University of Southern Queensland

2 April 2024

Undergraduate Research Scholarship Program - Available Projects for 2024

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School of Agriculture & Environmental Science

Project Title – Improving the trajectory of Collared Delma in south-east Queensland

Project supervisor/s and contact details	Dr Meg Edwards; meg.edwards@unisq.edu.au Dr JP Emery; jp.emery@unisq.edu.au
School/Centre affiliation	School of Agriculture and Environmental Science Centre for Sustainable Agricultural Systems
Additional information	This project is suitable for students in their 2nd or 3rd undergraduate degree with a major in Wildlife Management, Ecology and Conservation, Environment and Sustainability, or similar. It is expected that the candidate has some basic knowledge of Australian wildlife and their habitats, and an enthusiasm for fieldwork.
Project description	The collared Delma is an endemic legless lizard found in south-east Queensland. There is a paucity of information on this species, as it has a highly fragmented distribution, with limited records and low location accuracy. Therefore, this project aims to contribute new knowledge on the species through: • Assessing the response of collared Delmas to weed and fire management; • Improving the understanding of the impact of predators on the species; and • Establishing population estimates at properties throughout south-east Queensland. In this project, you will assist researchers with fieldwork and camera trap processing to contribute to the above project aims.
Future research activities	This project could be expanded, with additional analysis, into an Honours project in the Bachelor of Science Honours program. The fieldwork and analysis skills gained in this project are transferable to future post-graduate research projects and jobs.
Project location	There will be fieldwork involved in Brisbane, Ipswich and Toowoomba. The rest of the project can be completed online or on campus. This project will need a computer to process camera images and analyse data, as well as communicate with the project team.
Time commitment	The expected time commitment for this project is 1-2 days per week for approximately 10 weeks.
Benefits for successful candidates	By completing this project, you will develop skills in fieldwork, camera trap processing, analysis, and writing scientifically. You will work with researchers from UniSQ, as well as interacting with and gaining industry connections. You may also be asked to deliver a presentation on your findings to the collaborating organisations, providing you with an opportunity to develop your public speaking skills.
Project outcomes	The research from this project will be incorporated into a broader project investing the ecology of the collared Delma and disseminated to industry. Successful completion of the project may result in the preparation of a manuscript for peer review and publication after completion of the scholarship, with the student as a coauthor.

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Project Title – Preparation and Characterization of Fire-Retardant, Recyclable Thermosetting Resins with Phosphorus-Containing Group and Imine Bond

Project supervisor/s and contact details	Prof. Pingan Song: pingan.song@unisq.edu.au Dr. Siqi Huo: siqi.huo@unisq.edu.au
School/Centre affiliation	School of Agriculture and Environmental Science/School of Engineering/Centre for Future Materials
Additional information	This project is open for either a 2nd or 3rd year student with a background in chemistry and material engineering.
Project description	***Background:*** Disposable petroleum-based thermosetting resins have been widely used in industrial areas and human daily life. However, conventional thermosetting resins lack recyclability, because of their stable crosslinked networks. Hence, they are hard to be degraded in natural condition even after hundred years, resulting in serious environment pollution. Therefore, it is significantly urgent to develop degradable and recyclable thermosetting resins. The intrinsic flammability of thermosetting resins is a major issue restricting their high-tech applications. Thus, developing fire-retardant, recyclable thermosetting resins remains a great challenge. ***Project aim:*** In this project, the successful applicant will help to prepare the recyclable, fire-retardant thermosetting resins by introducing exchangeable imine bonds and fire-retardant phosphorus-containing groups into the crosslinked network of thermosetting resins. In addition, the applicant will also help to characterize the recyclability and fire retardancy of the obtained thermosetting resins. ***Project activities:*** • Conduct a literature review about recyclable and reprocessable thermosetting resins and fire-retardant polymers. • Prepare recyclable, fire-retardant thermosetting resins by using P-containing dialdehydes and diamines as raw materials. • Analyse the curing behaviors of the polymer systems by differential scanning calorimetry (DSC). • Characterize the mechanical, fire-retardant, and thermal properties of the polymer system by different tests. • Explore the recyclability of the polymer system by dynamic mechanical analysis (DMA). • Contribute to a high-quality journal paper reporting the key findings
Future research activities	The project can be extended into an Honours research project, and the candidate may also be able to apply the gained knowledge and experience to future research activities including a Master's or PhD project.
Project location	The successful candidate needs to work on Springfield campus throughout the duration of the project. The candidate may have the opportunity to collaborate with other students, researchers, and industrial partners. The candidate may complete some aspects of the project remotely from their home, such as literature review and data analysis. This will need to be negotiated with the supervisory team.

Time commitment	The successful candidate needs to commit 2 or 3 days per week throughout the duration of the project (10 weeks).
Benefits for successful candidates	The successful candidate will have the opportunity to work with our students and researchers from different academic backgrounds. The candidate will receive extensive training in research skills. Skill development may include: • How to undertake a comprehensive literature review • How to conduct research • How to manufacture fire-retardant, recyclable thermosetting resins • How to carry out fire-retardant tests • How to analyse research data • How to prepare research report and paper
Project outcomes	After successful completion of the project, the candidate will work with the supervisory team to write one research article, which will be published in a high impact journal and/or in the proceedings of a national/international conference. The successful candidate will be a co-author on the article.

School of Business

Project Title: Beyond the paperless office: Sustainability and digital transformation in regional and rural Australia

Project supervisor/s and contact details	Dr Sachithra Lokuge, Sachithra.Lokuge@usq.edu.au Dr Anup Shrestha, Anup.Shrestha@usq.edu.au Dr Fiona Russo, Fiona.Russo@usq.edu.au
School/Centre affiliation	School of Business
Additional information	This project is best suited for 2nd and 3rd year students who are enrolled in business, information systems and information technology degrees. However, considering the cross-disciplinary nature of the topic, we welcome students from other disciplines as well (i.e., health and engineering). We highly encourage (not mandatory) students who have successfully completed CIS1000.
Project description	Digital transformation and sustainability are both relevant and significant dimensions of modern business practices. The importance of these two areas increases with the complex and wicked business problems that require multi-disciplinary solutions. Contemporary examples of such problems include increased carbon emissions, environmental pollution, migration crises and pandemics. In this context, considering the sustainable development-related literature, there is little academic research that identifies the exact role of digital transformation toward sustainable practices, especially in regional areas and in the small to medium enterprise (SME) sector. The aim of this project is to build a solid understanding in relation to the status of the digital transformation in the regional Australia and how such initiatives could support sustainability, for example, to achieve the Sustainable Development Goals (SDGs) that contributes to the rural and regional sector in a meaningful way. The project explores the understanding of sustainability in digital transformation initiatives in rural and regional organisations. The student will work with the supervisors to conduct a systematic literature review (SLR). The objective of this SLR is to develop a conceptual model and articulate the gaps in this research area.
Future research activities	This project can be extended into a final year research project, an Honours thesis or higher degree by research (HDR) research project. The SLR will provide a foundation for broader research aligned to funding priorities of the Australian government in the areas of digitisation, sustainability, and regional/rural business.
Project location	The student can complete the project on-campus or distance online.
Time commitment	The duration of the project is 10 weeks. The student is required to commit at least 4 hours per week to the project. There is no set starting date for this project, and it can be negotiated with the supervision team.
Benefits for successful candidates	Successful completion of this project will build highly relevant business research skills such as accessing and managing existing literature, conducting a systematic literature review by following an evidence-based review protocol, identifying gaps in research, developing initial research models that can be extended further, working in a collaborative research environment, learning to use a citation management tool (e.g. EndNote) effectively and working with researchers from different disciplines. Successful completion of this project alongside high achievement in their degree program may afford students direct entry into the MRES program as a HDR pathway.
Project outcomes	A systematic literature review and further possible publications from the systematic literature review with the student as a contributor in the research team.

UniSQ

Project Title: Australian aircraft accidents – what do the bones say?

Project supervisor/s and contact details	Natasha Heap (Lecturer) Natasha.heap@usq.edu.au
School/Centre affiliation	School of Business
Additional information	This project is best suited for UniSQ Bachelor of Aviation students in their second or third year of study, with an interest in aircraft accident investigation and / or forensic investigation. There are two (2) positions available. The ideal candidate will have: • Developed research skills appropriate for advanced undergraduate studies, including familiarity with library and database research; • A basic understanding of EndNote; MS Excel and MS Word (further training will be provided if necessary); • Developing skills in critical thinking and evaluation; • Good written and verbal communication skills; • Good attention to detail; • Ability to work as part of a team; • Ability to work independently (under supervision).
Project description	This project will assist with a current research project being undertaken at UniSQ Aviation, and is bound by UniSQ Human Ethics Application: H22REA240P1 - Australian aviation accidents - what do the bones say? Since 1984 there have been c.835 fatal civil air accidents in Australia with an approximate total of 1055 fatalities. Of these fatal accidents c.319 involved more than one fatality (an approximate total of 924 dead). The over-arching project has two areas of investigation: 1) analysis of the use of forensic odontology for the identification of victims of mass disaster and 2) an analysis of types of trauma and fracture patterns suffered by victims of air accidents. In this project each student researcher will be an active participant in: 1. Conducting a systematic literature review; and 2. The writing up of the review with a view to publication. The student will be mentored through the process of collaborative research. It is estimated that the final developments of the written research will fall outside the bounds of the paid scholarship. The student will be credited as a co-author on all publications resulting from the systematic literature reviews. On successful completion of this project, students may apply for credit towards MGT3303 The Equipped Graduate.
Future research activities	This project is the beginning of a larger project as explained above. The research skills that the candidate will develop over the course of this project are transferable to future research activities. The results of this part of the project will be developed into a publication with the student being a co-author on the article.
Project location	The project can be conducted online. Generally, all team meetings will be conducted via Zoom and a Teams site will be set up for the project to store all data and files.

Time commitment	The elements of the project with which the student will collaborate as part of the scholarship program will run for 10 weeks The student will be expected to work 8 hours (approx. 1 day) per week. This will include a weekly meeting with the project supervisor. If the student would like credit for MGT3303 this project will need to be completed during Trimester 2 or Trimester 3 offering of the course. If credit for MGT3303 is not required, the student can commence this project any time before January 2025.
Benefits for successful candidates	On successful completion of this research project, the student(s) will be able to: 1. Apply a range of professional and personal attributes to develop communications that establish and build professional relationships with a broad range of research team members and project stakeholders; 2. Apply the principles of team dynamics and work collaboratively to achieve the project tasks; 3. Through communicating on the project and task progress with the Project Supervisor, engage in reflective practice that will support your transition to a post-graduation career; 4. Demonstrate research skills necessary for the accurate conduct of a systematic literature review; 5. Complete allocated research activities that contribute to a body of research for publication. These skills will be beneficial for moving into postgraduate study but are also transferable skills necessary for a successful career as a future aviation professional.
Project outcomes	The project will result in: • A minimum of one co-authored publication in a peer-reviewed scholarly journal (such as Forensic Science Research or Forensic Science, Medicine and Pathology). • The potential for a co-authored research seminar / conference presentation.

School of Education

Project Title – The Educational Impact of Children's Picture Books

Project supervisor/s and contact details	A/P Martin Kerby – martin.kerby@unisq.edu.au Dr Alison Bedford – alison.bedford@unisqu.edu.au Eseta Tualaulelei – eseta.tualalulelei@unisq.edu.au Dr Tracey Chamlin – tracey.chamlin@unisq.edu.au Prof. Margaret Baguley – margaret.baguley@unisq.edu.au
School/Centre affiliation	School of Education
Additional information	Applicants best suited to the project would be a 3rd year Bachelor of Education (Primary or Secondary) student, particularly those interested in the areas of History, the Arts, Inclusive Education, or First Nations Histories and Cultures.
Project description	This project builds on the research team's exploration of the educational impact of children's picture books. Areas which the team are focusing on include how children's books deal with trauma (war/conflict) (Baguley & Kerby, 2022), postcolonialism (First Nations, explorers, national identity) (Zerafa-Payne, et al., 2023; Baguley & Kerby, 2023; Baguley, et al., 2023), and inclusion and gender (LGBTIQA+) (Kerby et al., 2022; Bedford et al., 2023) by how authors and illustrators strategically and aesthetically using image and text. The student researcher will be involved in a series of research tasks, including the analysis of a children's picture book using the principles of systemic functional theory to understand the 'grammar' of the images that have been used. This will be undertaken through the three perspectives outlined by Painter et al., (2013) which involve the visual construction of the narrative events and characters (ideational meaning), the visual positioning of the reader through choices related to focalisation and appraisal (interpersonal meaning), and the discourse organization of visual meanings through choices in framing and composition (textual meaning). In addition, the student researcher will be guided through the process of conducting a literature review related to the themes related to the children's picture book and how to write the methodology related to the visual analysis they have undertaken. This will be incorporated in a draft journal article which they will co-publish with members of the research. They will also be introduced to international collaborators of the research team through the GALACTIC site: Global Association of Literary and Artistic Critique: Texts, Influences, Cultures – Exploring Children's Literature (wordpress.com) The outcomes for the student researcher will be learning research skills in visual analysis, the construction of a literature review, and the drafting of a journal article and presentations. The visual analysis skills will also be invaluable for their teaching approach and assist in the selection and presentation of children's picture books in their classroom. These skills will also contribute to a research pathway such as the Masters of Education, the Masters of Research and a PhD program.
Future research activities	This project can be extended into a Master of Education, Master of Research or Doctoral research project. .

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Project location	The successful candidate can work at the Toowoomba or Springfield campus or online for the project's duration with opportunities to work with other students, academics and researchers. To undertake this project, you must have access to a computer with a webcam (for Zoom meetings with the project team).
Time commitment	The project can be undertaken anytime between mid-June to December 2024, to be negotiated with the supervisory team. The student would need to be able to commit to 2 days a week for 10 weeks on average.
Benefits for successful candidates	The successful candidate will gain experience working in a collaborative research team and will participate in research activities that they can utilise for future research projects. They will also be invited to engage with research activities and workshops as appropriate to the project and an invitation to present the outcomes of the project with the team at a presentation for the School of Education
Project outcomes	Skills in visual analysis, construction of literature review, drafting of journal article, collaboration with research team and international collaborators, journal article, presentations.

Project Title – Authentic Research Mentor Program Impact on Science Learning

Project supervisor/s and contact details	Dr Louise Puslednik Email: louise.puslednik@unisq.edu.au Phone: 07 3470 4612
School/Centre affiliation	School of Education
Additional information	• A secondary Bachelor of Education student with an interest in Science and/or Mathematics would be suitable
Project description	Authentic Research Mentor Programs (ARMP) represent a powerful model of learning whereby students engage in hands-on original research, finding solutions to real-world problems with the cognitive and personal support of a mentor. The undergraduate researcher will examine the impact of students' science learning who have participated in an ARMP. For five years Year 10 student cohorts from a regional school have engaged in a year-long ARMP with science academics researching breast cancer detection. Academics have delivered regular tutorials on statistical data analysis, scientific writing, and experimental design within the context of students showcasing their research to an academic audience at the end of the academic year. This research will assess and evaluate the impact of the ARMP on students' science learning and their 21st century skills. The ARMP will be evaluated using the NSW Year 10 VALID independent science assessment scores of mentees relative to a control group. This quantitative research will assess the impact of the program building on the previous work of Puslednik and Brennan (2020). Significantly, this research addresses the disparity in science outcomes between regional and urban schools. The undergraduate researcher would be undertaking research associated with analysing data to assess the ARMP mentees academic performance in science knowledge and skills (Table 1). Mentees' academic performance will be determined via The NSW Department of Education Year 10 VALID science assessment. Initially the undergraduate researcher would be provided with background to the research project and with previously published journal articles to read. This will include an article which outlines the method for analysing data to assess the ARMP mentees academic performance. This would be followed by tutorials on data analysis, specifically focusing on descriptive statistics as well as inferential statistics including hypothesis testing using students t-test and analysis of variance. These are the statistical tests the student will use in analysing mentee's academic performance as compared to a control group of students. These data analysis will be carried out for the five cohorts of students who engaged in the ARMP. Following this the undergraduate researcher will extract data from de-identified spreadsheets for both the mentee group and a control group of students for each of the five measures of performance given by the VALID assessment for each cohort. The undergraduate researcher will generate new spreadsheets and prepare them to be imported into GraphPad Prism statistical package. The student will then draw on their knowledge of statistical analysis to undertake an analysis of variance comparing the mentee group to the control group for each of the five performance measures for each cohort. Based on the results of the statistical analysis the undergraduate researcher will in collaboration with the academic interpret the results of the data analysis. Finally, the undergraduate researcher will create five data tables (one for each cohort) showing the comparison of mean science performance scores between mentee group and control group using five

different Year 10 VALID performance measures.

Table 1. Activities of undergraduate researcher to be undertaken as part of the research project examining the impact of ARMP on science learning across five cohorts.

Week	Undergraduate Researcher Activity
1	Tutorial with academic introducing the research project. Previous research papers will be provided to the undergraduate researcher to read.
2	Tutorial with academic introducing descriptive and inferential statistics with a focus on hypothesis testing using students t-test and analysis of variance (ANOVA).
3	Tutorial with academic demonstrating how to use statistical software GraphPad Prism, allowing the undergraduate researcher to experiment with statistical software using previously published data.
4	Extraction of mentee Year 10 VALID scores for each cohort using the five performance measures. Data recorded in spreadsheets. Determine, and record, the range of Year 8 VALID scores of mentee students' scores for each cohort.
5	Using the range of mentee Year 10 VALID overall scores, create control group for each cohort. Extract control group Year 10 VALID scores for each cohort using the five different VALID performance measures. Record data in spreadsheets.
6	Prepare spreadsheets for data analysis in statistical package GraphPad Prism. Import data into GraphPad Prism ready for data analysis.
7	Perform ANOVA data analysis for each cohort comparing mentee academic scores to control groups scores for each of the five VALID performance measures.
8	Interpretation of data analysis, examining where significant difference and non-significant differences within the five Year 10 VALID performance areas for each cohort.
9	Discussion of this interpretation of the data analysis with academic.
10	Creation of five data tables showing comparison of mean science performance scores between mentee group & control group for five cohorts using five different Year 10 VALID performance measures.

Future research activities	There is the potential that this research could be extended to a Master of Education or Master of Research topic.
Project location	Springfield
Time commitment	This research will be completed over a 10-week timeframe, with the student expected to work 10-11 hours a week during those 10 weeks. Start dates are negotiable.
Benefits for successful candidates	The research will provide the undergraduate researcher with a deeper understanding of descriptive and inferential data analysis as they are used in research, and how to draw inferences and conclusions from these analyses. This project will allow for a deeper understanding of how to design research within an educational context. The candidate will be invited by the team to present this research, as well as attend, the School of Education Research Cluster meetings. This will allow the undergraduate researcher to develop communication skills and broaden their knowledge of research within the field of education.

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Project outcomes	The outcome of this research will be a completed longitudinal quantitative data analysis of the performance of students who have participated in an ARMP. This data analysis will then be used as the basis of a publication to report on the longitudinal outcomes of this program. This program will also provide the undergraduate researcher with data analysis skills and experience using data analysis software as well as communication skills.

School of Engineering

Project Title: Utilization of Glass Waste in Environmentally Friendly Grout Mixtures

Project supervisor/s and contact details	A/Prof Ali Mirzaghorbanali: ali.mirzaghorbanali@usq.edu.au A/Prof Andreas Helwig: andreas.helwig@usq.edu.au Prof Polly Burey: Polly.Burey@usq.edu.au Dr Tristan Shelley: tristan.shelley@usq.edu.au Mr Hadi Nourizadeh: Polly.Burey@usq.edu.au
School/Centre affiliation	Institute of Advanced Engineering and Space Sciences/Centre for Future Materials School of Engineering /School of Agriculture and Environmental Science/Centre for Future Materials/SIMPLE team
Additional information	This project can be conducted by 2nd and 3rd-year students of Civil Engineering discipline. It will be advantageous if the candidate knows how to use Excel for data analysis.
Project description	This project is intended to investigate the mechanical properties of amended grout products mixed with waste materials using compression testing machines. Initially, amended grout samples are cast by replacing cement for various percentages of waste-to-cement ratios ranging from 1 to 5%. Samples then are cured for different curing time intervals (1, 7, 14, 21 and 28 days), and tested for determination of Uniaxial Compressive Strength, Elastic Modulus in Compression and Shear strength. The student will be involved in the following activities: 1. A Literature review on mechanical properties of amended grout products, 2. An experimental study on the mechanical properties of amended grout for various curing time intervals, 3. Preparing a test report 4. Presentation of project outcomes to the School, Centre and/or industry. All the testing equipment and materials are currently available at the School of Engineering. The findings will be presented to the wider community at the Resource Operators' Conference.
Future research activities	This project can be extended further into an Honours research project with the potential for the candidate to go onto future research activities including a Masters or PhD project.
Project location	The successful candidate will be required to work at the Toowoomba or Springfield campus for the duration of the project as there are opportunities to work with other students, researchers, and industrial partners. Some aspects of the project, including literature review and data analysis, may be completed off campus from the candidate's home. This would need to be negotiated with the supervisory team.
Time commitment	This project involves the equivalent time commitment to a 3-day week 10-week intensive

	research and development project. This project may partially assist engineering students trying to meet their work placement requirements.
Benefits for successful candidates	The successful candidate will gain experience working in a research team where researchers from different backgrounds work together in a collegial environment. Skill development may include: • How to carry out a systematic literature review, • How to plan research studies, • How to cast small-scale concrete samples for testing, • How to use Engineering testing equipment, • A general understanding of safety and risk assessment in Engineering, • Data analysis using Excel, • Report preparation and submission **Student may have the opportunity to attend in Resource Operators' Conference in Feb 2024.**
Project outcomes	This project will lead to a better understanding of amended green grout applications in various conditions. An experimental equation will be developed based on the collected experimental data to model the strength of amended grout in relation to various Engineering parameters. Findings will be presented at Resource Operators' Conference in FEB 2024.

Project Title: PV-Micro-hydrogen Production from Seawater/Saline Bore Water and Operation Characterisation

Project supervisor/s and contact details	Andreas Helwig AProf. Electro-Mechanical Engineering (SoENG/CFM) Dr Mark Lynch
School/Centre affiliation	SoEng (Electrical/power/mechatronic engineering and relevant science discipline majors) Centre for Future Materials (Sustainable Systems RRC grant research alignment)
Additional information	**Background**: Large Photo-voltaic distributed generation has periods of excess energy generation that causes problems on electrical energy grids voltage and frequency. Creating a load absorption hydrogen production for long terms seasonal energy storage that can be quickly turned on and off is one means of creating such a load sink during peak renewable energy generation that exceeds grid demand. Hydrogen can also be injected up to 10% per volume in our current Australian natural gas pipeline network to improve the carbon footprint of Australia. This project is to create a model size 12V DC PV generation panel/s linked to a designed and 3-D printed array of electrolyser hydrogen cells using special long life cathode and anode materials for use with circulating seawater or saline or hard non-potable bore water to produce hydrogen, and byproducts such as industrial HCl, and NaOH solutions. The idea is to safely commission this scaled model system, and then investigate and characterise its operation, outcomes, reliability and fatigue to be able to be used later after completion of this project to implement an upscaled industrial dynamic model in that MATLAB SIMSCAPE and LCA model. The student should have an interest in sustainable energy systems, come from an electrical, or power, or mechatronics discipline major, with abilities to design 3-D components and print and assemble, be interested in risk management planning, operating systems, as well as have an attitude of curiosity to explore the physical phenomena associated with energy transfer and energy storage/recovery systems. The aim of this project is to contribute to Australia's future energy mix and towards our sustainable economy to support local industry and society, but without using precious potable fresh water.
Project description	CAD-CAM design and construct using 3-D additive printing additive construction methods a group of electrolyser cells using long life corrosion resistant anode and cathode materials to be connected to a 12 PV supply, and also use a dosing pump circulation system of bulk saline water to produce and investigate hydrogen production and study the other off-gasses and by- products. Risk management planning for construct and operation of this system, plus assessment of anode and cathode materials changes during the study to estimate life. Data collection and analysis and reporting (including poster / research paper), with a prepared and recorded poster pitch for hydrogen production as a load absorption ancillary service in the Australian NEM grid.
Future research activities	This project is to investigate the material phenomena associated with hydrogen production from non-potable water (as Australia has limited freshwater supplies), and then produce the upscaled industrial dynamic SIMSCAPE and LCA fatigue life digital twin models for long term hydrogen storage use as a switchable and fast response energy absorber when renewable energy distributed large sources exceed load demand. This will allow a techno-economic- sustainable impact

	analysis to be undertaken to understand potential roles that cheap green hydrogen production could help Australia reach its climate goal targets while keeping the cost of electrical and thermal energy to acceptable limits.
Project location	Toowoomba Campus Pro-Precinct Engine Lab that is fitted for hydrogen detection or hooded vented chemical lab cabinet, and SoEng Z-Block Computer Labs/ Student workspaces / 3-D printing facilities.
Time commitment	Two weeks 35 hour intensive weeks in mid-year break to design, print and construct model size system, plus 4 - 8 hours weekly contact for remaining 8 weeks of the project for testing/results consultations, with some data analysis/reporting undertaken in student's own time.
Benefits for successful candidates	The intent of this section is for the student to have a sense of what they will take away from this project experience. Energy systems and storage are a key to a future more sustainable economy and society. The project gives a student the opportunity to be mentored by an experienced industrial and academic researcher in renewable energy and energy storage systems design, analysis and modelling. The data and report/publication developed will also lead to a potential honours/ masters or HDR research topic in upscale dynamic modelling for Grid applications. Also outline the skills the student will develop: - 3D design and construct skills - risk management skills - experimental design skills and operational commissioning skills - Data collection and analysis - Energy systems and energy flow/efficiency analysis skills - Understanding of the importance of seasonal storage and development load absorption ancillary services in Queensland's energy NEM grid, while not depleting fresh potable water reserves.
Project outcomes	*1)* Student tangible outcomes are proof of concept, data collection and publication of investigations. *2)* Potential contribution to Honours, Masters or HDR future UniSQ research in this sustainable energy topic area.

Project Title – Design polymer-free slow-release fertiliser from lignite

Project supervisor/s and contact details	A/Prof. Lei Ge
School/Centre affiliation	School of Engineering, Centre for Future Materials
Additional information	Year 2 or 3 students with chemistry, agriculture or material background
Project description	This project is being conducted under the Department of Education AEA seed program. We will be engineering design activated lignite to slow-release fertiliser (SRF) in collaboration with the Australian fertiliser/lignite industry. This project can provide a very cheap but effective SRF and could overcome the cost barrier of peer SRF products. The research supports the Government's goals to improve fertiliser effectiveness and reduce losses to runoff to the waterways e.g. Great Barrier Reef and mitigate greenhouse gas emissions. The lignite simultaneously adds bio-carbon to the soil, improving soil sustainability. The cost of market-ready SRFs (polymer-embedded fertilisers) is currently so high that it is economically better to over-apply conventional fertilisers and accept losses to the environment. Lignite provides a very cheap but effective ion exchange host and could overcome this cost barrier. More importantly, our proposed lignite-based SRFs will eliminate the usage of polymer coating that is free of the microplastic issue thereby easing human health and environmental concerns. This project will mainly based on Springfield Campus Material labs and may also work within the Centre for Agricultural Engineering facilities depending on the progress. The specific research objectives of this project are: 1. To design and fabricate SRF from lignite by surface chemistry control and in-situ nutrient formation. 2. To validate the nutrient release characteristics of SRFs towards the greenhouse plant trials as well as evaluate the reduction of greenhouse gas emissions.
Future research activities	• The research scope and activities can be extended to Hons, Masters or PhD programs • This project will also provide students the opportunity for future PhD study.
Project location	Springfield campus
Time commitment	10 h per week
Benefits for successful	Research training on both fundamental research and potential opportunity to work

candidates	with industrial partners on technology development
Project outcomes	The outcome of this project is to sustainably convert lignite into a cost-effective polymer-free slow-release fertiliser that reduces environmental impact and provides efficient nutrient delivery.

Project Title: Development of Grass-Reinforced Natural Fibre Composites for Building Applications

Project supervisor/s and contact details	Assoc Prof Mainul Islam Mainul.Islam@unisq.edu.au
School/Centre affiliation	School of Engineering and Centre for Future Materials
Additional information	Any research-minded mechanical or civil engineering students in their second year and above should be able to conduct this project. An understanding of basic statistics and Excel for data analysis will be advantageous.
Project description	Agricultural wastes can be used in the production of environment- friendly composite materials. Wastes can be used as reinforcing constituents to be mixed with a polymeric resin to create engineered natural fibre reinforced composites. Natural fibre reinforced composites made utilising these wastes are relatively new. However, waste reinforced polymeric composites can be engineered through research and development for the uses as various components including sandwich composites for building and other applications as structural and semi-structural components. There has been an incredible development in polymer matrix composites of various plant fibres. Grass fibres are one type of the important plant fibres which occur in different parts of plants, mainly in the stems and leaves. Novel grass-fibre reinforced composites have a great potential particularly in building industries. Quality grasses from lawn mowing wastes will be extracted for chemically treated with simplified processes. Then a suitable polymeric resin will be used for fabricating these composites. The fibres can also be of various size ranges and combinations depending on the potential applications. Various types of sandwich composites can also be made by selecting different constituent materials for skins and these composite cores. Main objectives of this project are to (a) develop novel natural fibre composites using grasses as agricultural wastes with chemical treatment, and a suitable polymeric resin, (b) investigate relationships between various fabrication parameters, (c) investigate mixing behaviour of fibres and resin, (d) characterise mechanical and other behaviours of the developed composites, and (e) develop and investigate properties of novel sandwich composites made of developed composite cores and suitable skins.
Future research activities	A further extension of this project could be an Honours research project, enabling the transferred knowledge and experiences to be applied to future research activities such as Masters by coursework or research and PhD studies.

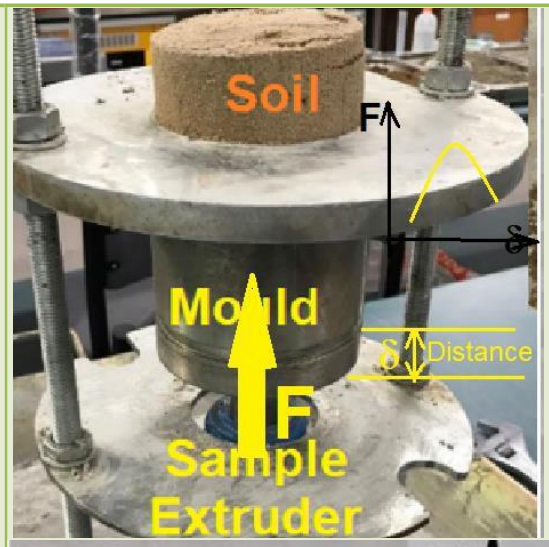
Project location	It will be necessary for the successful candidate to usually work in Toowoomba campus throughout the duration of the project due to the Toowoomba campus having well-established nationally leading experiment facilities. This will also benefit the candidate by collaborating with other senior students and researchers. The candidate may be able to complete some aspects of the project remotely from their home, such as literature review and data analysis. In this case, this would have to be negotiated with the supervisor.
Time commitment	The time commitment required for the project is normally for 10 weeks with an indicative involvement of 3 days per week, as per a tentative timeline below. Week 1: Become familiar with the project and working environment, Weeks 2-3: Literature review on the topic and relevant area, Week 4: Develop methodology and prepare RMP for experiments, Weeks 5-7: Fabrication and testing of the developed composites, Weeks 8-9: Data analysis and write up, Week 10: Wrap up the project and presentation/report submission.
Benefits for successful candidates	By working in a collaborative research environment with other senior students, researchers and technical staff from different disciplines, the candidate will acquire a diverse range of experience. Skills development may include: 1. Becoming familiar with the nationally leading advanced research centre and facilities, 2. Developing literature review skills through this project, 3. Developing engineered composites using agricultural wastes, 4. Understanding the testing procedures for characterising materials properties, 5. Collecting and analysing experimental data, 6. Opportunity to interact with potential industry and other interested parties which may lead to post-graduation employment opportunities.
Project outcomes	Upon successful completion of the project, the candidate will work with the supervisor to produce a publishable co-authored article in a high impact journal and/or in the proceedings of a national or international conference.

Project Title : Improvements in soil density and compaction test and analysis

Project supervisor/s and contact details	Dr Habib Alehossein
School/Centre affiliation	School of Engineering
Additional information	Preferred completion of Geotechnical Engineering courses CIV2403 and CIV2901

UniSQ

Project description	Solid minerals, organic matters, water, and voids are the main components of natural soils. However, soil deformability, density and shear strength can reduce substantially as the soil water content increases. An increase in soil water content will increase soil volume, hence reducing its density and increasing its permeability and erosion-ability. By compacting agricultural soils, not only soil pore volume decreases, causing an increase in the bulk density, but also soil void arrangements and structures deteriorate, causing permanent deformation. Proctor compaction testing is rarely used in laboratories, as most of the agricultural soil compaction tests are carried out in the field with the purpose of assessing the suitability of the soil void structure for cultivation. A modified compaction theory and testing is proposed here that can equally benefit both disciplines beyond the conventional proctor test results. This new test measures not only the traditional soil density, but also deformability and shear strength or bonding of the soil, which is highly important to both farmers and engineers. Supervised and mentored by our highly experienced laboratory engineers, you will conduct a series of soil compaction tests under a digitally load-displacement extruder setup to remove your compacted soil specimens. You will take photos and videos of the testing procedures and document them in both EXCEL and WORD files. A typical test will consist of following steps (See figures below as well): (a) You will be given 1500 g of dry coarse soil, plus 250 g dry clay and plus 250 g dry silt to first complete a sieve analysis before your compaction test. You will record all the results and graphs in your EXCEL file. (b) Mix this dry soil well in a dry tray. (c) Measure mass of your compaction mould (M_mould) and all the attached accessories (M_collar, M_base) separately and record them in your EXCEL file. Measure both inner diameter and height of the mould to calculate its exact volume V_mould. (d) Pour this well-mixed dry soil in the mould without applying any compaction and measure the mass of the uncompacted dry soil, M_uc_dry_soil. (e) Apply a compaction test in 3 layers and again measure the mass of the compacted dry soil, M_c_dry_soil. (f) Now add 1%, 2%, ….. water to your 2000 g soil, so that your wet soil total mass in the tray becomes 2000(1+w/100) where w is the total water content. Mix it well in a tray, once ready, cover it with a plastic nylon in order not to lose any soil moisture with time. Otherwise check the soil total mass (M_wet_soil = 2000(1+w/100) g) and add water if the wet soil mass in the tray drops below this number due to the loss of moisture to the air) (g) Gently fill up the (one litre volume) compaction mould without “any compaction at all” and measure the mass of the mould with this uncompacted sample inside it. Therefore, this should give you the mass of the WET UNCOMPACTED soil, M_uc_wet_soil. (h) Now start your compaction test - in three horizontal layers with 25 blows on each layer where the hammer hits the soil layer top surface section uniformly. Once compacted sample is trimmed and ready, measure the mass of the mould and the compacted wet sample. Therefore, this should give you the mass of the WET COMPACTED soil, M_c_wet_soil. (i) Now make sure your designed removal setup has a rigid non-deformable and non- moveable base and start the test at very low rate, until reaching the maximum force, after which you can increase the rate as much as you like.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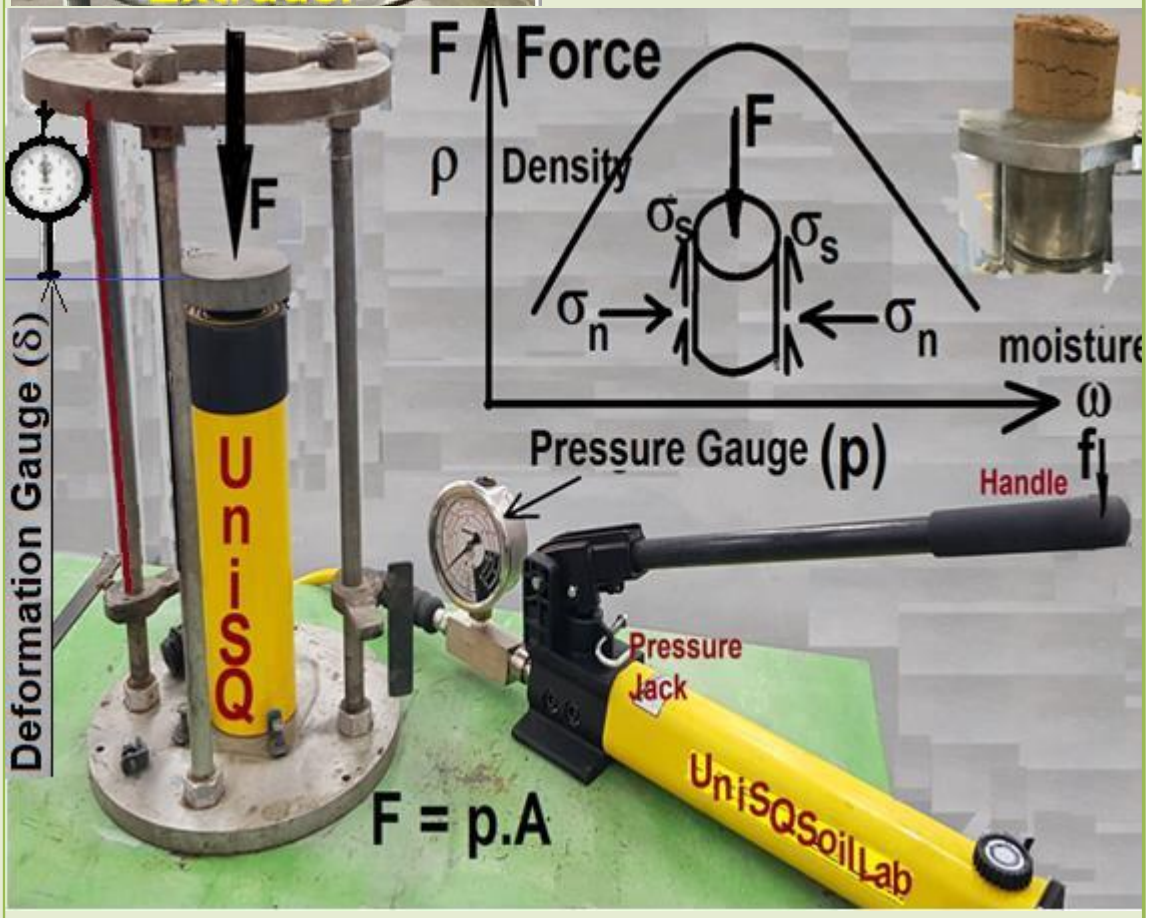
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Future research activities	The knowledge and techniques you practice in this project will not only enhance your civil-geotechnical-mechanical engineering soft and hard skills, and EA required competencies and capabilities, but also give you the opportunity and option to transfer them to your future research projects. In addition, the study topic can be extended into an Honours thesis, Master or PhD research work. This is an important topic which has been attractive to mining, civil, agricultural, mechanical and electrical engineers and pertinent industries both nationally and internationally.
Project location	The student will be required to travel to Toowoomba campus to participate in this project. The *location is the soil mechanics laboratory.*
Time commitment	This project will be conducted during normal working hours (8am to 4pm). Our staff in the lab are flexible enough to work with the student's availability. The entire research project is designed as a 2-month study. The project component of the study involves 10 weeks. You will attend 1 to 2 days per week, depending on your time and availability. The student work will be (i) help completing the tests with our lab staff as part of their team, (ii) help recording all the results, (iii) help analyzing the results, (iv) help doing a literature survey, (v) writing a final report, and potentially (vii) collaborate and help to write a journal article on the subject.
Benefits for successful candidates	This a great opportunity for the engaged student to work with international experts in a collaborative research environment, learning how to conduct and manage highly delicate testing processes and procedures with the highest accuracies and reliabilities - coming up with a new design and novel technique for extracting soil properties, as required in both soil analysis and soil engineering practice. Apart from the skills to manage and conduct the tests, analyzing data and results and writing a professional report, the student will have the opportunity to develop knowledge in soil or geotechnical engineering research and development.
Project outcomes	The outcome of this project in relation to the student engagement are as follows: 1. Learning how to be innovative, as innovation is highly crucial in advancing skills of our future graduates, engineers, researchers or scientists. 2. Participation in a team for the development of a complete new compaction testing tool for the mining, civil, geotechnical and agricultural engineering industries. 3. Collaboration with a team for the development of potential journal publications on this topic and the contributions made by the student. 4. The potential for future research projects at honours, masters and PhD levels.

Project Title: Chemical and Microstructural Characterization of waste glass materials from Council sites in Queensland for incorporating as a sand replacement in road base and concrete applications

Project supervisor/s and contact details	Dr Hannah Seligmann Hannah.seligmann@usq.edu.au Jessica Pahl Jessica.pahl@usq.edu.au
School and/Centre affiliation (if appropriate)	School of Engineering Centre for Future Materials
Additional information	This project is aimed at either a 2nd year or 3rd year Civil Engineering student. The student will need to have basic skills in analysis in excel and be available to do on-campus experimental work in either Springfield or Toowoomba. The student will be trained in experimental design and investigation throughout the duration of this project.
Project Description	Waste glass contributes a large proportion of solid waste material to landfill. In Australia, only 46% of glass products are recycled, and in the 2018-2019 year, 141,140 tonnes of glass products were recorded as being sent to landfill. There has been significant interest in using crushed waste glass product as a replacement for aggregate materials, particularly as a sand replacement in road base and in concrete. However, the sources of waste glass vary significantly, and this variation has been linked to variations in strength and durability. **Project Aim** In this research you will help to characterise the properties of waste glass from varying locations in QLD and quantify how these variations might impact on their applications in the civil construction industry. **Project Activities** The activities that will be conducted as part of this investigation include the following: • Conduct a literature review into how waste glass materials are currently used in the civil construction industry in QLD • Conduct an experimental investigation into the micro-scale properties of waste glass from three (3) different locations in QLD. These micro-scale investigations are likely to include: ○ Scanning electron microscopy and image analysis to determine shape and size properties ○ Atomic force microscopy to determine the surface roughness of glass particles ○ Chemical analysis of the composition of the glass • Conduct an experimental investigation into the macro-scale properties of waste glass from three (3) different locations in QLD. The macro-scale investigations are likely to include: ○ Aggregate crushing value ○ Aggregate absorption

	• *If time permits,* prepare mortar cylinders with glass mixes to compare the compressive, and indirect tensile strength of mixes. • Contribute to a journal paper that summarises key findings
Future Research Activities	This project can be extended further into an Honours research project which will open the opportunity to transfer the gained knowledge and experience to future research activities including a Master's or PHD program of research.
Project Location	The successful candidate will be required to work at Springfield or Toowoomba campus for the duration of the project with opportunities to work with other students, research and industrial partners. Some aspects of the project including the literature review and data analysis may be able to be completed off campus from the candidate's home. This would need to be negotiated with the supervisory team.
Time commitment	This project involves the equivalent time commitment to a 2-day week 10 week intensive R and D project. This project may partially assist engineering students tyring to meet their work placement requirements.
Benefits for successful candidates	The successful candidate will gain experience working in a collaborative research environment and with researchers from different disciplinary backgrounds. Skill development will include: ○ Understanding of crushed waste glass uses in the civil construction industry ○ Preparation of a literature review ○ Data collection and data analysis ○ Experimental design and testing ○ Opportunity to meet and engage with industry partners and other interested stakeholders.
Project Outcomes	The results of this project are anticipated to provide useful information that is required to determine the most suitable uses of waste glass in the development of novel and sustainable construction materials. Data from the project may also be used in publishing high quality journal articles. The successful candidate will be a co-author on these outputs.

Project Title: Design, manufacturing, and testing of novel lattices

Project supervisor/s and contact details	Dr Sourish Banerjee, email: Sourish.Banerjee@usq.edu.au
School/Centre affiliation	School of Engineering
Additional information	This project is suited for a 3rd year level for both Civil & Mech. It is expected that the student has a background knowledge of mechanics and modelling using any AUTOCAD software. It would be a bonus if he/she has completed a research methodology course.
Project description	Lattice materials have high stiffness and strength to density ratios due to their porosity Natural materials like wood, cork, bone are examples of such materials, while honeycombs and foams are their synthetic manmade counterparts. These materials also possess good thermal insulation and acoustic damping properties. These materials have been used in aerospace and marine industries along with infrastructure, packaging, and sports goods industries. These materials are interesting in the aspect that by changing the topology, different lattice geometries can be obtained with remarkable properties. An example is the negative Poisson's ratio observed in an auxetic lattice, that is not found in solids. This project aims to develop novel ultralight yet stiff, strong, and tough lattices that can be tailored to various applications. Because of the intricate features in various length scales, additive manufacturing methods - 3D printing will be used for making these samples. Objective: To design, manufacture and test a novel topology of lattice with enhanced mechanical performances Student needs to undertake the following activities: • Draw the geometry of the lattice samples • Manufacture the drawn samples in the laboratory using 3D Printing, • At the next step, test the mechanical properties of the lattices using the state- of-the-art experimental facilities at the UniSQ, The student will be guided at each step of the project. Thus they will have a good exposure of designing, making, and testing of these lattices.
Future research activities	The project is a part of a proposed HDR research project. It can be extended to a final year Honours thesis, and to a HDR research project. The research skills and the experience gained during designing and making the samples and, testing would be

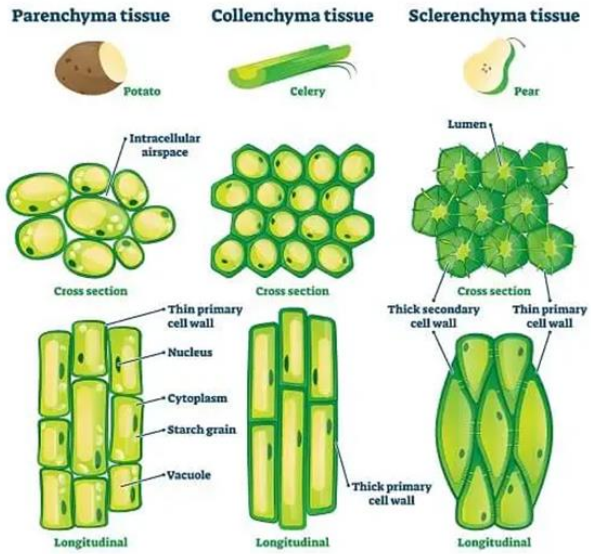
	valuable in future research activities.
Project location	The successful student needs to come to Toowoomba campus to carry out the project for the duration of the scholarship.
Time commitment	The student needs to commit at least 2 days per week over the duration of 10 weeks. It can be undertaken in a couple of blocks, and this will need to be negotiated with the supervisor.
Benefits for successful candidates	The student will learn how a research project is conducted and the importance of creative thinking. They will be exposed to how a research activity is undertaken and will gain experience in working in collaborative research environment at the School of Engineering. Apart from the creative thinking, research and communication skills, the student will develop the following skills • Introduction to 3D printing • How to model lattice using an AutoCAD software and make samples using the 3D printing • Experimental testing
Project outcomes	Apart from the test results, it is expected that the project findings will provide an insight into the design, manufacturing process and mechanical behaviour of these novel materials. The knowledge gained will be used in further research on the enhanced design of these lattices. Depending on their contribution and findings, their name will be included in a conference paper and/or in a journal publication in future. In addition, they can continue to a PhD program in this area after graduation. Furthermore, they will learn about a material that they may have seen but would not have known about how changing the topology of the lattices can lead to very different properties.

Project Title: Effect of camera model used in computer vision on prediction performance

Project supervisor/s and contact details	Jason Brown (jason.brown2@usq.edu.au, 07 3470 4026)
School/Centre affiliation	School of Engineering
Additional information	This project can be undertaken by a 2nd or 3rd year student in Electrical/Electronic Engineering, Computer Engineering or Mechatronic Engineering disciplines. The analysis part of the project will use Python as the programming language, so a student with skills and experience in that language will be the best fit. However, it is expected that students who know C, C++ or Java will be able to learn Python while working on this project. Some familiarity with cloud based tools, and specifically Google Drive and Google Colab, will be beneficial.
Project description	Computer Vision is used in a variety of applications such as biometrics, industrial inspection, and object avoidance. It employs a camera or cameras to feed images and/or video to a pre-trained artificial neural network model to discern what objects are present in the image/video, and possibly draw a bounding box around each object. This project aims to build on and extend some existing UniSQ research to determine whether (and if so how) the performance of some general purpose computer vision models depend upon the exact camera employed to capture the images/video. In this project, the student will first collect images and/or video using a variety of cameras, probably webcams for convenience. The data collection will be such that: • the same nominal images and/or video will need to be captured by each camera • the images and/or video will need to be of objects that can be recognised by a pre-trained computer vision model • a variety of scenarios are considered (e.g. distance to object(s), background scene) The captured images and/or video will then be input to a pretrained computer vision model to determine the recognition performance as a function of source camera. This will be done using Python scripts. Some scripts are already available, but it is expected the student will need to extend and customize these for the specific task. The student will also work on the effective presentation of results using the functions of the Python “matplotlib” library. This work has direct relevance to industrial inspection research that UniSQ is participating in with industrial partners.
Future research activities	The project can be extended into a final year research project or HDR research

	project. The skills acquired through strategic data collection, Python scripting and results presentation can be applied to other research projects.
Project location	This project can be conducted on campus or at a different location (such as the student's home). The main limitation is access to the variety of cameras that will be required for data collection. However, it is anticipated these can be sent to the location of the student for the duration of data collection. The student will need a space (e.g. a room) for data collection that will not be disturbed by others, since images/video will need to be captured using different cameras with a common background.
Time commitment	It is envisaged the student will need to commit to 2 days a week for 10 weeks for this project, although the schedule is flexible. It is anticipated the data collection will take some time and it would need to be completed by Week 5 or 6 to allow sufficient time for analysis.
Benefits for successful candidates	There will be opportunities to work in a collaborative research environment with academics from other disciplines (in particular, Maths and Civil Engineering) who are also involved in the broader project. There may be opportunities to gain some insight into industrial inspection with industrial partners, although this is to be confirmed. The skills acquired will be: • Ability to design a scientific data collection methodology • Python scripting in a cloud environment • Application of general purpose computer vision models • Ability to present results with maximum impact
Project outcomes	The intention is to publish the work in a journal with the student as a co-author.

Project Title: Experimental imaging and analysis of heterogeneous plant food cellular structure during drying operations

Project supervisor/s and contact details	Wijitha Senadeera (UniSQ) wijitha.senadeera@usq.edu.au , Jasmine Banks (QUT) and Charith Rathnayake (University of the Sunshine Coast)
School/Centre affiliation	School of Engineering
Additional information	Student should be familiarized with MATLAB in general and he or she know Image Processing with it or willing to learn image processing and create algorithms for image analysis using MATLAB. General understating of statistics for data analysis and interpretation. Report writing skills. Suitable for 3rd year Mechanical/Mechatronics or Electrical Engineering student. This project is an eye opener for robotic vision studies.
Project description	**AIM** – Development of an image-based algorithm for the determination of cellular heterogeneity among plant cells during drying and rehydration using MATLAB software **Background**  Figure 1 Different plant cells (Source: Katy, McLaughlin, 2001, Plant Cell, https://biologydictionary.net/plant-cell/) Plant cells are coming in different shapes and sizes (Fig. 1). Changes of cell size and shape deformations are observed during when they undergo food processing operations such as drying and rehydration. These changes can be visualized by using scanning electronic microscopic (SEM) images. Currently these images are analyzed with MATLAB image processing algorithms for different parameters like cell area, perimeter etc. Current knowledge of analysis of deformation is on the average behavior of cells considering individual cells. But in actual practice cellular deformations are in a heterogeneous manner. In present modelling work in drying and rehydration,

	homogeneous or similar cell shapes are used. If heterogeneity can be incorporated in these models' prediction behavior of food products are closer to reality and optimum parameters can be found for processing operations. Experimental scanning electron microscope (SEM) images during drying and rehydration are readily available to be used in developing the algorithm. In that project, average cell parameter algorithm was developed, and this is an extension to incorporate the heterogeneity identification algorithm of the cells in a tissue **What student will do** Student will develop an algorithm using MATLAB image processing techniques to determine the properties (perimeter, area etc.) of 2D SEM images of plant material during drying and rehydration. This algorithm helps to determine cellular heterogeneity (differences in basic cell properties) and ensemble averages during different stages of drying. Steps in the project work (milestones) 1. Literature review on image processing applied to determination of plant cell properties 2. Familiarisation of the image processing in MATLAB 3. Identification and isolation of cell boundaries in SEM images 4. Development of an algorithm to calculate individual cell properties (earlier work is already there to familiarise) 5. Development of an algorithm to calculate cellular heterogeneity 6. Use of statistics to interpret the heterogeneity 7. Report writing
Future research activities	So far, only ideal, and homogeneous models have been developed. In future research, real materials such as fruits and vegetables of commercial significance will be subjected to detailed investigations through computational modelling as well as experiments. This study can be expended to an honors project to study how the parameters such as maturity/ spatial distribution (i.e., location in the cell structure; differences of deformation due to cell sizes/shapes) contribute to cellular deformations in a heterogeneous manner. As, it is expected that, the findings will be of much interest to the field of engineering and science, particularly in industrial scales (i.e., the industrial food processing often requires to predict how a real plant food material will deform during drying e.g., drying of apple pieces from fresh as given in Figure 2 below). Using multiscale modelling techniques, a student can further study for a higher degree at PhD level.  Figure 2 Fresh and dried apple rings
Project location	Initial phase of the period student needs to come to university and familiarize with the past completed project. Time to time he/she may need to contact QUT or University of

	the Sunshine Coast University staff via online to discuss progress and get advice regard to his/her work. Report writing can be undertaken at anywhere and need to discuss the progress with the supervisors through meeting (via ZOOM). Regular meeting per week should be essential.
Time commitment	Project runs for 10 weeks Student needs to work at least 2~3 days per week in the project
Benefits for successful candidates	Student will improve the following. 1. Working with three supervisors who are experts in three different field eg. Food processing, EM, image processing and development of MATLAB Algorithms 2. Familiarised with research environments and how it operates 3. Ethics and safety related to research environment 4. Research report writing and presentation skills
Project outcomes	Student will gain a valuable experience in image processing techniques; this will improve his skills as a novice researcher This model will provide a source of guidance for industrial practitioners to optimize food drying operations in terms of final product quality, nutritious value, and overall process performance. In addition, the developed computational framework has potential future applications in modelling a wide range of plant and animal cells. Publication of findings in Q1 journals (targeting Journal of Food Engineering as a tentative journal and student can be a co-author) Further develop into grant applications

School of Humanities & Communication

Project Title 'Responding to warzone atrocities: comparing the international community's concerns towards violence against Ukrainian, Gazan and Sudanese civilians'

Project supervisor/s and contact details	Associate Professor Jess Carniel (jess.carniel@usq.edu.au) – Corresponding supervisor Richard Gehrmann Dr Mark Emmerson Dr Benjamin Harris
School and/Centre affiliation (if appropriate)	School of Humanities and Communication
Additional information	This project is best suited for a student who is entering into or completing their third year (or equivalent in part-time or dual degrees) of studies. As the project focuses on International Relations, a candidate from that discipline is preferred but there are no specific courses within the major that they will need to have completed. The ideal candidate will have: • Developed research skills appropriate for advanced undergraduate studies, including familiarity with efficient library and database research; • Strong skills in critical thinking and evaluation; • Good written and verbal communication skills; • Good attention to detail; • Ability to work as part of a team; • Ability to work independently (under supervision).
Project description	This project contributes to the supervisory team's established research agenda in International Relations, namely conflict studies, humanitarian aid, and soft power public diplomacy. It seeks to understand the role of soft power and public diplomacy in assisting the international community, via the United Nations, in effectively responding to issues of violence, displacement and human rights violations in active warzones. The study aims to be comparative in nature, focusing on the UN's use of soft power tactics to encourage global resolutions for not only the conflicts themselves, but support those civilians caught in the crossfire. The project team seeks a student researcher for the purpose of collaborative co-design, research, and writing. The student will assist with: • Co-designing the research methodology and theoretical framework • Conducting and writing up a systematic literature review. • Co-authoring at least one journal article for peer-reviewed publication

	The student will be mentored through the processes of qualitative research design, collaborative research processes, and publication strategies. It is estimated that the final development of the written research may fall outside the bounds of the paid scholarship. The student will have the option of continuing with the team in order to finalise the write-up processes. The student can gain credit for their research by enrolling in HAC3001 in T3 2024 or T2 2025 and completing a version or evolution of the project as part of their coursework. Alternatively, they may wish to enrol in HAC3001 in T2 2024, aligning the project timeline with the coursework, completing an element of it as their research project *or* using the experience as the foundations of a professional project (to be discussed with supervisors). The student will be credited as a co-author on all publications resulting from the project design and literature review, even if they do not participate in the journal write-up process.
Future research activities	If the student wishes to continue the research for course credit, they may enrol in HAC3001 in T3 2024 or T2 2025 (if they were not already enrolled in HAC3001 in T2 2024). They will also have continued access to the data as part of the research team, so may wish to use this existing dataset as part of an Honours thesis. After developing their original research for HAC3001, the supervisory team will work with the student to submit the final essay to E-IR's student essay showcase. E-IR is a well-regard open-access online magazine and publishing house.
Project location	The project can be conducted online. Generally, all team meetings are conducted via Zoom and a Teams site will be set up for the project to store all data and files. Occasionally, the research team may meet in-person at Toowoomba campus, but this is not a requirement for the successful candidate.
Time commitment	The elements of the project with which the student will collaborate as part of the scholarship program will run for 10 weeks, commencing May 2024 (T2) The student will be expected to work 10 hours (approx. 1.5 days) per week. This includes a weekly check-in with the project supervisor and a fortnightly meeting with the whole project team.
Benefits for successful candidates	In participating in this research project, the student will develop skills in: • Conducting a literature review; • Resource management; • Qualitative research design; • Collaborative research; • Developing research for publication (optional). These skills will be beneficial for moving into postgraduate study, but are also transferable skills sought by employers. They will also develop a publication track record and have the opportunity to develop an original piece of research for credit.
Project outcomes	The project will result in: • a minimum of one co-authored publication in a peer-reviewed scholarly journal (such as International Studies Perspectives);

	• a co-authored research seminar presentation; • a solo-authored piece of research for credit (for a student who continues the project for credit in HAC3001 or honours); • a solo-authored open-access publication (if the student chooses to pursue the option of submitting their HAC3001 essay to E-IR).

Project Title – Ginan: A literary Speculative Fiction project.

Project supervisor/s and contact details	Dr Maria Arena: maria.arena@unisq.edu.au Dr Nike Sulway: nike.sulway@unisq.edu.au
School/Centre affiliation	School of Humanities and Communications
Additional information	• The 3rd year student, who will have demonstrated a sustained record of high achievement in 2nd and 3rd year CWR courses and a community-of-practice orientation, will conduct a benchmarking and viability study whose goal is to evaluate the requirements for establishing a sustainable online literary Speculative Fiction 'journal'. The research will also, potentially, form the basis of a scholarly publication, for which the student would be invited to participate as a co-author with the research team. • In the long-term, the scoping/benchmarking research will lead to the establishment of an online 'journal' that will provide research and publication opportunities for the successful student, and for others within, and beyond, the School of Humanities and Communication.
Project description	• As part of a larger project aimed at establishing UniSQ as *the* place for students wishing to write and research Speculative Fiction in Australia, the Creative Writing team are working towards establishing an online Speculative Fiction literary journal. While the project is called a 'journal', the project is more wide-ranging than a traditional journal and may include additional services and activities, such as public lectures, training, and networking. • The successful recipient of the Undergraduate Research Scholarship will work with the research team to conduct initial benchmarking and sustainability research, looking at similar projects published/hosted by regional organisations. The student will be involved in identifying, analysing, and comparing various models for the 'journal', as well as identifying potential industry and community stakeholders and allies, and potential funding models and opportunities.
Future research activities	• Future research activities arising from the student's involvement in the project could include developing the research project in *HAC3001:The emerging professional*. The project will also prepare the student for completing a CWR Honours project by extending their research skills and developing partnerships with potential supervisors. • There is potential for the student to grow their engagement in the project into an editing and publishing based Honours project, or a Creative writing project.
Project location	Toowoomba and/or online.
Time commitment	2 days per week over 10 weeks, plus one hour per week for consultation with the supervisory team.
Benefits for successful candidates	The student will work closely with the research/supervision team to develop their research skills and will engage with other students involved in research and writing projects, thus expanding their research networks and increasing their confidence as researchers.

	The successful student researcher will be invited to share in presenting the research findings at a School Research Symposium, and (potentially) to contribute as a co-author to writing and publishing a scholarly article based on the research findings. In the long term, there is potential for the successful student to be involved in the ongoing development of the journal, including opportunities for professional development (in publishing and editing) as well as in both scholarly and professional writing and research.
Project outcomes	The research and findings of the successful student will be used to inform the ongoing project of establishing a sustainable literary Speculative Fiction journal, published by the Creative Writing team (staff and students). The journal, while in development and once established, will provide further research, writing, and publishing opportunities for HDR students, staff across a range of disciplines at UniSQ, and national and international researchers with an interest in Speculative Fiction.

Project Title – Shakespeare's Cultural Geographies

Project supervisor/s and contact details	Professor Laurie Johnson Email: laurence.johnson@usq.edu.au Ph: 4631 1739
School/Centre affiliation	School of Humanities and Communication Centre for Heritage and Culture
Additional information	Applicants should have completed ENL3009, ENL2005, or THT1001, with a result of Credit or higher, or should be able to provide evidence of equivalent knowledge.
Project description	An opportunity exists for an outstanding undergraduate researcher to contribute to an international research project studying how environment or geography shaped cultural innovation in Shakespeare's theatre. The successful candidate will undertake a study of several early modern English plays by Shakespeare or his contemporaries, focused on how these plays might have been changed for performances in different locations. The research required for this project builds on skills the student will have acquired in their undergraduate studies, but will also involve a suite of new skills in theatre history that will be taught through one-on-one training with Professor Johnson. These skills will include transcription of early modern archival documents, reading key historical source texts to construct a vocabulary of early modern playing culture, and developing knowledge of early modern stage directions and performance technologies. The major outcome of the project will be a publishable co-authored article or chapter targeted to a major journal like Early Theatre or for inclusion in a book published in the Anthem Studies in Cultural Geographies (on which Professor Johnson is a consulting editor).
Future research activities	The successful applicant can expect that the skills and outcomes from the completed research project will be directly transferable to an Honours thesis project and to Higher Degree Research in a relevant field of study in English Literature, Cultural History, or Theatre History.
Project location	The research required to complete the agreed project can be primarily undertaken online using databases to which UniSQ Library provides access (principally, the EEBO-TCP suite, Adam Matthews Digital resources, Cambridge Core) and those to which Professor Johnson can provide access (such as Folger LUNA Digital Image Collection and the Shakespeare Birthplace Trust). The researcher will be welcome to conduct this research on campus and to participate in supervision and skills training sessions with Professor Johnson in-person or via Zoom, as required.
Time commitment	It is expected that the project can be completed with a minimum investment of two days per week for the 10-week duration of the scholarship program. This 10-week program does not need to be undertaken in ten consecutive weeks and the dates of commencement and completion may be negotiated by the successful applicant, depending on course commitments during the T2 and T3 calendar in 2024. Ideally, the researcher will commit to 10 hours of training time (one hour per week for the duration of the project). In addition to the this, the supervisor will be available for a further minimum of 10 hours of consultation, collaboration, and supervision at times to be negotiated based on initial progress.
Benefits for successful candidates	The researcher's work will be acknowledged as a genuine contribution to a potential high impact publication, and the researcher will be provided with valuable opportunities to network directly with Professor Johnson's international research partners as well as with the global network of professional and research organizations at his disposal, including the Australian and New Zealand Shakespeare Association, the Shakespeare Association of America, the Shakespeare Institute (Stratford, UK), the Shakespeare Birthplace Trust, the Folger Shakespeare Library (Washington DC), the Museum of Shakespeare (London), the Museum of London Archaeology, and more. The

	researcher will also be invited to attend research seminars of the School of Humanities and Communication and in discussions with current HDR candidates. Skills that will be developed in training with Professor Johnson may include but are not limited to working with archives and archivists online, early modern paleography and skills in understanding early typography, transcription from secretary hand, expanding interdisciplinary knowledge about Shakespearean drama (including knowledge of early regulatory frameworks, business models of early modern playing companies, and the administration and governance of playhouses, playing, and print).
Project outcomes	Depending on the researcher's program of study, the participation in the Undergraduate Scholarship Program may be eligible for course credit, to be negotiated with the relevant Program Director. Upon successful completion of the project, the researcher will have the opportunity to continue to work with Professor Johnson to write up the research as a publishable co-authored essay in an international journal or book. This offer extends beyond the completion of the project but is provided as a long-term outcome of the research in keeping with the disciplinary norms in English Literature and cognate fields.

Project Title – Youth Intimate Partner Violence and Young Women's Attitudes to Non-Fatal Strangulation (NFS): A Digital Storytelling Intervention

Project supervisor/s and contact details	Prof Jessica Gildersleeve, Jessica.gildersleeve@unisq.edu.au Dr India Bryce, india.bryce@unisq.edu.au
School/Centre affiliation	School of Humanities and Communication Centre for Heritage and Culture
Additional information	Suitable for students completing study in psychology, education, and/or humanities and social sciences.
Project description	This project draws on young Queensland women's (people who identify as woman or nonbinary) experiences, attitudes, and knowledge of NFS (ie choking/sexual asphyxiation) as an act of sexual violence in order to develop public health communication resources via digital storytelling. Existing work in this field primarily looks at 1) NFS as domestic violence rather than sexual violence; 2) a broad rather than focused demographic; or 3) only those who have experienced NFS, rather than also tracing cohort attitudes towards it. This project maps those cohort attitudes alongside young women's experiences of NFS within intimate partnerships (casual, short-term, and long-term) in order to identify and understand the social and discursive frameworks within which this violence is not only permitted to occur, but normalised, accepted, and not recognised precisely as violence, despite its strong association with intimate partner assault (Bagwell-Gray 2016; Barker, Stewart & Vigod 2019). The project team presents a unique set of knowledge and interdisciplinary skills in trauma counselling, trauma analysis, and health communication, complemented by partnership with organisations devoted to supporting women and girls coping with the effects of domestic and sexual violence. The project is aligned with the specific priorities of the state and national communities, as well as healthcare providers and critical support services. It is aligned with Queensland's Prevent. Support. Believe. Framework to address Sexual Violence, contributing to the prevention strategy to 'increase knowledge and understanding of sexual violence and its drivers in the broader community'. The National Plan to End Violence against Women and Children 2022-2032 also recognises such violence as 'a problem of epidemic proportions in Australia'. Like the Prevent. Support. Believe. Framework, a priority area of the National Plan is preventing violence by changing individual and social attitudes. Youth sexual violence is a concern throughout all communities in Queensland, but particularly where young people are at greater risk of socioeconomic disadvantage (Final Report of the Youth Sexual Violence and Abuse Steering Committee, 2018). The present study represents Stage 3 of a three-phased project examining and countering the drivers of NFS as sexual violence within intimate partnerships in Queensland's youth: - Stage 1 was an online survey capturing young Queensland women's (18-25 years) attitudes to, knowledge and experiences of intimate partner violence, with a specific focus on NFS. - Stage 2 consisted of focus groups and interviews young Queensland women. Data gathered from the survey, focus groups, and interviews was examined within this stage using thematic and narrative analysis methods to not only understand the emergent themes in young women's attitudes to NFS, but the ways in which they tell these stories. - Stage 3 (the present study) constitutes the development of targeted, evidence-based digital storytelling resources which draw on the thematic and narrative data gathered in Stages 1 and 2 to produce effect health communication which recognises and addresses the lived experiences of young Queensland women today.

Future research activities	Development of targeted, evidence-based digital storytelling resources drawing on the data gathered in Stages 1 and 2 of the project. This project would be suited to someone with interest and experience in social media and its uses for public health communication.
Project location	Toowoomba and online
Time commitment	1-2 days per week, for six weeks. Primarily off-campus, with regular check-ins with the team.
Benefits for successful candidates	Familiarity with qualitative methods including thematic analysis and its applications; familiarity with timely topic of benefit to young people; experience in developing digital storytelling resources as public health communication.
Project outcomes	A suite of resources for distribution online and around Queensland.

School of Health and Medical Sciences

Project Title – Muscle activation changes underpinning protection to exercise-induced muscle damage

Project supervisor/s and contact details	Dr Ben Hoffman: ben.hoffman@unisq.edu.au Dr Patricio Pincheira: patricio.pincheira@unisq.edu.au Nicole Jones: nicole.jones@unisq.edu.au
School/Centre affiliation	School of Health and Medical Sciences Centre for Health Research
Additional information	The project is more suited to a current 2nd year student. The student must have an interest in biomechanics research and be comfortable in using computer software.
Project description	It is well established that undertaking sufficient physical activity can help to reduce the risk of many non-communicable diseases while physical activity is also highly effective in managing symptoms of many non-communicable diseases. Individuals will often seek the services of exercise physiologists, exercise scientists and personal trainers to be prescribed exercise that is tailored around their context. Typically, exercise programs consist of eccentric muscle contractions, where the muscle is lengthening while generating active force (e.g. lowering the barbell during a bench press). These type of muscle contractions are the best at developing strength and thus are important for improving health. However, eccentric contractions also can induce a transient loss in force and a delayed onset of soreness in the muscles in the hours and days following the exercise bout. This set of symptoms is characterised as exercise-induced muscle damage (EIMD). EIMD can act as a barrier to exercise adherence as 1) the sensation of soreness that lasts for up to a week can deter individuals from continuing to exercise, particularly in the elderly who experience greater amounts of soreness and 2) the transient loss in force may temporarily increase the risk of a strain injury while the muscle is in a weakened state. Our lab and others have been investigating a relatively recent phenomenon whereby the muscle on one side of the body is partially protected from the negative symptoms of EIMD, following a bout of eccentric exercise performed on the other side of the body. This is known as the contralateral repeated bout effect. Effectively speaking, the muscle experiences a protective adaptation despite not performing an initial bout of exercise to promote the adaptation. The contralateral repeated bout effect thus may be used as a method by which individuals avoid large EIMD while still receiving benefits of undertaking eccentric exercise. However, the mechanisms that underpin the contralateral repeated bout effect are not understood. It is likely the mechanism is linked to neural adaptations rather than a physical remodelling of the muscle, and it has been suggested that muscles that activate more fast-twitch fibres are prone to induce more muscle damage. However, muscle activation patterns between exercise bouts that induce the contralateral repeated bout effect have yet

	to be compared. As such, the aim of this project is to investigate the muscle activation pattern changes during exercise that induces the contralateral repeated bout effect. We will be using electromyography data captured during bouts of single-legged heel-drops to determine if there is a change in muscle activation pattern during the repeated bout of exercise compared to the initial bout of damaging exercise. The project is centered around understanding the mechanisms of exercise adaptations to inform exercise prescription and adherence, which aligns with the UniSQ flagship research area of Health. The student will be trained in using data processing and analysis software (LabChart, MATLAB). Once trained in these techniques, the student will be required to analyse the electromyography data collected during the exercise trials. The student will also attend some data collection sessions, which are run by a PhD student (Nicole Jones). Once the data is analysed, the student will provide a short report indicating the findings of their analysis. The student will also attend Sport and Exercise Science discipline research meetings (monthly) and School of Health and Medical Sciences research symposia (monthly).
Future research activities	The skills and knowledge gained in this project can be extended into future research study. The knowledge regarding exercise-induced muscle damage as well as the skills in using LabChart and MATLAB to process and analyse electromyography data can be used in an Honours research project in the 3rd and 4th years of the BSEH program. The student will be able to use these skills in a subsequent project where the student will recruit participants and collect their own original data to continue investigating the neural contributions to the protective contralateral repeated bout effect. Further to this, these data analysis skills will be advantageous for a student looking to undertake a HDR in any research area where biological data (e.g. force, pressure, position, electromyography) is captured.
Project location	Most tasks such as analysing data, attending meetings / seminars and developing a report of the findings can be done online/off-campus. However, there will be some contact required on-campus at Ipswich. At the beginning of the program, the student will be trained up in-person in using the required software and how to perform the data analysis. Also, the data collection sessions will be held on-campus at Ipswich.
Time commitment	The project will be run over Trimester 3, beginning at the start of September 2024 and finishing in mid-November 2024. The project will require a commitment of 2 days a week for the 10-week period.
Benefits for successful candidates	The student will gain skills and knowledge in processing and analyzing electromyography data. Through this, the student will develop skills in using specialized pieces of software (LabChart, MATLAB). This experience will equip the student with valuable data science / analysis skills, which will be beneficial for a future career in sport science. The student will also develop their knowledge concerning exercise-induced muscle damage and the contralateral repeated bout effect. Through data collection sessions, the student will experience life in a biomechanics research laboratory where ethical human experimentation is conducted. The student will be trained in safe laboratory procedures and work in a collaborative

	environment. Through attendance at research symposiums and meetings, the student will be exposed to the research culture across the discipline of Sport and Exercise Science and across the School of Health and Medical Sciences. This will facilitate an appreciation of different fields of research and research design approaches as well as developing their capacity to undertake research for the future.
Project outcomes	The data that is analysed by the student will contribute to a bigger study being led by the PhD student (Nicole Jones). This data will be included in a journal article publication.

Project Title – The investigation of neuropathological changes in experimental stroke models

Project supervisor/s and contact details	Dr Lin Kooi Ong lin.ong@unisq.edu.au Dr Prajwal Gyawali Prajwal.Gyawali@unisq.edu.au
School/Centre affiliation	School of Health and Medical Sciences Centre for Health Research
Additional information	This project is best suited for a 2nd or 3rd year student who is undertaking biomedical science or medical laboratory science. Experience with biomedical techniques (eg Western blotting, ELISA) would be advantageous, but not essential.
Project description	Stroke is strongly associated with cognitive decline and dementia. Indeed, significant impairment in at least one cognitive domain was reported in approximately 70% of stroke survivors who achieve full clinical recovery. Whilst stroke in brain regions involved in cognition (i.e. hippocampus) are rare, impaired cognition, decreased hippocampal function and hippocampal neurodegeneration are common after stroke. There is emerging evidence suggesting that stroke triggers a wave of secondary damage that causes the progressive and inexorable loss of brain tissue at sites connected to the area damaged by the initial infarction, a phenomenon termed as secondary neurodegeneration. Our studies to date have focused on characterising the pathophysiology and cognitive deficits associated with secondary neurodegeneration in rodent (mouse and rat) stroke models, and providing evidence of delayed injury in regions remote to the infarct following stroke, in a clinically relevant ovine model. Notably, we have shown that cortical stroke is associated with persistent neuronal loss, blood brain barrier dysfunction, neuroinflammation and accumulation of neurotoxic proteins at secondary neurodegeneration sites, including the hippocampus, out to 84 days post-stroke in a mouse model. Leveraging on these findings, we have established research collaboration with national researchers to access “biobank” tissue samples. Critically, we have established key biomedical methodologies in Toowoomba campus. In this project, a student will support the analysis of neuroinflammation, neurodegeneration and cerebrovascular remodelling using biomedical techniques and will also be involved in critical appraisal of post-stroke hippocampal secondary neurodegeneration and cognitive impairment.
Future research activities	The research skills that the candidate will develop over the course of this project are transferable to future research activities. This project could be extended to an Honours, Masters, or PhD project.
Project location	The project is located on the USQ Toowoomba campus. Some aspects of the project (eg literature review) may be able to be completed off campus from the candidate’s home.
Time commitment	The project will run for 10 weeks and will typically involve the student to commit 1.5 days a week to the project. This includes meeting with project supervisors.

	Please note the candidate may be required to commit to working up to 3 days a week at varius points in the project when performing various biomedical assays.
Benefits for successful candidates	The candidate will be involved with the following activities and will learn skills in: - Sample handling and processing - Biomedical science techniques such as western blotting and ELISA - Experimental design - Data acquisition and analysis - Systemic review The candidate will have the opportunity to present the findings at research symposium within the University. The candidate will also undertake workshops related to research, as part of the expected time commitment.
Project outcomes	This project will provide critical insights to the spatial and temporal neuropathological changes in various experimental stroke models will advance our knowledge in secondary neurodegeneration after stroke and link to post-stroke cognitive impairment. The project will result in a one co-authored publication in a peer-reviewed scholarly journal.

Project Title: Digital/computerised tools for assessment of post-stroke cognitive impairment.

Project supervisor/s and contact details	Dr Lin Kooi Ong lin.ong@usq.edu.au Dr Prajwal Gyawali Prajwal.Gyawali@usq.edu.au Dr Anna Girardi anna.girardi@usq.edu.au
School/Centre affiliation	School of Health and Medical Sciences Centre for Health Research
Additional information	This project is best suited for a 2nd or 3rd year student undertaking a health-related degree. Completion of previous courses related to public health/psychology would be advantageous, but not essential.
Project description	Stroke is a leading cause of acquired disability worldwide, and its disease burden is shifting towards that of a long-term condition. Cognitive impairment is common after a stroke and is known to significantly worsen the quality of life of stroke survivors. Stroke induces dysfunction of various cognitive domains including cognitive flexibility, attention, working memory and visuospatial memory. Stroke is a major risk factor for development of dementia. However, there is no gold standard for cognitive screening, with measures needing to cover a broad range of cognitive domains, be valid, feasible and sensitive for identification of post-stroke cognitive impairment. Typically, cognitive screening tools, such as Mini-Mental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA) are used to screen post-stroke cognitive impairment. While MoCA is sensitive to detect post-stroke cognitive impairment, it has poor specificity. Excitingly, there is emerging usage of digital/computerised cognitive assessment tools, such as Cambridge neuropsychological test automated battery (CANTAB) to screen post-stroke cognitive impairment. These digital/computerised tools may offer sensitive and reliable measures that can be customised for specific cognitive domains as well as temporal measures post-stroke. Accordingly, in this project, a student will be involved in: • critical appraisal of studies where digital/computerised tools have been applied in stroke population for identification of post-stroke cognitive impairment and • explore the translatability of digital/computerised tools for cognitive assessment in pre-clinical stroke models.
Future research activities	The research skills that the candidate will develop over the course of this project are transferable to future research activities. This project could be extended to an honours, or PhD project.
Project location	The project can be conducted online. Generally, all team meetings are conducted via Zoom and a Teams site will be set up for the project to store all data and files. Occasionally, the research team may meet in-person at Toowoomba campus, but this is not a requirement for the successful candidate.

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Time commitment	The project will run for 10 weeks, typically 1.5 day a week. This includes meeting with the project supervisors.
Benefits for successful candidates	The candidate will be involved with the following activities and will learn skills in: • Conducting a systematic review; • Quantitative research design; • Developing research for publication. The candidate will also undertake workshops related to research, as part of the expected time commitment.
Project outcomes	New knowledge gained will contribute to usage of digital/computerised cognitive assessment tools for identification of post-stroke cognitive impairment. This project will provide critical insights to cognitive screening using digital/computerised tools in humans and pre-clinical stroke models. The project will result in a one co-authored publication in a peer-reviewed scholarly journal

School of Mathematics, Physics & Computing

Project Title – Is My Data Safe? Data Protection for Business from Attackers

Project supervisor/s and contact details	Dr. Di Wu di.wu@unisq.edu.au Prof. Ji Zhang ji.zhang@unisq.edu.au Prof. Xiaohui Tao xiaohui.tao@unisq.edu.au
School/Centre affiliation	School of Mathematics, Physics and Computing
Additional information	This project can be conducted by 2nd and 3rd year undergraduate students in computing and business discipline. It is expected that the candidate has some IT literacy and foundation (having taken some introductory computing courses), be proficient in the use of Microsoft Office Software and display an enthusiasm for artificial intelligence and its applications.
Project description	Background: In the modern business landscape, data analytics plays a crucial role in decisionmaking and strategy development. However, ensuring data privacy and security has become a growing concern for organizations. Federated learning, a decentralized machine learning approach, offers a solution by training models on distributed data without sharing sensitive information. This project aims to explore the application of federated learning to business analysis while preserving data privacy. Objective: To investigate the feasibility and effectiveness of federated learning in business analysis by comparing it to traditional data analysis methods. Students will develop a deeper understanding of federated learning, its potential applications, and the challenges it poses.
Future research activities	It is anticipated that this project has the potential to evolve into an Honours-level or even a Higher Degree by Research (HDR)-level program. It has the potential to offer sustained opportunities for the candidate to engage in research within this area, possibly including machine learning models, programming, and large-scale system development. The expertise and experiences acquired by the candidate throughout this project are highly adaptable, enabling them to apply IT and AI technologies across various high-impact domains effectively.
Project location	This project does not have any on-campus research component that must be fulfilled. The candidate is able choose their preferred location, either online or attending one of the three UniSQ campuses, to complete the project. The supervisory team will maintain close contact with the candidate and will provide supervision through the research period via Zoom meetings and/or face-to-face meetings as appropriate.
Time commitment	The project will run for 10 weeks and can be undertaken in either T2 or T3, 2024. The candidate will be required to commit to working up to 2 days per week for the duration of the project. The candidate has discretion in deciding which days of the week they will work on the project.
Benefits for successful candidates	This project will provide the following benefits to the candidate. Specifically, this project will provide the candidate with: 1. Hands-on exposure to IT and AI technologies and an opportunity to engage in an interdisciplinary research project to solve a real high impact problem;

	2. Hands-on experience in real-life large-scale data collection, storage and cleaning along with a good understanding of various potential data quality issues and possible solutions. 3. Experience in conducting a systematic literature review with critical thinking, summarizing and analytic skills. 4. Initial experience with various classification models, frameworks and their implementation. 5. Experience in working in a highly collaborative research environment with researchers from different disciplinary expertise and backgrounds in computer science, artificial intelligence, material, and waste management.
Project outcomes	This project will lead to following outcomes: 1. This project will help us better understand the requirements and the features of business data. 2. A literature review surveying the existing federated learning methods in business data analysis and systems will be produced. 3. Sufficient data will be collected which will be potentially used to train the machine learning classification models. 4. A paper manuscript will be written based on the project outcome. Depending on the contribution, the candidate will be listed as a co-author or acknowledged in the final publication(s).

Project Title – Artificial Intelligence Feature Extraction Approaches for Biomedical data

Project supervisor/s and contact details	Dr. Tianning Li Tianning.li@usq.edu.au Professor Yan Li Yan.li@usq.edu.au
School/Centre affiliation	School of Mathematics, Physics and Computing
Additional information	• This project can be conducted by 2nd and 3rd year undergraduate students from either the Bachelor of Information Technology, Bachelor of Science or Bachelor of Business (Information System Management). • It is expected that the candidate has fundamental programming (e.g. completed • CSC1401 course), statistics, and data analytics knowledge and has an enthusiasm • for machine learning technique and its applications.
Project description	• Background: • The features of brain signals are valuable to assess the depth of anesthesia, classify • different sleep stages or identify/predict the seizure of patients. Some novel time • frequency domain signal processing techniques, which are better suited for • nonstationary Electroencephalogram (EEG) signals have been proposed to obtain • useful features for different detection or prediction tasks by different researchers. • However, the EEG signals are the signatures of neural activities, their great • nonlinearity and Non-stationarity make the EEG signals hard to assess. In addition, it • is hard to apply just one feature extraction method on different patients' EEG data to • get satisfactory results because individual patients' EEG data have variability and • various factors. As a result, obtaining valuable features efficiently from EEG data is a • challenging research task. • Objective: • To obtain brain signal features efficiently based on Artificial Intelligence techniques for • accurately assessing the depth of anesthesia. Students will develop efficient feature • extraction algorithms to obtain valuable features based on supervised machine • learning techniques.
Future research activities	• The project can be extended into a final year research project, an Honours thesis or HDR research project. It is possible to provide sustained opportunities for the candidate to actively engage in further comprehensive research within the field of data analytics. The expertise and experiences acquired by the candidate throughout this project are highly adaptable to other areas such as financial

	analysis, text mining and so on.
Project location	• Scholars are not required to come on campus for this project for the duration of the scholarship. • The data collection is based on open databases published online so scholars can complete the project online. The supervisors will arrange regular Zoom meetings to supervise and support students. Face-to-face meetings may be also offered if appropriate.
Time commitment	The project will run for 10 weeks in T2 or T3, 2024 and the scholar will be required to commit to working up to 2 days per week. Students can flexibly arrange their working time with the agreement of the supervisors. For example, it is acceptable that the candidate works 2 full weeks during June and July – then one day per week thereafter.
Benefits for successful candidates	This project offers numerous benefits to the candidate, including but not limited to: 1. Obtaining systematic research training as a novice researcher 2. Experience in conducting a systematic literature review with critical thinking, summarizing and analytic skills 3. Experience in analyzing massive data sets for pattern recognition and data modelling 4. Experience in using key technical skills of applying Machine Learning techniques to problem-solving and decision- making support 5. Experience with various classification models, frameworks and their implementation. 6. Collaborative research experiences with researchers from different research areas relating to biomedical data.
Project outcomes	The expected and achievable outcomes: 1. The scholar obtains research skills and data science research experiences. 2. Scholar and supervisors develop efficient feature extraction algorithms to obtain valuable features for different brain signal applications. 3. A paper manuscript will be written based on the project outcome. Depending on contribution, the scholar may be listed as a first author or co-author.

Project Title - Dynamical simulations of Small Solar system Bodies

Project supervisor/s and contact details	Dr. Timothy Holt, timothy.holt@usq.edu.au
School/Centre affiliation	Centre for Astrophysics.
Additional information	Open to 2nd or 3rd year undergraduate students, with a background in Astronomy and/or programing. Linux access necessary, Python and LaTex experience preferable, but can be taught.
Project description	There are currently over 800,000 small Solar system bodies known: asteroids, Trojans, comets, Centaurs, and the like. Many of these objects are moving on unstable orbits, and will one day be ejected into interstellar space. Others move on orbits that are stable for the life of the Solar system. This project will investigate the life of a Small solar system body or small group of objects. By using n-body simulations of the Solar system, the dynamical history and future of the object or objects can be investigated. The specific body or group is to be selected by the student, with the help of their mentor. Simulations can then be conducted, with the time-frame specific to the object. The results are then analysed and presented in a journal format.
Future research activities	This project investigates a single object, but the methodology can be expanded to any population of Solar system bodies, depending on the students competency level. The project will also give students the chance to engage with professional-level simulations and to gain experience writing an academic-style journal article. The skills learnt in this project could be transferred to any future simulation-based science endeavor.
Project location	The project is designed to undertaken remotely. Access to a computer with Linux, or willingness to install Linux on an existing machine, will greatly help accelerate the project. VPN access to the USQ HPC may be requested, pending on the student's experimental design and experience level.
Time commitment	The time commitment for this project is 10 weeks, at approximately 25hrs (3 days fulltime) per week. This will greatly depend on student's existing programing skills, particularly, Linux, Python and LaTex. While not strictly necessary, a higher level of outcome would be achieved with more advanced skills.
Benefits for successful candidates	A student participating in this project should achieve the following skills: • Independent research subject selection, with a degree of automation • Conduction of a high-quality literature review • Designing and running a professional level computer simulation. • Python analytical skills • Creating a journal article using a given style guidelines using Latex.
Project outcomes	The outcome of this work is to be a report in the style of an academic journal article, including a literature review, simulation methodology, figures presenting analysed data and meaningful conclusions.

Project Title: Privacy-Preserving Face Recognition for Smart Home Applications

Project supervisor/s and contact details	Dr. Wencheng Yang wencheng.yang@usq.edu.au Prof. Ji Zhang ji.zhang@usq.edu.au Dr. Taotao Cai taotao.cai@usq.edu.au
School/Centre affiliation	School of Mathematics, Physics and Computing
Additional information	The project is intended for the 2nd and 3rd year undergraduate students who possess basic information technology (IT) literacy and a foundation in computing and/or cybersecurity. The ideal candidate should have completed some introductory courses in these areas and demonstrate an enthusiasm for artificial intelligence (AI) and its applications.
Project description	With the continuous advancement of smart home technology, the use of face recognition technology in smart homes has become increasingly popular. However, applying face recognition technology in the smart home may raise severe concerns about privacy, as it involves the gathering and processing of sensitive biometric data. To mitigate these privacy concerns, this project aims to develop a privacy-preserving face recognition system for smart home applications that protects personal privacy while still providing efficient identification and authentication. This project will involve exploring existing privacy-preserving techniques, such as secure multi-party computation, homomorphic encryption, differential privacy, and federated learning, and adapting these techniques to the context of face recognition in smart homes. The project will also involve evaluating the performance and effectiveness of the proposed system. The candidate will have the opportunities to be involved in a wide spectrum of research activities in this project, including: • Conducting a literature review of existing privacy-preserving techniques for face recognition; • Identifying the requirements and constraints of a privacy-preserving face recognition system for smart homes; • Designing and implementing a prototype privacy-preserving face recognition system for smart homes; • Evaluating the performance and effectiveness of the prototype system; • Developing a final report documenting the project process and outcomes. Candidate's involvement in the project activities mentioned above will depend on their progress and abilities. The candidate will have the opportunity to participate in some or all of the activities depending on their performance and potential.

Future research activities	This project can be expanded into an Honours or HDR-level project, offering further opportunities for the candidate to engage in in-depth research in the field. This may involve exploring further topics in deep learning and cybersecurity. The skills and experiences gained from this project are highly transferable, enabling the candidate to apply IT and AI technologies to other high-impact research areas beyond the scope of this project.
Project location	The successful candidate will have maximum flexibility in terms of location, with the option to work either online or on campus, depending on preference. The supervisory team will maintain close contact with the candidate through convenient Zoom meetings and/or face- to-face meetings, if on campus is selected, to provide guidance and support throughout the project.
Time commitment	The project can run for any 10-week period between June 2023 and February 2024. During the selected 10-week period, the candidate will be required to commit to working up to 2 days a week on the project. However, the candidate will have the flexibility to choose which days of the week they will work.
Benefits for successful candidates	As a successful candidate working on this project, they will gain valuable experience and develop a range of skills that will be highly transferable to their future career. Some of the benefits of working on this project include: • Gaining valuable experience in conducting a systematic literature review with an emphasis on critical thinking, summarization, and analytical skills. • Getting hands-on exposure to AI and cybersecurity technologies, while participating in solving a real-world high-impact problem. • Receiving initial experience with various face recognition and privacy-preserving models, frameworks, and their implementation. • Working in a highly collaborative research environment with researchers from diverse disciplinary backgrounds in computer science, artificial intelligence, and cybersecurity. • Improving communication skills through regular team meetings, project presentations, and research reports.
Project outcomes	The intended project outcomes include: • Development of a prototype privacy-preserving facial recognition system that can accurately recognize individuals while preserving their privacy. • Demonstration of the effectiveness of the privacy-preserving facial recognition system in a real-world scenario, e.g., smart home. • Evaluation of the performance of the privacy-preserving facial recognition system in terms of accuracy, speed, and computational efficiency. • Writing a manuscript based on the project outcome. Depending on the level of contribution, the candidate will be listed as a co-author or acknowledged in the final publication. The paper manuscript is intended for publication in a peer-reviewed journal or conference.

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School of Psychology and Wellbeing

Project Title – Green Parenting: Understanding parenting in times of climate change

Project supervisor/s and contact details	Dr Carolina Gonzalez, carolina.gonzalez@unisq.edu.au Dr Carla Jeffries, carla.jeffries@unisq.edu.au
School/Centre affiliation	School of Psychology and Wellbeing
Additional information	• This project is best suited for psychology students in their third year. Some interest in parenting, childhood, and early prevention is highly recommended. Students are required to have good critical thinking and written communication skills
Project description	In the last few decades, there has been a growing interest in mitigating the impact of climate change on our lives. Having fewer children has a direct benefit for the environment (Wynes &Nicholas, 2017); however, supporting young families can also have a positive impact in a world of ageing population (Ofori-Asenso et al., 2018). This research introduces the concept of green parenting, which refers to those behaviours that parents engage in as role models when raising their children in an environmentally friendly way. UNICEF (2021) has provided some suggestions for parents to raise their children in an environmentally friendly way, keeping in mind that these behaviours are also consistent with their children's developmental stage. However, limited research has been conducted to understand parents' proenvironmental attitudes and behaviours. This ongoing project, supported by the 2023 UniSQ Capacity Building Grant, aims to understand parents' pro-environmental attitudes and behaviours when raising their children in an environmentally friendly way in Australia. It will provide a framework for green parenting that will inform future research and public policy. This project includes the following research activities: 1. Conduct a scoping review of the international literature about green parenting to identify definitions, theoretical models, measures, and key variables of interest. 2. Prepare a national survey to identify parents' environmental attitudes and behaviours and gaps in the support available. 3. Prepare interviews with parents who are currently actively engaged in green parenting and relevant stakeholders to identify facilitators and barriers to pro-environmental behaviours (under evaluation). The student will assist with: - • Scoping review: Data extraction, write-up of results, and update of literature review. • Survey: Co-writing the ethics applications, participant recruitment. Interviews (under evaluation): Co-design of the interview protocol, co-writing the ethics applications, planning of participant recruitment. • Project management: Minute-taking of team meetings and meetings with stakeholders, project data management
Future research activities	This project will prepare the student to continue working with the supervisors on an Honours project in a related area with the potential to expand this work towards an HDR degree (e.g., PhD) and grant applications.
Project location	The project work can be done online.
Time commitment	The student will need to commit to 2 days per week for 10 weeks. The proposed dates

	are 3rd June to 9th August 2024. However, there is some flexibility about dates as it is also possible that the successful student will work in blocks of time depending on personal availability.
Benefits for successful candidates	The student will acquire foundational skills for research required for an Honours or HDR degree. The student will be able to develop knowledge and skills in: • Conducting a literature review, • Pre-registering study protocol (for scoping review and empirical study), • Project management skills, • Ethical review process, • Quantitative and qualitative research, • Critical thinking skills, • Liaison with relevant stakeholders, • Academic writing for publication, and • Science communication (optional, though conference presentations). These skills are desirable for a future research career but also transferable into the workforce.
Project outcomes	This project will involve as outcomes: • One co-authored publication in a high-impact peer-reviewed journal; and • One co-authored conference presentation.

Project Title – Advancing Gender Affirming Health Care in Australia

Project supervisor/s and contact details	Dr Daniel Brown (daniel.brown@unisq.edu.au), Prof Amy Mullens, A/Prof Annette Brömdal
School/Centre affiliation	School of Psychology and Wellbeing, School of Education, and Centre for Health Research, Health Equity Research Theme
Additional information	• This opportunity is recommended for 2nd or 3rd year psychology students with an interest in clinical, health, or social psychology. This opportunity will focus on a program of research including a community forum exploring publicly accessible and available models of gender affirming surgery in QLD. This project will expose the undergraduate student to opportunities spanning interdisciplinary research methodologies, issues that affect priority communities (e.g., trans, gender-diverse and non-binary communities), and a focus on advancing health care access in Australia. • While it is encouraged, the student does not need to have a special interest in trans, gender diverse, or non-binary people. It is expected that the student has an interest in the intersection of health care and social justice.
Project description	• Trans and gender-diverse adults who seek to alleviate their gender dysphoria via gender-affirming surgery face a range of barriers in Queensland (QLD) and Australia more broadly. Despite calls by important global authorities such as the United Nations and the World Health Organisation to increase publicly funded access to healthcare services, many trans and gender-diverse adults cannot access affordable public services in QLD. These structural challenges can have lasting negative consequences on the health and wellbeing of trans and gender-diverse peoples, which already experience disproportional ill-health. • In QLD, healthcare and advocacy groups identified this gap of medical services over 30 years ago, creating the Gender Health Service in Brisbane. Despite this clear gap of service and the QLD human rights imperative of non-discriminatory access to healthcare – “every person has the right to access health services without discrimination” (Queensland Human Rights Commission), little has been done to understand the ongoing barriers and opportunities to equitable healthcare access for trans and gender-diverse adults engaging in or contemplating gender-affirming surgery in QLD. • The student will assist the team across a number of research opportunities that have developed from a community forum exploring publicly funded models of gender affirming surgery in QLD. The specific tasks for the project will be matched in part to student’s interest, experience, and goals. Current opportunities include: 1. Data-analysis of archival data from a community forum; 2. Literature searching and synthesis to guide identifying current trends and gaps in the literature to inform arising research outputs (e.g., publications, presentations, industry reports) and future funding submissions; and 3. Assist with preparing research proposals and writing ethics proposals for subsequent phases of research.

Future research activities	It is expected that a range of ongoing research activities will develop from the current program of research. This project has potential to be extended into final year research projects for WIL, Honours, or HDR projects (Master's or PhD). Please speak to the supervisory team if this is of interest to you. The research skills developed through this project will be highly relevant and transferable to a range of future research or clinical activities.
Project location	The work required for this project primarily uses a computer and can, therefore, be located where best suits the student. The student will be invited to attend online team meetings with other academics and/or stakeholders, where relevant and appropriate to do so.
Time commitment	The project will be running for 10 weeks from the 3rd of June to the 9th of August 2024. There is some flexibility in hours/days per week for the student, however it is expected that a minimum of 4 - 6 hours per week is needed. Weekly supervisory meetings with a supervisor or the supervisory team will be negotiated with the student based on availability of the research team and other stakeholders (typically Monday, Wednesday, Thursday, or Friday).
Benefits for successful candidates	The student will learn a variety of research skills: - Literature searching and synthesis. - Qualitative data analysis. - Academic writing for multiple purposes (e.g., peer-reviewed articles, industry reports). - Knowledge creation via the research process. - Group and other teamwork skills. - Content knowledge in health and wellbeing, social justice, health care access, gender-minority communities, and other interdisciplinary intersections. - Stakeholder engagement. - Research translation. - Other research management skills.
Project outcomes	Overall, it is expected that the student with meaningfully contribute to the advancement of a larger program of research that seeks to advance gender affirming health care in Australia. This may include: - A completed analysis of a community forum. - An industry report to the QLD government and community stakeholders about the community forum, and recommendations for action. - A literature review identifying research gaps in the barriers and facilitators to public models of gender affirming surgery in QLD. - A list of recommended future research. - Completed ethics applications. Ultimately, the research team aims to understand the barriers and opportunities for publicly available and accessible gender-affirming surgery for trans, gender-diverse, and non-binary people in QLD, and the student will contribute to the research processes and outputs (e.g., grant submissions, conference presentations, industry reports, journal articles) that contribute to this aim.

Project Title – The assessment and identification of Autism among Australian youth: Understanding psychologists' clinical process

Project supervisor/s and contact details	Dr Meg Richardson* Dr Crystal McMullen
School/Centre affiliation	School of Psychology & Wellbeing, *Centre for Health Research
Additional information	This project is best suited for a scholar who is in their third year of undergraduate study and who is undertaking a psychology undergraduate degree. This opportunity is recommended for a student with interest in clinical psychology, child and youth mental health, and neurodiversity. The ideal candidate will have: - Strong written and verbal communication skills; - Ability to work independently (under regular supervision); - Developed research skills at an expected level for undergraduate psychology study, including the ability to systematically search for, interpret and synthesise research articles; - Reasonable understanding of MS Word and Endnote; - Experience with online survey platforms would be highly desired, but certainly not mandatory; and - Availability to meet for regular supervision with the project team.
Project description	In 2018, the Autism CRC released the 'National Guideline for Assessment and Diagnosis of Autism Spectrum Disorder' (Autism CRC, 2018). This publication presented the first integrated approach in Australia to the recommended diagnostic assessment process for the identification of Autistic individuals. The guidelines aimed to provide clinicians and clinical teams completing diagnostic assessments with a clear and comprehensive protocol for best practice. However, one area that continues to be unclear for diagnosticians is how the DSM-5-TR level specifiers should be determined. Specifically, the DSM-5-TR (American Psychiatric Association, 2022) diagnosis for Autism includes three specifiers: Level 3: Requiring very substantial support, Level 2: Requiring substantial support, Level 1: Requiring support. Neither the DSM-5-TR nor the Autism CRC's National Guidelines provide a clear process for clinicians on how best to determine which level should accompany a diagnosis. It remains unclear how current practicing clinicians are determining these specifiers. Given that funding bodies, such as the National Disability Insurance Scheme (NDIS), use diagnostic levels to gauge an understanding of the level of support required for an individual, it is important that we have consistency and integrity in how this aspect of the diagnostic process is conducted. This project aims to increase our understanding of how current Australian psychologists who conduct Autism assessments in children and adolescents determine the DSM-5-TR diagnostic level when assigning diagnoses. The research will involve two related studies that involve qualitative and quantitative methodologies. This project involves the following research opportunities: - Being involved in the completion of a literature review (including the writing up

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	of this review) on the assessment and identification of Autism Spectrum Disorder; - Assisting with preparing research proposals and developing ethics applications relating to the above project; - Co-designing the protocol for qualitative interviews and quantitative surveys, to be conducted with practising Australian psychologists who conduct Autism assessments with children and adolescents; and - Potential opportunities to contribute to data analysis.
Future research activities	This project has the potential to be extended into an Honours project. The research skills developed by the scholar via this opportunity will also be relevant and transferrable to future research and/or clinical pursuits.
Project location	This project can be completed either on campus or at the scholar's home/a private location. The scholar will need access to a computer, webcam and the internet.
Time commitment	The project runs for 10 weeks, and the scholar must be able to commit to 2 days per week. The project can be undertaken anytime between June - August 2024. It may be that the work occurs in blocks of time, rather than 2 days per week for 10 weeks.
Benefits for successful candidates	The scholar will acquire key research skills that are necessary for an Honours or HDR degree. The student will have the opportunity to develop knowledge and skills in: - Literature searching and synthesis; - Project management skills; - Writing for academic, research and professional audiences; - Liaison with relevant stakeholders; - Quantitative and qualitative research, including study design and potentially data collection and analysis; - Ethical review process; - Critical thinking; - Professional communication skills (e.g., liaising with supervisory team)
Project outcomes	It is anticipated that the study will be published in a peer reviewed psychology journal, in addition to being presented at an appropriate conference. The scholar's work on this research would help to meaningfully advance our understanding of the best practice for the assessment and identification of Autism among Australian youth.

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Project Title – Transforming Child and Adolescent Mental Health through Digital Supports

Project supervisor/s and contact details	Prof Sonja March; Sonja.March@unisq.edu.au
School/Centre affiliation	Centre for Health Research; School of Psychology and Wellbeing
Additional information	Blue card would be required
Project description	1 in 7 young people will experience a mental health disorder, and 50% of adulthood mental illness begins before the age of 14. Therefore, it is crucial to provide support to children and adolescents early, before they turn into lifelong difficulties. The Innovative Mental Health Solutions Research Team in the Centre for Health Research (and School of Psychology and Wellbeing) have been codesigning and testing digital tools, assessments and interventions for children and adolescents for the last 20 years. There are several ongoing projects that the successful applicant could work on. The two main projects are: 1. Momentum – a digital self-help platform for child and adolescent mental health. This project has codesigned a fully integrated digital assessment and treatment platform for child and adolescent anxiety, depression and related difficulties (sleep, substance use, healthy lifestyles) with young people, parents and clinicians. This platform is now ready to launch, and the student would help disseminate the platform, assist in collection of data, data monitoring and analysis, and preparation of outputs from our existing dataset (quantitative and qualitative) from the codesign stage. 2. Staged mental health care plan for children in education settings. This project is developing a set of psychoeducation modules for children and parents and integrating these with our Interactive Child Distress Screener (ICDS) – a digital tool that children can complete to report on mental health. In this project, the student would help to finalise modules, help establish recruitment procedures in schools, and assist in data collection. As part of this project, we are also collecting data on our ICDS tool with local clinicians and their child clients, and the student would also be able to help with this project.
Future research activities	Both of these projects are ongoing, the team also have other digital mental health projects starting, and will continue this work into the future. The team hold external funding to conduct child and adolescent mental health research and there will be ongoing opportunities for students to be involved either in placements or student projects.
Project location	Springfield, but can be flexible
Time commitment	Can be negotiated. 1 6 or 10-week placement is possible, with 14-20 hours per week.
Benefits for successful candidates	Students will be exposed to a highly thriving and successful applied research team at UniSQ who hold several external research grants. The team are world leaders in digital mental health and are leading the field in research for child and adolescent mental health. Students will have the opportunity to get involved in applied research, designed to work with young people and help improve mental health. There are opportunities to learn about both qualitative and quantitative methodologies, get involved in data collection and help disseminate digital tools. The student will have opportunities for

	ongoing involvement should they be interested.
Project outcomes	Project outcomes will include: - Gain experience in recruitment and data collection in clinical, applied projects - Gain experience in data analysis - Participate in preparation of a publication relating to the Momentum or ICDS projects (and be an author) - Gain experience in working in a research team - Opportunities to present on the research.

School of Surveying and Built Environment

Project Title – Enhancing public participation geographic information systems to increase community engagement in urban and regional planning

Project supervisor/s and contact details	Dr Anthony Kimpton (anthony.kimpton@unisq.edu.au)
School/Centre affiliation	School of Surveying and Built Environment
Project description	This project's focus is the community codesign of an advanced public participation geographic information system (PPGIS) web application. This will improve the capacity of community members and interest groups to engage with their local and state governments in relation to urban and regional planning matters. Web applications such as CrowdSpot are already enabling organizations such Victoria Walks, Plan International, Amy Gillet Foundation, and the City of Melbourne to gather feedback on the built environment from the communities but are yet to capitalize functionalities already available from free software packages and that would greatly extend the accessibility, interactivity, effectiveness and community engagement. These functionalities could include prompting users with follow up questions that clarify provided feedback or privately request contact information that is only released to researchers and organizations working towards improving the built environment or other users that provided similar responses and that could be allies in their community engagement activities. Likewise, real-time interactivity functionalities could be introduced that analyze and compare the user's feedback against feedback provided by other users (e.g., comparing text key words and emotional valiance) or researchers and organization (e.g., spatial overlays detailing environmental and demographic characteristics, and council and state government plans and overlays, and interactive maps and infographics) to improve community engagement. Lastly, functionalities could be introduced that summarize their findings in the form of shareable interactive maps and infographics, or export their findings as reports pre-populated with professional-quality figures, summary statistics, and descriptive text including addressing the report to their elected representatives to facilitate effective community engagement in land use and transport planning. For example, a user could potentially identify a hazardous road crossing that is negatively impacting the walkability of their community, locate other community members that shared this or similar assessments, and together develop a professional-quality report that the submit to their elected councilor to address this planning concern.
Future research activities	The core code of this PPGIS will be developed so that it can be adapted to a range of community projects that align with UniSQ flagship areas including regional development, community health, and heritage management. This PPGIS will have multiple benefits for UniSQ including strengthening ties with the community and reducing the overheads of collecting high quality qualitative and quantitative data for fostering research activity and collaborations that attract research funding and support communities.
Project location	Springfield Campus
Time commitment	6 weeks, one day per week
Benefits for successful candidates	The role of undergraduate researcher will be to develop the preliminary literature review of the current state of PPGIS research and services, and the workshop format for community codesign of proposed PPGIS. This workshop will resemble the AGILE development approach becoming commonplace in industry entailing rapid iteration through planning, prototyping, testing, deployment, and reviewing of the platform with representative set of potential community and organization end users. This will ensure

	a PPGIS project outcome that maximizes community engagement through interactivity while also minimizing the expertise required for effective community engagement in land use and transport planning.
Project outcomes	The foundations of a PPGIS literature review and a workshop format for codesign of a PPGIS that foster effective community engagement in land use and transport planning.

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