

National Industry PhD Program

Round 1 2023 – Successful Projects

Application No.	Stream	Project Title	Project Description	Field of Research	Participating University	Industry Partner	State
34988	Industry Linked	Decommissioning of mixed-media industrial equipment and opportunities for plastic waste upcycling and recycling in Australia	This project aims to identify and assess pathways for polymer recycling applicable to industrial decommissioned equipment. This project expects to generate a circular materials network within the Australian landscape that links scalable technologies for plastic recycling from university and industry research with the appropriate industrial waste streams and material processing partners. Expected outcomes of this project include a network linking industrial waste to upcycling and recycling partners, which maximises the use of Australia's most novel and scalable polymer processing technologies. The new recycling network will redirect over 50,000 tonnes of material, destined for landfill, into new products and fuels.	Materials Engineering	Monash University	Woodside Energy Group Ltd	VIC
34996	Industry Linked	Using machine learning to improve polygenic risk prediction of cancer	This project aims to improve the way that genetic analysis can be used to help predict risk of colorectal cancer. The project will use cutting-edge machine learning techniques to develop new genetic analysis methodologies that are more accurate across a variety of ancestries. The new genetic analysis will be incorporated into Genetic Technologies' existing colorectal cancer risk prediction test. The new test will better identify people at high risk and enable them to take preventive action or undergo additional screening. This will save lives through early detection of colorectal cancer.	Health	The University of Melbourne	Genetic Technologies Limited	VIC
35071	Industry Linked	Reducing uncertainty and improving the efficiency of driven pile foundation technologies in	This project aims to investigate how the load capacity of driven pile foundations changes over time. The project expects to generate new approaches to predict this behaviour, as there is no robust methodology that considers the range of influencing variables resulting in inefficiencies and delays when it occurs. Expected outcomes of this	Geotechnical Engineering	The University of Queensland	FSG Geotechnics & Foundations	QLD

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		infrastructure and land development projects	project include utilizing the findings in the design of driven foundations, strengthening collaborations and exposing the PhD student to practical foundation engineering. This project will improve efficiency and predictability of driven foundations; benefiting the construction industry and the many public and private projects which rely on piled foundations.				
34973	Industry Linked	Intelligent Retinal Blood Vessel Analysis on Multiple Imaging Modalities	The project aims to develop advanced artificial intelligence techniques to analyse retinal blood vessels. The project expects to generate new analysis approaches for retinal blood vessels, which are the only visible vessel network in the human body in non-invasive imaging methods. The outcomes of the project will help people understand the relationship between changes in retinal blood vessels and cardiovascular disease. In Australia, 1.2 million people had heart disease and 27% of all deaths are related to diseases of the circulatory system. The project's outcomes will contribute to cardiovascular disease risk prediction, early detection and disease monitoring.	Artificial Intelligence	Queensland University of Technology	TeleMedC Pty Ltd	QLD
35026	Industry Linked	Understanding animal disease spread by an insect vector in northern Australia	The project aims to investigate how exotic animal diseases carried by an insect vector could spread in northern Australia. The project expects to develop new approaches to biosecurity surveillance and early detection of exotic animal disease by utilising innovative genomic methods and epidemiological modelling. This project will provide national benefit and support the livestock industry through advancing disease surveillance for animal biosecurity in northern Australia. The expected outcomes of this project include development of skills and capacity in animal biosecurity diagnostics and surveillance and strengthening existing collaborations between the Northern Territory Government and Charles Darwin University.	Animal Husbandry	Charles Darwin University	Department of Industry, Tourism and Trade, Northern Territory	NT
35022	Industry Linked	Yeast fermentation and strain optimisation for the Ethtec Cellulosic Ethanol Pilot Plant Project	This project aims to optimise production of bioethanol from agricultural waste, by engineering yeast strains to improve fermentation. The project will generate yeast strains that are efficient in fermenting sugars to products in the shortest time possible, so that the process is economically viable on an industrial scale. Expected outcomes include strengthening the collaboration between the University and Ethanol Technologies, providing excellent training to a PhD student and	Food Science and Biotechnology	University of Newcastle	Ethanol Technologies Pty Limited	NSW



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			demonstrating the ability to scale-up fermentations for industrial purposes. This project will produce carbon-neutral bioethanol and green chemicals, offering an alternative to fossil fuels, helping to mitigate climate change impacts.				
35063	Industry Linked	TeraStream: Analysing Network Traffic at Terabit Speed using Artificial Intelligence	This project aims to provide telecommunications network operators deep visibility into user experience on interactive multimedia applications and cybersecurity threats by utilising novel Programmable Networks and Artificial Intelligence techniques. The project expects to develop innovative network analysis techniques for the partnered Australian enterprise Canopus Networks, addressing Enabling Capabilities priority. Expected outcomes include novel AI systems for user experience and cyber-security, strengthening industrial collaborations, and developing PhD candidate's skills for translational telecommunications research. This AI-based telecommunications analytics system will provide intellectual property for the Australian industry to maintain its leading position in the telecommunications market globally.	Communications Technologies	University of New South Wales	Canopus Networks Pty Ltd	NSW
35054	Industry Linked	Highly sensitive nanosensors for the detection of trace gases in air-based gas mixtures	This project aims to address the agriculture industry's challenge of establishing a non-invasive pregnancy detection system for animals on farms, through the development of advanced gas sensing technologies. The project expects to significantly improve livestock and dairy operator productivity and animal welfare, decrease costs and reduce operator injury. The project will improve gas sensing technology selectivity, fostering a strong research-industry collaboration, and offering the PhD candidate valuable industry insights. This project will revolutionize cattle management across the Meat, Livestock, and Dairy industries, benefiting not only the key industry partner but also various sectors such as food, agriculture, and environmental monitoring.	Manufacturing Engineering and Technology	Macquarie University	Agscent Pty Ltd	NSW
34980	Industry Linked	Development of a Chinese herb-drug interaction database: insight into literature, high-	This project aims to develop an online Evidence-Based Chinese Herb-Drug Database by utilizing laboratory technology and literature reviews. The project expects to generate an advanced digital tool for health care and service in integrative medicine, thereby improving health outcomes and addressing the government's science and research priorities.	Traditional Chinese Medicine	Western Sydney University	UnityHealth Pty Ltd	NSW



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		throughput screening and applications	Expected outcomes of this project include strengthening existing collaboration between WSU and UnityHealth Pty Ltd. This platform will provide easy access to and reliable information on the integrative use of Chinese herbs, benefiting healthcare professionals, industry, customers, and the public utilising Chinese herbal medicines across Asian Pacific countries.				
35019	Industry Linked	Precision biomanufacturing of postbiotics: the next-generation functional materials for pharmaceutical, nutraceutical, food, and agriculture applications.	Postbiotics are functional molecules produced by probiotics through fermentation and are responsible for the biological effects of probiotics. There is limited knowledge surrounding the physicochemical parameters that affect production of postbiotics. This project will provide fundamental understanding of how the microenvironment of probiotics regulates production and function of postbiotics. The project outcomes will be: (i) commercialisation of Australian-made, sustainably derived functional materials, (ii) highly-skilled workforce and biotechnology experts, and (iii) establishing a resilient academia-industry biomanufacturing ecosystem. Understanding this relationship will enable a paradigm shift from pro- to postbiotics, key to unlocking the full potential of these important functional molecules.	Materials Engineering	The University of Sydney	BiomeCentric Pty Lt	NSW
34954	Industry Linked	Artificial intelligence-guided personalized medical and assistive device prescription for improving clinical outcomes and adherence	This project aims to address the issue of generic medical and assistive device prescriptions for patients with diabetic-related foot disease by utilising and advancing artificial intelligence to guide personalised device prescriptions, allowing for individual patient preferences and lifestyles. The project expects to develop an innovative tool for the pedorthic industry, assisting clinicians in prescribing personalised medical devices. Expected outcomes include strengthening existing collaborations with the industry partner and the development of the PhD candidate's skills. This solution will enhance practice for the industry partner, enabling them to better address their patients' needs and ultimately improve patient adherence and clinical outcomes.	Decision Support Systems	Charles Sturt University	Foot Balance Technology Pty Ltd	NSW
35059	Industry Linked	Performance Evaluation of Eco-friendly Concrete Produced with Granulated lead smelter slag	In partnership with Hallett Group, this project will generate new knowledge about efficient recycling of iron-rich solid waste. This project responds to the global challenge of safe disposal and reuse of lead slag (10–20% of output) due to potential heavy metal leaching and low-use efficiency. The project will develop innovative and cost-effective	Construction Engineering	University of South Australia	Hallett Group	SA

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			concrete building materials using lead-zinc slag from Port Pirie smelter to replace cement. Australia, a leading global producer of lead-zinc, will benefit from the availability of more green, economical, and commercially-available methods for producing lead-zinc slag concrete, and new knowledge about efficient recycling and durability performance.				
35040	Industry Linked	In-situ characterisation of in vitro cell models in a microfluidic flow	This project aims to develop new strategies to monitor cell development in custom-made microscopic incubators that are only achievable using nanoscale 3D-printing. The project seeks to increase functionality, precision, and commercial value for an Australia-made in vitro fertilisation (IVF) technology, developed by the industry partner. The biology studied, ranging from single cells through to complex organoids, will provide new insights into disease modelling, drug screening, tissue engineering, and regenerative medicine. The benefits of this project include world-class skills in nanoscale 3D-printing for commercial manufacturing, knowledge that underpins improved IVF and other cellular systems, and world-leading Australian-made biomedical devices.	Biomedical Engineering	University of South Australia	Fertilis	SA
35058	Industry Linked	Durability of concrete/mortar made with recycled Port Augusta fly ash	This project investigates the durability of concrete/mortar made with recycled Port Augusta fly ash, contributing to Hallett Group's Green Cement Transformation Project and advancing sustainable construction practices. The project offers innovative sustainable construction approaches to address a challenge the recycling industry is currently facing, which aligns with industry and government priorities for carbon reduction. The project will provide insights into recycled fly ash concrete/mortar durability and recommendations for its effective use, supporting sustainable construction practices. The practical benefits of the research will include reduction of carbon emissions, deepening industry-academia collaborations, and promoting sustainable practices in the cement and concrete industry.	Construction Engineering	University of South Australia	Hallett Group	SA
35048	Industry Linked	Developing a novel cross-protective, inactivated vaccine against non-typeable Haemophilus	This project aims to develop a new vaccine that will prevent ear infections in children and lung infections in adults. These infections are caused by increasingly common bacteria, Haemophilus influenzae (NTHi). An effective vaccine would reduce the illnesses caused by NTHi,	Health	The University of Adelaide	GPN Vaccines Ltd	SA



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			delivering a new Australian product to sell on the global vaccine market. Indigenous communities will also benefit from this vaccine because many children have high rates of middle ear infections caused by NTHi. This project will strengthen collaboration between the University and GPN Vaccines, equipping the PhD candidate with life-long industry-relevant skills and networks, and future career opportunities.				
35006	Industry Researcher	Development and characterisation of DNA aptamers immobilised on gold electrode surfaces for utility in wearable electrochemical biosensors	This project aims to understand how to optimise the function of DNA-based sensing elements when immobilised on electrode surfaces for use with wearable sensors. This is now known to be the crucial step to solving the 50 year old challenge of sensors that can continuously monitor drugs and biomarkers in patients in real time. This will be achieved by using new surface characterisation methods that can show how individual DNA molecules assemble on the electrode and allow the determination how the assembly influences function. This knowledge will accelerate Nutromics' launch of its wearable biosensor into hospitals and clinics.	Chemical Sciences	University of New South Wales	Nutromics Pty Ltd	NSW
35030	Industry Researcher	The development of rapid and sensitive methods for the detection of pathogens in water	The project aims to develop portable methods to detect pathogenic microorganisms in water samples at the sensitivity level of laboratory gene tests. The new methods will enable onsite and online detection of disease-causing organisms water supplies. The Industry PhD candidate will contribute to the creation of industry-ready portable tests for water safety monitoring. The new designs will be adapted for product development and commercialisation. The outcomes will provide Australia with indigenous capability for portable monitoring of water-borne pathogens and reduce Australia's reliance on the overseas supply chains for critical biosensing measures.	Health	University of New South Wales	Biopoint Pty Ltd	NSW
35014	Industry Researcher	New methods for biomarker discovery from microsampled whole blood of cancer patients	The project aims to develop better ways to diagnose and track the health of cancer patients by using blood samples taken from a fingerpick. The project expects to generate new processes, innovative products and intellectual property for the partners. Expected outcomes of this project include strengthening existing collaborations between university and industry partner and providing the PhD candidate with new scientific research skills. The expected benefits of this project will	Laboratory Technology	The University of Sydney	Sangui Bio Pty Ltd	NSW

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			be to allow consumers to play more active roles in their healthcare by introducing innovative methods for conducting blood tests.				
35065	Industry Researcher	Characterisation of the Aetiology and Prodromal Phase of Parkinson’s Disease in a Novel Murine Model	This project aims to develop a physiologically relevant mouse model of Parkinson’s disease to robustly assess potential efficacy of new treatments for Parkinsons’. Parkinson’s disease is a degenerative brain disorder increasing in prevalence with no cure. Failure to find effective treatments is significantly confounded by a lack of robust preclinical mouse models to efficiently test potential treatments. The outcomes of this project will have a global impact for people living with Parkinson’s disease. The project through the industry partnership will also generate Australian-intellectual property that will be of global interest.	Health	Curtin University	Ozgene Pty Ltd	WA
35037	Industry Researcher	Clinical translation of laser bone sculpting for total knee replacements	The aim of this project is to optimise and verify laser bone shaping parameters, facilitating adoption of this ground-breaking Australian technology into clinical practice. With two million osteoarthritis patients in Australia, the project introduces a novel, patient-centred approach to knee replacements, aimed at improving patient satisfaction and expediting recovery. The project will strengthen academia-industry collaborations, provides a foundation for new partnerships, and develops local expertise for future Australian medical device commercialisation. Laser bone shaping will revolutionize the global practice of orthopaedics, improve patient outcomes, and alleviate strain on public health resources and wait times.	Health	The University of Western Australia	Australian Institute of Robotic Orthopaedics	WA
34978	Industry Researcher	Heritage Equity in Energy Transitions: First Nation cultural heritage protection in extractive mining industries in Australia, Canada and the United States of America	This project will develop new, balanced approaches for the protection of Indigenous cultural heritage, while facilitating the sustainable extraction of Energy Transition Minerals (ETM). Extractive industries represent 10.4% of Australia’s GDP and a staggering 49% of WA’s Gross State Product (2020-1) but operate under deficient frameworks for heritage protection and industry conflict resolution. Expected outcomes include mitigating risks to Indigenous people’s well-being by co-managing impacts to their cultural heritage, reducing risk and industry costs and advancing strategic government priorities. This project will strengthen existing collaborations between industry, Indigenous people, and heritage professionals by providing novel, international best-practice models.	Anthropology	The University of Western Australia	Atlas Iron Pty Ltd	WA



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35068	Industry Researcher	Natural enemies of key invertebrate pests of WA grain crops: impacts and monitoring techniques	The project will develop innovative methods of measuring and enhancing natural enemies of Diamondback moth, a key pest of canola. This will contribute to a reduction in insecticide use in canola, which aligns with the Department's strategic focus on driving sustainability and growth in Australian agriculture. Anticipated outcomes include natural enemy monitoring techniques for growers and agronomists. Additionally, the PhD candidate will gain skills in entomology, adding essential capacity to the State. This knowledge will support farmers to harness the free benefit provided by natural enemies. Additionally, it will contribute to global understanding of biological pest control of Diamondback moth.	Pest and Weed Control	The University of Western Australia	WA Department of Primary Industries and Regional Development	WA
34984	Industry Researcher	Implementation science approaches for the translation of ocular gene therapy into medical care	This project aims to develop a framework for Australian institutes to deliver ocular gene therapy, encompassing regulatory, organisational, clinician and patient preparedness. This will be achieved by aggregating data, focusing on barriers and enablers to delivering ocular gene therapy. The project will provide an evidence-based model supporting the Australian healthcare system in implementing ocular gene therapy, at the translational interface between research and clinical delivery. Expected outcomes include expanded capacity and capability to deliver ocular gene therapy to patients in Australia. The project will establish a sustainable model for ocular gene therapy, providing sight-saving treatments to Australians at risk of blindness.	Optical Science	The University of Melbourne	Centre for Eye Research Australia	VIC
34985	Industry Researcher	Adaptive Optics Imaging as a Novel Clinical Trial Endpoint for Retinal Gene Therapy	This project aims to improve clinical trials for people with inherited retinal diseases by using adaptive optics, a novel imaging technique that monitors disease progression at a cellular level, surpassing previous limitations. Adaptive optics is a new technology that allows accurate evaluation of treatment effectiveness, facilitating faster drug discovery and improved patient care. The project intends to develop new outcome measures to streamline and expedite clinical trials, resulting in better and more cost-effective treatments for patients. Integrating adaptive optics into research advances the understanding of disease progression, leading to targeted therapies and improved clinical care.	Optical Science	The University of Melbourne	Centre for Eye Research Australia PYC Therapeutics	VIC

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35018	Industry Researcher	Biological predictors of clinical, functional, social and cognitive response to clozapine	This project aims to investigate if brain waves can predict who will respond to clozapine, a treatment for people with schizophrenia. Not everyone with schizophrenia needs clozapine or will get better if they take it. This project is expected to help identify who should be given clozapine and is especially relevant to the industry partner (medical care) who provide care for young people with schizophrenia. Show whether brain waves can predict who will have the best response to clozapine. This project will provide valuable information to improve the lives of young people with schizophrenia.	Psychiatry	The University of Melbourne	Orygen	VIC
35062	Industry Researcher	A Digital Twin Model for Design and Development of Cutting Tools with Macro and Micro Geometries	This project aims to develop a digital twin model of a cutting tool that can incorporate macro and micro geometries. The project expects to develop an accurate and innovative 3D digital model for automated metrology, which is aligned to the core R&D work at Sutton Tools. Expected outcomes include an understanding of the effect of macro and micro tool geometries on cutting tool performance; and development of a digital twin model of a cutting tool that can deliver tool design solutions related to real-world applications. These technologies will benefit rapid development of AI-based approaches for advanced tool design.	Metal fitting, Turning and Machining	Swinburne University of Technology	Sutton Tools Pty Ltd	VIC
35017	Industry Researcher	Methods for the robust employment of metal additive manufacturing in high-risk industrial applications.	The project aims to develop techniques that ensure safe and reliable use of metal additive manufacturing (AM) in high-risk industrial applications by using cold spray and other AM technologies. Currently, the widespread use of AM is hindered due to comprehending quality controls and material properties. Significantly, the project will pioneer the establishment of reliable validation methodologies. The outcomes include the development of new validation techniques, materials and process control methods. The benefits are new possibilities for AM as a viable manufacturing technique without onerous levels of validation and testing thus reducing the effects of supply chain issues in remote areas.	Manufacturing Engineering	Charles Darwin University	Effusioentech trading as SPEE3D Pty Ltd	NT
34956	Industry Researcher	Genetic investigations into mango defence responses to safeguard the future of	This project aims to improve mango plant resilience by utilising molecular technologies to explore response to disease at the genetic level. Mango fruit yield and quality can be severely affected by pests and diseases, which impacts the \$217 million/year Australian mango	Horticulture	Queensland University of Technology	Northern Territory Department of Industry,	QLD



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		the Australian mango industry	industry. This collaborative project between QUT and NT DITT will identify mango varieties with superior immune responses and plant defence activators that can strengthen that response. These outcomes will provide growers with strategies to improve plant health, reduce pesticide use, and improve industry decision-making around selecting varieties suitable for regions with high disease loads.			Tourism and Trade	
35033	Industry Researcher	Co-design and evaluation of a fully interoperable paediatric burns registry for patients, families and clinicians.	This project aims to co-design and implement a paediatric burns registry using automated data capture (ADC) from electronic medical records. It has the potential to improve efficiency and accuracy of data collection for clinical registries, whilst expanding the scope of data collection for national registries to include outpatient data and patient-reported outcome measures. Expected outcomes include a feasible, acceptable and sustainable implementation of a codesigned paediatric burns registry, providing critical insights into paediatric burn care and informing treatment and prevention strategies. The project has the potential to improve paediatric burns outcomes, provide an implementation template of ADC methods for other clinical registries, improve efficiency and effectiveness of observational healthcare research.	Surgery	Griffith University	Children's Health Queensland	QLD
35021	Industry Researcher	Building digital resilience for the climate crisis	The aim of this project is to enable Australian businesses develop innovative digital services that help them adapt to the challenges of climate change and promote environmental sustainability. It is crucial for businesses in Australia to prepare for the impacts of climate change today to achieve net-zero by 2050. The expected outcomes of this project include valuable knowledge, tools, and frameworks that can be used by both technical and non-technical individuals to respond to, and prepare for, climate-related crises. By building digital resilience and helping reduce carbon emissions, this project actively contributes to a more sustainable future for everyone.	Information Systems	The University of Queensland	APPEGGIO	QLD
35072	Industry Researcher	Prevalence, Prediction and Prevention of spinal pain in rotary wing aircrew	This project aims to reduce the prevalence of spinal injuries in Helicopter aircrew by leveraging past research successes in load monitoring for injury prevention. By reducing spinal injuries, this research will have a direct impact on the Defence Force capabilities by, addressing personnel availability, high training costs, and the negative	Physiotherapy	University of Canberra	HMAS Albatross Fleet Air Arm	ACT



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			effects of injuries. The project expects to develop effective strategies for preventing spinal pain, leading to increased personnel availability, reduced training costs, and improved deployable forces. This research will enhance the Defence Force's operational readiness, mitigate financial and personal burdens associated with injuries.				
35011	Industry Researcher	A deep learning method for radiological analysis of spinopelvic mobility	This project aims to using advanced 2D to 3D image reconstruction techniques and artificial intelligence to improve the planning of total hip replacement surgery. The project expects to provide valuable additional information to a surgeon to enhance their surgical decision-making process. This project will enhance the collaboration between 360 MedCare and Flinders University through the application computer vision and deep learning techniques, whilst training the next generation of biomedical engineers. This technology will reduce the risk of dislocation, a major cause of failure of total hip replacements.	Computer Engineering	Flinders University	360 Med Care	SA

