualitative research in this area of study.

Keywords: Social Media, education, pedagogy, teaching and learning tools, Social Media integration

Thursday 5th September – Morning Session (10:30am – 12:30pm) - Integrity, diversity, and social justice in education - Mal Nairn Auditorium
Thursday 5th September – Afternoon Session (1:30 – 3:30pm) HDR
Candidate presentations

**Sustainable communities 2**

Yellow 1.1.39

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*(Note: Adam has been moved to this session)*
The values of sustainable development

Planning for sustainable development in Northern Australia needs decision-making informed by an interdisciplinary evidence base.

This presentation is based on my PhD research into a model of social and cultural impact assessment of major projects in Northern Australia that delivers socially, culturally, economically and ecologically sustainable development.

Fieldwork incorporated an audit of 120 impact assessments – or regulatory approvals - of projects in the Northern Territory since the Ranger Uranium Mine in 1974 and key informant interviews examining what constitutes a quality assessment. The audit found studies inadequately consider the perspectives of impacted communities. Interviews suggested diverse stakeholders consider regulatory systems generally as inefficient and not participative.

Best practice standards for social impact assessment highlight the role of community values in shaping perceptions of threats and opportunities. However, this element was missing from most impact assessment studies. For regulatory systems and company approaches to meet changing societal expectations, values mapping is suggested. This will serve as an essential weather vane of significance as well as community resilience to change and preparedness to consider trade-offs between positive and negative impacts.

The aim of the presentation is to present an approach to values mapping - from sentimental or home values to changing societal values – and the implications of disturbance.

It concludes that values mapping provides a form of ‘people due diligence’ which gives decision-makers a balanced evidence base, proponents an early warning system of community acceptance and communities a chance to provide earlier and meaningful input to strategic land use planning.

Keywords: sustainable development, values mapping, develop the North, social assessment, cultural assessment, strategic assessment
Small-scale fisheries are essential for the livelihoods and nutrition of many Timorese people. However, a lack of data about fisheries and their users is a barrier to ensuring sustainable management of these valuable resources in the future. Women’s fishing can be a significant part of household livelihood, but the role of women in the governance of Timor-Leste small-scale fisheries is little studied and poorly understood. In Timor-Leste poor governance has been a barrier to sustainable fisheries management. In response many communities are turning to locally managed marine areas, using the customary mechanism of tara bandu as a potential solution. Traditionally tara bandu have been used to manage the relationship between humans and nature more broadly, but more recently have been applied to marine resource management. Communities can use tara bandu to designate No-Take Zones or regulate fisheries practices in their local area, whilst maintaining ownership over their own natural resources. While women are included as signatories on tara bandu regulations, their involvement in design and implementation is minimal. By examining Timor-Leste’s small-scale fisheries management through a gender lens, this presentation aims to determine areas in which addressing gender roles in fisheries management could lead to greater gender equality, stronger governance and more sustainable fisheries management in the future. This work will contribute to the growing literature that links community scale governing processes with gender equity and natural resource outcomes.

*Keywords: Gender equity, Small-scale fisheries, Equality, Timor-Leste, Community-based fisheries management*
Northern Australia has a large Indigenous population, who often receive some of their services from organisations, the form of which is encoded in contracts. This is due to a governmental preference for the non-government sector (private or not for profit) to undertake the delivery of some services, a process which has taken hold in Australia over the last thirty years. This means that organisations must simultaneously meet the requirements of the funding body while delivering services that meet client needs. While ideally there would be no conflict between these goals, the reality is that on-ground delivery, particularly where Indigenous people are the primary clients, situations occur where the demands for service adaptation by clients (or others) creates tensions for organisations seeking to maintain contract compliance.

My research investigates how one organisation, Tangentyere Council, is exploring design and evaluation as practices to assist their navigation of these tensions, with the goal being to design and deliver more effective services that meet the needs of both funders and clients. It does this through engaging with the lived experience of undertaking an evaluation project in collaboration with the Council to develop analyses to assist those who grapple with the social and ethical realities that emerge in service delivery in a northern Australian context. The presentation will examine some of the knowledge making challenges inherent in this process.

Keywords: design, evaluation, organisational practice, strategy, accountability

Thursday 5th September – Afternoon Session (1:30 – 3:30pm) - Sustainable communities 2 - Yellow 1.1.39
Factors influencing farmers’ risk perceptions of and preparedness for extreme weather events in western Terai, Nepal

This study explores risks from extreme weather that farmers in the western lowlands of Nepal (Terai region) face, how they currently adapt to them and factors influencing their preparedness to cope with these risks in the future. We focus on three extreme weather events (EWEs): floods, heat waves and cold spells which are all common in the region. Data on both preparedness measures for each hazard and proposed precursor variables were collected through a survey of 350 randomly selected farmers from Banke and Bardiya districts from the Terai region. We applied bootstrapping in structural equation modelling to analyze impacts of damage experience, trust, perceived response cost and responsibility, concerns regarding the extreme weather and farmers’ preparedness for intended adaptation. Environmental and climate risks were perceived as the most severe existing agricultural risks, along with biological and market-related risks. Farmer’s perceived individual responsibility (that they can reduce exposure to EWEs) was negatively associated with risk perception, while the damage experience, perceived potential response cost and farmers’ worry were positively associated with farmers’ risk perception for all three EWEs. Farmers’ perceived self-efficacy (capability to control the risk of extreme events), responsibility, education, trust on existing government preparedness strategies, potential response cost and worry had significant direct impacts on farmers’ preparedness intention. Anxiety associated with the respective EWEs was partially mediated by damage experience and risk perception for all three EWEs. Risk perception for floods partially mediated (to some extent explained) the relationship between perceived responsibility, education, damage experience, potential response cost, and anxiety/worry about floods and flood preparedness intentions separately. The implications of this for proactive risk management and resilience will be discussed.

Keywords: Environmental risk, Structural equation model, Preparedness strategies, Mediation, Trust

Thursday 5th September – Afternoon Session (1:30 – 3:30pm) - Sustainable communities 2 - Yellow 1.1.39
An essential area of emergency management is the management of communication issues. Digital communication has shown the positive contribution it can make to improve public communication in disaster and emergency response. However, further studies are needed to explore ways to ensure the benefits are sustainable. Previous studies indicate that despite the number of benefits, social media also has become a source of misinformation and has disrupted the way people perceive otherwise accurate information. This study seeks to find a model to manage misinformation on social media when a disaster happens, by understanding how risk perception and social media user behaviour affects people’s decisions when spreading rumours, gossip, “fake news”, and other inaccurate information related to risk and disaster events. This study’s key desired outcomes include assessment of existing policies and strategies and to offer recommendations based on that assessment in combination with the broader research, knowledge, and practice in the field. It is anticipated and hoped that this study will produce recommendations that contribute to improving, expanding, and better integrating theory and strategies for government in dealing with the risks and disaster events.

*Keywords: rumour management, risk perception, social media behaviour, emergency management*
Traditional medicine has sustained health throughout the past and has the potential to sustain health into the future. Our project looks at how traditional medicine is still used today to wash the body in a few remote Aboriginal communities. To do this we create short documentary films on traditional medicine with knowledge holders to use for health promotion within schools and clinics. We also conduct interviews with members of the community to measure the extent to which these traditional medicines are still being used today. We have found that while knowledge of specific medicines has been retained, it is often underutilized. We are now looking at means by which one or two traditional medicines can be made more available to the community. We believe by making traditional medicine more available we will not only improve health through the use of effective medicine but also increase people’s motivation to improve their own health through health-seeking behaviours that lead to early treatment and prevention.

Keywords: traditional medicine, Aboriginal communities, medicinal plants

Thursday 5th September – Afternoon Session (1:30 – 3:30pm) - Sustainable communities 2 - Yellow 1.1.39 Thompson (Note: Adam has been moved to this session)
Thursday 5th September – Afternoon Session (1:30 – 3:30pm)

HDR Candidate presentations

Governance

Red 9.1.48

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<td>Australian military engagement in disaster relief in the South Pacific</td>
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Safeguarding and Protecting Intangible Cultural Heritage in Indonesia

The research analyses aspects of safeguarding and protecting intangible cultural heritage in the context of Indonesia from the cultural preservation and intellectual property law perspectives. It focuses on Indonesia’s efforts in forms of legislations and government policies concerning intangible cultural heritage. It encompasses activity and material of internal country development relating to interpretation and enforcement of the legislations, as well as interaction and harmonisation by Indonesia with international treaties under the United Nations Educational, Scientific and Cultural Organisation, the World Intellectual Property Organisation, and the World Trade Organisation.

The research uses primarily a normative legal research since the research object is legal principles and norms in forms of legislations. The research utilises a combination of a doctrinal approach and non-doctrinal approaches incorporating empirical methodologies. The research uses a socio-legal approach on the influence or implication of politics, economy and culture towards the law and vice versa.

Although Indonesia has ratified international treaties and has passed legislations on the related issue, the current face of safeguarding and protecting intangible cultural heritage is not yet adequate. This is due to negative government politics and people’s inadequate awareness of the value of safeguarding and protecting intangible cultural heritage, as well as limited legal infrastructure. These factors lead to an unsuccessful implementation of the law on the issue. For future directions, Indonesia needs to improve understanding of all stakeholders on the issue, and to enact a specific law on intangible cultural heritage with a more comprehensive approach.

*Keywords*: Indonesia, intangible cultural heritage, safeguarding, protection, intellectual property, culture
The process of gradual political decentralisation in Timor-Leste.

This paper examines the process of gradual political decentralisation in Timor-Leste and the impact that decentralisation will have on local-level governance and democratisation. It argues that since 2003, the First Timor-Leste’s Constitutional Government (Fretilin government) has put into motion the process for decentralisation reform; however, the final model which is intended to make democracy work at all level of government has not yet been finalised. By decentralising the administrative system, the government aims to expand democratic space to the grassroots level and devolve public administrative functions to the municipal level. However, the implementation process has been slow among other contending urgencies in the state-building process.

Typically, the conventional approaches to political decentralisation in many countries comprised of deconcentration, delegation, and devolution. Since the Parliamentary Majority Alliance (AMP) government held power in 2007, they decided to take the approach through pre-deconcentration, followed by deconcentration as the best way to prepare and establish the functional representative's bodies of local governance. However, the role of traditional institutions in a decentralised governance structure is not always made explicit.

The thesis argues that the role of such institutions is crucial in the process of local government reform. A model of a decentralised administrative system is practicable in Timor-Leste, only when the traditional institutions have the space to involve in the governance of the country.

Using a combination of exploratory and descriptive case study approach, this study gathered data from both primary and secondary sources in order to answer the research question: why decentralisation reform in Timor-Leste has not been fully implemented?

*Keywords: Lisan, Tradition, deconcentration, decentralisation, Fretilin government, Majority Alliance (AMP) government.*

*Thursday 5th September – Afternoon Session (1:30 – 3:30pm) - Governance - Red 9.1.48*
National uniform legislation links the federal distribution of powers achieved more than 117 years ago to the challenges and opportunities faced by Australia in an interconnected world. Over this span of time, developing and drafting national uniform legislation has been described as the ‘art of the impossible’. Uniformity has been achieved and sustained, but only through constant battles over almost every initiative. Achieving national responses becomes challenging when it is not clearly understood how to sustain harmonisation effort.

Rather than focusing on why an individual set of uniform Acts has not achieved a high level of uniformity or has diverged through unilateral amendment, this presentation examines national uniform legislation by analysing the factors at play.

This macro-approach has enabled the identification of four discernible links with theory to explain how sustainable uniformity may be achieved: (1) the ‘Incrementalism and Policy Cycle’ model - to explain harmonisation that may take decades because the policy is developed incrementally with each cycle bringing increased sustainable uniformity (31 sets of Acts); (2) the ‘Multiple Streams’ framework applies to cases where legislation emerges as sustainably uniform from the outset due to an ‘open policy window’ (16 sets); (3) ‘pragmatic federalism’ solutions are developed in the course of interjurisdictional negotiations when uniformity is required but particularly difficult to achieve (14 sets); (4) the ‘Advocacy Coalition’ framework which, in contrast, helps explain situations where jurisdictions hold firm views about retaining diversity (23 sets).

National reforms can become the ‘art of the possible’ with this improved understanding.

Keywords: Harmonised legislation, federation, harmonisation

Thursday 5th September – Afternoon Session (1:30 – 3:30pm) - Governance - Red 9.1.48
Jianhua (Jane) Zhang

Doctor of Philosophy

Asia-Pacific College of Business and Law

Full Presentation

A comparative analysis of the liability of foreignness of Chinese firms operating in Australia

This study investigates the factors that contribute to the liability of foreignness that Chinese firms incur and how Chinese firms’ capabilities help them to manage such liabilities. The author argues that multinational enterprises from emerging markets (EMNEs) operating in developed markets suffer from both context-free and context-specific liabilities. Data will be collected from subsidiary senior managers of 230 Chinese multinational enterprises. By using Chinese investment predominantly in Australia as an empirical setting, complementing with the evidences of Chinese investment in other major developed economies, such as the United States and Europe, thus the study explains the research question. The controversies that accompanied the rise of Chinese investment into Australia have been mirrored in many other developed economies. The rising prominence of emerging economies, including China, as a leading outward investment nation, warrants a need to explore this issue in-depth in the near future. Australia provides an ideal context to discover new theoretical insights based on a new conceptual framework. From a practical perspective, this study is of interest to Australia and China. Given the strategic important economic relationship between two nations, a good understanding the research questions can potentially determine long-term global success for both countries. A review of literature suggests that only a small handful of articles and case studies focus on Chinese investment in Australia. There are no preliminary results yet at this stage.

Keywords: liability of foreignness, Chinese investment, emerging market firms (EMNEs), Australia, developed markets

Thursday 5th September – Afternoon Session (1:30 – 3:30pm) - Governance - Red 9.1.48
Strict criteria govern the use of Foreign Military Assets (FMA) in Humanitarian Assistance and Disaster Relief (HADR) as a ‘Last Resort’ option that is solely needs-based. However, patterns of military engagement in HADR do not reflect the principle of ‘Last Resort’ in practice. The varied patterns indicate that factors beyond humanitarian-need influence donor-state’s deployment of FMA to disaster-affected states. The tension between the humanitarian imperative and donor’s self-interest has potential consequences for the effective use of FMA to meet the needs of an affected population, affected-state and donor-interest. However, a model to categorise and evaluate the deployment and use of FMA in HADR does not exist.

This research will identify and categorise the humanitarian and strategic objectives that underlie donor’s deployment of FMA to recipients and evaluate how effectively policy outcomes meet donor’s policy objectives. Using the case study of Australia in the South Pacific, the research will adopt a mixed-methods approach to trace the emerging norm of Australian military engagement, determine the statistical significance of humanitarian-need and self-interest in Australian decision-making, and use survey and interview feedback from government, military and civilian stakeholders to evaluate the effectiveness of Australia’s efforts to secure the region from multiple perspectives.

Keywords: Australia, effectiveness, foreign military assets, humanitarian assistance and disaster relief, power, security, South Pacific.
Thursday 5th September – Afternoon Session (1:30 – 3:30pm)

HDR Candidate presentations

Engineering and computing solutions to challenging problems

Mal Nairn Auditorium

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Wireless video transmission is challenging due to limited bandwidth and error-prone nature of the wireless networks. Although the latest video coding standard, high efficiency video coding (HEVC), has a high compression ability, the compressed bitstreams are extremely vulnerable to channel errors. For robust transmission of such compressed videos, video applications may utilize specific characteristics of the video content, known as region-of-interest (ROI). With the introduction of new coding features in HEVC, such as tiles, an unequal error protection (UEP) scheme aiming to enhance the quality of the important regions can be considered. In this paper, an adaptive ROI based UEP scheme is proposed to protect HEVC compressed video bitstreams in wireless networks. In order to determine the important regions, motion activity of different tiles in a video frame is represented by motion density (MD). Compared to previous methods, motion density has better capability to extract the importance of small details in a video. Simulation results suggest that the proposed UEP scheme achieves better objective quality, compared to conventional UEP approaches.

*Keywords: Unequal Error Protection, HEVC, Compressed Videos, Motion Density*
Cedric Tan

Master by Research

College of Engineering, IT and Environment

Speed Presentation

Corrosion of Chromium Based Iron Alloys Deposited via Welding

Wear resistant alloys are often highly desired in industries such as metallurgical processing and mining; however, understanding of the corrosive behaviour of these alloys is often neglected in research, leading to unexpected failure of components in the field. As such, it is important to improve behavioural knowledge to aid the design of more efficiently performing materials in the future. One alloy that is noted to be prominent in use for high wear resistance applications is High Chromium White Iron (HCWI). While these alloys can be cast, the primary focus of this investigation is within weld overlay application (or hardfacing), where harder materials are deposited onto the surface of the base metal to improve wear properties. Processing such as heat treatment is also employed post-application to further modify material behaviour. This includes laser surface melting, which can in part help homogenize the surface microstructure to reduce corrosion inducing elements. Testing of hardfaced HCWI alloys is intended to be conducted electrochemically, as well as via direct exposure towards differing environments in different pH environments.

Keywords: Corrosion, Hardfacing, Chromium Carbides, Heat Treatment

Thursday 5th September – Afternoon Session (1:30 – 3:30pm) - Engineering and computing solutions to challenging problems - Mal Nairn Auditorium
Felix Baker  
Doctor of Philosophy  
College of Engineering, IT and Environment  

Full Presentation

Constrained Kalman Filtering: A Compensating Approach

Kalman filtering can produce unrealistic values and can prevent accurate convergence as the technique does not naturally include safeguards that exclude unphysical states. It can be demonstrated that without implementing constraints, or even some existing constraint strategies, that the filter could converge incorrectly. Currently available approaches to constraining the estimated state variables are arbitrary. For example, a simple way to constrain a violating state variable, is to reset its value to the constraint limit, the effect of which is a reduction of the importance of the measurement. The proposed constraining method attempts to preserve the importance of the observation/measurement in the fused estimate. This method compensates the changes in the constrained state variables by adjusting the non-constrained state variables in order to force the net change in measurement estimate to zero.

Keywords: Kalman Filtering, Compensated Constraining, Extended Kalman Filtering, Tracking
To reduce the noxious outcome of fossil fuel combustions, renewable sources of energy should be put into practice among which the solar energy is most accessible. Solar cells can convert solar energy to electricity directly and they have different types. One of the novelest and most efficient solar cells is perovskite solar cells (PSCs). The power conversion efficiency (PCE) of PSCs has grown drastically in the last few years and reached higher than 23% [1, 2]. However, the poor stability of PSCs hinders their commercialisation. One of the factors that can influence the PCE and stability of PSCs is their operating temperature. High temperatures may reduce PCE as well as may lead to degradation of the active perovskite layer. In this research, by developing a mathematical model, the temperature of PSCs under different operating conditions has been calculated. It is found that by reducing the density of tail states at the interfaces through some passivation mechanisms, the temperature of operation can be decreased significantly. The results show that if the density of tail states at the interfaces is reduced by three orders of magnitude through some passivation mechanisms, the stability of PSCs may increase significantly. It is expected that this study culminate in an increase in the stability of PSCs.

Keywords: Perovskite solar cells, Temperature, Interface passivation
A new scheme of serially concatenated systematic polar codes is presented. In this coding, the low reliable message bits of the outer polar code are re-encoded by the inner polar code. This is because bits recognised as low reliable ones are more vulnerable to the channel noise. A spectrum distance method is analyzed to compare the performance of the proposed code with previously constructed ones. In addition, the existence of two constituent codes, which unequally protect information bits, provides unequal error protection (UEP) capability for the concatenated code. Conducted analysis and simulations confirm that with same rate and code length, the newly designed codes outperform the existing punctured polar codes.

*Keywords: Polar Codes, Unequal Error Protection, Spectrum Distance*
Sulphate reducing bacteria (SRB) are able to regulate the environmental pH because of their metabolism. This study focuses on effect of pH on corrosion of duplex stainless steel 2205 in a nutrient rich artificial seawater environment containing SRB species, Desulfovibrio vulgaris for 28 days at 370°C in pH ranging from 4.0 to 7.4. The open circuit potential value, sulphide level, pH and number of bacteria in the medium were recorded. Electrochemical impedance spectroscopy (EIS) was used to study the properties of passive film and biofilm. Inductively coupled plasma mass was used to measure the concentration of cations Fe, Ni, Mo, Mn in the experimental solution after 28 days. Scanning electron microscopy (SEM) and Energy Dispersive X-Ray Spectroscopy (EDX) were used for surface analysis. The results showed the ability of D. vulgaris to regulate the environmental pH after 5 days. The highest iron concentration was at pH 4 and this was 3 times higher than at pH 7.4 indicating increased release of iron due to corrosion at lower pH. SEM revealed pitting on the stainless steel only at pH 4. EDX showed the presence of sulphide on all specimens but with more sulphide corrosion products at pH 4. EIS showed the film resistance of the specimen at pH 4 was much lower than at pH 7.4 which suggests the corrosion resistance of the stainless steel was better at pH 7.4 than at pH 4. The nature and mechanism of SRB attack on duplex stainless steel at different acidic environments are discussed.

Keywords: Sulphate reducing bacteria, pH, duplex stainless steel, corrosion
Through the use of typical computer grade Graphics Processing Units (GPUs), general purpose GPU programming is rapidly becoming popular for high performance computing due to the massive reductions in power consumption for parallel algorithms. However, so far it has been difficult to design and implement effective parallel algorithms for solving hard computational problems, such as the vertex cover problem. This research focuses on a highly scalable approach to effectively parallelise the vertex cover problem, using GPU programming in order to take advantage of the efficiency and increasing popularity of GPU computation. I have produced results from an algorithm using manually specified parallel workload parameters. The outcome of this is a working demonstration of the proposed approach for efficient parallelisation of the vertex cover problem. I achieved improved results over previous attempts at benchmarks, including some previously unsolved problem instances. Experimental results in the research have shown significant speed-ups over previous best known results for the DIMACS benchmarks, with some of them two or three orders of magnitude faster. I also provide previously unsolved vertex cover results for the 120-cell graph and variants. Future work will focus on improvements that effectively and dynamically reconfigure parallel workloads.

Keywords: gpu programming supercomputing algorithm parallel
**Friday 6th September – Morning Session (11:30 – 1pm)**

**HDR Candidate presentations**

**Sustainable environments 1**

**Yellow 1.1.39**

| Student Chair: Robin Leppitt |
| Academic mentor: Brett Murphy |
| Technical assistant: Cath Hood |

| Rebecca Rogers |
| Full Presentation |
| Repurposing rain Radar to track waterbirds in a changing world |

| Gavin Trewella |
| Full Presentation |
| Den selection in woodland populations of northern quolls (Dasyurus hallucatus) |

| Amy Kirke |
| Speed Presentation |
| Ecology and biology of exploited sharks in offshore fisheries of the Northern Territory, Australia. |

| Sigit Sasmito |
| Full Presentation |
| Fingerprinting the origin of West Papuan mangroves blue carbon |

| Simon Votto |
| Full Presentation |
| Vegetated microhabitats are critical for avian access to arid zone waterholes |
Many waterbirds are capable of travelling large distances and responding rapidly to changes in environmental conditions. The data required to understand processes at these scales pose significant challenges for ornithologists. This has led to the need for novel research approaches that integrate ecological knowledge with recent advances in technology. One such example, is the use of operational weather surveillance radar (or weather radars) overseas to map the distribution and habitat use of waterbird populations. Despite having over 60 weather radars in Australia, some with decades of historical data, this method is currently not used to study bird movements. Weather radar could be particularly useful for mapping and tracking Australian waterbirds as many of these species form large flocks that move at regular or predictable times. Here, I will discuss the potential of weather radar as a tool for mapping waterbird movement and distribution in Australia. I will present examples of different bird movement patterns I have found on the Darwin radar and discuss how we can ground-truth these patterns. Using weather radar, we will be able to find important habitat areas for Magpie Geese in the Top End as well as track seasonal variation in their behaviours and this same technique could be utilised for waterbirds throughout Australia.

*Keywords: Weather radar, waterbirds, ecology, animal movement*
Den selection in woodland populations of northern quolls (Dasyurus hallucatus)

Northern quolls (Dasyurus hallucatus) are the largest marsupial predator in northern Australian savannas. Once abundant, they have declined sharply over the past 50 years and are now considered locally extinct over much of their former range. Local extinctions have been most pronounced in eucalypt woodlands, with rocky outcrops acting as refugia. To prevent further decline of this species, we need to understand what factors allow remaining woodland populations to persist. Of the regions where northern quolls persist, Cape York Peninsula has the least studied populations of northern quolls. Only three remnant populations have been identified across western Cape York Peninsula, all inhabiting eucalypt woodlands. I fitted tracking collars to 10 individual quolls in March 2019. The collars were equipped with very high frequency radio transmitters and GPS loggers, allowing me to track the quolls to their day-time den sites over a 4-week period. I identified 57 den sites, comprising 37 hollows in standing trees and 20 in fallen logs. Of the 57 den sites, 13 sites were used repeatedly over the survey period, suggesting individual quolls preferred characteristics of these den sites over others. I found 70% of den trees were Eucalyptus tetrodonta and 60% of den trees were categorised as having a distinctive leaning growth form that promoted the likelihood of hollow development. Quolls also showed a preference for long, fallen logs as ground dens. My results highlight the importance of large, hollow-bearing trees as a critical resource for northern quolls in eucalypt woodlands.

Keywords: northern quoll, Cape York Peninsula, radiotracking, woodland, den selection
In Northern Territory commercial trawl fisheries bycatch can be 10-15% of the total catch by volume. Much of this is dominated by elasmobranch species that lack species-specific biological information for their management. Elasmobranchs tend to be more susceptible to trawl fishing and data-deficient/undefined in fisheries stock reports. Species-specific biological information for fisheries management allows managers to effectively manage fisheries at biologically sustainable levels. The overarching aim of the PhD research is to address key biological knowledge gaps for Carcharhinus coatesi, Rhizoprionodon acutus and Carcharhinus macloti to support future fisheries management. This study will focus on investigating the biology (age, growth rate, reproduction, population connectivity and diet) of these three species to improve bycatch management in Northern Territory fisheries in the future. This study will be important because according to the United Nations Food and Agricultural Organisation (FAO) knowledge gaps for bycatch species in global fisheries is still one of the greatest concerns to sustainability. It will contribute to original and significant knowledge as it is the first study on a bycatch species caught in the Northern Territory. The biology of C. coatesi has never been studied before in Australia, and their parasites will also be investigated in this study. There is likely to be new species of parasites discovered in these sharks, and this study may give new insights into the life cycles of these parasites. The life cycles of marine parasites are largely unknown.

Keywords: Elasmobranchs, fisheries, bycatch, biological information, sustainable
Mangrove stores five times more organic carbon (blue carbon) stocks per unit area compared to terrestrial forests, but an understanding of blue carbon sequestration mechanisms is limited. This research assesses carbon stocks, carbon burial rate, and carbon origins of mangrove soils in West Papua, Indonesia — a region represents nearly 15% of the world’s mangrove area. A series of field biophysical data collections were conducted across three study sites representing coastal geomorphology gradient; namely coastal mudflat, fringe mangrove, and interior mangrove. Soil carbon stocks were determined by analysing physicochemical properties. A 210Pb radionuclide dating and stable isotopes (δ13C and δ15N) approaches were used to estimate the burial rates and origins of soil carbon. The largest carbon stocks and burial rates of the top 50 cm soil were obtained at interior mangrove with 179 Mg C ha⁻¹ and 0.86 Mg C ha⁻¹ yr⁻¹. The ages of buried soil carbon ranged between 74 and 87 years. Carbon stored in mangrove soils is originated from multiple sources (autochthonous and allochthonous), with net primary productivity of hinterland forest and mangrove itself induced carbon burial substantially. Our findings indicate that carbon cycling in mangrove and terrestrial forest ecosystems are closely linked, and at least a part of carbon losses from terrestrial forests can be captured and buried in mangrove ecosystems. This research suggests that ecosystems connectivity within a catchment scale play a key role in optimizing the blue carbon sink capacity of mangrove and therefore should be considered in the mangrove conservation management policy.

Keywords: coastal wetlands, carbon accumulation, radionuclide, stable isotope, climate mitigation, Indonesia
Vegetated microhabitats are critical for avian access to arid zone waterholes

Long lasting waterholes provide resources and habitats that are essential for the persistence of many avian species in arid landscapes, especially in hot and dry periods when water demand is high. As air temperatures rise under climate change, pressure on waterhole access for smaller subordinate species is likely to increase as larger predatory birds begin to frequent waterholes more often to hunt. We investigated if vegetated microhabitats facilitate surface water access for terrestrial avian species during periods of high surface water demand when predation risk is high. Camera trap data were collected at six long lasting waterhole sites in West MacDonnell and Watarrka National Parks across three sampling seasons throughout 2018 and 2019. Recorded species were assigned to functional groups, including nectarivores, granivores, carnivores, omnivores and insectivores. Similarities between functional group daily trapping rates (DTRs) (collected by the cameras) and microhabitat variables (determined a priori) were analysed using non-metric multidimensional scaling (NMDS). Nectarivores, small omnivores and small granivores showed significant positive relationships with distance (decreasing) to nearest shrub and percent cover variables. Large granivores, large omnivores, carnivores and insectivores showed no significant relationships with habitat variables collected during the study. With the number of days exceeding 35°C likely to increase under predicted climate change scenarios it is probable that periods of high avian water demand and predation risk will increase in the future. Our results suggest waterholes surrounded by vegetative cover provide subordinate avian species with refuge from predators and increase opportunities to safely access the water during these times.

Keywords: avian functional groups, arid zone, long-lasting waterholes, vegetated microhabitats, predation risk
Friday 6\textsuperscript{th} September – Morning Session (11:30am – 1pm)

HDR Candidate presentations

Child and Maternal Health

Red 9.1.48

| Student Chair: Danielle Aquino  
Academic mentor: TBA  
Technical assistant: Jasmina Sesar |
|----------------------------------|
| **Emily Gibson**  
Full Presentation  
Dietary diversity and fish consumption of mothers and their children in fisher households in eastern Indonesia |
| **Gianna Bonis-Profumo**  
Full Presentation  
Women’s agency over livestock and income are key to ensure dietary quality among smallholders in rural Timor-Leste |
| **Nevio Sarmento**  
Speed Presentation  
Carriage of Streptococcus pneumoniae in children under 5 years of age at Hospital Nacional Guido Valadares, Dili, Timor-Leste |
| **Trisasi Lestari**  
Full Presentation  
Implementation of tuberculosis contact investigation and preventive treatment in Papua, Indonesia |
Dietary diversity and fish consumption of mothers and their children in fisher households in eastern Indonesia

Small-scale coastal fisheries contribute directly and indirectly to the food and nutrition security of fisher households. Fishers can apportion part of their catch for home consumption, or use income earned to purchase staples or other desired foods. Fish are an important animal source protein, and rich in micronutrients and lipids essential for the cognitive development of children and for adult health. Despite these contributions, food insecurity remains prevalent in many low and middle income fish-producing countries, and fish has been largely absent in the development of strategies to reduce micronutrient deficiencies.

This paper reports findings from an exploration of the factors leading to food and nutritional insecurity in three coastal communities in eastern Indonesia, focusing on the contribution of fish to the diets and nutrition of women and children. The research was undertaken as a mixed-methods case study. The study found that over fifty percent of mother-child pairs failed to meet the minimum recommended dietary diversity for a nutritionally adequate diet, and, while fish was the main animal-source food in mothers’ diets, the introduction of fish to diets of infants and young children was delayed due to fears of allergies and illnesses.

Given the emerging trend for ‘nutrition-sensitive interventions’ to improve the livelihoods and wellbeing of fisher households, these results highlight the need for analysis of intra-household sharing of fish, and the development of culturally-appropriate strategies to improve the quality of complementary foods in infant and young child diets. Such research and strategies will help maximise the impact of future livelihoods interventions programmes.

Keywords: food and nutrition security; women; infants and young children; dietary diversity; fish

Friday 6th September – Morning Session (11:30am – 1pm) - Child and Maternal Health - Red 9.1.48
Ensuring the food and nutrition security of populations is the basis for sustainable national development and regional stability. In rural Timor-Leste, the majority of people are semi-subsistence farmers who raise livestock, yet diets consistently lack protein and child malnutrition is high. This longitudinal mixed-methods study aimed to examine gender relations, particularly women’s agency, related to livestock production, sale and consumption among smallholders in Timor-Leste. Data collected in two districts over a 12 month period included seasonal livestock herd size, and an adapted Abbreviated Women’s Empowerment in Agriculture Index administered to mothers and male adults in dual-headed households (n=282). Semi-structured interviews (n=35) explored social norms on household decision-making. Seasonal child and maternal dietary diversity and animal-source foods (ASF) intake quantified their dietary quality. Most women and men considered livestock as household assets and made decisions jointly. Yet women showed lower levels of input into decision-making compared to men. Mothers had more autonomy to sell eggs and chickens than larger animals. Despite women frequently reported as the sole decision-makers for small ASF purchases, the qualitative results suggest a greater disparity in control over household resources than indicated by the quantitative data. No differences in ASF allocation according to gender were identified. Seasonality influenced ASF intake, with eggs usually prioritised to children. Women display stronger agency in small livestock management despite unequal bargaining power informed by traditional gender norms. Findings suggest that programs focusing on poultry and pigs have potential to support nutrition outcomes and women’s empowerment, while contributing to poverty alleviation efforts.

**Keywords:** Women’s empowerment, nutrition, Timor-Leste, decision-making, dietary quality, livestock

**Friday 6th September – Morning Session (11:30am – 1pm) - Child and Maternal Health - Red 9.1.48**
Pneumonia and malnutrition are leading causes of the high child mortality rate in Timor-Leste (TL). Reducing child mortality and malnutrition are key indicators of the Sustainable Development Goals, and important ways we can improve the lives of future generations. Children with malnutrition are at higher risk of pneumonia. The TL Ministry of Health plans to introduce a pneumococcal conjugate vaccine (PCV) to prevent pneumonia.

Pulmaun Saudavel (PULSA, “healthy lungs”) is a prospective cross-sectional surveillance study that aims to assess the prevalence of S. pneumoniae nasopharyngeal carriage in children aged 1-59 months admitted to Hospital Nacional Guido Valadares (HNGV) with pneumonia and/or malnutrition between August 2019 and July 2020.

Two nasopharyngeal swabs (NPS) will be collected. The NPS will be separated for bacterial culture and for an automated multiplex reverse transcriptase polymerase chain reaction (PCR) test for viruses. Culture, identification and serotyping of S. pneumoniae colonies will be performed. Other nasopharyngeal colonisers, namely S. aureus, M. catarrhalis, non-typeable H. influenzae, will also be identified. Bacterial culture, sensitivity and PCR will be done at National Health Laboratory, Timor-Leste. The serotyping of S. pneumoniae will be done at Menzies School of Health Research.

We will calculate the overall and vaccine-type S. pneumoniae carriage prevalence. We will compare carriage between age groups and between malnourished and non-malnourished children. Our study will provide preliminary data to support the National Immunization Technical Advisory Group (NITAG) to advise the Ministry of Health to introduce pneumococcal conjugate vaccine in TL, and allow for monitoring of vaccine effectiveness.

Keywords: Malnutrition, Pneumonia, Children, S. pneumoniae, Serotyping, Immunisation
Papua has among the highest tuberculosis (TB) rates in Indonesia, including high child TB rates. Isoniazid Preventive Treatment (IPT) is recommended for TB contacts < 5 years.

Research purpose: to implement preventive treatment for children in close contact with active TB patient.

This study commenced in Mimika district, Papua province in September 2017. Implementation was evaluated using the RE-AIM framework (Reach, Effectiveness, Adoption, Implementation and Maintenance). Chief interventions were training and continuous quality improvement workshops as tools for change and motivation for TB health workers.

Three primary health centers (PHC) and two hospitals participated. All TB doctors and nurses participated in 14 trainings on contact investigation (CI), IPT and child TB management. 1681 contacts (271 (17.8%) < 5 years) of 458 index TB cases were investigated. 155 (57.2%) eligible children received IPT. Of those commencing IPT, 56.8% completed, 20.2% defaulted, 1.1% failed (switched to TB treatment), and 21.8% remain on treatment. All TB staff participated in CI activities, gaining positive perceptions of IPT. The commonest reason for default / non-adherence was rejection of IPT by parents. No adverse drug reactions were reported. The program is supported by the district health office. Six of 21 other PHCs have started to adopt it. Funding for CI has now been included in the district budget.

Conclusions and key recommendations: CI and IPT can be implemented in a resource-limited setting and works best if management of TB cases is led by primary health centers.

Keywords: tuberculosis, prevention, Indonesia

Friday 6th September – Morning Session (11:30am – 1pm) - Child and Maternal Health - Red 9.1.48
### Friday 6th September – Morning Session (11:30am – 1pm)

**HDR Candidate presentations**

**Language and communication in the future**

**Red 9.1.45**

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<th>Student Chair: Jianhua (Jane) Zhang</th>
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<td><strong>An Evaluation of Recent Trends and Techniques of Spam Detection</strong></td>
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<td><strong>Situated learning for collaboration across language barriers</strong></td>
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<td><strong>Sustaining Australian Indigenous languages - how can technology help?</strong></td>
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<td><strong>Speed Presentation</strong></td>
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<td><strong>Natural Language Processing for Low Resource Languages</strong></td>
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An Evaluation of Recent Trends and Techniques of Spam Detection

In today’s world, email has become a massively essential medium of communication, having a near-instant worldwide reach. However, due to its ubiquity, email has also became a highly adopted vehicle for a range of perpetrators to carry out their sinister objectives through ever increasing spamming. Due to the rising severity of the situation, number of researchers, governments and corporations had to adopt a more profound approach, resulting in the establishment of a number of government regulations and scientific research being taking place, especially in recent times. In parallel, the growth in Machine Learning frameworks have also seen a significant rise over the years, which, now days, is having a

prominent footprint in all sorts of developments where Artificial Intelligence may have a say. The issue of spam identification and classification has also been benefited from this evolution. This paper discusses the type and threat of spam emails in detail, and surveys a large number of recent advancements in spam email detection and prevention, particularly focusing on the Machine Learning based spam filtering frameworks. In light of the studies discussed here, a set of gaps in the relevant research initiatives has also been identified.

Keywords: Machine learning, phishing attack, spam classification, spam detection, spam email, spam filtering

Friday 6th September – Morning Session (11:30am – 1pm) - Language and communication in the future - Red 9.1.45
Many Australian Indigenous communities are experiencing language shift in favour of English. This phenomenon is not new but its acceleration is. Most of these languages are spoken in remote communities where western workers collaborate with locals. The main language is not systematically known by the members of the community, and the language barrier might cause issues for collaboration. This situation presents an opportunity to preserve the endangered language through its documentation, and then use this documentation as a new material to help locals and western workers learning each other native tongues.

This work will be divided into four parts: the first part will take place in a remote community in west Arnhem where a data collection will be made in English and Kunwok. The purpose is to record usable data related to the task in which the two communities have to collaborate. In a second part, we will use recent NLP (Natural Language Processing) technologies in order to automatically extract relevant knowledge such as lexicon or catch phrases. From this information, we will design a prototype which can be used in an uncontrolled environment for helping the mutual comprehension. Finally, we will evaluate this prototype in terms of the effectiveness of the collaboration and the mutual language learning. If successful, this work could not only enhance cross-lingual collaboration in these communities, but also help to preserve the minority language.

**Keywords:** language documentation, natural language processing, indigenous communities, language learning
Cathy Bow

Doctor of Philosophy

College of Indigenous Futures, Arts and Society

Full Presentation

**Sustaining Australian Indigenous languages - how can technology help?**

Digital technologies are commonly used in the work of maintaining and revitalising Australian Indigenous languages, supporting the documentation, analysis, sharing and promotion of these important yet endangered repositories of cultural heritage. The capacity of digital technologies to 'save' languages is often overstated, and the sustainability of the technologies themselves interacts with the sustainability of the languages.

My research focuses on three digital assemblages of language resources: the Living Archive of Aboriginal Languages, the Digital Language Shell project, and the online Bininj Kunwok language and culture course. Using an 'ethnography of infrastructure' approach, I consider how these assemblages are developed, delivered and used. In exploring the alliances of people, technologies, institutions, artefacts, pedagogies and knowledge systems involved in producing such assemblages, the contingent nature of these alliances is revealed. These contingent alliances - constantly in flux and vulnerable to various threats - impact the sustainability of the digital resources, and intersect with the languages and the linguistic ecologies in which they exist.

*Keywords: Indigenous languages; Digital technologies; Ethnography of infrastructure; Assemblages*

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**Friday 6th September – Morning Session (11:30am – 1pm) - Language and communication in the future - Red 9.1.45**
Melvin Freestone  
Doctor of Philosophy  
College of Education  
Speed Presentation  

Questions a quantum transformation in the digital world  

Questions provoke possibilities. They generate ‘concatenates of sense’ which connect perceptions, mental images and imagination in ways that have value. The progression in digital systems from search to social to smart opens up opportunities to evolve towards a question driven culture, as distinct from the prevailing answer focus.

An eclectic design-based phenomenological project is being designed to explore the potential of generic generative questions (GGQs) to kindle dialogue and discourse in digital environments. Particular issues include in what ways might GGQs-

- stimulate consequent questions at different stages in investigations?
- enhance personalisation and customization of inquiries?
- provide creative insights that help identify areas for further work?
- promote digital scaffolds that support active engagement and dialog?

Work in progress will be presented on how appreciative inquiry and action research approaches will be used to reveal ways GGQs might influence promotion of online conversations around climate change. Strategies for inquiry, data collection and analysis will be discussed along with issues related to the development of resources, authenticity and online consistency.

The import might provide insights into ways the current ‘search paradigm’ could be transformed into a ‘questions paradigm’. The implications could be significant in all spheres of education as well as for the design of digital resources. Knowledge creation might be accelerated, and knowledge building enhanced beyond assimilation and conveyance.

Keywords: questions, answers, teaching, learning, digital, technologies

Friday 6th September – Morning Session (11:30am – 1pm) - Language and communication in the future - Red 9.1.45
Hao Wu

Doctor of Philosophy

College of Indigenous Futures, Arts and Society

Full Presentation

Love and Hatred in Philosophy

The purpose of this research is for a better understanding of human nature. Several topics selected from this research will be presented. First topic will focus on the difference between psychology and philosophy in studies of love and hatred. Secondly, there will be a discussion on necessity and free will, which is an important and controversial topic related to love and hatred in philosophy. The following section is to explain people’s love and hatred toward “concepts”. Finally, the discussion will focus upon the difference between pride and self-love in their causes, principles and effects.

Keywords: Love; Hatred; Necessity; Free Will; Pride; Self-Love

Friday 6th September – Morning Session (11:30am – 1pm) - Language and communication in the future - Red 9.1.45
William Lane

Doctor of Philosophy

College of Indigenous Futures, Arts and Society

Speed Presentation

**Natural Language Processing for Low Resource Languages**

A low-resource language is defined as one for which there are few, if any, documenting resources such as lexicons, grammars, or written texts. For communities who speak rare and underserved languages, these kinds of materials are important for preserving and promoting their culture, linguistic heritage, and identity. In the Northern Territory, there are many indigenous communities who speak such languages and who would like to develop and benefit from these kinds of linguistic resources.

In alignment with the goal of aiding local communities with their language documentation and promotion efforts, my research will focus on leveraging technology to model various aspects of human language in a low-resource setting. Specifically, I will work on modeling speech, transcriptions, lexicons, and grammars, by drawing on symbolic, statistical, and neural network approaches to natural language processing.

This research will build on elements from various academic fields including linguistics, computer science, and software engineering. The goal is to use this multi-disciplinary foundation to come up with practical and principled methods for building natural language systems in a low-resource setting; systems like those used to support translation, language learning, and information access. Indispensable to this effort is the participation and guidance of local indigenous communities. Together, we can work towards a future where technology is available to help these communities document and promote their linguistic identities.

Keywords: natural language processing, linguistics, technology, language documentation

Friday 6th September – Morning Session (11:30am – 1pm) - Language and communication in the future - Red 9.1.45
### HDR Student presentations

#### Sustainable environments 2

#### Yellow 1.1.39

| Student Chair: Rebecca Rogers  
| Academic: Sam Banks  
| Technical assistant: Cath Hood |
|---|---|
| **Cara Penton**  
Full Presentation  
Tree hollow requirements of three arboreal mammals on the Tiwi Islands, northern Australia |
| **Lisa Chandler**  
Full Presentation  
Assessing the response of the groundwater communities to mine water impacts in a seasonal sandy stream in the wet-dry tropics |
| **Rebecca Pearse**  
Full Presentation  
Healthier governance systems for better environmental market outcomes |
| **Robin Leppitt**  
Full Presentation  
The habitat requirements and potential threats of the endangered Alligator Rivers Yellow Chat *Epthianura crocea tunneyi* |
Cara Penton
Doctor of Philosophy
College of Engineering, IT and Environment

Full Presentation

Tree hollow requirements of three arboreal mammals on the Tiwi Islands, northern Australia

There has been a rapid decline of small mammals across northern Australia, possibly driven by predation by feral cats and habitat simplification via changed fire regimes. It has been suggested, that arboreal mammals are being negatively affected by the fire-driven loss of large, hollow-bearing trees. We aimed to characterise the reliance of arboreal mammals on tree hollows as den sites on Melville Island. We radio-tracked 41 individuals of three species (brush-tailed rabbit-rat, black-footed tree-rat, and common brushtail possum), to 220 den sites. 30 of these individuals was tracked for a continuous 2-week period to assess frequency of tree hollow use. All three species almost exclusively denned (≥88% of den sites) in tree hollows (other sites such as hollow logs, Pandanus canopies, dreys etc). Larger tree hollows (entrance diameter >10 cm) were most common. Den trees were clustered, typically occurring within an area of just 0.9 ha-1. Although all none of our study species are considered obligate hollow users, we conclude that access to suitable tree hollows is essential to maintaining viable populations of these species. We speculate that the rapid decline of northern Australian arboreal mammals could have been amplified by contemporary fire regimes reducing the abundance of tree hollows

Keywords: conservation, mammals, ecology

Friday 6th September – Afternoon Session (1:45 – 3:15pm) -Sustainable environments 2 - Yellow 1.1.39
Assessing the response of the groundwater communities to minewater impacts in a seasonal sandy stream in the wet-dry tropics

Seasonal sand-bed streams are common throughout the wet-dry tropics of northern Australia. While a resident fauna has been found to exist in the shallow groundwater of these beds during the dry season, little is known of the ecology of these communities, nor of the potential impacts upon exposure to contaminants. Lowland portions of Magela Creek comprise a seasonal sand-bed stream, located mostly within the boundaries of Kakadu National Park, but with portions of the creek flowing through the Ranger uranium mine lease which is excluded from the Park. The sands in the creek channel have a relatively high hydraulic conductivity and will be a pathway for the transport of contaminants, including MgSO4, from the mine site. As part of a broader ecological risk assessment project, we sought to determine whether shallow groundwater communities are at risk from elevated levels of MgSO4. To do this we collected water samples from 18 piezometers installed within the stream channel of a reach of Magela Creek, extending from approximately 3 km upstream of the Ranger uranium mine to 4 km downstream. In addition to describing the water chemistry, biotic communities were characterised using molecular techniques and traditional morphological methods. Our initial findings confirmed the presence of a groundwater contamination gradient. While the molecular data are still being analysed, initial analysis of the invertebrate communities showed lower dispersion in ordination space between exposed sites compared to reference sites, indicating less variability within the exposed communities.

Keywords: groundwater, eDNA, tropical
Healthier governance systems for better environmental market outcomes

Ecosystem service market-based approaches to solving environmental challenges represent an attempt to relieve the tensions between economic development, environmental protection and Indigenous culture in relation to the productive use of an ecosystem. Design needs to carefully consider the objectives and the necessary trade-offs in terms of environmental effectiveness, social equity and economic efficiency. Such approaches have, however, had varying success due to factors such as contextual complexity. Healthy governance systems are increasingly recognised as being fundamental to embed sound market-based approaches. This study contends that paying more attention to the analysis of the health of the governance system driving environmental markets today can aid in overcoming some of the challenges faced in achieving desired outcomes for tomorrow. This study empirically analyses the health of the environmental market governance systems around two synchronous case studies in Far North Queensland to reduce Greenhouse Gas Emissions and improve water quality entering the Great Barrier Reef lagoon using the Governance Systems Analysis framework. The study uses a conceptual synthesis of ‘actually occurring neoliberalism’ to generate a theory of the political ecology emerging in northern Australia. In the water quality offset arena, the characteristics necessary to enhance the health of the governance system to drive transformative land management practice change through efficiency and effectiveness are explored. In relation to carbon, examination of the savannah burning arena analyses the extent to which the system is constraining social equity outcomes. Theoretical and policy recommendations consider co-benefits, incentives and strategic application.

Keywords: environmental markets governance systems northern Australia
The Alligator Rivers Yellow Chat (Epthianura crocea tunneyi) is a poorly researched, endangered passerine of coastal floodplains from Darwin to Gunbalanya, Northern Territory, Australia. Whilst recent surveys suggest the subspecies is in decline, potential evidence-based management programs will be hampered by a lack of ecological data as there has yet to be a detailed study of the chat’s ecology. Using generalised linear modelling, this study investigated the influence of 51 habitat variables collected at 241 sites on Alligator Rivers Yellow Chat site occupancy. Chat occupancy was found to be closely correlated with the presence of the annual shrub Sesbania burbidgeae, the presence of hydrogeographic features such as channels and depressions and to sites that are unburnt yet have a high fire frequency. Notably, no Chats were found where the common weed Mimosa pigra was present and Feral Pigs (Sus scrofa) were detected at 87% of chat occupied sites compared to 66% of unoccupied sites. These results indicate that Yellow Chat populations may respond to tailored fire management and the control of weeds on the surveyed floodplains. This study is the first to provide baseline ecological data on the Alligator Rivers Yellow Chat and its ecology.

Keywords: Alligator Rivers Yellow Chat, Threatened Species, Habitat preference, Floodplains, Kakadu National Park
## HDR Student presentations

**Transformations in education**

### Red 9.1.48

| Student Chair: Güsti Agung Ayu Pramitasari  
| Academic: Birut Zemits  
| Technical assistant: Irina Harbeck |

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Analysis of Enterprise bargaining & graduate certificate prep courses: mixed messages for Teaching Focus staff in Biosciences? |
| **Lala Bumela Sudimantara** | Full Presentation  
Intonation, Emotions, and Aesthetics: Fostering Learners’ Agency in Academic Writing Course in Indonesia |
| **Tithchanbunnamy Lor** | Full Presentation  
Policy Implementation in Higher Education in Cambodia |
| **Thi Hong Loc Hoang** | Speed Presentation  
The contribution of tertiary education to sustainable economic growth: the evidence from the fishery sector in Vietnam |
| **Widya Pertiwi** | Full Presentation  
Educational research in Indonesia: chance and challenge of play-based research |
The academic identity of professionals, particularly in biomedical sciences, has been transformed in the 21st century. Globally and in Australia, there is increased pressure towards formalisation of university teaching qualifications, with the expectation that completion of a Graduate Certificate in Higher Education (GCHE) will lead to better teaching and learning practices. This is based on the expectation that the GCHEs experience and study content is consistent across different universities thus translating to academic leadership, competence in scholarship of teaching and learning, and good teaching and learning practices as exemplified in the aims and outcomes listed by such courses. This qualitative study explores the teaching focused academic role through systematic analysis of documents and policies from academic Enterprise Bargaining Agreements (EBA) and publicly available course content in GCHE from four Australian universities via Leximancer software analysis. Preliminary results from EBA analysis suggests that whilst all universities convey similar information regarding formal working conditions legal entitlements, information pertinent to the GCHE and information regarding appropriate professional development in teaching and learning, and other such related entitlements can vary depending on the respective university. Preliminary analysis of GCHEs across four Australian universities show that whilst all courses have a total of 4 units within the GCHE, the degree may have different names and study content depending on the university. Outcomes from this study can lead to an understanding of sustainability in the process of training and development of biomedical scientist researchers to teaching focused academics at Australian universities.

Keywords: tertiary education, pedagogy, graduate certificate in higher education, teaching focused academics, biomedical science
This study explores the development of learners’ agency in resources-based academic writing pedagogy in Indonesia. Not only does this pedagogical approach encourage critical thinking and creativity in a more learner-centred mode, but also triggers a break-away from the predominating linguistic-based approach that limits students’ capacity to grow as a better language user and future teacher. Informed by latest empirical findings from neuroscience, this study adopts the ideas that language learning is a multisensorial experience; is processed first in the right hemisphere of the brain through intonation; and should encourage learners to build their own template for long-lasting learning results. To this end, three pedagogical tools to enrich students’ learning experiences in an Academic Writing unit that is inquiry-based: Verbotonal-based Moodle, Reading for Emotions, and Aesthetics. This study shows that while the experimental groups performed slightly better than the control groups in the post-test, their specific agentive learning in the final paper vary in terms of the use of intonational and emotional resources. The better writers tend to construct each sentence with a regular number of chunks (4 to 5 chunks) where the peak shifts were properly placed, and the emotional resources were fulfilled. The inferior writers, in contrast, seem to find it difficult to utilise the chunking mechanism and emotional resources in the texts, thus leaving more rooms for improvement. This study suggests that both intonation and emotions can be engineered as valuable (foreign) language learning components in a technologically enhanced language learning environment.

*Keywords: agency, critical thinking, creativity, intonation, emotions, aesthetics*
Tithchanbunnamy Lor

Doctor of Philosophy

College of Education

Full Presentation

Policy Implementation in Higher Education in Cambodia

The Khmer Rouge genocide has left Cambodia with diminished resources and cultural capital as countless people were murdered, educational institutions were closed, and the traditional links between different layers of Cambodian society were broken. Today, Cambodia seeks to rebuild these connections and restore its capacity to participate in the regional and global economies. The new higher education STEM reforms target a range of issues including higher education, curriculum and teacher qualifications, supporting advanced research in priority areas, and strategic sectoral governance. The present study concerns itself with the processes by which Cambodia’s higher education institutions address, and plan for, community engagement in order to facilitate a better embedding of the country’s education policies and programs within the broader needs and values of the country. Previous studies conducted in Cambodia in the area of higher education reforms showed serious gaps in this respect. The present study engaged policy planners and the key higher education institutions in Cambodia that are being most impacted by the current STEM reforms. In the first instance, the researchers conducted a needs analysis to inform the process of implementation of the STEM reforms. In the next step, the researchers developed a questionnaire in order to examine the expectations that informed the implementation strategies of the respective higher education institutions in regard to community engagement. The study will report its findings. The study is part of the evaluation process developed by Directorate General of Higher Education in Cambodia to inform its policies and their impact on the community.

Keywords: Policy Implementation in Higher Education

Friday 6th September – Afternoon Session (1:45 – 3:15pm) - Transformations in education - Red 9.1.48
The past economic growth model of Vietnam has relied on rapid investment, cheap labour and use of natural resources as a cut-price source of energy, while little attention was given by industry or Government towards investing in science and technology improvements. The resulting rapid economic growth has come at a cost in the form of environmental problems, now understood to threaten future growth. This applies to many sectors on which Vietnam’s growth has been built, including export-intensive industries such as aquaculture-based fisheries. The use of obsolete technologies and the tendency to re-circulate wastewater and chemicals in publicly used watercourses has led to negative environmental externalities on a range of water users and inferior product reputation in global markets.

While technological change and innovation typically originate from research and development activities of universities, the role of tertiary education and research in regional economic development is still poorly understood and controversial in Vietnam. This study aims to examine the long-term relationship between tertiary education and economic growth assumed to operate through five main channels. These are technological change, human capital, demographic and environmental values change, good governance of the State, and entrepreneurship. It will also examine the opinions of firms in a specific sector on the potential contribution of tertiary education. Empirical work will be conducted with the fishery sector in the Mekong Delta where the bulk of fish-farming, -processing and -exporting occurs (aim to interview 200 fish operations) as well as stakeholders located in key universities/vocational education and training (VET) and government agencies in relevant cities.

*Keywords: tertiary education, economic growth, environment, sustainable, fishery, Vietnam*

*Friday 6th September – Afternoon Session (1:45 – 3:15pm) - Transformations in education - Red 9.1.48*
Educational research in Indonesia: chance and challenge of play-based research

This study examined the culture of how research is taught and supported for undergraduate students in Indonesia in relation to the new Indonesian higher education Qualifications Framework and National Standard of Higher Education. It engaged academic staff involved in the teaching of research and/or supervising undergraduate students’ theses in English language teacher education programs and aimed at investigating the intellectual and practical challenges that the new policies present to them. Regarding to it, the study employed case study as its design to gain as rich perceptions as possible from the participants and to explore their approach and thoughts when teaching research and/or supervising students’ theses. Various data collection methods (surveys, focus group discussion, interviews) and data analysis were used to understand the issue better as the participants grapple with the task of implementing competency standards specified in the new policies. The findings show that while the participants were aware of the change, to reach the goals explicated in the competency standards need more than just a status quo concerning “what-are” and “what have been done”. It requires courage to grow intellectually by daring to think out of the box, following the scientific intuition, and playing with any disciplines in order to avoid the “trend” of unadventurous and introverted educational research.

Keywords: educational research, innovation, play-based research

Friday 6th September – Afternoon Session (1:45 – 3:15pm) - Transformations in education - Red 9.1.48
The changing roles of computers, machines, and artificial intelligence

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Faisal Badar

Doctor of Philosophy

College of Education

Full Presentation

Pragmatic pathways with digital education at home for the underprivileged children in Pakistan

58 million children are out-of-school globally despite literacy enhancement programs at international, national and local levels focused on devising ways to educate these children in underprivileged context. Despite their extensive efforts to provide these children a sustainable solution, one out of every five children are still out-of-school. In Pakistan, 63% of the population is under 25 years of age, representing the fourth largest out-of-school population in the world with 48% children not going to the schools. The situation demands re-thinking strategies for education in underprivileged contexts. Continued advancements in learning technologies give hope to innovative learning solutions suited to such challenges. This research probes adaptable and sustainable approaches for providing home-based digital education to out-of-home children in the underprivileged context in Pakistan, suited to local dynamics and limitations. The research design comprises multiple components in a sequential flow including review of ‘stand out’ educational technology initiatives during last two decades; synthesis of practical one-room schoolhouses and multi-grade teaching methods adopted in rural Pakistan; and, comparative analysis of qualitative data collected through interviews with parents of out-of-school children and quantitative data collected from other stakeholders to understand significant factors limiting these underprivileged children from going to school. Based on findings, the research aims to identify local-context guided adaptable and sustainable approaches to optimally educate these underprivileged out-of-school children, providing them with hope for a better future through home-based education technology solutions.

Keywords: digital learning, underprivileged, out-of-school, Pakistan, home schooling

Friday 6th September – Afternoon Session (1:45 – 3:15pm) - The changing roles of computers, machines, and artificial intelligence - Red 9.1.45
Can humans maintain autonomy with the rise of increasingly ‘intelligent’ machines? BODYTANK is my PhD project that seeks to evoke understandings of complex, evolving relationships and dimensions between humans/nonhumans and digital technologies. My research practice engages with emergent performance ethnography, to interrogate human agency and how humans co-design and perform with or without digital technologies and data in a particular context.

For this presentation, one of the maverick humans operating in the theatre of Darwin Harbour in remote Northern Australia will be invoked as a provocation. My aim is to vividly problematise the contemporary human, amongst the pressures of performing with digital systems and disembodied entities. My research data captures the arising tensions and feedback loops of this situated embodiment. In the analysis, projecting dynamic hybrids of being, doing and knowing are grappled with.

...The body of the harbour is a stage on which many cosmologies collide – sometimes clashing, sometimes meshing, sometimes in mutual ignorance. It is in this collision, amongst swirling ebbs and flows, that this research is performed. Nonhumans participate; mangroves, midges, and muddy tides. Digital technologies and data networks participate, in embodied and in disembodied ways, producing cyber knowledges. Humans and other autonomous lives differ from digital networks and data in that they are inherently situated and offer situational experiences. In these experiences, some tensions and maverick performances emerge...

I welcome participation and feedback that might further extend this inquiry. Keywords: agency; autonomy; data; embodiment; performance; technologies

Friday 6th September – Afternoon Session (1:45 – 3:15pm) -The changing roles of computers, machines, and artificial intelligence - Red 9.1.45
Matt Tatam  
Master by Research  
College of Engineering, IT and Environment  

*Speed Presentation*

**Enhancing Cyber threat modelling by applying innovative machine learning approaches**

The objective of my research is to develop a Threat Intelligence Framework that augments threat data, to provide value to securing information and assets on a strategic, and operational level. The framework will provide actionable threat intelligence using a learn, adapt, suggest and action approach. It will focus on a four-phased approach that collects, analyses, identifies and predicts threats using existing machine learning techniques identified through my systematic and critical review process.

I will research and review the most effective approach to extract data from threat repositories. The collection phase will then provide input to the next phase that will contextualise the acquired threat data based on asset features and configuration. This phase will then identify the supporting assets and their relevant threats, vulnerabilities and potential exploits. The third phase of the system will be to analyse the data and model collective existing known/unknown threats, and the resulting likelihood of a compromise. The output of this assessment phase will provide the features used in the threat prediction phase, that then iteratively feeds back into the previous (third) phase.

The proposed research will compare machine learning algorithms and identify the best combined Machine Learning Algorithms in the 4 Phases of the framework. The asset risks identified from vulnerabilities, threat intelligence and models, will be part of a feedback loop, providing itself with training data. The iterative system will continue to analyse and put into context asset/threat/vulnerability data and attempt to make point-in-time predictions on known, unknown and emerging threats.

*Keywords: Threat Intelligence, TTP (Tactics/Techniques/Procedures), Machine Learning, Cyber security, Threat modelling, Threat prediction*

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**Friday 6th September – Afternoon Session (1:45 – 3:15pm) -The changing roles of computers, machines, and artificial intelligence - Red 9.1.45**
Improvised Explosive Devices (IEDs) and the terrorist networks that employ them pose a current and future threat throughout the world. An ongoing challenge is identifying the linkages and relationships between the individuals that form these terrorist network. However, this information is essential if these networks are to be disrupted.

This research utilises the novel application of data science and machine learning techniques to analyse chemical test data from recovered samples of explosives, with the aim of identifying matches and relationships between the samples. Previously, forensic chemists have demonstrated the ability to identify matches between explosive samples through chemical analysis. However, this analysis was a manual and time-consuming process using advanced chemical testing techniques and could not be applied at a large scale. The use of data science aims to reduce the need for advanced testing and enable rapid analysis of large data sets.

The research methodology combines machine learning clustering techniques with traditional chemometric techniques for analysing chemical test data. Data pre-processing techniques have been researched to improve clustering outcomes and assessment metrics have been developed to assess the goodness of clustering. Data fusion techniques are also utilised to analyse data from multiple disparate tests applied to each explosives sample. The intended result of this analysis is confident matching of explosive samples; inferring they are made by the same bombmaker, or, matching of common characteristics within differing explosive samples; inferring linkages between different bombmakers.

**Keywords:** AI, Machine Learning, Clustering, Data Science

**Friday 6th September – Afternoon Session (1:45 – 3:15pm) - The changing roles of computers, machines, and artificial intelligence - Red 9.1.45**
Barriers to innovation and technology adoption in the field of 3D-metal printing

3D Metal Printing also known as ‘Additive Manufacturing’ is an innovative process with positive sustainability outcomes. This technology is reported in the literature as having the potential to transform industries such as manufacturing and construction. However, despite myriad opportunities there are also many challenges that must first be overcome before this technology becomes widely adopted and the sustainability benefits fully realised. This research focusses on the challenges facing 3D Metal Printing in Australia. In-depth interviews were conducted with various stakeholders including businesses involved in the construction, primary production and manufacturing sectors. The interviews investigated perceptions of 3D Metal Printing, adoption barriers and possible ways to encourage its future adoption. A review of the literature, in conjunction with the depth interview findings facilitated the development of a conceptual model of 3D Metal Printing adoption barriers. These include aspects such as financial barriers, lack of technical standards and specification criteria, as well as safety standards.

Subsequent research will seek to verify the conceptual model and quantify the relative importance of the barriers to adoption. This research will therefore inform future strategies for overcoming barriers to innovation and encouraging the adoption of this sustainable technology.

Keywords: 3D-Metal Printing, Additive Manufacturing, adoption, barriers, challenges, sustainability

Friday 6th September – Afternoon Session (1:45 – 3:15pm) - The changing roles of computers, machines, and artificial intelligence - Red 9.1.45
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