iPREPWA
Industry and PhD
Research Engagement Program

Perth
Biodesign

iPREP BIODESIGN PRESENTATION BROCHURE

ROUND 2, 2020

The team at iPREP Biodesign acknowledges the Traditional Custodians of the lands on which we meet and work, the Whadjuk people of the Noongar nation, and pay our respects to the Elders past, present and emerging.

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ABOUT iPREP BIODESIGN

Connecting Researchers to the Healthcare Industry

THE CHALLENGE

With about 51% of PhD students seeking employment in business and public sectors (McCarthy & Wienk, 2019) there is a need to equip them with competitive skills for industry and government organisations. Industry feedback suggests universities need an increased focus on developing non-technical skills in their doctoral candidates to prepare them for a wide range of future careers.

THE INNOVATION

iPREP Biodesign is a new collaboration between iPREP WA and Perth Biodesign. This opportunity was made possible by the X-TEND WA grant, part of the State Government's $16.7 million New Industries Fund. The program offers teams of late-stage PhD candidates from WA universities the opportunity to work on problems faced by industry in the healthcare sector. PhD candidates are trained and mentored using the Biodesign Methodology developed by Stanford Byers Center for Biodesign. Students participate in an induction program focussed on business skills, prior to commencing a seven-week team project under the supervision of an industry mentor. The teams share the outcomes of their project with the industry partner at the conclusion of the program through a formal presentation, written report and other deliverables.

THE PROJECTS

iPREP Biodesign projects focus on solving authentic workplace problems in WA healthcare. Projects range from blue sky design thinking to highly technical projects. Examples include: concept design; pilot study; needs assessment; review market trends; create or test a product; develop or evaluate a service; prepare a publication; apply for a grant or tender; program evaluation; or feasibility study.

PARTICIPANTS

THE PhD CANDIDATES

Participating PhD candidates are in the late stages and hence possess extensive research expertise. The PhD candidates gain greater and more diverse career opportunities through developing skills and experience in:

- Business acumen
- Project management
- Strategic problem solving
- Interdisciplinary teamwork
- Leadership

THE INDUSTRY PARTNERS

Industry partners range from start-ups and SME's through to large corporations and government departments. The industry partners benefit from:

- Value for money consultancy from an interdisciplinary team of experienced researchers
- Innovative, creative and credible solutions to problems
- Increased engagement with WA universities to optimise knowledge translation from research outcomes
- Potential to recruit outstanding PhD graduates

THE FUTURE

Through a regular program of industry based projects, iPREP Biodesign will maximise benefits for PhD candidates, industry partners and the universities of Western Australia.

If you would like to become involved in iPREP Biodesign, further information can be obtained by contacting us on:
Email: iprepwa@ecu.edu.au
Website: www.iprep.edu.au/iprepbiodesign

VITALTRACE

Mentors: Arjun Kaushik and Michael Challenor
Students: Georgios Mavropalias, Alvin Lee, Saman Akbar Zadeh
Project Title: First end to end wearable fetal monitoring prototype

Monitoring babies and mothers currently requires guesswork due to deficiencies in monitoring technology, leading to a world of stress, medical guesswork, litigation and poorer outcomes. VitalTrace is developing a new technology for keeping mothers and babies safe during labour and delivery. It provides continuous, accurate data about the baby's status during labour, which allows Obstetricians to make informed decisions about management, intervening only when necessary and allowing mothers to birth in the most natural way possible.

The iPREP Biodesign team worked on algorithms to convert raw biosensor data into accurate, presentable real-time information about the patient. Their work will be incorporated into a larger-than-final wearable prototype to prove the concept. The students received insight into medical device research and development, including considerations of IP, regulatory and reimbursement. They learnt the entrepreneurial mindset, principles of lean-start ups and contributed to the development of a device that has been proven to positively affect millions of mothers and babies.

Georgios Mavropalias

Edith Cowan University

My PhD examines how different intensities of eccentric exercise trigger beneficial remodelling and adaptations in muscle, the nervous system, and connective tissue in humans. My passion is to research eccentric exercise prescription to elderly and clinical populations.

What were your motivations for studying a PhD?
Simply my love for research.

What is one skill that you excel at?
I have developed a unique ability to delve into scientific literature, draw knowledge from under-researched topics, and applying them to solve problems in other fields.

What is your ideal profession?
I want to work in my own laboratory, where I conduct ground-breaking research in exercise medicine for rehabilitation and cancer patients.

Alvin Lee

The University of Western Australia

My PhD examined performance monitoring as a neural process involving the evaluation of error signals to facilitate behavioural adaptation. My results demonstrated that greater levels of performance monitoring were associated with greater anxiety symptoms, whereas lower levels of performance monitoring were associated with greater depressive symptoms. My studies revealed that variability in performance monitoring is a plausible biological marker of anxiety and depressive symptoms.

What were your motivations for studying a PhD?
I was motivated by the prospect of being able to further our understanding of cognition and behaviour through research.

What is one skill that you excel at?
Algorithm and data analysis.

What is your ideal profession?
A researcher.

Saman Akbar Zadeh

Edith Cowan University

The purpose of my PhD study was to investigate the use of machine learning methods and advanced algorithms to discriminate weeds/crops in agriculture. Various statistical approaches and machine learning methods were investigated and optimized as classifiers to provide high accuracy for real time weed detection.

What were your motivations for studying a PhD?
Providing a tangible solution to a real-world problem.

What is one skill that you excel at?
Data analytics.

What is your ideal profession?
A position where I could deliver high value solutions that provide convenience, joy and happiness.

DIAG-NOSE MEDICAL

Mentor: Eldin Rostom
Students: David Hach Soeur, Vi Nguyen Thanh Le, Mohammed Khaiata
Project Title: DNM Design Sprint (Software)

Every year, acute sinusitis accounts for 30 million, 45 million and 2 million GP visits in the United States, Europe, and Australia respectively. 10% of those cases are suspected to be bacterial while over 80% are needlessly given antibiotics. With 70% of unnecessary prescriptions and the cost of antibiotics at $20 per script, we estimate a global burden of $1.06 billion.

Diag-Nose is working on a novel diagnostic tool to assist in the accurate testing of acute bacterial sinusitis to reduce the economic burden of the disease and unnecessary antibiotic prescriptions. The product consists of a small handheld device; and a collection means to facilitate mucus collection from the nasal cavity, colorimetric assay strips to indicate the presence of infection and an algorithm that takes clinical symptoms & strip results as input to output the risk of infection.

The iPREP Biodesign team worked on prototyping and developing the software as per the current software architecture plan, advanced user interface design by gathering user requirements, designing graphic elements, and building navigation components. They also conducted a health economics study for the world's top three markets (US/EU/AU).

David Hach Soeur

Curtin University

My PhD investigated the antecedents and the outcome of the power of star designer (PSD). In addition, the moderating role of consumers' online engagement as well as the frequency of the star designer's online posting was examined. Key theories such as meaning transfer model, source-credibility theory, congruence theory, appraisal theory and uses and gratifications theory (UGT) were explored within the research context of marketing and luxury branding.

What were your motivations for studying a PhD?
Enhance Employability: Becoming a multi-disciplinary researcher gives me an advantage to use my broad knowledge and skills to apply for positions at various workplaces
Curiosity: My fascination in the field of luxury branding and marketing led me to pursue a higher degree in research.

What is one skill that you excel at?
Consulting skill: Being a good consultant is more than just offering what clients want but also being a good listener and having the ability to offer what clients need. Drawing from my various work experience, I provided a fresh perspective into the project – critically and creatively.

What is your ideal profession?
Being my own boss. The goal in my future career is to establish a successful branding company.

Vi Nguyen Thanh Le

Edith Cowan University

My research is about developing advanced machine learning algorithms to classify and accurately detect weeds and crops with similar morphology in real-time, in laboratory conditions as well as complex field environments. This will help reduce on-farm herbicide application, water usage, minimise negative environmental impacts and improve the crop yield and farmers' profitability.

What were your motivations for studying a PhD?
To further develop and sharpen my technical skills to solve practical problems in industry.

What is one skill that you excel at?
Problem solving.

What is your ideal profession?
Artificial Intelligence Researcher and Consultant.

Mohammed Khaiata

The University of Western Australia

My research "A Blockchain Strategic Evaluation Tool" helps organisations evaluate an emerging technology (blockchain) and assess its beneficence and impact on their business model. I developed a conceptual managerial framework that systematically assesses the potential benefits / risks of blockchain to an organisation and provide a customised roadmap to the participating organisation.

What were your motivations for studying a PhD?
To contribute to enriching research around emerging technologies and to help organisations with systematic approaches to evaluate emerging technologies.

What is one skill that you excel at?
Project Management.

What is your ideal profession?
ICT Strategy / Programme Management.

ONCORES MEDICAL

Mentors: Robert Pass, Tom Curnow
Students: Gina Chatellier, Jason Boynton, Asha Ramachandran
Project Title: Breast Conserving Surgery: Detailed Market Evaluation & Literature Review

OncoRes Medical is a private, venture-backed company which spun out of The University of Western Australia and The Western Australian Department of Health in October 2016. It is based at Harry Perkins North in Nedlands, Western Australia.

OncoRes is focused on improving outcomes in Breast Conserving Surgery. OncoRes is developing an in-cavity intra-operative imaging system for use during cancer surgery. The system (working name 'ORM-1') will enable surgeons to conduct in-cavity assessment for residual tumor during cancer surgeries, to identify and remove cancerous tissue. The technology effectively digitises the sense of touch, and 'sees' the difference between cancer and healthy tissue.

The iPREP Biodesign team worked towards OncoRes's goal of improving surgical outcomes with their 'ORM-1' system by conducting a US market analysis, commercially focused literature review and an assessment of future clinical applications of the product.

Gina Chatellier

The University of Western Australia

My PhD was on volunteer attraction and retention, essentially investigating how to use organisational values and work characteristics to attract the right personalities to a role to achieve good fit and thrive in the organisation.

What were your motivations for studying a PhD?
I want to help people and I am fascinated with the concept of combining psychology with business to create better outcomes for organisations and the employees within them.

What is one skill that you excel at?
Relationship building, I love meeting new people, learning from them, and finding a way to work together.

What is your ideal profession?
To work in organisational development where I can help organisations thrive through developing strategic programs, training, and initiatives that with allow individuals and their organisations maximise their potential. Eventually I would like to be a CEO, currently only 6.6% of Fortune 500 CEOs are female and I would love to help change that.

Jason Boynton

Edith Cowan University

My research demonstrated that High-intensity interval training (HIIT) performed in hot (35°C) versus cool (13°C) conditions resulted in similar increases in performance, yet different cardiovascular, thermoregulatory, and subjective responses during exercise post intervention. These results potentially have important implications in medical and occupational health fields.

What were your motivations for studying a PhD?
I've been interested in science and improving performance since my youth. As an adult I combined these two passions and started researching aspects of endurance athletes and performance. This eventually led me to pursuing a PhD in Exercise and Sport Science.

What is one skill that you excel at?
I enjoy critical thinking and problem solving. However, I am leery of saying I excel at these skills since there is always an immense amount of improvement that can be attained with either.

What is your ideal profession?
In the future I ideally see myself working at some capacity in both academia and industry. I enjoy both environments and believe it is beneficial to employ individuals who partake in simultaneous dual roles.

Asha Ramachandran

Curtin University

My thesis is a novel attempt to underpin the effect of sustainable alternatives such as bacterial biopolymers and biomineralisation on stabilization of soil. It is a matter of growing concern that popular chemical soil stabilizers possess high carbon footprint and adversely affect the eco-system, so I researched bio-geotechnology as an environmentally benign alternative to chemical stabilization.

What were your motivations for studying a PhD?
I was intrigued by the development of sustainable construction materials which possessed low carbon footprint. In addition to this, experimental work had always fascinated me which further motivated me to pursue a PhD.

What is one skill that you excel at?
Technical writing has always been my favourite during the course of my PhD.

What is your ideal profession?
My long-term career objective is to continue my research and work towards a carbon neutral construction industry. I would also love to continue educating and mentoring other aspiring civil engineers along the way.

SOUTH METROPOLITAN HEALTH SERVICE

Mentor: Chloe Goodred, Hazel Hudson, Barry Jenkins and Deirdre Criddle
Students: Julia Tang, Rhys Poulton
Project Title: SMHS Innovation Projects

South Metropolitan Health Service (SMHS) delivers hospital and community based public healthcare services to a population of approximately 659,000 people. SMHS supports 25% of the state's population and typically caters to older consumers. Our innovation centre is supporting staff to design and implement innovative solutions to improve service delivery and outcomes for our community.

The iPREP Biodesign team worked on two different projects which ran simultaneously over the seven-week period. One project investigated the application of artificial intelligence to improve and sustain a risk screening tool currently in development at SMHS which focused on reducing hospital readmission through the lens of medication safety. The other project evaluated the SMHS 'Kaartdijin' Innovation progress to date and developed ongoing communication and marketing strategies.

Both projects provided the iPREP Biodesign team with exposure to the large and complex nature of government service provider organisations. The team gained an insight into both the opportunities and challenges of working within a large organisation and learnt how to solve complex problems in an environment of constraint and competing priorities.

Julia Tang

Curtin University

My thesis aimed to develop and evaluate the feasibility of a social emotional intervention for autistic adults. Participatory design techniques were used to inform the development of a novel social emotional online mentoring program for autistic adults, MindChipTM. The research explored intervention approaches and content for improving outcomes relating to the engagement and generalisation of learnt skills to everyday social environments.

What were your motivations for studying a PhD?
I enjoy discovering and learning new things.

What is one skill that you excel at?
Interpersonal skills.

What is your ideal profession?
Project Coordinator or Manager.

Rhys Poulton

The University of Western Australia

My thesis objective is to accurately model the lifetime of merging galaxies in simulations by providing an analytical formula for galaxy formation models. To achieve this, I first assessed the robustness of their lifetime and its dependence on orbital properties. I then examined the accuracy of current models before creating a new prescription to predict the lifetime given the galaxy properties. Finally, I demonstrated the impact of the formula on an existing galaxy formation model.

What were your motivations for studying a PhD?
My interest in pursuing a PhD has come from my passion for pushing the frontier of computational research.

What is one skill that you excel at?
Programming.

What is your ideal profession?
A profession in the computer science field.

As a result of COVID-19 and the need to maintain distance, this round was the first time the iPREP program was run virtually. The majority of collaboration between student teams and industry was done using online collaborative software. They also engaged with development sessions online. The students, partners and trainers adapted quickly to the constantly changing situation and used it as an opportunity to adjust to the world of online collaboration. Here is a picture of the iPREP Biodesign student cohort during a group mentoring session on Biodesign Methodology using Zoom.

GET INVOLVED WITH iPREP BIODESIGN

Industry Partners

Do you have a business problem to solve or an opportunity to address? Could your organisation benefit from university expertise? Do you want to expand R&D capacity on a tight budget?

iPREP Biodesign supports research engagement between the universities and healthcare industries of Western Australia. The program involves interdisciplinary teams of PhD students, from all five WA universities, working on a seven-week project with an industry partner.

Industry Partners are expected to submit a short project outline that can be further scoped once students are selected and provide a mentor from the organisation who is available during the program.

We offer two different levels of engagement for industry partners who wish to be involved with the iPREP Biodesign program.

$10,000 + GST Partnership

- Team of three PhD students for seven weeks full-time
- Prominent position of logo and link to company website on iPREP WA home page, industry partner page and promotional materials
- Project profile and short video on iPREP WA website
- Opportunity to include flyer in Induction pack
- Banner to be displayed at final celebration event

Not-for-Profit & Startup sponsorship opportunity

- 50% off for eligible startups and not-for-profits ($5000 + GST)
- All applications will be assessed for the reduced fee

TAKE PART IN iPREP BIODESIGN

PhD Candidates

WHY PARTICIPATE IN iPREP BIODESIGN

- Diversify your career opportunities
- Develop new networks and contacts
- Gain new skills in project management, team work, interdisciplinary problem solving, business awareness and leadership
- You may be eligible for a $4000 scholarship

ELIGIBILITY

- Enrolled as a PhD candidate at a university in Western Australia
- Applicants should have submitted their thesis for examination prior to the program commencement but their degree must not be conferred before the end date of the program
- Domestic students who have completed 2 EFTSL of their research degree program may also be eligible for iPREP Biodesign
- Must be available to complete the project on a full time basis during the scheduled seven-week program

Student guidelines and online application form are available on the iPREP WA website. Check back to see when applications open: www.iprep.edu.au

INDUSTRY PARTNERS

VitalTrace

DIAG-NOSE MEDICAL

Government of **Western Australia**
South Metropolitan Health Service

OncoRes Medical
In-Cavity Residual Tumour Assessment

SUPPORTERS

This program was made possible by the X-TEND WA grant, which is part of the State Government's $16.7 million New Industries Fund. Matched funding is provided by a consortium consisting of The University of Western Australia, Edith Cowan University, Curtin University, Murdoch University, Harry Perkins Institute of Medical Research, Telethon Kids Institute and Perron Institute.

GOVERNMENT OF WESTERN AUSTRALIA

NEW INDUSTRIES WA

The New Industries Fund is managed by the Department of Jobs, Tourism, Science and Innovation

THE UNIVERSITY OF WESTERN AUSTRALIA

AUSTRALIA ECU EDITH COWAN UNIVERSITY

Curtin University

Murdoch UNIVERSITY

TELETHON KIDS INSTITUTE

HARRY PERKINS INSTITUTE OF MEDICAL RESEARCH

perron institute for neurological and translational science

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The iPREP Biodesign Team

iPREP Biodesign Coordinator: Michelle Luca

iPREP WA Coordinator: Narelle Jones

Perth Biodesign Director: Intan Oldakowska

Contact iPREP Biodesign:

iprepwa@ecu.edu.au

(08) 6304 5814

www.iprep.edu.au/iprepbiodesign

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