

HDR RESEARCH CONFERENCE
2021 PROGRAM

Fed

Acknowledgements

Federation University Australia acknowledges the Traditional Custodians of the lands and waters where our campuses, centres and field stations are located and we pay our respects to Elders past and present, and extend our respect to all Aboriginal and Torres Strait Islander and First Nations Peoples.

The Conference Committee would like to acknowledge and thank staff and HDR candidates who assisted with the organising of this event and contributed to the success of the conference.

Conference Committee:

Professor Wendy Wright

Dr Robert Watson

Mrs Paula Di Maria

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FOREWORDS

Professor Duncan Bentley

VICE-CHANCELLOR AND PRESIDENT

Welcome to this year's Annual Higher Degrees by Research (HDR) Conference. This is a special day in the Federation University calendar, which offers our HDR candidates a valuable opportunity to showcase the outstanding quality and diversity of their research.

Federation University's research aims to transform lives and enhance communities. We are committed to building innovative and applied research that will help to strengthen, sustain and enrich communities in regional Australia and beyond. This involves connecting with our local communities, government and industry partners to provide real world research opportunities and engagement for our HDR candidates and innovation capability for our partners.

The HDR Conference helps to enhance and grow the research culture of our university. This event acknowledges the value of our HDR programs and students and their contributions to our research outputs and reputation.

The conference provides a platform for our HDR candidates to present the impact of their research. For many, this may be one of the first opportunities to stand in front of an audience of peers and scholars to present their research. This valuable learning experience can assist candidates to prepare for later external conferences and speaking opportunities.

Today we celebrate the research contributions and achievements of our HDR candidates. I hope that you all have a great day and take full advantage of this exciting opportunity.



Professor Chris Hutchison

DEPUTY VICE-CHANCELLOR
(RESEARCH AND INNOVATION)

It is a pleasure to welcome you to the 2021 Higher Degree by Research Conference 'Celebrating our Research Together'. I very much look forward to joining you at the event.

The COVID-19 pandemic has provided many challenges to conducting research and as we approach a different way of working, with COVID as an endemic disease, I would like to thank all of our HDR students for staying the course. Our HDR students produce much of our world class research and growing our HDR cohort is a priority for the University.

Over the coming year, through our research centres and groups, we intend to significantly enhance the cohort identity of our HDR students. This is particularly challenging at Federation University because our students are spread across seven campus locations. A major purpose of the Graduate Research School is to ensure that you can connect easily and share your experiences and expertise.

This conference will provide some of our HDR students with their first opportunities to present and reflect upon the results of their research and to engage with others to gain constructive criticism and advice on their central hypothesis and the methods adopted to test and extend this hypothesis. It will also provide a first opportunity, post COVID, to understand the breadth of research being carried out across the University and how it enhances local communities.

Appreciating research in different discipline clusters is an important development opportunity for emerging researchers. The Higher Degree by Research Conference will expose students to different ideas, methods and technologies and therefore different ways of thinking about and solving the problems they are working on. It is important to be open, particularly to new technologies and methods, and to engage with potential new collaborators. Even within an organisation it can often be challenging to network effectively but this conference should provide plenty of opportunity to do just that.

To network effectively, it is important to be an active participant. Be willing not only to share the results of your research but also to offer help and support to your fellow students. In growing research at Federation University, it is important to build a culture of community and HDR students are a pivotal part of our research community. We have ambitious plans to expand our HDR numbers across our campuses, both through home and overseas scholarships and through working closely with industry and community partners. One of our ambitions for 2022 and beyond is to provide as many of you as possible with opportunities to have internships with a regional industry partner, so that you become skilled and valuable intellectual leaders of the future. The Dean and I will share these ideas with you during the conference.

Lastly, I'd like to thank everyone who will help make this year's Research Conference a success. This includes the organising committee, and the staff of the Graduate Research School who make this event possible – and especially Paula Di Maria for her coordination – and of course, all participants.

I hope you will enjoy and remember the day.



Professor Wendy Wright

DEAN, GRADUATE STUDIES

A very warm welcome to our 2021 HDR Conference! After COVID-19 caused us to cancel the 2020 conference, and after such a long and challenging couple of years, we had very much hoped to see everyone in person this year – but this was not to be! Undaunted, we made the decision to hold a virtual conference this year so that we do not miss another opportunity to celebrate the diversity and quality of our HDR research. I am acutely aware of the difficulties that HDR candidates, their families and their supervisors have endured recently and congratulate everybody for the resilience and adaptability that has helped keep the research activity going in some form or another. I am grateful to all of the speakers, poster presenters and attendees for your support of the conference in the current environment and I thank the HDR supervisory teams, the HDR co-ordinators and the Associate Deans, Research who have all been so generous in their support of our HDR candidates during the pandemic.

As Dean, Graduate Studies, I am sometimes privileged to glimpse some of the new knowledge that HDR candidates, with the support of their Schools and supervisors, are generating; and to hear about the methods and approaches being used to undertake these studies. The contributions of our HDR candidates, while varied, are often substantial. They really do make a difference. The work that our HDR community is engaged with is certainly worth **celebrating together**. While the online format for the 2021 conference will create some differences, we hope that this year's conference, like its predecessors, will inspire and celebrate while providing practical opportunities for HDR candidates to extend their research communication skills either via an oral presentation or via a research poster. The conference is designed to empower our HDR candidates by providing a safe environment in which to showcase their work and experience an academic research conference for perhaps the first time.

Please join us in celebrating our research together during **Federation University's 2021 HDR Conference**.



Associate Professor Andrew Barton

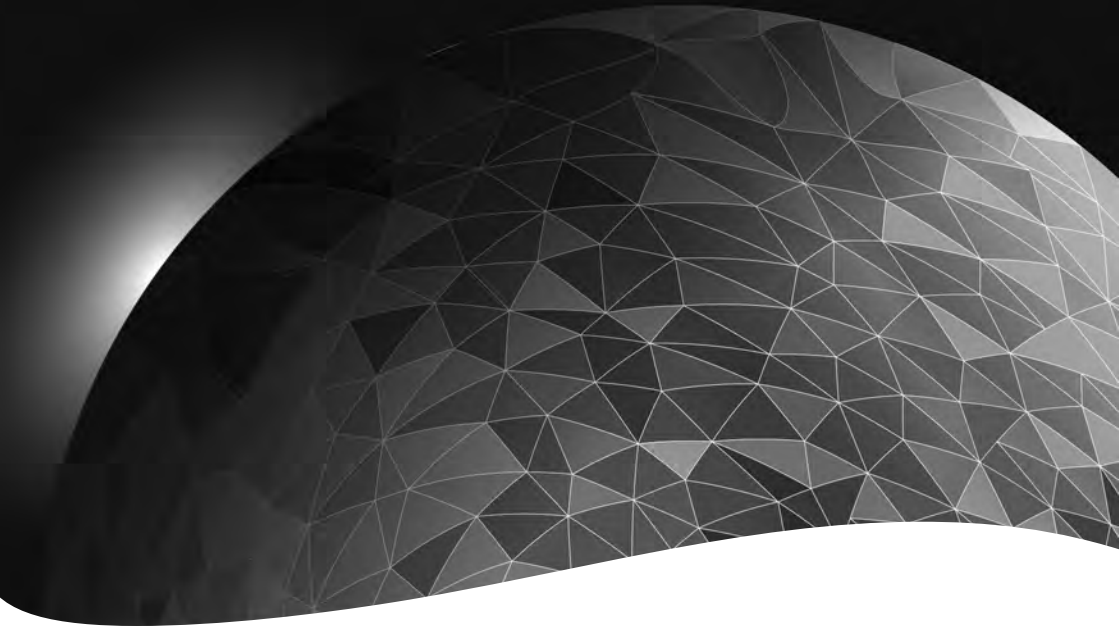
ASSOCIATE DEAN, RESEARCH TRAINING PARTNERSHIPS

It is my very great pleasure to welcome all HDR students and participants to the 2021 HDR virtual conference. This is a highly anticipated opportunity for the University's HDR community to come together and share our research successes. It is particularly exciting to be able to come together for this event given the ongoing challenges of COVID-19. The impacts of COVID have been felt differently through our diverse HDR cohort, and I would like to acknowledge the ongoing efforts of our part-time students, those with carer and home schooling responsibilities, those who have had their field and laboratory work disrupted and those with other obstacles to their progress.

Sharing and presenting research with colleagues is an important element of research training, with the experience and skills developed being things that will stay with you for the whole of your research and professional careers and beyond. The University is invested in the training and success of our HDRs, and we are eager to provide this opportunity for you. I encourage all HDR students to engage fully with the program and to support your peers. I hope you are inspired by what you see and hear, and take renewed excitement to be working on your research and within the wider research sector.

I am particularly looking forward to seeing the broad cross-section of research being undertaken by our HDR students, and the extensive industry and community connections our HDR students have. Federation is very fortunate to have many deep and productive research partnerships and is a further dimension I would like for us to celebrate as we come together for this conference.

Good luck to all presenters!



ORAL PRESENTATIONS



Physiological data-based features evaluation of clinical alarms in remote patient monitoring applications

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Supervisors: Dr Venki Balasubramanian and Associate Professor Andrew Stranieri

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Doctor of Philosophy

In recent years remote patient monitoring (RPM) applications have emerged with the wireless body area network (WBAN) as their monitoring component. These RPM applications can monitor the patient continuously and remotely with the help of wearable sensors. These wearable sensors collect the physiological data of the patient and send it to the telemedicine platform for remote monitoring. Several factors could affect the monitoring of these physiological data such as the vibration of the floor, movement of the patient, clinical set-up, which increases the non-clinically significant alarms. For the accurate diagnosis of the patient's condition physicians rarely used the single physiological health data information. In this work, we have evaluated various physiological data-based features such as modified early warning score (MEWS), trust, slope, frequency, and the trend for the clinically observed patient's collective data by wearable sensors using the concept called patterned modified early warning score (pMEWS) with a sliding window. These physiological data-based features help in the diagnosis of the urgent medical condition of the patient. Prioritization of the clinical alarm has been performed with the majority voting method after the evaluation of the physiological data-based features.

Teena Arora is supported by an Australian Government Research Training Program (RTP) Fee-Offset Scholarship through Federation University Australia



Low tide during lock-down: a critical ethnography of beach usage during COVID-19

Elissa Ashton-Smith

Supervisors: Dr Jessica Reeves, Dr Fred Cahir, Dr Birgita Hansen and Dr Angela Murphy

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Doctor of Philosophy

A social research project that happened to coincide with COVID-19 has generated some interesting insights about what the beach means to people. The research aimed to generate in-depth understanding of socio-cultural values associated with sandy ocean beach ecosystems, focussed on the southern Bellarine Peninsula, Victoria. Critical Ethnography was employed to explore socio-cultural values, via in-depth interviews, policy and media analysis, and participant observation.

Although not the primary focus of the research, societal responses to COVID-19 accentuated particular aspects of the socio-cultural values associated with beaches and the unique role of beaches in the network of public open spaces available to people. Preliminary analysis of data indicates that COVID-19 accentuated awareness of the therapeutic value of beach experiences; a sense of ownership by 'locals'; expectations for unrestricted public access; and an expectation for beaches to be somewhat beyond the reach of regulation, places where people experience a sense of freedom, getting away from 'civilisation'.

The observations gained during COVID-19 offer insights into the challenges of managing these unique socio-ecological spaces. Policy and planning systems need to better account for the multiple roles of beach ecosystems within the broader landscape, informed by conservation planning and mapping of beach attributes.

Elissa Ashton-Smith is supported by an Australian Government Research Training Program (RTP) Stipend and RTP Fee-Offset Scholarship through Federation University Australia, and by a Barwon Coast Committee of Management Scholarship.



Impacts of in-memory database technology on organisational business processes: A decision-making perspective

Haroon Bhutta

Supervisors: Associate Professor Andrew Stranieri and Dr Mehmood Chadhar

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Doctor of Philosophy

In-memory database technologies enable large volumes of complex data transactions and algorithms in real-time for planning, forecasting, and decision-making. Business processes describe the series of tasks and activities inherent in organisational departments and functions. Little is known about how in-memory database technologies change business processes. Understanding the impact of in-memory database technology on business processes can help the organisations to anticipate how these business processes might be transformed so that tedious business processes reengineering work can be planned and expensive technology vendors' customisation can be reduced. This research is a qualitative study involving the thematic analysis of data collected during interviews with managers of different organisations who have simultaneous knowledge of the use of in-memory database technology and various businesses processes activities in their organisations. Data will be transcribed, coded, and analysed using template based thematic analysis.

Haroon Bhutta is supported by an Australian Government Research Training Program (RTP) Fee-Offset Scholarship through Federation University Australia.



Undergraduate nursing students' team communication skills within a simulated emergency setting

Sharon Bourke

Supervisors: Professor Simon Cooper, Dr Louisa Lam and Professor Lisa McKenna

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Doctor of Philosophy

A grounded theory methodology was adopted to understand how undergraduate nursing students communicate in a simulated emergency setting and to explore the factors that affect nursing students' team communication. These factors include culture, language, gender, age and power. Nurse education in Australia has become complex and demanding with increasing online components. The ability to focus on team communication and non-technical skills may be reduced in a saturated curriculum. Students find prioritisation of clinical skills challenging and may not be exposed to specific skills on clinical placement due to the dynamic and unpredictable nature of clinical environments. Even when communication education and exposure simulation is provided, students' utilisation of non-technical skills remains challenging. This study is unique in focusing on constructing a grounded theory of how students communicate in patient emergencies, based on students' perspectives and researcher observations.

Data was gathered through constant comparative analysis from interviews and video observations of 3rd year Federation University nursing students during simulated team emergencies. Through theoretical rendering of the data, categories and an explanatory theory have emerged. This presentation will offer a description of the explanatory theory and the supporting categories and present preliminary recommendations for education, clinical practice and research.

Sharon Bourke is supported by an Australian Government Research Training Program (RTP) Fee-Offset Scholarship and a School of Health scholarship through Federation University Australia.



It's no longer bad guys in their bedrooms: Insights into healthcare cybersecurity

Wendy Burke

Supervisors: Associate Professor Andrew Stranieri, Dr Taiwo Oseni, Dr Charlynn Miller and Professor Iqbal Gondal

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Doctor of Philosophy

Technological advancements in the healthcare industry have seen an increase in the number of security breaches such as ransomware attacks, data breaches and insider threats. Most cybersecurity research has focussed on understanding and mitigating cyber threats to health information systems, however few studies have been conducted to gauge the healthcare sectors cybersecurity capacity to take on system changes such as MyHealthRecord (Australia). Indexes have been developed to assess a country's cyber security capacity but none of these have been adapted for the healthcare sector.

An expert panel was asked to share their professional insights into healthcare cybersecurity. They were asked questions about perceived and current cybersecurity threats to healthcare, the role the media played in reporting incidents and impact limited budgets and lack of support for IT security professionals had on the sector.

The presentation will describe the thematic analysis of the discussion and reveal how emergent themes are being used toward the creation of the first Australian cybersecurity index for the healthcare sector.

Wendy Burke is supported by an Australian Government Research Training Program (RTP) Fee-Offset Scholarship and Vice-Chancellor and President Scholarship through Federation University Australia.



Ecology and management of rhizomatous weeds in the wet tropics

Aakansha Chadha

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Doctor of Philosophy

Invasive species cause significant economic burdens to the environment and agriculture sectors. Of particular importance is the rhizomatous weed, *Cyperus aromaticus* (Navua sedge) found in tropical environments. This project addresses ecological traits and derives suitable management techniques for this significant weed group. Four laboratory and field-based experiments focused on: Seed germination ecology; the effects of rhizome fragments size and burial depth on regeneration ability; the relationship between the soil seedbank density of Navua sedge in infested pastures and climatic conditions; and herbicide effects and impacts. Results show that Navua sedge seeds require light to germinate and do not emerge from soil depths greater than 2 cm. Total emergence was positively correlated with length of rhizome fragment and negatively correlated with burial depth. The soil seedbank study indicates a significant difference ($p < 0.05$) between the number of Navua sedge seeds present in the infested and control plots and also in different soil layers. Herbicides can effectively control plants growing from seeds but not plants with established rhizomes. Results from these trials will assist in developing suitable control approaches for this and other similar rhizomatous weed species and we discuss the relative merits of the various interventions.

Aakansha Chadha is supported by Vice-Chancellor and President Postgraduate Scholarship Stipend and RTP Fee-Offset Scholarship through Federation University Australia.



The adoption of blockchain: the actors' perspective using institutional theory

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Doctor of Philosophy

Given the rapid move of organisations towards blockchain adoption, this research focuses on the niche area associated with blockchain technology adoption. Literature is scarce around the explorative view of the blockchain adoption process and a need to identify the interplay of human and non-human elements at several points that influence the actions and ultimately the decision to adopt a blockchain application in an organisation. This study investigates blockchain adoption process from an explorative view and determines yet uncovered aspects to be considered before and while adopting blockchain. For this purpose, the study employed Institutional Theory and Actor-Network Theory to identify the interactions among actors and several influences/pressures behind their actions. The results of the study are crucial for blockchain literature as it fills gaps of empirically investigated, explorative and dynamic insight into the process and assists potential adopters in realising the interactions required before and during a successful adoption process.



Approximating past water quality trends using history

Faith Coleman

Supervisors: Professor Peter Gell, Professor Keir Reeves and Gary Hera-Singh

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Doctor of Philosophy

The Coorong is a wave-dominated, 140 km long, anthropogenically truncated coastal lagoonal estuary in South Australia. This low-flow, often hypersaline estuary receives water inputs from a diversity of sources, including Australia's largest river basin, the Murray-Darling.

The first documented visit to the Coorong by Europeans occurred in the 1830s. During the first seventy years of European colonisation, the Coorong and affiliated wetlands were widely considered the premier fishing and hunting region of Australia, with early concerns being expressed in the 1920 with regard to declining wildfowl and fish populations. Despite the remoteness of the site, management of the estuary was rife with competing interests. Each activity within the estuary and catchment impacted (and continues to impact) the estuary in a parallel rather than sequential manner, making the impact of individual activities difficult to quantify.

This complex history of anthropogenic impact and initially minimal scientific endeavour has made determining a baseline for restoration and identification of long-term trends challenging, with each stakeholder having their own view about the causes of current issues and desired restoration goals. This presentation will look at how isolated historic water quality and hydrology data can be used to approximate ecological baselines and long-term trends.

Faith Coleman is supported by an Australian Government Research Training Program (RTP) Stipend and RTP Fee-Offset Scholarship through Federation University Australia, with industry sponsorship from the Lakes and Coorong Fishery.



Munitions chemists: knowledge transfer agents for Australian manufacturing between the wars

Ann Collins

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Doctor of Philosophy

From 1915 200 chemists were employed by the British Ministry of Munitions as works chemists, over 130 of these were Australian who had been recruited by the Australian government.

These chemists combined their practical knowledge of physical chemistry and metallurgy with 'chemical engineering' to design, supervise and manage munitions factories throughout the UK. After the war, their experience triggered an elevation in their status, prestige and remuneration. It also contributed to changes in technical education in Australia, the expansion of Australian manufacturing following the war and prepared a technical labour force needed in Australia for World War 2.

The need for more chemists and engineers during the defence of Australia instigated Commonwealth income support for students, which ultimately became the Commonwealth Scholarship Scheme.

Contrasting the education and work experiences of 120 munitions chemists with 230 chemists recruited to the pulp and paper industry between 1935 and 1950 provides an illustration of the changes in technical education, the evolution of a profession and the management of technical resources during a national crisis.

Ann Collins is supported by an Australian Government Research Training Program (RTP) Fee-Offset Scholarship through Federation University Australia.



Modelling and assessing paths to an environmentally sustainable Australian economy

Benjamin Curnow

Supervisors: Associate Professor Jerry Courvisanos, Dr Quanda Zhang, Emeritus Professor John King, Dr James Culham and Dr Tim Thornton

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Doctor of Philosophy

Human impact on the Australian environment is now so extensive that the basic operations of many ecosystems are threatened. Australia needs to rapidly reduce the consumption of its natural resources, reduce pollution, and provide greater space for 'natural' ecosystems. This research provides a detailed proposal on how this can be achieved. Both theory and evidence are used to propose the policies and institutions needed to transform the Australian economy. A macroeconomic model is being developed that incorporates the unique aspects of Australia's economy, society and environment. The model simulates four policy suites representing four different pathways for the economy. These simulations provide the basis for a political economy analysis of key policies within each policy suite with predictions of possible inflection (crisis) points and an analysis of which policy suite is most likely to lead to a successful transformation of the Australian economy so it delivers a high standard of life for all Australians within environmental limits.

This presentation sets out the basics of the initial model, highlighting the critical resource saving and sustainability features in the Australian macroeconomy developed. It will also provide the first modelling results, with some preliminary comments on the green impact of these results.

Ben Curnow is supported by an Australian Government Research Training Program (RTP) Stipend and RTP Fee-Offset Scholarship through Federation University Australia.



Using simulations to increase ICT graduates work-readiness: Instructors, employers and students preceptions

Nadia Faisal

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Doctor of Philosophy

The employability agenda has been one of the most significant developments in higher education over the last decade. In IT education, an appropriate teaching design can yield enhanced learning outcomes and higher skill levels which ultimately support students' job-readiness.

A pragmatic paradigm was adapted in this ongoing PhD research project to investigate the effects of an experiential teaching technique "Simulation Games" on ICT graduates' work-readiness. This longitudinal study used multi-stage multi-method data collection over the period of two years. Starting from Industry experts, the researchers conducted in-depth interviews to first ascertain what work-ready attributes are desirable in an ICT graduate. An ICT work-readiness framework was developed which was later used to conduct in-depth interviews from simulation games instructors from different Victorian universities and institutes. The same framework was used to develop pre and post game surveys. These surveys are being conducted with students enrolled in different courses using ERPsim game. The findings from these interviews and surveys will be mapped with SFIA (Skill Framework of Information age) to determine whether these games are making significant contribution towards ICT graduates work-readiness.

Nadia Faisal is supported by an Australian Government Research Training Program (RTP) Fee-Offset Scholarship through Federation University Australia.



Theories of diversity and individuality in early American protectionism

Mathew Frith

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Doctor of Philosophy

Protectionists, both historical and in the present, commonly cite the need for economic diversification. Yet, often many of the earlier protectionist theories of economic diversification are more refined and developed than their modern counterparts. This paper focuses on the theories of the 19th century American protectionists, which while refined and very influential at the time, are now largely forgotten. Whereas classical and modern neoclassical economics largely consider human beings to be uniform and homogeneous factors of production, the American protectionists emphasized the existence of natural and nurtural differences among individuals. This understanding, while simple, leads to profoundly different ideas concerning the nature of economic growth and development. This approach touches almost every aspect of their system of thought – including issues concerning income inequality, the nature of recessions, and technological change.

The recognition that innate differences exist between individuals underpinned many of their arguments for tariff protection. Since individuals possess different talents, abilities, dispositions and even interests, the protectionists saw that providing a greater scope of diverse employments and industrial pursuits would maximize the productive potential and welfare of the nation's citizens. A brief description of this approach is presented with implications for policy actions.

Mathew Frith is supported by an Australian Government Research Training Program (RTP) Stipend and RTP Fee-Offset Scholarship through Federation University Australia.



Where computation meets genetics

Jaskaran Kaur Gill

Supervisors: Associate Professor Madhu Chetty, Dr Jennifer Hallinan, Dr Adrian Shatte and Professor Fadi Charchar

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Doctor of Philosophy

Gene regulatory networks (GRNs) embodies the complex structural and operational details of biological systems. These networks represent interaction details among genes/gene products. These interactions when uncovered, convey substantial information that is used in developing drugs and treatments. The experimental reconstruction of GRN involves high throughput technologies that assist in recording various parameters such as sequence and expression, and, evaluating those parameters to recover the network or concerned interaction. The computation reconstruction of the network uses computational methodologies that uses the high throughput recorded parameters to reconstruct the network. GRN inference is a domain specific problem, that needs significant knowledge of biological domain concerning genetic behaviours. This presentation is based on GRN inference using computational methodologies. We will start with brief discussion of biological significance of the process including current limitations. Then, we will analyse state-of-art computational methodologies that have been extensively used for reconstruction of the system. The methods will include – information theory models, Boolean networks, Bayesian models, differential equation models, machine learning models and ensemble models. Lastly, various benchmark performance measures that are used to compare the candidate solutions will be highlighted. Our aim for this presentation is to introduce fellow researchers to the field of GRN reconstruction using computational methodologies.

Jaskaran Kaur Gill is supported by the tuition fee waiver scholarship from Federation University and the stipend scholarship from Health Innovative and Transformation Centre (HITC), Federation University Australia.



Academic-Industry divide: Analysis of the Australasian video games design and development sector

Jordan Greenwood

Supervisors: Associate Professor Andrew Stranieri, Dr Leigh Achterbosch and Dr Grant Meredith

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Doctor of Philosophy

Contemporary game design and development has been impaired by poor communication. The lack of collaborative communication has caused a clear divide between game developers and their academic counterparts. In the literature, this divide has been dubbed as the *Academic-Industry divide* and it relates to problems of communication, collaboration, and knowledge transference between the two communities of practice. Alongside the divide, the misalignment of motivations and goals between industry and academia is hindering the growth and sustainability of the Australasian games sector. To answer the primary research question of, "How can the divide between video game researchers and video game developers be characterised then potentially reduced for Australia and New Zealand?", a mixed-methods research design will be employed with complementary stages: (i) Develop and validate a quantitative instrument to measure the divide; (ii) Conduct interviews from the games industry and academia to further the characterisation of the divide and to understand why is the divide still perpetuating between the communities; and (iii) Analyse suggestions to potentially reduced the divide for the Australasian video game sector.

Jordan Greenwood is supported by an Australian Government Research Training Program (RTP) Stipend and RTP Fee-Offset Scholarship through Federation University Australia.



Breathing new life into Victorian lignite; from fossil to plant food

Andrew Hood

Supervisors: Associate Professor Vincent Verheyen, Dr Alicia Reynolds and Dr Teferi Belayneh

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Doctor of Philosophy

Victorian lignite is currently open-cut mined predominately for combustion in coal-fired power stations. Alternative (non-combustion) uses for lignite are of interest in a low carbon emission future. Agriculture has an established use for lignite derived humic compounds. This research shows that a readily available run-of-mine lignite could be chemically (artificially) oxidised at a commercial-scale to provide this feedstock for soil amendments. Scale-up trials have shown that heat-management is the key consideration for translating laboratory findings into industrial production.

The research has also defined (i) The impact of variables including temperature, pH, oxidant-to-lignite ratio, and reaction time on product yield and their respective chemical properties; (ii) The chemical changes being made to the lignite, including the constituent fractions of humic acids, fulvic acids, and humin; (iii) analytical tools that can be used to monitor the progress of a reaction; and (iv) scale-up trials to assess viability for industry.

Andrew Hood is supported by an Australian Government Research Training Program (RTP) Fee-Offset Scholarship through Federation University Australia.

This research was conducted with the financial assistance provided by Australian Carbon Innovation, a private member-based company with funding contracts through Australian National Low Emissions Coal Research and Development Ltd (ANLEC R&D) and the Victorian State Government.



'I've got something to say and I need you to listen'

Michelle Hunt

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Doctor of Philosophy

This research is part of a University and Industry collaboration to improve services for women and children who have experienced family violence in the Central Highlands region of Victoria. The research uses photovoice, a feminist participatory research method, to gather the insights and knowledge of women with children who have experienced family violence.

Through photographs and narratives research participants advocate for change and transformation to the family violence service system. Participant insights focus on the need for services to listen to and understand the complexity and multiplicity of women's experiences of family violence. Consistent with feminist epistemologies, this research highlights the importance of relational understandings of family violence acknowledging the importance of women's social context and family networks, as well as the interconnectedness of women and children's safety and wellbeing. Participants advocate for the transformation of family violence policy and practice from reliance on patriarchal and colonial knowledge to one grounded in feminist epistemologies and women's experiential knowledge. This research has implications for the family violence service system as it grapples with the inclusion of lived experience as more than voice but positioning women's experiential knowledge (with all its emotion, complexity and subjectivity) at the heart of policy and practice.

Michelle Hunt is supported by an Australian Government Research Training Program (RTP) Fee-Offset Scholarship through Federation University Australia.



Narrative enquiry as an alternative method for measuring the impact of volunteering

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Doctor of Philosophy

This presentation examines how practice-based creative research approach can be used to measure and explore the health, social and economic impact of volunteering. Using the artefact-exegesis model, creative writing is employed to create a young adult fiction novel, the artefact. The study explores those aspects of volunteering which are difficult to capture using traditional research methods and wove them together in one artefact. The real-world-within-the-imaginedworld methodological approach allows for realities, documented, observed and anecdotal, to be examined that may have otherwise been under-represented in more traditional research approaches. This method draws on the universal human activity of storytelling to gain a shared insights and potentially new understanding. In this way, the real-world-within-the-imagined-world method of narrative inquiry leads to insights and knowledge that are not always seen in traditional research methods. From this a number of questions emerge: can a practice-based creative research approach be used to complement and progress traditional research methods to gain greater research insights when answering research questions? What implications might this method have for other disciplines throughout the academy?

Rosemary Joiner is supported by an Australian Government Research Training Program (RTP) Fee-Offset Scholarship through Federation University Australia.



Changes in organisational cyber resilience strategies during WFH in COVID-19 pandemic

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Masters by Research

COVID-19 pandemic has transformed traditional work practices. The COVID-19 pandemic has urged organisations to shift employees to undertake work from home (WFH). This WFH has resulted in a tremendous increase in cybersecurity challenges. Organisations are encouraged to reassess their organisational cyber-resilience systems to minimise the impact of cybersecurity challenges while practising WFH. The purpose of this research project is to develop a deeper understanding of cyber security challenges and the resilience strategies, organisations learn to address cybersecurity issues and to perform WHF efficiently and effectively. An interpretive approach using the qualitative methodology will be adopted and semi-structured interviews from various stakeholders such as security experts, managers, expert users, and normal users will be conducted. These interviews will be analysed using two phases – open and theoretical coding. The theoretical coding will be carried out using socio-technical system (STS) dimensions and organisational learning (OL) dimensions. This study will focus on various sectors such as education, research, and health sectors as these are reportedly facing the highest cybersecurity issues. This study will provide a comparative analysis of organisational cyber-resilience strategies during WFH for two significantly important sectors in Australia.

Samreen Mahmood is supported by an Australian Government Research Training Program (RTP) Fee-Offset Scholarship through Federation University Australia.



Nursing students' experiences of incivility and their perceived self-efficacy (PSE) in dealing with incivility

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Doctor of Philosophy

Background: Mistreatment at work is problematic for the employee as it causes physical and mental stress, and poses risks for career progression. Theories and practice suggest that these uncivil behaviours, collectively termed as 'workplace incivility', are most frequently instigated by coworkers or supervisors and is destructive and toxic to the nursing profession.

Aim: The overall purpose of this study was to ascertain the extent of workplace incivility experienced by pre-registration nursing students, and to determine their self-efficacy in managing workplace incivility.

Methods: This study comprised an online cross-sectional survey design for which a school-wide census was undertaken of all nursing students (1st, 2nd and 3rd years), across all three campuses of Federation University. Current descriptive statistical analysis of 333 participants using SPSS is aiming to determine incivility prevalence rates and current PSE in dealing with incivility estimations in the student population.

Results: Data will be stratified according to demographic characteristics by utilising Chi-square, ANOVA or Kruskal-Wallis H test, depending on the data characteristics, to determine if statistically significant differences were present between various categories.

Conclusion: This study was a stand-alone study, undertaken before the second phase, to inform the educational intervention aiming to improve awareness about uncivil behaviours and self-efficacy in effectively managing workplace incivility.

Bindu Mammen is supported by an Australian Government Research Training Program (RTP) Stipend and RTP Fee-Offset Scholarship through Federation University Australia.



Truth disclosure when breaking bad news to palliative patients: A qualitative meta-synthesis

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Doctor of Philosophy

Disclosing the truth about a patient's diagnosis or prognosis is a difficult task for many health professionals yet is essential for informed end-of-life decision making. Therefore, the aim of the meta-synthesis was to explore and examine how patients, families, and health professionals experienced truth disclosure during bad news conversations in the inpatient/outpatient palliative care setting.

The authors conducted a systemised search for peer-reviewed, published papers between 2013 and 2020 using 'truth disclosure,' 'bad news,' and 'palliative or end-of-life' keywords and MeSH terms. Eight papers were analysed and synthesised using a modified meta-ethnography process. Two concepts: 'Enablers in breaking bad news' and 'Truth avoidance / disclosure' resulted from the synthesis. The Enablers for breaking bad news concept was underpinned by several elements: the importance of the therapeutic relationship, reading cues, acknowledgment of the diagnosis/prognosis, language/delivery style, choosing an appropriate time/place, and qualities of the health professional. During the bad news conversation, truth avoidance could occur if the health professional was not comfortable, feared an emotional response or was afraid of taking away the patient's hope. Breaking bad news is a circular, not linear, process and truth disclosure needs to be repeated often to allow absorbability.

Elizabeth Miller is supported by an Australian Government Research Training Program (RTP) Stipend and RTP Fee-Offset Scholarship through Federation University Australia.



The COVID-19 pandemic's impact on fintech market

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Doctor of Philosophy

Fintech has been increasingly popular recently for its potential to transform the global finance industry and economy. Since COVID-19 spreads around the world, several reports have showed positive influences of the pandemic within fintech's development, but there are insufficient scientific studies that robustly assess the outbreak's real impact on the sector.

This research aims to address this gap by employing a mixed-method approach, which involves multiple phases: In the first phase, media content analysis will be utilised to investigate the change in fintech's trends and communication before and after the pandemic. How fintech would have performed without the pandemic will be weighed using the counterfactual analysis on major cryptocurrencies in the second phase. Case studies on SMEs will be conducted at the final phase to see if there are any differences in attitudes and intentions to adopt fintech because of the COVID-19.

Research findings will provide insights into user's responses in using fintech in situations like the current pandemic. They will also act as a reference for policymakers to navigate their agenda for pandemic relief efforts. Furthermore, SMEs can learn from their counterparts and gain a better understanding of the fintech market in terms of adopting and implementing the technology.

Ms Truong Quynh Chau Nguyen is supported by the Destination Australia Scholarship through Federation University Australia.



Women's experiences of health care pre, during and post-incarceration

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Doctor of Philosophy

This presentation will outline the design of a qualitative research study which seeks to explore women's experiences of health care pre, during and post-incarceration and how these experiences reflect current human rights frameworks and the concept of 'through-care'. A review of the literature indicates that there is a paucity of research that examines women's health care experiences from prior to their periods of incarceration through to and following their release, and how those experiences reflect through-care principles and human rights frameworks that have been adopted in the correctional setting in Victoria.

A narrative inquiry methodological approach has been adopted, reflected through the use of semi structured interviews, as a mechanism to collect data. Interviews have been conducted with seven post-release women and six post-release support workers. This presentation also considers my role in this study as an insider-researcher and how my lived experience of incarceration has not only been the impetus for this research, but also how it has been woven into the study. Furthermore, this presentation will outline the processes and tools utilised to both identify and analyse themes of through-care and human rights within the data and provide an overview of the findings.

Jennifer Nicholls is supported by an Australian Government Research Training Program (RTP) Stipend and RTP Fee-Offset Scholarship through Federation University Australia.



Galloping through Ballarat: The social, cultural and economic contribution of the horse

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Doctor of Philosophy

The Ballarat region of Victoria experienced significant population growth and consequent physical and economic development in the mid-nineteenth century due to the discovery of gold. Almost every aspect of this period and beyond has been recorded by scholars, historians and even genealogists. Surprisingly, the contribution of the horse to this spectacular development has not been considered in any depth.

Horses were of central importance to the economic, cultural and social life of colonial Australia. Horses were everywhere and involved in almost every aspect of human existence, nowhere more so than in the Ballarat region. This research analyses the complex social, cultural and familial bonds strengthened by the individual and collective use of the horse. A novel strand of this research highlights the distinct culture and tradition around the use of draft horses known as the Horseman's Word.

This research covers the physical history of transport, agriculture, mining, war and urbanisation as well as less tangible history – stories of knowledge, ideas and concepts, stories of art and symbolism. It will provide a social, cultural and economic 'snapshot' of past urban and country life that will enable present generations to understand an age upon which theirs was built.

Graeme Quick is supported by an Australian Government Research Training Program (RTP) Stipend and RTP Fee-Offset Scholarship through Federation University Australia.



Cultural competence among mental health nurses in a Victorian metropolitan health service

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Doctor of Philosophy

Background: Research suggests that improving health workers' knowledge regarding mental health service provision and cultural responsiveness enhances CALD community access.

Aim: The study's main objective is to prepare, implement, and evaluate an education package for mental health nurses to support nurses' cultural awareness and responsiveness to CALD clients. This presentation reports the baseline survey regarding the cultural awareness of mental health nurses (MHN) in a Victorian metropolitan health service.

We found that almost a quarter of MHNs did not have any knowledge of the resources available to consumers and their families regarding mental health services.

The survey's outcomes will inform an educational package for MHNs focussing on cultural safety and responsiveness and improved mental health services, service access for consumers and carers.

Reshmy Radhamony is supported by an Australian Government Research Training Program (RTP) Fee-Offset Scholarship through Federation University Australia.



Female football players strength-related lower-limb injury risk following an injury prevention program

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Bachelor of Exercise and Sport Science (Honours)

Females have increased risks for sustaining non-contact lower-limb injuries, compared to males in Australian Football. Specifically, muscle strength asymmetries and imbalances in the lower limb can contribute to increased risk of injuries to the ACL of the knee, and quadriceps, and hamstrings muscles. This study aimed to determine if an injury prevention exercise program increased the concentric and eccentric strength of the quadriceps and hamstrings to reduce the lower-limb injury risk.

This quasi-experimental study recruited a convenience sample from the Ballarat area. The experimental participants were 9 amateur AFLW players with a mean age 24.4 ± 7.1 and experience of 2.6 ± 2.3 years. The control participants were 10 physically/sport active team sport females with a mean age of 30.5 ± 8.3 and experience of 9.5 ± 8.5 years. Pre- and post-intervention testing utilised the Biodex Dynamometer and the NordBord to measure concentric and eccentric muscle strength. The exercise intervention, designed for AFLW players was conducted twice a week for a period of six weeks (experimental group), separating the pre- and post-tests.

The results have indicated an increase in strength among experimental participants. The results and comparisons between study groups will be discussed in detail within the presentation.



A Deep Learning assisted networking for IoT data delivery

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Doctor of Philosophy

The advancement of smartphones and other communicating devices led to the rise in IoT. In future, trillions of smart devices will connect to transfer zettabytes of data. To accommodate the proliferation of intelligent devices in the existing network infrastructure and address the heterogeneity among these devices, meeting Quality of Service (QoS) requirements and ensuring privacy/security are two significant challenges. The current Software Defined Network (SDN) architecture control plane has been designed for the single controller or multiple distributed controllers. But a large-scale network with a logically centralized single controller faces severe bottleneck issues.

The existing solution is based on the static deployment of multiple controllers without considering the flow fluctuations and traffic burst that leads to a lack of load balancing among controllers in real-time. With the help of deep learning some of these researchers achieved better success rate using static deployment of controllers in SDN.

Inspired by all these researchers, we have proposed Temporal Deep Reinforcement Learning to solve the issues of dynamic flow mapping and latency optimization without increasing the number of controllers which are optimally placed, and dynamically adjusting the switch-controller mapping according to the flow fluctuations.

Aakanksha Sharma is an international full fee-paying candidate and is not supported by an Australian Government Research Training Program (RTP) Stipend and RTP Fee-Offset Scholarship through Federation University Australia.



A mixed-method evaluation of an educational interventions to enhance mental health nurses' view towards mental illness and recovery

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Doctor of Philosophy

A sequential explanatory mixed-method with a pre and post-test design was used to evaluate the effect of consumer-led education. This PhD research involved three phases. In the first phase, the study explored mental health nurses' attitudes using a survey and a non-participant observation. The second phase was focused on the co-development and co-implementation of a consumer-led education package. The effectiveness of the intervention was evaluated using immediate post-test assessment and three months later. The final phase was focused on exploring the results obtained in the first and second phases of the study through an in-depth interview.

The result shows that participants generally had positive attitudes towards mental illness and recovery. However, there were some negative views regarding regularly updating knowledge, disclosure and faith and recovery. Meanwhile, the consumer-led education package significantly enhanced positive attitudes towards mental illness and recovery among participants immediately after the interventions. Findings from this research may inform other health services about using consumer-led education in influencing cultures of practice in adult acute inpatient units. However, future research should be focused on the behavioural outcomes using a large sample with a randomized controlled trial.

Anju Sreeram is supported by an Australian Government Research Training Program (RTP) Fee-Offset Scholarship through Federation University Australia.



Complex slope stability analysis and parameter optimisation

Dakshith Ruvin Wijesinghe

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Doctor of Philosophy

Slope stability is a one of the key issues in open-pit mines in terms of safety and economic aspects. Slopes with complex geometries and complex stratigraphies are often difficult to analyse and optimise their design parameters. Numerical methods, such as the finite element method are used in slope stability analysis, but require significant user input. They can be time consuming and can struggle to adequately capture fine geological and geometric features. Optimised slopes with steep angles directly improve the financial aspects of mines. However, it is difficult to implement slope optimisation techniques with the finite element method as it requires continual mesh generation through-out the process. This research presents a numerical technique combining quadtree decomposition with the scaled boundary finite element method to perform complex slope stability analysis and optimisation while capturing complex features. Image-quadtrees decomposition is an automated mesh generation technique which allows iterative mesh generations for slope parameter optimisation. A coal slope at the Yallourn mine is used as a case study to demonstrate the application of presented method.

Dakshith Ruvin Wijesinghe is supported by a Henry Sutton PhD Scholarship from Federation University Australia.



Using Amazon's Mechanical Turk for online surveys

Charlotte Young

Supervisors: Associate Professor Peter Vamplew, Dr Cameron Foale and Associate Professor Richard Dazeley

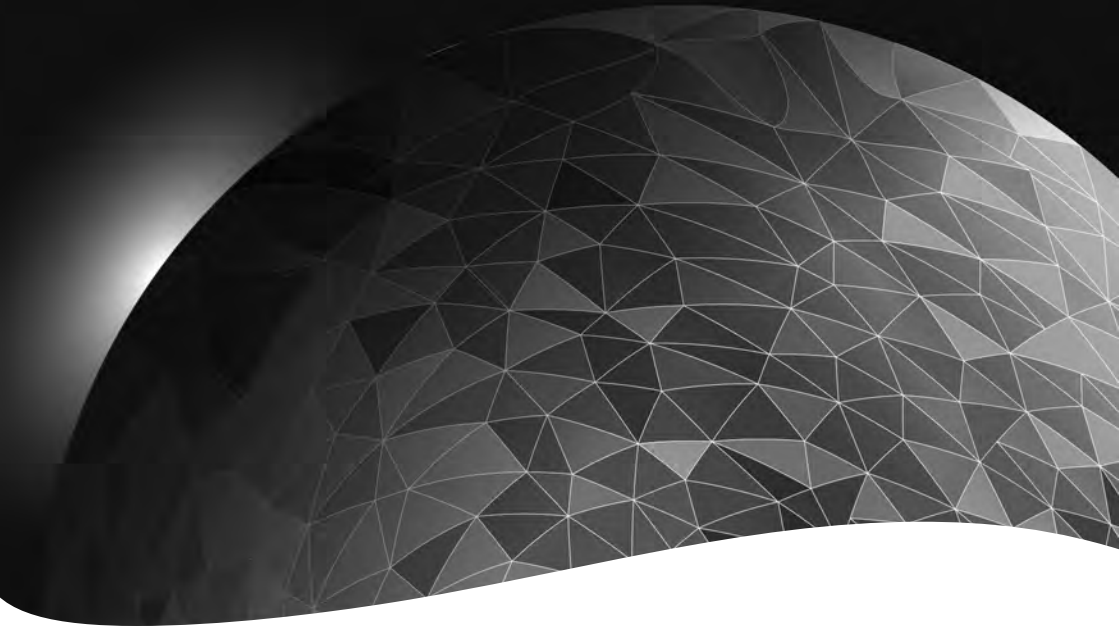
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Doctor of Philosophy

My thesis, in a branch of computer science and artificial intelligence, concerns the evaluation of explainable artificial intelligence, XAI. I am in my final year. My research required me to evaluate responses to a long, technical survey. For the survey itself I used Mechanical Turk, an Amazon.com service that employs casual survey-takers. Surveys are a common part of PhD theses; however, it can be difficult to find participants, particularly if you have a long or complicated survey. This talk will cover my use of Amazon's Mechanical Turk. I will offer some practical tips and look at some of the ethical considerations of employing people to fill in questionnaires.

Charlotte Young is supported by an Australian Government Research Training Program (RTP) Stipend and RTP Fee-Offset Scholarship through Federation University Australia.



POSTER PRESENTATIONS



Between a rock and a hard place: Site selection for Brush-tailed Rock-wallaby translocation

Emily Mathews

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Masters by research

Despite advances in conservation management, the number of threatened species continues to rise globally. In Australia, since European colonisation, we have seen increased extinction rates and significant population declines for many species.

This project contributes to conservation of an iconic threatened species: Brush-tailed Rock-wallaby (BTRW) (*Petrogale penicillata*) by identifying potential release sites for captive-bred wallabies in order to support the establishment of new BTRW colonies in Victoria and the ACT.

Structured Decision Making (SDM) (Gregory *et al.* 2012) involving a panel of experts will be used to identify and rank key habitat attributes for BTRW. Highly ranked attributes will be used to create a habitat suitability model (HSM) for BTRW, employing Geographic Information System (GIS) methods, remote sensing data and Maxent software. The HSM will facilitate identification of potential release sites. These sites will be ranked from most to least feasible by the expert panel through a second SDM process.

Emily Mathews is supported by an Australian Government Research Training Program (RTP) Stipend and RTP Fee-Offset Scholarship through Federation University Australia.



The hospital's physical environmental effects on palliative patients and families

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Doctor of Philosophy

The physical hospital environment influences behaviour and emotions, which affect the quality of life of patients receiving palliative or end-of-life care. Therefore, a meta-synthesis was undertaken to explore and examine the literature published between 2010 to 2020 about the perception of the physical environment in the general acute wards or palliative care units within the hospital. Thematic analysis and meta-ethnography techniques were combined to analyse and synthesise the twelve international qualitative papers.

The SSAFeR Place concept model was developed through understanding the environmental factors important to palliative and end-of-life patients and families when receiving care in the acute or palliative care units. The SSAFeR Place acronym represents an environment that feels safe and is customisable, sharable, home-like in ambience and aesthetics, values and accommodates family, and promotes reflection. Findings showed that patients connect their home to their safety, identity, and belonging, producing a desire to create a safe and familiar home-like environment within their hospital space. The meta-synthesis revealed that accommodating families and attention to room layout, home-like aesthetics, and ambience is needed in order to foster a palliative approach to comfort and quality of life for palliative and end-of-life patients and their families.

Elizabeth Miller is supported by an Australian Government Research Training Program (RTP) Stipend and RTP Fee-Offset Scholarship through Federation University Australia.



The COVID-19 pandemic's impact on fintech market

Truong Quynh Chau Nguyen

Supervisors: Associate Professor Sisira Colombage, Dr Qingguo Zhai and Dr Tasadduq Imam

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Doctor of Philosophy

Fintech has been increasingly popular recently for its potential to transform the global finance industry and economy. Since COVID-19 spreads around the world, several reports have showed positive influences of the pandemic within fintech's development, but there are insufficient scientific studies that robustly assess the outbreak's real impact on the sector.

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Research findings will provide insights into user's responses in using fintech in situations like the current pandemic. They will also act as a reference for policymakers to navigate their agenda for pandemic relief efforts. Furthermore, SMEs can learn from their counterparts and gain a better understanding of the fintech market in terms of adopting and implementing the technology.

Ms Truong Quynh Chau Nguyen is supported by the Destination Australia Scholarship through Federation University Australia.



Participation, retention and dropout of children and adolescents in club-based community tennis

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Doctor of Philosophy

Within the national sports policy of Australia, improving participation in organised sport, specifically club sport, is a priority due to its recognised positive association with health and wellbeing of participants. Club-sport participation is high among children, but it declines sharply during adolescence. Little is known about the factors that influence this age group in making the choice to continue playing (retention) or to dropout. Based on a research study that focused on participation of adolescents in community level club-based tennis, the aim of this study was to investigate the determinants of retention and dropout of registered tennis players aged between 10-18 years from tennis clubs in Victoria. A mixed-method approach comprising of quantitative and qualitative studies within the framework of the socio-ecological model was used. The findings reveal the interconnection of enjoyment and competency and how the direct or indirect links of the different socio-ecological elements enhance these factors in supporting retention and dropout. Along with an insight on the variability of enjoyment factors across the socio-ecological framework, it highlights the importance of prioritising promotion of fun along with developing sporting skills at sports clubs to sustain children's interest and passion for the game.

Key words: Retention, Dropout, Club tennis, Socio-ecological model, Mixed-method approach.

Ambili Unni is supported by an Australian Government Research Training Program (RTP) Fee-Offset Scholarship through Federation University Australia.