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HDR RESEARCH CONFERENCE
2019 PROGRAM

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Acknowledgements

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

Contents

POSTER PRESENTATIONS

Professor Helen Bartlett

VICE-CHANCELLOR AND PRESIDENT

Welcome to this year's Annual Higher Degrees by Research Conference. This is a special day in the university's calendar, which offers our HDR candidates a valuable opportunity to showcase the outstanding quality and diversity of their research. This conference provides a genuinely supportive environment to all of its presenters. Indeed, this conference can provide one of the first opportunities for a candidate to stand in front of an audience of peers and scholars to talk about their research project.

Being able to communicate a project succinctly and in a meaningful way to a diverse audience, from both within and outside of their immediate disciplines, is an important skill for research candidates to develop. The process of participating in this conference assists in the building of many other important skills, such as preparing an abstract and following organiser's instructions. Hence, this annual conference provides a valuable learning experience, which can assist candidates to prepare for later external conferences and other public speaking opportunities.

The conference is also an initiative that helps to enhance and grow the research culture of our university, by providing networking opportunities and informing all those involved about the wonderful postgraduate research being done here. It should be noted that this conference is just one of the many ways that our university supports and nurtures the development of its Higher Degrees by Research candidates.

Today we celebrate the research contributions and achievements of our Higher Degrees by Research 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 2019 Higher Degree by Research Conference at Federation University Australia.

Higher Degrees by Research present many challenges and development opportunities. In particular the challenge of developing and testing hypotheses. This cannot be achieved without peer review and critique. This conference will often provide an HDR student 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.

Conferences also 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 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. As we do so, the vibrancy of our HDR community will become a defining feature of our University brand.

The 2019 conference theme 'Research that Matters', it particularly important as we progress towards the second quarter of the 21st Century. Whether it is climate change, challenges to employment demographics or health, it is critical that the research we carry out has positive and measurable impacts on the communities that we serve. Let's together make research that makes a difference a feature of the research at Federation University.

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 Fadi Charchar

DEAN, GRADUATE STUDIES

As the Dean of Graduate Studies, I am delighted to welcome all Higher Degree by Research (HDR) candidates, their supervisors and all other attendees to the 2019 Higher Degree by Research Conference at Federation University Australia.

A year after the launch of the inaugural Graduate Research School at Federation University, we are proud of the achievements and success of our programmes. A prime example is our new Skills Development Program. I encourage all HDRs to complete some of the courses on offer in the program. These courses are designed to support HDRs in their degree and give them tools that equip them for the next phase in their careers.

The theme of this year's conference, 'Research that Matters', was a deliberate choice because it embodies the importance of the research that our graduate students conduct. Whilst completing a postgraduate qualification many candidates are so engaged with completing their study that they forget the importance of their research to the university, the regional communities we live in and to the global community. The research projects HDR students work on at FedUni are — truly transformative – whether socially, scientifically or artistically. We are certainly proud of our HDR candidates.

I trust you will enjoy and benefit from the 2019 conference. The success of this event is only possible through the support of the university, the commitment of individual professional and academic staff, keynote speakers and the participation of postgraduate candidates and their supervisors.

I would particularly like to acknowledge the support of the Graduate Research School, Paula Di Maria and Rob Watson in the organisation of the conference.

And, don't forget to follow *@FedUni_Research* using **#FedUniHDR19** and the University Facebook page *Federation University Australia* for the latest conference highlights throughout the conference week.

Associate Professor
Wendy Wright

ASSOCIATE DEAN, RESEARCH TRAINING

I am pleased to add my words of welcome to participants of the 2019 FedUni HDR conference. This year's conference theme is: 'Research that Matters' and I wanted to take this opportunity to remind our HDR candidates of the contributions that they are making, and that they will continue to make after they graduate.

Australian Universities are key contributors to the creation of new knowledge in our nation – and a great deal of that new knowledge is constructed by HDR candidates, working with their supervisors. These new ideas and approaches provide tangible and intangible benefits which can improve our world. In itself, this is a remarkable contribution. In addition, Australian universities are also responsible for guiding the development of a cohort of highly skilled researchers, many of whom will go on to enable or undertake research and innovation activities across academic, industry, government and not-for-profit sectors.

The annual HDR conference at FedUni is now a key part of FedUni's new Skills Development Program, where our focus is on developing the researcher as well as supporting the research. Whether you are a candidate, a supervisor or a visitor, we are so pleased that you have joined the Graduate Research School in celebrating the achievements of our FedUni HDR candidates across a broad range of research disciplines. The conference also provides a supportive environment for candidates to develop or refine skills associated with the communication of research ideas and outcomes; and facilitates a sense of community among the current HDR cohort.

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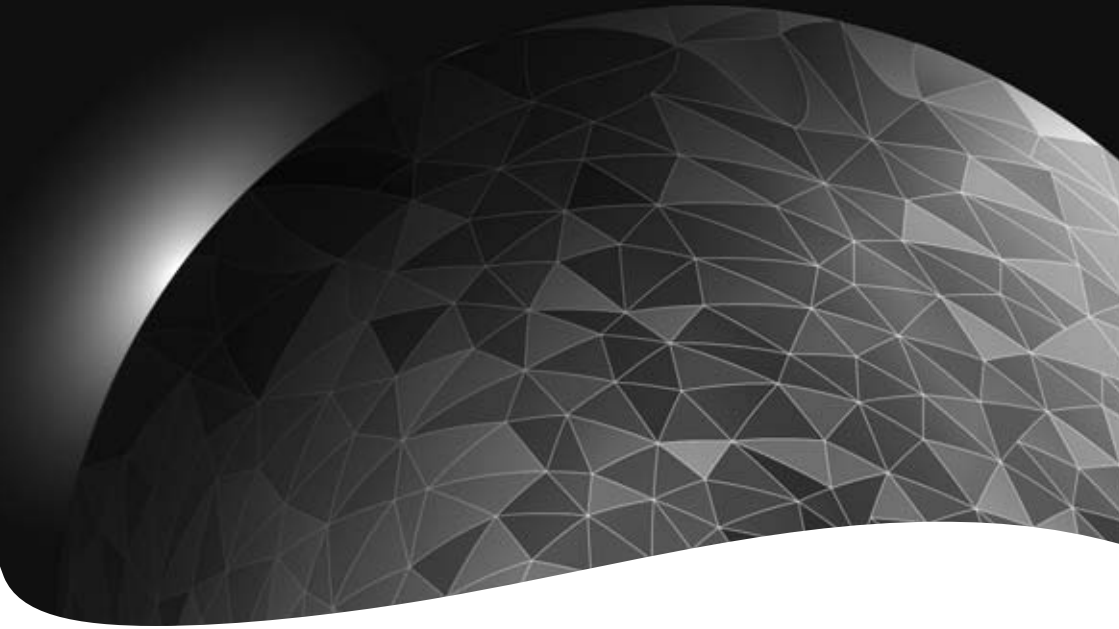
ORAL PRESENTATIONS

Role of leadership on the relationship between technology-readiness, trust and digital agriculture

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It has been recently reported that by realising the full potential of digital agriculture, Australia could boost the value of agricultural production by $20.3 billion. Despite this enticing number, the same research recognised that the value of changing to digital agriculture is not clear to producers, since the adoption requires balancing complex factors such as monetary value, peace of mind, confidence, social and lifestyle factors. There are many recognised barriers for end users of digital agriculture, such as technology readiness, trust, branding and leadership. This research aims to investigate the moderating role of leadership and branding on the relationship between technology readiness, trust and diffusion of digital agriculture in Australia. Furthermore, this research project combines methods from various disciplines including information and communication technologies, agriculture, statistics, economics, sociology, social sciences, and environmental management. The research framework may include a combination of reasoned action theory, diffusion of innovation theory and technology readiness index. The potential research outcomes are very significant, since deep insight into the potential barriers for adopting digital agriculture and proper measures to address the subject could unlock billions of dollars for Australian agriculture. Such findings would be of global interest.

Exploring Australian baccalaureate nursing students' perceptions of nursing: A mixed method

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Nursing students experience difficulties when transitioning into the role of a qualified Registered nurse. The stress and discontent experienced by these newly qualified nurses, often result in high attrition rates within the first year of practice. This phenomenon known as transition shock is thought to be contributed from social, emotional, knowledge and physical elements. While many studies focus on transition shock, studies related to nursing students perceptions of the reality of what it is like to be a nurse, are limited. It is hoped that by gaining a better understanding of nursing students' perceptions and expectations of the nursing role, that future curriculum may be shaped accordingly ensuring that the future nursing workforce are better prepared for the role.

The purpose of this presentation is outline a research project aimed at exploring Australian nursing students' perceptions of the Registered nurses role at the three points of year level within the Bachelor of nursing program. Using an explanatory sequential design, it is anticipated that each phase of research will inform the next. Data from surveys will explore student perceptions at year level intervals, while focus groups will provide insight and detail as to what influences these perceptions.

Microbes make miso happy!

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Miso is a traditional fermented soybean paste originating from Japan. It is becoming increasingly popular in Western countries, where it is used as a versatile flavouring for soups, marinades and even desserts. Miso manufacture consists of two successive fermentations, where firstly rice is inoculated with *Aspergillus oryzae* mould and fermented to make a product called "koji". Koji is subsequently added to a salt and soybean mash and undergoes a second fermentation, this time by yeasts and bacteria.

Recent advances in gut health research has increased the public interest in traditional unpasteurized fermented foods, such as miso. Fermented foods are considered easier to digest, have increased bioavailability of nutrients, and may benefit health due to the probiotics, prebiotics and metabolites they contain. Microorganisms in fermented foods have been shown to survive digestion and affect the gut microbiota, and numerous papers have highlighted the positive effects that miso consumption may have on conditions such as hypertension, type 2 diabetes, and gastroesophageal reflux.

This project aims to determine the safety and diversity of the microbial communities in both koji and unpasteurized miso, using microbiological, biochemical and metagenomic analysis.

The effect of epinephrine and norepinephrine on proliferation and lipid uptake of THP-1, VSMC and endothelial cell lines

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Background: Cardiovascular disease (CVD) is the leading cause of death worldwide, responsible for 31% of total deaths. Lipid accumulation in the arterial wall (atherosclerosis) is a major cause of CVD. High blood pressure (HTN) is a major risk factor for developing CVD and atherosclerosis, affecting 1 in 6 adults in Australia. HTN is associated with increased central sympathetic nerve activity and levels of epinephrine (EPI) and norepinephrine (NE). Previous reports suggest these compounds may enhance atherosclerosis formation and progression, though this role is not fully understood.

Objective: To investigate the effects of adrenalin and noradrenaline on cell proliferation and lipid uptake of monocytes, vascular smooth muscle cells (VSMCs) and endothelial cells (ECs).

Methods: Each cell type was exposed to different concentrations of EPI and NE. Proliferation was analysed utilising the MTS Proliferation Assay. Uptake of oxidised-low density lipoprotein (ox-LDL) was analysed by confocal microscopy after the cells were exposed to Dil-labelled ox-LDL.

Results: EPI and NE did not affect the proliferation of any cell type tested. Uptake of oxLDL by VSMCs was not modified by epinephrine.

Conclusion: EPI and NE may not have an effect on the proliferative and lipid uptake processes.

Incidence and prevalence of therapeutic cardiotoxicity amongst UK-biobank breast cancer diagnoses

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Breast cancer is the most common malignancy in women and the leading cause of death in women worldwide (25% of total cancer cases and 15% of the cancer deaths). Moreover, breast cancer incidence and prevalence are projected to increase.

Breast cancer therapies have biological effects known to coalesce to induce clinically impactful degeneration of heart function, in a phenomenon known as 'cardiotoxicity'. Importantly, there are no universal guidelines or clinical definition for cardiotoxicity in breast cancer patients. To bridge this current gap in knowledge, this thesis will employ both retrospective cohort analysis and prospective [Cox-regression models to estimate adjusted hazard ratios (HRs 95% CIs) for incident cancer diagnosis with age/events with cancer treatment regimens in women with early-stage breast cancer participating in the UK-Biobank cohort (n=502,536) (protocol available http://www.ukbiobank.ac.uk/wp-content/uploads/2011/11/UK-Biobank)]. Analyses will be conducted using Stata version 14.1 (Stata Corp LP, Tx) using two-sided likelihood ratio tests and significance criterion of P<0.05.

Thesis findings will contribute to developing a universal definition of 'cardiotoxicity' in breast cancer. By increasing physiological understanding of drug treatment interactions and clinical consequences in breast cancer patients, this research has potential to improve clinical management, health-span and quality of life for breast cancer patients.

Rank alarms for Remote Patient Monitoring

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The use of wearable sensors is an emerging trend in healthcare. Sensors monitor vital signs such as heart rate, blood pressure, temperature, respiratory rate and SpO2 and reduces work-load of nurses. These sensors are capable of transmitting health data, where doctors can check a patient's condition remotely. Recent studies have demonstrated that generation of alarms for Remote Patient Monitoring (RPM) is useful for diagnosis of a patient's deteriorating health condition at very early stages, helps in commencement of treatment, which in turn helps in reducing the mortality rate.

However, the sensitivity of devices and data processing algorithms results in high false alarm rates. Which reduces the effectiveness of medical monitoring resulting in alarm fatigue. In this work, vital signs data patterns have been observed by considering RPM data factors such as Multiple Early Warning Score (MEWS) values, frequency of MEWS pattern, the slope of the pattern and the pattern trend, can help to rank alarms based on the criticality level. Literature shows a model that produces overall alarm data assessment in RPM setting has not been advanced. The integration of these RPM factors to rank the alarm can help health care professionals to assess alarm instance for early intervention.

Understanding the impact of in-memory technologies on organizational business processes and culture

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Many modern enterprise information systems are equipped with in-memory technologies (IMT) that keep all data and applications in computer's main or primary random access memory (RAM). This avoids expensive input/output access channels, reduces latency times, and increases the ability to process large volumes of complex data queries instantly for strategic and operational business decision. However, the enactment of IMT is time consuming and challenging to align with an organization's strategy because of the massive complex changes of business processes and culture values that are associated with IMT. Few research studies describe the IMT enactment and implications for an organization's business processes and culture. Adoption and effective usages of IMT is important to justify the financial and time investment to achieve the desired organizational strategy. The research study aims to propose a new strategic framework to examine, investigate, observe and analyze the organization's business processes and culture during IMT implementation. Data will be collected through observations, interviews and the review of organization's documents by using an interpretive methodology through thematic analysis. It is expected that the research study will lead to improve better decision making, real time analytics and new performance standards for the entire organization.

Seasonal visitors or sophisticated land managers? Aboriginal people in the Northern Mallee

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This research looks at new sources and new methodologies for establishing the nature of Aboriginal land-use in the Mallee back country. With few contemporary accounts of Aboriginal land-use at, and before, the point of colonial settlement, a nineteenth century judgement was made that Aboriginal people had historically been merely brief, seasonal visitors to the area. The harsh climatic conditions of the area and its reputation as a 'howling wilderness' discouraged any later investigation that might have tempered this view, and the notion of seasonal visitors remained current until the end of the twentieth century. More recently, as the sophisticated nature of Aboriginal land management was demonstrated by, amongst others, Gammage, '*The Greatest Estate on Earth*', and Pascoe, '*Dark Emu: Black Seeds*', the nineteenth century judgement has been challenged. An alternative narrative of sophisticated land management has emerged, without new evidence to support it.

In the absence of recorded observations, this research seeks to construct a picture of Aboriginal peoples' land-use from the marks left on the land by their presence; pathways, quarries, wells, cleared land etc. Evidence of that land-use will be sourced from various maps and consolidated into a GIS application for analysis.

Imagine taking a survey to gauge your preparedness for healthcare cybersecurity attacks

Wendy Burke

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The healthcare sector is vulnerable to security breaches such as human error, criminal attacks and systems faults. Currently, cybersecurity standards specifically designed for the healthcare sector are non-existent. While universal standards exist, none are routinely or consistently applied in the healthcare sector. The healthcare cybersecurity landscape reveals fragmented governance, immense interconnectivity amongst sectors, widespread access, and limited resources. Much research has already been undertaken regarding cyber threats to health information systems. However, not a lot of research has been conducted to gauge Government, the healthcare sector and healthcare consumers' cybersecurity capacity to take on system changes such as MyHealthRecord (Australia).

Cybersecurity indexes have the potential to address some of the healthcare's need for industry-specific cybersecurity standards and solutions. Currently, available indexes measure security preparedness and capabilities of a country or organisation. An index is made up of a series of questions, often broken into categories. These categories target areas such as law, technical responses, organisational threats, capacity building and social context.

This presentation will report on an exploration of the currently available cybersecurity indexes to discover if any can be used in healthcare.

Blockchain for financial processes in energy sector – An Actor-Network Theory viewpoint

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Blockchain which is the backbone technology behind Bitcoin has the potential to provide benefits to almost all industries, like healthcare, finance, energy, agriculture etc. However, researchers argued that such benefits could only be achieved when Blockchain is used for appropriate business processes as it might not fit for every process. The review of academic and commercial literature revealed that there is an absence of guidelines or processes to identify the most fruitful business process for Blockchain. Using a qualitative case study, this study aims to fill the literature gap by proposing a framework that would contribute with the technique based guidelines for identifying the most appropriate financial business process to start Blockchain implementation with. Since processes are comprised of actors, the study presumes to use Actor Network Theory to provide the theoretical lenses in investigating how the use of Blockchain in a business process has delivered value to its actors and how people come up with what they are doing? Moreover, analysing data qualitatively would provide a comprehensive answer to the research questions. The study holds significance for the energy company decision makers, identifying the most impacted financial business process to start their Blockchain implementation in terms of business value.

What factors influence early-career researchers to consider a change in their work?

Katherine Christian

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A research project exploring challenges faced by early-career researchers (ECRs) in the sciences in universities and independent research institutes in Australia has investigated the work environment for these researchers in order to examine their job satisfaction and the likelihood of them continuing to work in research in Australia.

As part of the data collection, a national survey has sought views of these ECRs about the challenges they face in their work and the factors which contribute to their job satisfaction and dissatisfaction and to their intention to leave the academic environment. The survey has included investigation of their views about:

- Job and work status and workload
- Job security and funding
- Job satisfaction
- Challenges relating to work
- Mentoring and supervision
- Professional development and training
- Career planning
- Whether they are considering a change in their work
- Expectations for the future

This presentation reports on early data from the section of the survey which addresses whether they are considering a change in their work and whether this includes intention to leave academic research in Australia. Results from the survey are compared and contrasted with data collected in in-depth interviews with seven women who have left academic research in Australia for other work environments.

Patient education in the emergency department — A literature review of existing barriers

Nicole Coombs

Supervisors: Associate Professor Joanne Porter and Dr Michael Barbagallo

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A scoping review of the current literature was undertaken to identify existing barriers to effective patient education delivery in the Emergency Department (ED). Although past research has explored the effectiveness of different patient education practices and outcomes, limited studies have occurred specifically within the ED setting. Current evidence suggests that progression in patient education practice has stagnated, with minimal change in patient understanding or outcomes occurring over the last decade, despite increasingly varied information delivery techniques.

This review identified three consistent contributing factors that commonly impact on patient education delivery, as well attitudes, comprehension and compliance. This triad of perspectives gives a much broader understanding of why patients are not receiving or understanding health information in the ED, as well as explaining the attitudes and efforts of the staff providing it. This three pronged approach refers to the patient (recipient), the staff (provider) and the organisation (environment) and how they cannot exist independently without impacting on the quality or effectiveness of the education provided. Therefore a multi-pronged approach is required to overhaul practice and increase the value of patient education in the ED environment of the future.

Links in the chain: British slavery, Victoria and South Australia

Cameron Coventry

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Beneficiaries of British slavery were present in colonial Victoria and provincial South Australia, a link overlooked by successive generations of historians. The Legacies of British Slave-ownership database, hosted by University College, London, reveals many people in these colonies as having been connected to slave money awarded as compensation by the Imperial Parliament in the 1830s. This article sets out the beneficiaries to demonstrate the scope of exposure of the colonies to slavery. The list includes governors, jurists, politicians, clergy, writers, graziers and financiers, as well as various instrumental founders of South Australia. While Victoria is likely to have received more of this capital than South Australia, the historical significance of compensation is greater for the latter because capital from beneficiaries of slavery, particularly George Fife Angas and Raikes Currie, ensured its creation. Evidence of beneficiaries of slavery surrounds us in the present in various public honours and notable buildings.

When you go looking for me, I'm not there: Description through absence

Fiona Crawford

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When women don't have access to public voices, their stories may be told through symbols and sewing, publicly viewed but understood by an audience of intimates.

This practice led visual arts research project builds upon my residency in May 2016 in Assisi, Italy. I take the history, principles and materials of *Punto Assisi* to explore description through absence. *Punto Assisi*, an embroidery tradition predating the Renaissance, is still practiced by women of Assisi. The patterns and form, highly stylized, are derived from the exterior of medieval San Rufino Cathedral in Assisi. Uniquely, the subject matter is void, empty of detail. This resonates with my interest in the ubiquity and anonymity of women's work.

Basing this body of work on the concept of drawing with thread to manifest content I started in my contemporary application of the *Punto Assisi* style and technique with an understanding of the rules and limitations I would adhere to, and those transgressions I would make to ensure the works were my own.

Studio practice revealed insight into imagery, form, palette and the materiality of making. Traditional symbols revealed new meanings in a contemporary context. Through constraints I found creativity. In absence, I found description.

Optimising water quality outcomes for complex water resource systems and water grids

Sayani Dey

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Scarcity of good quality water is a serious problem faced by many regions in the world and more pronounced in a dry continent like Australia. Meeting ever increasing water demands are not the only significant problem, as ensuring good access to appropriate water quality, for each user, is of equal concern. Therefore, a water resource system requires effective management of both water quality and quantity. This study aims to develop a model to explore the relationships between water quantity and quality in complex water supply systems. The software Source® will be used as the primary tool to undertake this study as it is capable of modelling complex system using a node-link format and incorporates tailored plug-ins which makes it capable of modelling water quality. Research will initially focus on building a water balance model to be calibrated and validated using Grampians water supply system data. Beyond this initial work, water quality will also be considered, including around how the varying quality of source water, and the different end user water quality requirements should be represented. The study outcomes are expected to help water managers more efficiently operate water supply systems through better understanding the trade-offs related to water quality versus water quantity decisions.

Can epigenetic markers predict the biological response to either endurance/resistance exercise training?

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Background: Personalized exercise medicine may be achieved by progressing the field of epigenetics. To date, meaningful understanding of specific individual genetic traits of responders to exercise, remains to be accomplished.

Hypothesis: It was hypothesised that: (i) 4-weeks of supervised resistance/ endurance training can improve VO2max and muscular strength in sedentary male participants compared, thus allowing (ii) interrogation of epigenetic biomarkers compared with (positive) athlete control groups.

Methods: Following ethical approval, an RCT design of n=81 healthy male participants; where criteria were met by sedentary males (n=31), subsequently randomized into arms receiving either 4 weeks of strength or endurance training, compared with positive controls; strength athletes (n=20); endurance athletes (n=20). Blood and physiological measurements were taken before PRE and POST intervention. Transcriptome analysis was performed using Next Gen Sequencing. Data were analysed by linear mixed model (SPSS 24.0) and transcriptome data by differential expression analysis (n=44 participants).

Results: Endurance training increased VO2max of sedentary participants (p<0.01). Sedentary participants undertaking 4 weeks of resistance training improved muscular strength (P<0.01).

Conclusions: 4-weeks of resistance or endurance training (i) improves physical performance thus (ii) allowing a platform to interrogate group and individual epigenetic response to exercise. This research will generate knowledge in exercise epigenetics.

Are ERP simulation games assisting students' job readiness? An Australian university's perspective

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Universities are spending significant amount of resources on ERP Simulation games. Evidence from previous studies show that this method is enhancing students' motivation and engagement but not a single study is done on whether this method is increasing students' employability which is one of the major deciding factors for students to take up any course. This study will fill this gap by investigating whether ERP simulation games are helping students to develop job ready skills and as a result, increasing their chances of employability. It will try to answer the following question: how do ERP simulation games help students to achieve higher learning levels and skills in order to be job ready? This study will propose a theoretical framework that provides a concrete mapping of two qualification frameworks; AQF (Australian Qualification Framework) and SFIA (Skill Framework for the Information Age and then will map ERPsim learning outcomes with the levels defined in these frameworks. The proposed framework may also help ERP Simulation experts to make improvements in pedagogical techniques in order to fill the learning gap to match the skill levels of these frameworks hence making student job ready.

A model for coping mechanisms in post-war study

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The 30-year Sri Lankan civil war has been a classical example for studying phase transformations during resettlement and regaining normalcy. For many years, war has caused serious loss of life, assets and property, and beside these losses, the majority of people have been survived either directly or indirectly affected. It is incomprehensible that over the past decades, the people, especially in the north were significantly affected economically, socially and culturally (ESC) who had to cope with multiple challenges.

The study focuses on the importance of meanings individual attribute and specifically, the aim is on participants' thoughts, feelings, values, viewpoints, and assertions, rather than gathering facts and describing acts. In an effort to chart and examine experiences of selected vulnerable groups on ESC rights related challenges, the researcher found, surprising and interesting coping mechanisms by the community to push back and secure those rights. Therefore, the purpose here is to introduce a model whereby certain community behaviours may be conceptualized in positive terms. The proposed model illustrates on how people sacrifice, seek support and negotiation of arrangements in order to exhibit a strong sense of belonging in the community.

The economics of
Henry Charles Carey

Mathew Frith

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This presentation will discuss an important, but overlooked, aspect of economic thought that is relevant to the debate on free trade and protectionism. It will be argued that some of the most refined arguments against the economics of free trade were developed by the 19th century American protectionists. The modernity of this 'American School' is reflected in its grasp of technological change almost a century before its introduction to mainstream economics. Despite this, the American School remains neglected in most literature devoted to the history of economic thought. This presentation will focus specifically on the theories of Henry Charles Carey, the most important figure in the school after the pioneering influence of Alexander Hamilton. While Carey's ideas reflect the tendencies of the American School, his work contains stark instances of originality. Carey developed a theory of value which encapsulated scale effects, and this later formed the premise of an innovative wage theory which incorporated human capital formation and productivity. The most overlooked contribution by Carey, however, was his writings dedicated to the formation of industrial cities and local production systems – or 'agglomeration economics'. This represents an important development which anticipated many advances in modern development economics.

The incidence of heat-related sports and leisure injuries in Victoria

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Background: We generate heat internally when we exercise while simultaneously absorbing heat from the playing environment. Of the twelve hottest years on record, eleven have been recorded in this century alone. Hence, for the Australian sports community, these climatic changes pose new risks from exposure to extreme heat. However, there is little knowledge of the incidence rates for heat-related illness within Australian sport.

Aim: The aim of this study is to examine the incidence of heat-related sports and leisure injuries in Victoria, Australia and identify the sports, population groups and locations most affected by extreme heat.

Methods: The study measured the scale of heat-related illness through the analysis of existing hospitalisation data obtained from the Victorian Injury Surveillance Unit (VISU).

Results: There were 171 sports-related and 83 leisure-related hospital admissions for heat injuries between 2008 and 2018. Lawn bowls (n=26) and golf (n=28) recorded the most number of sports-related hospital admissions. There were 139 sports-related and 662 leisure-related emergency department presentations for heat injuries between 2008 and 2018.

Conclusion: This study provides a baseline from which heat-related guidelines and interventions can be developed, evaluated and modified.

Success stories of Indigenous Australians

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This research project aims to understand success stories of Indigenous Australians. An assessment of literature for Indigenous groups indicates a focus on negative themes. The literature reported here reviews papers with a positive focus including examples in art and academia. Dennis Foley's publications for example reports research of entrepreneurial success. Foley's assists the understanding of Indigenous research issues.

Ethics values for this research project employ an Indigenous worldview to recognise past research mistakes and assist the communication within Indigenous groups. This approach enables cultural knowledge to expand and thus enhance the reconciliation process in Australian society.

Methodology employs semi-structured qualitative interviews with Indigenous Australians with participants who are ready to discuss the topic of success. Essential methodical aspects include respecting participants and allowing maintenance of participant identity. Methodology problems/limitations include limited suitability of formal interviews for all participants, analysis difficulties due to necessary subjectivity and participants losing focus on the topic.

Further data are collected via field notes and observation. A grounded theory analysis method is used to analyse data. Preliminary results indicate that Individual differences have been observed. Although key points for success include contributing to community, accessing goals and happiness. The concept of gaining material assets is devalued by most participants.

Feasibility and effectiveness of preoperative exercise therapy for cancer diagnoses in Victoria

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This study aims to generate new knowledge on the feasibility and effectiveness of pre-operative exercise training ('prehabilitation') to induce clinically relevant improvements on cardiopulmonary function in patients with prostate, colorectal or breast cancer undergoing surgery.

This pre-registered clinical trial (ACTRN12619000214134) has received clinical and institutional research ethics approval to conduct a randomized controlled trial (RCT) of all new diagnoses of prostate, colorectal or breast cancer requiring surgery in Ballarat and Grampians region of Victoria, for a continuous 6 month period.

Participants (m/f) consisting new breast, prostate or colorectal cancer diagnosis requiring surgery. Control participants will receive usual care, Intervention participants will undertake a supervised aerobic exercise program prior surgery. Physiological assessments will be undertaken at enrolment, at four weeks, then 30 days post-surgery. Data will be obtained in compliance with best practice clinical measurement guidelines. Data will be compared (SPSS 24.0) by MANOVA and students t-tests, where a priori two-tailed α:0.05 and β:0.8 requires N=26 minimum population sample.

Primary outcome measures are; aerobic capacity ventilatory threshold, while secondary outcomes are; Quality of Life (QoL), immune function biomarkers and surgical complications.

This study will generate new locally relevant clinical-best-practice evidence relating to feasibility, safety and efficacy of prehabilitation in cancer patients.

Development of new Agoraphilic navigation algorithm in dynamic environment with prediction

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This research was conducted in developing a new navigation methodology based on the Agoraphilic algorithm. This new methodology is capable of manoeuvring robots in both static and dynamically clutter unknown environments.

The Agoraphilic algorithm is an optimistic navigation algorithm. The algorithm is based on free space attraction rather than repulsion of obstacles for navigation. Therefore, this algorithm directs robots to follow the free space leading to the goal instead of avoiding obstacles. This approach has eliminated many draw backs of the traditional APF algorithm. However, the major limitation of the previously developed Agoraphilic algorithm could only deal with static environment. The new proposed algorithm has successfully extended the capacity of Agoraphilic algorithm to deal with environment cluttered with dynamic obstacles. The new Agoraphilic algorithm uses a tracking and prediction methodology to estimate the path of unknown moving objects. The estimated locations of the moving objects are combined with static object locations in the robot's visible region to generate time-varying free space attractive forces. These time varying forces manoeuvre the robot to the goal in dynamically cluttered unknown environment without collusions. To demonstrate the algorithm's ability, several simulations were performed. Simulation results showed the effectiveness of the new Algoraphilic navigation algorithm.

Distortion robust image classification using Convolutional Neural Network with Discrete Cosine Transform

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Convolutional Neural Network is good at image classification. However, it is found to be vulnerable to image distortion. Even a small amount of noise or blur can severely hamper the performance of these CNN architectures. Most of the work in the literature strives to mitigate this problem simply by fine-tuning a pre-trained CNN on mutually exclusive or a union set of distorted training data. This iterative fine-tuning process with all known types of distortion is exhaustive and the network struggles to handle unseen distortions. In this research work, we have worked on distortion robust DCT-Net, a Discrete Cosine Transform based module integrated into a deep network which is built on top of VGG16. Unlike other works in the literature, DCT-Net is "blind" to the distortion type and level in an image both during training and testing. The DCT-Net is trained only once and can be applied in a more generic situation without further retraining. We have evaluated our proposed method on a number of benchmark datasets and experimental results have shown that once trained, DCT-Net not only generalizes well to a variety of unseen distortions but also performs better than other methods in the literature.

Sports, cultural experience and social media analytics

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Sport has a place at the heart of every culture. Supporting the home team is a truly local experience and an exhilarating one at that. SportsHosts, a Melbourne based start-up company proposes to connect local fans (hosts) with travellers (guests) to go to live sports together. What better way to learn about a place and its culture than with the most passionate locals? One of the key objectives of SportsHosts at the moment is to grow their client base exponentially by leveraging social media and big data analytics. Hence, this Ph.D. project aims to tackle the problem of automatically identifying and classifying dynamically, socially produced online textual data to understand user behaviours. To achieve this, during the first phase of the study, we are planning to design novel intention analysis algorithms to identify information of interest from noisy data channels. A wide range of features and methods for user intention analysis across different spheres, ranging from wishes to offering help to buying commercial products to sexual assaults, have been researched in recent years. Given the complexity to understand the intent from natural language, researchers have explored various approaches using both rule-based methods and machine learning techniques including deep learning.

Impact of Physical-Fitness on cardiovascular health amongst incident/prevalent cancer: UK-biobank study

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Recent oncology literature identify the potential of habitual physical activity to reduce the risk for developing many types of cancer. Separately, the terms Physical Activity and Physical Fitness are used interchangeably. However, but the difference in nomenclature is not semantics and warrants challenging. Therefore, this study will examine the moderating effects of physical activity and physical fitness on cardiovascular health outcomes in both *Prevalent* and *Incident* breast, prostate, lung, & colorectal (BPLC) cancer diagnoses within the Uk-biobank cohort.

This provisionally approved epidemiology http://www.egcukbiobank.org.uk/ study will employ both retrospective cohort analysis (BPLC *Prevalence*) with prospective cohort analysis (BPLC *Incidence*). Cox-regression models will provide estimates of adjusted hazard ratios (HRs 95% CIs) for Incident BPLC cancer diagnosis with age/fitness category and cardiovascular health outcomes, accounting for established cancer covariates (environmental, biological characteristics and behavioral) amongst UK-Biobank cohort [*n*=502,536; (protocol available http://www.ukbiobank.ac.uk/wp-content/uploads/2011/11/UK-Biobank)]. Analyses will be conducted using Stata version 14.1 (Stata Corp LP, Tx). Two-sided likelihood ratio tests will be used (P<0.05) accounting for data heterogeneity.

Further to quantifying the nomenclature of being 'physically active' or 'physically fit', this study will quantify the relative importance of physical activity **or** physical fitness as non-pharmacological strategies in cancer prevention in persons aged 39-82 years.

Selective adversarial training for mobile malware detection

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Due to its widespread use, with numerous applications deployed every day, smartphones have become an inevitable target of the malware developers. To automate the process of malware detection, researchers have proposed several classification techniques based on machine learning models including deep neural networks. However, these models are vulnerable to adversarial attacks where malware are crafted by introducing small perturbation to legitimate malware so that the machine learning model is fooled. To defend against such attacks, these adversarial samples are mixed with the unperturbed clean samples to retrain a machine learning classifier. This process is known as adversarial retraining. However, retraining with too many samples can further degrade the classifier performance. Hence, it is important to carefully select these samples. In our work, we proposed two novel approaches for selecting adversarial samples for retraining; based on the distance from malware cluster center and based on the probability derived from a kernel-based learning (KBL). Our experiments show that KBL delivers 6% improvement in overall detection accuracy.

Barriers and enablers to women's access to maternity services in Timor Leste

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Background: In Timor Leste, the maternal mortality ratio is 426 deaths per 100,000 live births, one of the highest in Southeast Asia (UNFPA, 2018).

Purpose: Determine the barriers and enablers to women's access to maternity services in Timor Leste.

Methodology: Qualitative research using focused ethnography, data collection methods included semi-structured interviews and participant observation. Seventeen stakeholders and thirty women participated between January – June, 2017. Ethics approval was obtained from Federation University and Timor Leste's Ministry of Health.

Results: Barriers to woman's access to SBA include poor roads, lack of transport, costs associated with accessing SBA, lack of availability and poor quality services.

Discussion: Women understand that pregnancy and childbirth poses potential risks to their health. Rural women and women from low socio-economic have less access to services. Perceptions of poor quality services reduce the women's demand. The women identify respectful communication, the provision of privacy and one to one care, ideally from a woman as key expectations and needs. Midwives in Timor Leste work in challenging physical and socioeconomic environments, however, the provision of effective communication and other culturally safe services will improve Timorese women's confidence, health literacy and decision making and facilitate their uptake of maternity services.

Artifice and illusionism within paintings, animation and the diorama: A phenomenological perspective

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My arts-based practice led research investigates the use of artifice to form illusions within paintings, animation and the diorama. Illusions are phenomena which only exist within the perceptual faculties of those who behold them. As embodied beings we frequently encounter illusions within the natural world. Heat mirages, rainbows, and the seeming diminutiveness of distant objects may only become apparent to us when prevailing conditions combine with our physical proximity to provide the ideal circumstances for the formation and perception of such illusions.

Artist often use artifice to create the ideal conditions for illusions to be perceived within their work. My project experiments with the transferability of illusion forming artifice across the three selected mediums. I seek to understand and experiment with established techniques, while also endeavouring to discover new illusion forming artifice.

I am particularly interested in the use of artifice to form illusions within the diorama. Recently, in both Europe and America, there has been an unprecedented number of contemporary art exhibitions dedicated to the diorama. Although often referred to as being highly illusionistic and recognised by many as being a precursor to virtual reality, the artifice used to form illusions with the diorama remains largely undocumented.

Knowledge transmission mechanisms: Addressing research questions using a Critical Realist paradigm

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A Critical Realist methodological paradigm was adopted in this PhD research to understand the provision of small business advisory services in a Regional Australian setting by Professional Business Advisors (PBAs). Through evaluating research findings against a conceptual framework and identified theories, knowledge transmission causal mechanisms are determined, and aspects of the real world (largely unobservable) are revealed.

A series of diagrams will illustrate four critical aspects of PBA knowledge transmission, they are: (i) Influences of PBA knowledge creation; which describe the process of PBA knowledge development, and answer the first subsidiary research question – What is the nature of PBA knowledge? (ii) The PBA knowledge transmission process, which answers the second subsidiary question – What mechanisms enable or prevent PBA knowledge transmission to business? (iii) Applying a Regional Australian small business context, answers the third subsidiary question – How does the context of Regional Australian small business shape the PBA knowledge transmission process? and; (iv) Identification of both primary mechanisms and conditional mechanisms of PBA knowledge transmission, which answers the primary research question – How does the nature of Professional Business Advisor (PBA) knowledge enable or prevent advisor knowledge transmission actions to business, in the context of Regional Australian small business?

Factors affecting the adoption of blockchain technology among Australian organisations

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This research in progress paper explores the factors influencing organisations in adopting blockchain technology (BCT). Although used initially for Bitcoin-cryptocurrency, recent literature indicates BCT applications are utilized in several sectors, e.g. health care, cyber security, IoT, e-voting, document verification, supply chain etc. Regardless of abundant BCT benefits reported, both academic and commercial literature reveal that practical adoption of BCT among organisations, particularly in Australia, is low. This lack of uptake provides us the rationale to investigate the factors that influence organisational adoption of BCT. To better understand the relationship between different factors and organisational adoption, we propose an integrated framework for BCT that is grounded on fundamental theories of adoption and diffusion i.e. Technology, Organization, Environment (TOE) framework, Diffusion of Innovation (DoI) and Organizational Learning. The proposed framework is novel and will provide a significant contribution into the IS literature since it will not only increase understanding of researchers, marketers, practitioners, consulting firms, and developers working with BCT but also empower them to remain adaptive in digital market. In next stage of the research, proposed framework will be empirically validated through collection of data from those organisations, which have implemented BCT.

Women's health care experiences in Victorian prisons and human rights

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This presentation will outline the design of a qualitative research study which seeks to explore women's experiences of health care throughout their incarceration journey and how those experiences align with 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 the point of incarceration to release and how those experiences align with human rights.

A narrative inquiry methodological approach will be adopted and reflected through the use of semi structured interviews, as a mechanism to collect data. It is proposed that Interviews will be conducted with women who have been recently released from prison. Further insights and perspectives will be sought from post-release support providers and previous prison health care providers,

As this research is still in development, this presentation will focus on providing an overview of the adopted research paradigm, the ethical issues faced when conducting research of this nature and how these issues will be addressed. Additionally, consideration will be given to the unique 'insider' dimension my personal experience of prison health care will bring to the study.

Land and opportunity or social development based on dispossession

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The Land Act of 1869 'opened up' far eastern high-country Victoria, allowing 'selection' of land under fairer terms. The area was geographically remote, the climate inhospitable, travel arduous – by bullock dray over unmade tracks. Earlier land acts had met with limited success: squatters simply consolidated their holdings, while many would-be farmers, the Selectors, failed from inexperience, inadequate land or the challenges of the Australian climate. The Scots emigrated here, a people dispossessed: of their land under the Clearances, or their livelihood through the Industrial Revolution and mechanisation of the weaving industry. This was their opportunity and while still not every Selector would prosper, the Scots managed well in the harsh environment. But there is another side to this story. That land was not for sale. The Aboriginal owners had been dispossessed in turn, of their land and livelihood, freeing their land to be divided for European selectors. Their demise was largely assured by 1860, by massacre and European diseases, some remnants 'protected' in Mission Stations, some staying on as station-hands for the new landowners. A shameful irony: opportunity for some, based on dispossession of others; and still largely unrecognised today.

Exercise as a treatment for clinical depression among older adults: A network meta-analysis

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Background: The prevalence of clinical depression is greatest in those over the age of 65 years. The moderating effect of physical exercise on depression is widely recognised and supported by randomised control trials (RCTs). However, the most effective mode of exercise on clinical depression in older adults is currently unknown. This study therefore compared the efficacy of resistance, aerobic, and mind-body exercise interventions for the treatment of depressive symptoms in older adults with diagnosed clinical depression.

Methods: Databases were searched for RCTs using one or more of aerobic, mind-body or resistance training interventions, assessing depressive symptoms as an outcome variable, and including a sample of participants aged over 65 years with a clinical diagnosis of depression.

Results: Fifteen studies allowed a pooled quantitative analysis of 596 participants. Effect size estimates were strongest for mind-body exercise (SMD = -1.15, CI = -2.31, 0.01), followed by aerobic exercise (SMD = -0.79, CI = -1.73, 0.15). Resistance exercise was the least effective out of the three exercise types, although estimates were still significantly larger than control conditions (SMD = -0.69, CI = -1.48, 0.10).

Conclusions: Surprisingly, mind-body exercise programs show the greatest effect to reduce symptoms of clinically depression in older adults. Aerobic and resistance exercise demonstrate a less consistent effect in the same population. This is an important public health message with relevance to caregivers, clinicians, and policymakers.

PWLCI: Piecewise linear classifier for imbalanced datasets

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The success of supervised learning heavily depends on the training dataset. A good training dataset leads into a better classification. A dataset can be categorized as imbalanced when the number of instances of some classes are significantly larger compared to the number of instances of other classes. During the training stage this majority classes dominate the learning model resulting in poor classification in minority classes. In security area, machine learning based detection have drawn more attention of researchers due to its capability of detecting new and modified attacks based on previous attack's behaviour. Number of malicious activity in a certain domain is significantly low compared to the normal activity which creates an imbalanced dataset and traditional classifying techniques perform poorly on detecting threats from an imbalanced dataset. We proposed a new piecewise linear classifier, PWLCI, to solve supervised classification problems in imbalanced data sets. The finding of this classifier is modelled as a constrained optimization problem where the objective function is the error function and constraints are formulated for only minority classes. The proposed algorithm is tested using real-world datasets and compared with several mainstream classifiers and it shows the superiority of the proposed algorithm in the sense classification accuracy for minority classes.

WITHDRAWN

Aggregatibacter actinomycetemcomitans infection contributes to the formation of atherosclerosis —a literature review

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Periodontal diseases are inflammatory conditions around the teeth including the gum. They affect over 20% to 50% of the population worldwide. Aggregatibacter actinomycetemcomitans (*Aa*), a gram-negative anaerobic coccobacillus, is a common oral bacterium colonizing the dental biofilm (plaque) and contributing periodontal diseases. There are 5 different serotypes of *Aa*: serotype a-f in which the serotype b is the most virulence strain. Aa can secrete a large number of proteins such as lipopolysaccharide, repeats in toxin and extracellular matrix proteins.

Atherosclerosis is an inflammatory disease of the arterial wall that is responsible for 50% death in developed countries. Macrophages engulf ox-LDL but cannot utilize them and eventually transform into foam cells, the important hallmark of atherosclerosis.

Accumulating evidence has shown that periodontal infection can lead to the formation of atherosclerosis. This review will discuss the link between Aa and atherosclerosis with a focus on the underlying cellular and molecular mechanisms. Endothelial cells stimulated with *Aa* show significantly increased levels of IL-6, IL-8 and ICAM1.This attract monocytes and dendritic cells to the endothelium. Dendritic cells stimulated with Aa produce enhanced levels of IL-6, TNFα TGFβ, IL-1β, IL-21, IL-23, CCL19, CCL21, CCR7 and along with Matrix metallopeptidase MMP2, 8, 9 and 13.

Motherhood and maternal ambivalence in crime television

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This presentation will examine the construction of maternal ambivalence within crime television. Maternal ambivalence is defined as having loving and hating feelings towards a child. Discussion of these ambivalent feelings are often ignored by society. The crime genre provides various representations of ambivalent mothers. While maternal ambivalence is not always a negative state, within the crime genre it is often positioned as dangerous and at its most extreme. In this research I will utilise Barbara Almond's work on what she terms 'the hidden side of motherhood'. The presentation will highlight the extremes of maternal ambivalence in crime television, and examine how they portray the mother as dangerous. I will also examine subtle forms of maternal ambivalence in an effort to contrast various forms of this state.

The relationship between business incubator services and the psychological capital of tenant-entrepreneurs

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Business incubators (BI) are protective environments that support tenant-entrepreneurs to grow their business. Characteristic support services inherent at BIs appear analogous with interventions that support positive psychological development. In this research, the relationship between BI support services on tenant's positive psychological development was examined, measured through psychological capital (PsyCap) and the constructs of hope, efficacy, resilience, and optimism. Survey data from incubator tenants (n=30) reveals a relationship between three incubator services – physical amenities, business support services, networking – and tenants PsyCap. Thematic analysis of interview data from incubator tenants (n=12) and managers (n=28) identifies that these same incubator services are analogous with methods that support tenants' hope, efficacy, resilience and optimism. Until now, very little research has examined the relationship of BIs on tenants' positive psychological development. This research is unique and provides evidence of a relationship between incubator support services and tenants' positive psychological wellbeing, with data obtained from both the recipient (the tenant) and the donor (incubator manager). These findings offer new insights for the incubator industry about the additional value of incubator services for tenants.

Immune regulation in patients with chronic lymphocytic leukemia

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Chronic lymphocytic leukaemia (CLL) is a slow-growing leukaemia that affects developing B-lymphocytes (B-cells). Under normal conditions B-cells produce antibodies that help protect our bodies against infection and disease. Lymphocytes in CLL patients undergo a malignant change and become leukaemic cells. Previous studies have identified defects in immune lineages of patients with CLL, but their significance to the development, progression and treatment of CLL is poorly understood. Preliminary studies have identified altered populations of Mucosal Associated Invariant T cells (MAIT cells), which are a type of immune T cell that is known to influence immune responses by other cell types through rapid release of soluble mediators. The function of MAIT cells and related T cells in CLL patients will be investigated, including the nature and impact of their functional response to CLL cells and their value as potential targets as new immunotherapies. The interactions between MAIT cells and other cell types, including CLL cells will be investigated. This will include cellular and molecular analysis of MAIT cells and other immune cells from CLL patients and from healthy donors. The overarching goal is to develop new knowledge about interactions between the immune system and CLL that may lead to improved treatments.

Parent, practitioner and system aspects of engagement with family services

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Family services from nongovernment agencies are funded to support families needing assistance, to enable early help with dealing with family issues, before Child Protection are needed. But the literature suggests that some families, often those who need help most, do not engage with these voluntary services after referral. This PhD project looked at the factors influencing engagement with family services, from both the practitioners' and parents' perspectives, and according to referral source. Parents were asked who referred them, what led them to trust or not the services that were offered, and what enablers and barriers they found to engaging with formal supports that could provide links to the community. They also informed how and when support is best offered, and suggested system improvements which would promote their engagement. Practitioners' views on engagement were contrasted with those of parents, and system measures were related to the concept of engagement.

This project is one of four undertaken by PhD students within the Inner Gippsland Children and Youth Area Partnership (IGCYAP). The aim is that this project will contribute to optimal support for parents in meeting children's needs in Inner Gippsland.

Elucidating novel functions of MAGMAS signalling in ovarian cancer progression and chemoresistance

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Background: Ovarian cancer is asymptomatic and currently no specific markers are known to detect it at an early stage. The 75% of women (more than 900 Australian women/year) diagnosed with stage III/IV disease have a survival rate of less than 40% for five years. The development of recurrent peritoneal metastases after standard chemotherapy treatment is a major clinical issue in the management of ovarian cancer patients.

Mitochondria are key organelles in adaptation of cancer cells towards neoplastic transformation. MAGMAS, previously described as a mitochondria-associated protein is involved in protein import into mitochondria and is essential for cell growth, development and controlling oxidative damage. Hence, the expression of MAGMAS which is significantly elevated in advanced-stage ovarian tumours compared to benign tumours warrants further investigation.

Aims and Hypothesis: This study is based on the hypothesis that MAGMAS through its inherent ability to regulate cell growth and oxidative stress is responsible for driving ovarian tumourigenesis and subsequent ongoing disease progression in ovarian cancer patients after chemotherapy treatment. This study therefore aims to investigate the role of MAGMAS in ovarian cancer progression; metastasis and chemoresistance associated recurrence by using overexpressing and knock down of MAGMAS expression in cultured cancer cell lines and injecting in suitable mouse xenograft models.

Evaluating classfiers for effective assignment into 'Digital-Health' interventions

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The research work aims to discover new knowledge from real life biopsychosocial data, generated from 'Digital-Health' intervention programs. The focus of this research work is to compare machine-learning methods and investigate if non-linear classifiers can learn the undercurrent influence of biopsychosocial features, in order to design a method for effective assignment of participants into 'Digital-Health' intervention programs by using participants' historical biopsychosocial data. The biopsychosocial data set comprises data from biological, psychological and social disciplines aligned to the biopsychosocial model of health. The significance and challenges in analysing different kinds of real life biopsychosocial data is presented. The broad research areas are:

a. Compare effectiveness of 'Digital-Health' intervention program using biopsychosocial dataset and its subsets

b. Challenges in mining, pre-processing and analysis of biometric sensor data from wearables

c. Compare non-linear classifiers' prediction accuracy and design a method for effective assignment of participants into 'Digital-Health' intervention programs using their historical biopsychosocial data.

d. Development of prediction model to predict self-reported primary emotion based on results of biopsychosocial predicates.

Key benefits of this research include the ability to predict wellbeing based on biopsychosocial factors and discovery of new knowledge and patterns weaved from correlating features of the biopsychosocial data.

Hydralazine treatment improves the survival of THP-1 cells exposed to hydrogen peroxide

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Background: Abdominal aortic aneurysm (AAA) is a significant public health issue that affects approximately 5% of people aged over 65. AAA rupture is almost uniformly fatal. There are no pharmaceutical treatments for AAA. Macrophage apoptosis is a feature of AAA tissue. Hydralazine is an anti-hypertensive drug that also has anti-oxidant and anti-inflammatory properties, making hydralazine a potential candidate drug for treating AAAs.

Objective: To investigate whether hydralazine reduces cell death in cultured human macrophages (THP-1 cells) exposed to hydrogen peroxide.

Methods: THP-1 cells were treated with 100 µM or 500 µM hydralazine, two hours before hydrogen peroxide or simultaneously with hydrogen peroxide. 24 hours later, the percentage of viable cells was measured using Trypan Blue and the percentage of apoptotic cells was measured using flow cytometry.

Results: Treating THP-1 cells with low-dose hydralazine at the same time as hydrogen peroxide improved cell viability (82% 100 µM hydralazine plus hydrogen peroxide vs 63% peroxide only, $p < 0.05$) and reduced the percentage of early (7.1% vs 2.8%, $p < 0.05$) and late (64% vs 30%, $p < 0.05$) apoptotic cells. Similar results were obtained when treating THP-1 cells simultaneously with low-dose hydralazine ad hydrogen peroxide. High-dose hydralazine (500 µM) did not show the same protective effect.

Conclusion: Low-dose hydralazine can prevent hydrogen peroxide induced cellular death in THP-1 cells.

Challenges in IoT connectivity

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Internet of Things is the connection of different types of smarter devices with intelligent processing capable of transmitting useful information. The recent advent of smarter phones and devices let to the deployments of numerous IoT. The existing network infrastructure design is to accommodate only fewer wireless devices, to accommodate rapidly growing various smarter devices is a significant challenge. Literature show, in future, one can expect trillions of more intelligent devices will connect to transmit useful information, therefore to provide bandwidth to these devices efficiently network management and configuration in of traditional IP network need to be flexible to match the future IoT. Also, to construct an extensive network infrastructure to accommodate the growing number of IoT is not feasible due to complexity in the implementation of such network support, Software Defined Networks (SDN) is a technology that can be used to provide resources to connect the growing number of IoT with the existing network infrastructure. The SDN is a scalable solution that can be implemented in the edge devices of the network to overcome future IoT network connectivity challenges.

Epithelial-to-Mesenchymal Transition and cancer stem cells: Robust biomarkers in Renal Cell Carcinoma

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Background: Epithelial-to-Mesenchymal Transition (EMT) and cancer stem cells (CSC) have been shown to be requisites for cancer metastasis and therapy resistance in RCC. There has been accumulating evidence suggesting that the potential reason behind the failure of conventional therapy failure is because the cancer cells have phenotypically changed themselves into CSCs using EMT programme. This activation of EMT further confers the tumor cells resistance to many therapeutic agents including sunitinib. The identification of new biomarkers and druggable targets will be thus be of great clinical importance in RCC.

Hypothesis and Aims: We hypothesize that RCC tissues inherently express signatures of EMT and CSC pathways. We also hypothesize that both EMT and CSCs are critical regulators of sunitinib resistance in RCC cells. Hence, targeting the EMT or CSC modulating pathways in combination with sunitinib may re-sensitize RCC to Sunitinib treatment.

Methods and Results: In this study, we demonstrate RCC tissues display signatures of EMT and CSCs. We also show that RCC cell lines resistant to sunitinib have enhanced expression of EMT and CSC markers.

Conclusion: EMT, as a mechanism of intrinsic or acquired resistance to targeted therapy has the potential to be a robust predictive and prognostic marker in patients with RCC.

Approaches for the visualisation of health information

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Clinical reasoning leading to diagnosis or treatment decisions in the modern era can be complex due to clinical scenarios that involve multiple morbidities, unique patient contexts, distinctive patient journeys and the availability of a plethora of evidence repositories and guidelines. In this study, a case is advanced that the knowledge transfer can be facilitated if relevant information is presented visually. A categorisation of diagrams for this is advanced and presented to individuals from different backgrounds (clinical as well as non-clinical). The diagrams are analysed in terms of their adherence to the visual principles like Gestalt. Illustrative examples include a diagram that presents key information for a treatment decision and another that depicts the combination of evidence underpinning likelihood estimates. Thematic analysis of the interviews is conducted which leads to the identification of certain patterns and suggestions that will act as an input to the next iteration and will guide the design through the next phase of the diagrams e.g. the suggestion is made that decisions about elements to include in diagrams will vary according to patient and organisational circumstances. An evolvable knowledge base is proposed to capture heuristics that guide the selection of visual elements for dynamic generation of visualisations.

Cuboid colour image segmentation using intuitive distance measure

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In this work, an improved algorithm for cuboid image segmentation is proposed. To address the two main limitations of the recently proposed cuboid segmentation algorithm, the improved algorithm substitutes colour quantization in HCL colour space with infinity norm distance in RGB colour space along with a different way to impose area thresholding. We also propose a new metric to evaluate the quality of segmentation. Experimental results show that the proposed cuboid segmentation algorithm significantly outperforms the existing cuboid segmentation algorithm in terms of quality of segmentation.

Depth augmented networks for optimal fine-tuning

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Convolutional neural networks (CNN) have been shown to achieve state-of–the-art performance in a significant number of computer vision tasks. Although they require large labelled training datasets to learn the CNN models, they have striking attributes of transferring learned representations from large source sets to smaller target sets by normal fine-tuning approaches. Prior research has shown that these techniques boost the performance on smaller target sets. In this paper, we demonstrate that growing network depth capacity beyond pre-trained classification layer along with careful normalization and scaling scheme boosts fine-tuning by creating harmony between the pre-trained and new layers to adjust more to the target task. This indicates pre-trained classification layer holds high-level (global) image information that can be propagated through the newly introduced layers in fine-tuning. We evaluate our depth augmented networks following our designed incremental fine-tuning scheme on several benchmark datasets and show that they outperform contemporary transfer learning approaches. In addition, our in-depth analysis manifests freezing highly generic layers encourage better learning of target tasks. Furthermore, we have found that the learning rate for newly introduced layers of depth augmented networks depend on target set and size of new layers.

Mental health anti-stigma education: a systematic quantitative review

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Background: Evidence shows that prejudicial attitudes are evident among health professionals (Maranzan, (2016); Stull et al., (2017); Reavlely & Jorm, (2013). Strategies targeting stigma on mental illness for mental health professionals are limited (Reavlely & Jorm, 2013). Therefore, the purpose of the current review is to identify and evaluate the effectiveness of anti-stigma education intervention among mental health professionals.

Aim: The review aims to assess the effectiveness of anti-stigma interventions among mental health professionals.

Method & Quality Appraisal: A systematic review was conducted based on Joanna Briggs Institute [JBI] Reviewers Manual (2014). Quality check of the selected studies was undertaken using the experimental JBI Critical Appraisal Tool. The heterogeneity of the papers directed to narrative review instead of meta-analysis.

Result: The analysis showed that contact based and non – contact based anti-stigma strategies had a positive impact on the attitudes of health professionals. Results suggest that contact-based interventions are more effective.

Conclusion: Anti-stigma interventions are effective in changing the attitudes of health professionals working in community settings. Future investigations should focus on homogeneous groups such as attitudes of nurses' working in acute in-patient psychiatric unit.

Soliciting individual preferences for storing health related data

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Recently a range of mediums for the storage of health related data have emerged. Health data can be stored on government managed electronic health record repositories, on Blockchains emerging for health, on healthcare service provider systems, on Cloud based repositories, or on patient devices. Each storage mechanism has different security vulnerabilities and patients have diverse levels of concerns about privacy. However, little is known about the preferences an individual has for one storage medium over another. Knowledge of individual storage preference is particularly important for the storage of data streaming rapidly from wearable sensors where preferences need to be encoded into streaming software so that data can be channelled to the preferred medium. In this work, we propose a model that recommends a storage policy for health related data following the solicitation of preferences a patient has regarding level of confidentiality, protection against cyber-attacks and cost.

Between art and science: a broad spectrum

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In many minds, art and science are distinct disciplines: one clean, precise and objective, the other messy, imprecise and subjective. This presentation challenges these assumptions by discussing the space between, with particular reference to the School of Mines and Industries, Ballarat, (SMB) during the early twentieth century. A world-famous school of mining and engineering science, SMB also achieved prestige via its technical art school. Art and science shared an organisational structure, a campus, and a purpose to serve industry. From 1915, the Lydiard Street campus witnessed student rivalries, good-natured sledging and the occasional snow fight. It also oversaw collegiality, collaboration and a shared esprit-de-corp. In this time and place, art and science had more in common than their distinctions imply.

Differentially expressed circular RNAs in hypertensive patients

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Essential hypertension (EH) is a major contributor to development of cardiovascular disease. The genetic mechanisms involved in EH development is yet to be fully elucidated. Circular RNAs (circRNA) a novel class of noncoding RNAs, have been reported in many diseased states however their role in EH development/progression remains unclear. Deep-sequencing analysis has been able to identify 12 differentially expressed circRNAs from kidney samples of hypertensive patients. Utilizing circRNA databases, 11 of the 12 circRNAs have already been characterized in other studies (none relating to EH). This research will further validate by use qPCR with a larger sample size (n≈78) and will clarify the main circRNA targets from the sequencing data for further investigation at a molecular level.
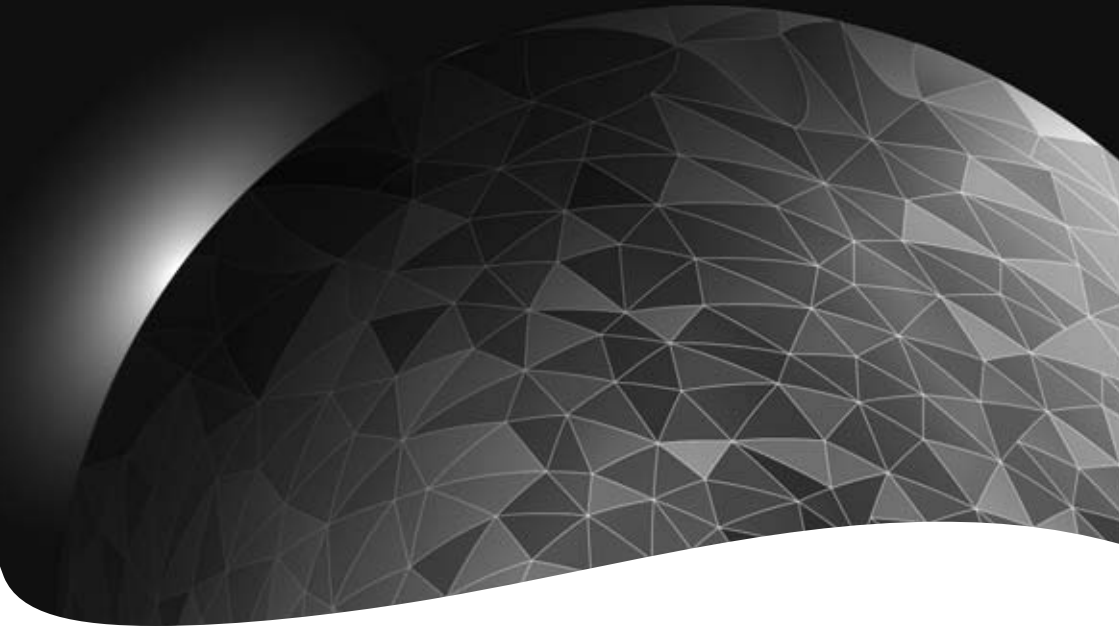
POSTER PRESENTATIONS

How do ECRs in STEMM view professional development in their institutions?

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A research project exploring challenges faced by early-career researchers (ECRs) in the sciences in universities and independent research institutes in Australia has investigated the work environment for these researchers in order to examine their job satisfaction and the likelihood of them continuing to work in research in Australia. As part of the data collection, a national survey has sought views of these ECRs about professional development opportunities available through their institutions. In particular, the survey has investigated professional development as follows:

- Are ECRs supported in their quest for professional development?
- Are there opportunities they would like which are not available?
- What would they like to do more of?
- What is available they don't want to do?
- What opportunities do they actually take up?
- Do they even know what is available?
- How could professional development be better delivered?

Mentoring, a key component of successful professional development, is investigated in a separate section. Questions asked include whether the ECR has a mentoring relationship(s), and how did that relationship come about? How important has this mentoring been to their career progression? How beneficial has it been? The survey also investigates the approach of ECRs and their institutions to career planning, seeking answers on sources for advice, learning about career opportunities beyond academia and the existence of career advisory services. Early findings are presented.

Are ERP simulation games assisting students' job readiness? An Australian university's perspective

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Universities are spending significant amount of resources on ERP Simulation games. Evidence from previous studies show that this method is enhancing students' motivation and engagement but not a single study is done on whether this method is increasing students' employability which is one of the major deciding factors for students to take up any course. This study will fill this gap by investigating whether ERP simulation games are helping students to develop job ready skills and as a result, increasing their chances of employability. It will try to answer the following question: how do ERP simulation games help students to achieve higher learning levels and skills in order to be job ready? This study will propose a theoretical framework that provides a concrete mapping of two qualification frameworks; AQF (Australian Qualification Framework) and SFIA (Skill Framework for the Information Age and then will map ERPsim learning outcomes with the levels defined in these frameworks. The proposed framework may also help ERP Simulation experts to make improvements in pedagogical techniques in order to fill the learning gap to match the skill levels of these frameworks hence making student job ready.

Effect of pharmaceuticals in water on the environment and its components

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High amount of pharmaceuticals in waterways is a risk factor that may leads to changes in the environment. These effects appear on different living and environmental components. Pharmaceuticals in water have been shown to change the behaviour of many organisms such as fish. At the same time, high amount of pharmaceuticals threaten sources of surface water and groundwater for human use. It is important to identify the chemical impact of many new and emerging contaminates. This project aims to study and characterise pharmaceuticals in river waters in the state of Victoria. To provide more data on pharmaceuticals and their impact on the environment.

Faecal egg shedding in equines with pituitary pars intermedia dysfunction

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Pituitary pars intermedia dysfunction (PPID) is a commonly diagnosed endocrine dysfunction in aged equines which results in the over-production of hormones, including adrenocorticotropic hormone (ACTH). Often, PPID equines have altered body shape, abnormal hair growth and immunosuppression. Poor immune responses may increase susceptibility to infections in these equids, including purported high parasitic worm burdens. This study aimed to identify if PPID positive equines had an increased worm infection over a fourteen-week period.

Forty-one pasture-based horses over 10 years old, in two areas of western Victoria were recruited. Plasma ACTH measurements were used to indicate PPID positive (n=12) or negative (n=29) equines. All equines were treated with the drug, ivermectin (0.2mg/kg) to clear resident worm infections. Reinfection of these equines with worms were monitored for 98 days after drug treatment using the faecal egg counts (FEC) technique.

At all time-points the PPID group had a higher average FEC than control horses, although the variation around the mean was high. Moreover, cumulative FEC tended to be higher in the PPID positive group ($p = 0.07$). In conclusion, this study suggests that some PPID positive horses are at higher risk of worm infections, but further work is required to confirm this.

Narratives of two teachers with dyslexia: Navigating the Three-Dimensional Space Approach

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Amidst the current groundswell of inclusive practices within learning institutions, there appears to be a paucity of research about the experiences of teachers with impairments in Australian education systems. Although there is some related national and international literature and research that identifies an imprecise range of issues for teachers with impairments, there does not appear to be an Australian study that investigates the lived experiences of multiple teachers with impairments in their professional lives. This presentation presents a preliminary analysis of data from interviews with two teachers with dyslexia collected for the author's study into teachers with impairments. The study will outline the process of re-storying narratives through a structured thematical process, which is the Three-Dimensional Space Approach. This research is viewed through the lens of the social model of disability. The aim of this research is to illuminate the barriers and enablers for teachers with impairments within Australian schools.

A decentralized Patient Agent controlled Blockchain for remote patient monitoring

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Blockchain emerging for healthcare provides a secure, decentralized and patient driven record management system. However, the storage of data generated from IoT devices in remote patient management applications requires a fast consensus mechanism, careful management of keys and a new privacy protocol. In this paper, we propose a lightweight consensus mechanism and a decentralized patient software agent to control a remote patient monitoring(RPM) system. The decentralized RPM architecture includes devices at three levels; 1) Body Area Sensor Network- medical sensors typically on or in patient's body transmitting data to a Smartphone, 2) Fog/Edge, and 3) Cloud. We propose that a Patient Agent(PA) replicated on the Smartphone, and Fog and Cloud servers processes medical data to ensure a reliable, secure and private communication. Performance analysis is conducted to demonstrate the feasibility of the proposed Blockchain leveraged, distributed Patient Agent controlled remote patient monitoring system.

Notes

Ballarat ↑
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