2026 Research Internship Program

Project List

Faculty of Science, Engineering & Built Environment

This document outlines the available research projects for the 2026 Research Internship Program with the Faculty of Science, Engineering & Built Environment (SEBE) at Deakin University

Each project provides high-achieving students from our partner institutions the opportunity to:

- Gain hands-on research experience at Deakin University.
- Collaborate with world-class academics and research institutes.
- Explore pathways to postgraduate or PhD study in Australia.

Important for Students:

- Review this list and select the project(s) are you interested in.
- **The project description can be found below the table. Please use the list number to find the relevant project description.**
- Only students who meet the eligibility criteria (GPA >= 8.0 and final-year status) will be considered.
- Applications close **Sunday September 14th 2025.**
- Your institution will shortlist applications and submit their nominations to Deakin. Deakin Supervisor will then select candidates for a formal interview. After interviews, official offer letters will be issued to selected students.

#	Project Title	Discipline / Institute	Level *(UG- undergraduate or PG - postgraduate)*	Duration *(can be negotiated)*	Location	Lead Academic
1	Adaptive LLM Framework for Personalised Spear-phishing Simulation and Detection	Information Technology (IT)	UG and PG	Start: January End: March	Waurn Ponds	Dr Je Sen Teh
2	Cryptanalysis of Lightweight Ciphers	Information Technology (IT)	UG and PG	Start: January End: March	Waurn Ponds	Dr Je Sen Teh

3	Sustained Workflows for Automated Digital Forensic Investigations	Information Technology (IT)	UG and PG	Start: February End: July	Waurn Ponds, Burwood, Waterfront	A/Prof Zubair Baig
4	Evaluating LLMs' Linguistic Representation Learning: Foundation for Competence Modelling and Task Generalization	Information Technology (IT)	PG	Start: Feb-May End: Aug-Nov	Burwood	Dr Bahadorreza Ofoghi
5	Enhancing mobile robot localisation in indoor environments using AprilTags	Institute for Intelligent Systems Research & Innovation (IISRI)	UG and PG	Start: Feb-Dec End: May-Dec	Waurn Ponds	A/Prof Samer Hanoun
6	Areial survey of fires and post-fires burnt areas using drones	Institute for Intelligent Systems Research & Innovation (IISRI)	UG and PG	Start: Feb-Aug End: May-Nov	Waurn Ponds	A/Prof Samer Hanoun
7	The value of data and digital transformation in industry systems	Engineering (ENG)	PG	Start: Mar-Dec End: Sep-Dec	Waurn Ponds	A/Prof Kris Law
8	Non-adhesive timber connections	Engineering (ENG)	UG and PG	Start: Jan-Dec End: March-Dec	Waurn Ponds	A/Prof Kazem Ghabraie
9	Developing pavements from recycled plastics	Engineering (ENG)	UG and PG	Start: Jan-Dec End: March-Dec	Waurn Ponds	A/Prof Kazem Ghabraie
10	Mechanical performance of perforated plates	Engineering (ENG)	UG and PG	Start: Jan-Dec End: March-Dec	Waurn Ponds	A/Prof Kazem Ghabraie
11	Design of a novel spacecraft shield for protection against space debris impact	Engineering (ENG)	UG and PG	Start: Jan-Nov End: March-Nov	Burwood	A/Prof Shannon Ryan

12	Modular Building Performance Evaluation.	Architecture & Built Environment	UG	Start: Jan-Sep End: May-Oct	Waterfront	Dr Olubukola Tokede
13	Data Integration for Life Cycle Sustainability Reporting	Architecture & Built Environment	UG	Start: Jan-Sep End: May-Oct	Waterfront	Dr Olubukola Tokede
14	Application of AI for evaluating and benchmarking sustainability reporting in the built environment.	Architecture & Built Environment & Information Technology (IT)	UG and PG	Start: February End: July	Waterfront	Dr Abdul-Manan Sadick
15	Robust Control of UAVs for Direct Firefighting Applications	Institute for Intelligent Systems Research & Innovation (IISRI)	PG	Start: Jan-Jun End: May-Nov	Waurn Ponds	Dr Ahmad Abu Alqumsan
16	Investigating the Link Between Systems Thinking and Learning Performance in STEM (Engineering) Students	Engineering (ENG)	PG	Start: Mar-Sept End: Aug-Nov	Waurn Ponds	A/Prof Kris Law
17	Quantifying the impact of human activities on cancer in wildlife	Life and Environmental Science	UG and PG	Start: Jan-Jun End: Jun-Dec	Waurn Ponds	Dr Antoine Dujon
18	Vulnerability Analysis and Safety Guarantee for 3D Deep Learning	Information Technology (IT)	UG and PG	Start: Jan-May End: Mar-Jul	Waurn Ponds	Dr Duc Thanh Nguyen
19	Artificial Intelligence (AI) for wildlife monitoring	Information Technology (IT)	UG and PG	Start: Jan-May End: Mar-Jul	Waurn Ponds	Dr Duc Thanh Nguyen
20	Visual reasoning and applications	Information Technology (IT)	UG and PG	Start: Jan-May End: Mar-Jul	Waurn Ponds	Dr Duc Thanh Nguyen

21	Advancements in Optimisation Algorithms for Neural Architecture Search	Institute for Intelligent Systems Research & Innovation (IISRI)	UG	Start: Jan-Dec End: March-Dec	Waurn Ponds	Dr Kelvin Choo
22	Blockchain fuzz testing	Information Technology (IT)	PG	Start: Jan-Feb End: April-May	Burwood	Dr Anh Dinh
23	Re-use of sheet metal components by reforming using additively manufactured (AM) plastic forming tool inserts in combinations with a steel support structure.	Institute for Intelligent Systems Research & Innovation (IISRI)	UG and PG	Start: Feb End: Nov	Waurn Ponds	A/Prof Matthias Weiss
24	Numerical investigation and testing of steel fence crash performance at high-rate impact with 7 tonne truck or passenger car.	Institute for Intelligent Systems Research & Innovation (IISRI)	UG and PG	Start: Jan-Dec End: March-Dec	Waurn Ponds	A/Prof Matthias Weiss
25	Genesis Motion Simulation	Institute for Intelligent Systems Research & Innovation (IISRI)	UG and PG	Start: Feb-Oct End: Apr-Dec	Waurn Ponds	A/Prof Michael Johnstone
26	Exploring Cognitive Load and Stress through Multimodal Biosensing in Immersive VR	Institute for Intelligent Systems Research & Innovation (IISRI)	UG and PG	Start:Jan-Oct End: Jun-Dec	Waurn Ponds	Dr Imali Hettiarachchi
27	Modelling Driver Behaviour with Discrete Event	Institute for Intelligent Systems Research &	UG and PG	Start:Jan-Oct End: Jun-Dec	Waurn Ponds	Dr Imali Hettiarachchi

	Simulation from Motion Simulator Data	Innovation (IISRI)				
28	Human Interactive Control of Robotic Manipulator	Institute for Intelligent Systems Research & Innovation (IISRI)	UG	Start: Feb-Sept End: Apri-Dec	Waurn Ponds	Dr Asher Winter
29	Energy-Efficient Driving Assistant with Driver Behaviour Simulation	Institute for Intelligent Systems Research & Innovation (IISRI)	UG and PG	Start:Jan-Oct End: Jun-Dec	Waurn Ponds	Dr Imali Hettiarachchi
30	SCARLET-α: SpaceCraft Autonomy and Onboard AI for Next Generation Space Systems	Institute for Intelligent Systems Research & Innovation (IISRI)	PG	Start: Jan-Jun End: May-Sept	Waurn Ponds	Dr Pretha Sur
31	Autonomous vehicles data collection and analysis	Institute for Intelligent Systems Research & Innovation (IISRI)	UG and PG	Start: Feb-Oct End: Apr-Nov	Waurn Ponds	Dr Navid Mohajer
32	Hydrogen fuel cell stack testing and development	Hycel (Hydrogen Technologies)	UG and PG	Start: Jan-Oct End: Mar-Dec	Warrnambool	A/Prof Michael Pereira

Project Descriptions

1. This project proposes an AI-driven phishing simulation framework designed to improve organisational resilience against AI-enabled phishing threats. The framework features a quad-agent architecture: a Multi-Armed Bandit (MAB) agent that selects

contextual cues, and three large language models (LLMs) acting as a phishing email generator (simulating attackers), a phishing detector (mimicking spam filters), and a click agent (modelling user behaviour). There is an adaptive learning loop, where the MAB optimises prompts that guide the generator to craft phishing emails with high click likelihood while avoiding detection. Unlike traditional templates or library-based simulations, our approach mirrors the tactics of real-world AI-assisted phishing that leverages publicly available data to generate highly targeted and realistic emails. This enables more effective and scalable phishing awareness training.

a. **Minimum requirements:** Machine learning, cyber security, programming skills

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2. This project investigates developing tools to cryptanalyse lightweight block ciphers. This could be based on machine learning or mathematical solvers. The goal is to produce new cryptanalysis findings and provide tight security margins for ciphers that have been recently proposed.

a. **Minimum requirements:** Mathematics, programming, machine learning skills

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3. Artefacts from cybercrime scenes are varied and complex. Acquisition is one challenge and processing of these are another. A sound digital investigation entails ahead of time data logging, and identifying the most opt data for logging, to help investigators pursue digital forensic investigations, after a cyber incident has occurred. This project would comprise the design of an automated workflow and implementation of the same viz a stacked software system design that includes all the following stages of investigation:

a. 1. Identification of data artefacts
   2. Asset inventorying
   3. Data acquisition using agentic intelligence
   4. Data collection and integrity check
   5. Design of an integrated digital investigation platform that takes feeds from the acquired data and passes this on via a workflow definition to a range of forensic investigation toolkits including but not limited to: Autopsy, FTK, TShark.
   6. Automated analysis and reporting tool - design and testing

b. **Minimum requirements:** Scripting expertise, Software design, basics of cyber security.

4. This internship will explore how effectively large language models (LLMs) learn and represent language at different linguistic levels, i.e., syntax, morphology, semantics, and pragmatics. The intern will evaluate these capabilities using probing techniques and benchmark datasets and assess how well these representations align with performance on both formal (e.g., parsing, tagging) and functional (e.g., sentiment analysis, question answering) NLP tasks. This foundational work will contribute to a broader research program investigating LLMs' linguistic competence, cross-level generalization, and failure attribution in downstream tasks.
    a. **Minimum requirements:** Python programming, a good understanding of natural language processing and LLM concepts, adept at machine learning.

5. Robot localisation is the process of determining a robot's position and orientation within its environment. It's a crucial component for any robot to achieve autonomous navigation and perform its designated tasks within its environment. Adaptive Monte Carlo Localisation (AMCL) has been one of the popular techniques adopted for robot localisation in indoor environments. It is based on a particle filtering algorithm combined with a KLD sampling filter to estimate the robot position and orientation in its environments aided with a map for the environment and sensing of the environment using LiDAR scans. Although, AMCL is a reliable technique, its performance degrades in large-scale and feature-less environments, not to mention, its positioning accuracy limited by the environment map and LiDAR scans resolutions. This work aims at utilising tag-based pose estimation, such as AprilTags, for enhancing robot localisation produced by AMCL. AprilTags have several advantages as their immune to the environment lighting conditions while they can be recognised and detected at large distance from the camera. As AMCL position accuracy is within □10cm, the objective is to integrate AprilTags recognition to further enhance the precision of the robot pose and orientation for applications requiring accurate robot pose such as in warehouse with robots handling materials and transporting goods. The work requires developing an AprilTag assisted positioning algorithm (visual localisation module) using vision-based sensors such as a camera, to increase the precision of the robot local pose and orientation at the target or goal point in reference to the AprilTag. The module will rely on detecting the AprilTag, calculating the robot relative position and orientation, understanding the robot pose

and orientation error and guiding the robot motion towards the target point while informing AMCL with the required correction.

a. **Minimum requirements:** Python, C++, ROS, NAV2, Gazebo, RVIZ

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6. Firefighters and emergency services teams are increasingly using drones equipped with cameras as a tool to assist them with their operations understanding the scale of live fires and assessment of burnt areas and environmental impact post fires. In most scenarios, drones cruise around the fires or overhead the fire affected areas, collecting relevant footage using on-board cameras and/or relaying this information in real-time to the ground control for visual inspection. Drones, in this case, are remotely piloted by human operators guiding them around and overhead the required areas. Enabling visual recognition and processing of the fire and burnt areas can lead to the drone autonomously following the areas contours collecting the required visual information without the need for a human pilot. This is becoming essential to relive the load of the emergency services individuals as the drone can take off, cruise the area, collect the required visual information and then return to the take-off location. The work aims at utilising machine vision and image processing techniques for detecting and estimating fires and burnt areas regions using colour-based segmentation models. Fires have distinct colour characteristics, often appearing in shades of red, orange, and yellow while burnt areas have unique colour features of black and dark brown colour. As the fire region is detected and its contour region is estimated, the drone path planner can guide the drone to follow the fire region via guided waypoints approximating the fire contour into small-scale straight-line segments while the on-board camera visually covers the fire region. The work requires developing the colour-based segmentation algorithm utilising OpenCV techniques, build a simple geometrical model of the fire region, estimate the positional transformation between the fire contour segments and the drone current planned path from the previous waypoint to the target waypoint, and inject the correction of the new waypoint to guide the drone to follow the fire region.

a. **Minimum requirements:** Python, C++, MAVLink, SIT, Gazebo

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7. Challenges are emerging around management of changing data characteristics, technology integration and interoperability, effective deployment of artificial intelligence and machine learning techniques, cybersecurity and regulatory compliance concerns in dynamic environments. This research will develop a valid

direction in understanding complexity in support of future-focused decision-making, particularly within the context of digital transformation. To strengthen this approach, strategic systems thinking methodologies will be integrated with advanced AI technologies. This research aims to help organisations better understand the complex systems of influencing factors, their interconnections, interdependencies, and associated risks and opportunities.

a. **Minimum requirements:** systems thinking, knowledge management concept, programming skills (i.e. R or Python), possible statistical analysis, data mining etc.

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8. This project focuses on studying the behaviour of non-adhesive timber connections, such as wooden dowels, in different loading conditions.

a. **Minimum requirements:** Background knowledge (stress analysis, structural analysis, etc). Working with load frames in the lab (training would be provided).

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9. This project aims to produce pavement blocks/bricks from recycled plastics. The suitable plastic types need to be selected. A suitable production technology needs to be adopted. And finally, the products need to be tested in different situations. Depending on the progress, the project might cover all the above stages or only one or two of them.

a. **Minimum requirements:** Knowledge and experience of technologies such as injection moulding, pultrusion, extrusion, etc, are highly favourable as well as familiarity with polymer materials.

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10. This project involves testing the strength of perforated plates with specially designed holes.

a. **Minimum requirements:** Experience with testing samples in load frames is favourable.

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11. The impact of millimetre-sized space debris objects poses a significant hazard to operational spacecraft due to the extreme velocities at which they occur (>25000 km/h). Such impacts involve complex shock dynamics and material response that are often simulated in explicit finite element analysis codes. In this project you will utilise such numerical tools to develop and verify a novel aluminium open-cell foam shield to provide enhanced protection for spacecraft, compared to the current state-of-the-art. Existing experimental data generated by NASA will be used to verify the accuracy of your numerical model.

a. **Minimum requirements:** Finite element analysis, Python programming

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12. This project seeks to develop and test thermal energy models for different modular building designs.

a. Minimum requirements: Energy Simulation tools, Programming with Python, Machine Learning Energy Modelling

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13. This project involves the collation of Life Cycle Sustainability Assessment (LCSA) data for a mobile application that has been developed. The purpose is to collate and integrate data from relevant web sources.

a. **Minimum requirements:** Web Programming, Familiarity with Unity

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14. In January 2025, Australia mandated climate-related financial disclosures for large organisations, requiring them to include these risks in their annual sustainability reports. This legislation applies to large organisations, including those in the built environment, that meet certain criteria, which must produce and publish a sustainability report each year addressing their financial risk exposure. Nonetheless, there is a lack of research on assessing and benchmarking sustainability reports within the built environment. Therefore, this study aims to use recent advancements in AI to create tools that enable effective evaluation and comparison of sustainability reports in the built sector.

a. **Minimum requirements:** Programming with Python

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15. This research project aims to develop robust and fault-tolerant control strategies for hose-outfitted Unmanned Aerial Vehicles (UAVs) deployed in direct bushfire suppression. Unlike traditional UAV firefighting roles limited to surveillance or payload drops, hose-equipped UAVs face unique challenges, including dynamic tether forces, highly unstructured environments, and disturbances from wind and thermal updrafts near active fires. The project will involve detailed mathematical modelling of the UAV system, incorporating the dynamics of the hose, fluid flow, environmental disturbances, and actuator behaviour. Advanced control law design, with a focus on Sliding Mode Control, will be used to ensure robust trajectory tracking and system stability. Fault tolerance will be incorporated in the control design to ensure performance in the presence of actuator faults or sensor degradation. Simulation studies will be utilized to test and validate the proposed control strategies.
    a. **Minimum requirements:** Control theory background, Mathematical modelling, Numerical Integration, Matlab experience.

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16. This research aims to investigate the relationship between systems thinking ability and learning performance in engineering students. 1) Understand the connection between systems thinking and learning performance in engineering education, including factors that influence this relationship (e.g., teaching methods, curriculum design). 2) Develop a framework to assess both systems thinking ability and learning performance in engineering students.
    a. **Minimum requirements:** NLP / systems thinking, data mining (text mining)

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17. This project will examine how human-induced environmental changes cause cancer in wildlife and the resulting impacts on animal biology, ecological interactions, and overall ecosystem function. It will investigate how exposure to human-produced chemicals or abiotic stressors affects tumour formation in freshwater Hydra and planaria, two models available in Dr Antoine Dujon's laboratory at Deakin University. By maintaining and monitoring population of Hydra and planaria exposed to oncogenic stresses in the laboratory, the project will examine the impact of cancerous processes on their asexual reproduction, behaviour (e.g., predator-prey interactions, activity, environmental stressor avoidance), and survival rates. The proposed project will be conducted at Deakin University Waurn Ponds campus as part of the international CANECEV laboratory (Cancer and Evolution), a collaborative initiative between Australian and French researchers. They would be suitable for students with interests in ecology, ecotoxicology, and animal behaviour. Students will

be fully integrated into this collaborative framework and will primarily conduct laboratory experiments, with occasional fieldwork to collect specimens. These projects will provide students with core transferable skills, including scientific writing, oral presentation abilities, and experience collaborating with researchers from diverse cultural backgrounds.

a. **Minimum requirements:** An interest in multidisciplinary projects (this project has an important ecological component but also requires learning about cancer biology). Good basic laboratory skills and attention to detail. Good work ethics, accountability and ability to communicate orally and in writing with supervisor to ensure efficient communication about all matters relevant to the project. Willingness to learn new methods and work with freshwater invertebrate models. Willingness to learn statistical analyses using the R statistical software, with training from the supervisor (e.g. mixed effect models, survival analyses...). Willingness to undertake field work if the project requires it. Ability to work with collaborators from diverse backgrounds, genders and nationalities to maintain a respectful and productive environment. Ability to present and discuss scientific ideas (in English) with the local and international collaborators.

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18. Deep learning for 3D point clouds has shown significant progress in various 3D scene understanding tasks and applications (e.g., robotics, autonomous driving). In a safety-critical environment, it is however not well understood how such deep learning models are vulnerable to adversarial examples. In this work, we study adversarial attacks for point cloud-based neural networks. We will develop a unified and general formulation for adversarial point cloud generation. Our method generates adversarial examples by attacking the classification ability of point cloud-based networks while considering the perceptibility of the examples and ensuring the minimal level of point manipulations. We will apply our method to analyse the vulnerability of existing 3D deep learning techniques, from which new approaches will be developed to address safety issues in 3D deep learning.

a. **Minimum requirements:** Solid background in 3D deep learning (3D point cloud processing). Background knowledge in Maths (knowledge in topology is preferred).

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19. This project aims to develop datasets and AI algorithms for monitoring animals in their natural habitat. The developed algorithms include animal identification and zero-

shot animal recognition from camera trap videos. This project is a part of the research grant "An AI video trap to detect cold-blooded threatened and invasive species" funded by the Department of Climate Change, Energy, the Environment and Water.

a. **Minimum requirements:** Solid background knowledge in computer vision, machine learning; proficiency in python programming; hands-on experience in deep learning frameworks, e.g., PyTorch.

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20. This project aims to explore the reasoning capabilities of large vision-language models with focus on zero-shot reasoning and domain-invariant capabilities. The outcomes of the project (frameworks, algorithms) will be applied to video synthesis, video understanding, and anomaly detection.

a. **Minimum requirement:** Solid knowledge in computer vision, machine learning; proficiency in python programming, hands-on experience with deep learning frameworks (e.g., PyTorch).

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21. This project focuses on the development and application of advanced optimisation algorithms, particularly those inspired by natural processes, to enhance the efficiency and effectiveness of Neural Architecture Search (NAS). The aim is to improve search performance when tackling complex optimisation tasks, such as global, constrained, and multi-objective optimisation. These enhanced algorithms are integrated into NAS frameworks to automatically design high-performing neural network architectures.

a. **Minimum requirements:** programming with Python

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22. The project aims to apply fuzzing to implementation of recent consensus protocols. The distributed nature of the protocols, the lack of formal specifications and full implementations for many of them, make it challenging to design effective fuzzing framework. The project will build on state-of-the-art solutions that target old consensus protocols.

a. **Minimum requirements:** C/C++, distributed systems programming

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23. The project aims to develop a process for flattening end-of-life sheet metal building components by first flattening them in a continuous roll forming process. The flattened sheet is then reformed to a new second-life component.

a. **Minimum requirements:** Pre-existing knowledge of Metal forming, and/or CAD supported product/process design, and /or Finite Element Analysis (FEA).

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24. This project is very CAD and FEA analysis based. It aims to represent the crash behaviour of a steel fence under high impact loading. The project is part of a continuous research activity with Australian manufacturer SpeedPanel and aims to optimise mise the steel fence design with view on crash performance and failure mode as well as material and cost reduction. It will include some experimental static testing of reduced scale components to validate model results.

a. **Minimum requirements:** Strong expertise in CAD and FEA based product design, testing and optimisation.

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25. Work with Deakin's Genesis motion simulator—one of the most advanced in the Southern Hemisphere—used by industry and researchers to explore future mobility, defence, and human–machine systems. This cutting-edge platform combines a full motion base with immersive visuals and real-time data streams, giving you the chance to contribute to next-generation simulation research and innovation.

a. **Minimum requirements:** 3D CAD; python; SPSS

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26. Join the cutting-edge of human performance research by working with IISRI's Galea multimodal biosensing headset, fully integrated with high-fidelity VR. This advanced platform captures real-time physiological data, including electroencephalography (EEG), electromyography (EMG), electrodermal activity (EDA), Photoplethysmography (PPG), and eye tracking, so you can explore how cognition, emotion, and stress unfold in immersive environments. You'll help turn raw bio-signals into insight, finally seeing how the brain and body respond under simulated conditions in ways that have never been possible before.

a. **Minimum requirements:** Signal Processing & Data Analysis – Ability to preprocess EEG, EMG, EDA, PPG, and eye-tracking data, extract features, and apply statistical or machine learning methods. Programming Proficiency –

Strong skills in Python or MATLAB for bio-signal processing, modelling, and data visualization. Experimental Design & Research Methods. Understanding of cognitive science concepts, human factors, and how to design and run VR-based experiments ethically. Integration & Problem-Solving – Hands-on ability to work with biosensing hardware, troubleshoot software/hardware issues, and integrate real-time feedback in VR environments.

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27. Transform driver behaviour, captured in Deakin's high-fidelity motion simulators—into Discrete Event Simulation (DES) models. This project combines immersive simulation data with advanced modelling to test traffic scenarios, hazard responses, and safety-critical interactions. By turning raw inputs such as steering, braking, gaze, and reaction times into behaviourally accurate DES models, the project will enable rigorous safety testing and a deeper understanding of risk dynamics before they occur on real roads.

a. **Minimum requirements:** Data Handling & Preprocessing (Ability to clean, process, and structure simulator data (steering, braking, gaze, reaction times)). Programming & Modelling (Proficiency in Python, MATLAB, or similar for building and running Discrete Event Simulation (DES) models). Simulation/Modelling Knowledge (Understanding of simulation concepts (e.g., traffic modelling, human behaviour modelling, or system dynamics)). Analytical & Statistical Skills (Capability to analyze behavioural data, identify patterns, and validate models against experimental outcomes).

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28. This project investigates the design and implementation of a human interactive controller tailored to a robotic manipulator. The purpose of this research will be to enhance user control over manipulator motion, including replication of multi-axis control inputs within the manipulator workspace, real-time control, and motion smoothing. Programming and motion analysis software (e.g. MATLAB-SIMULINK) will be used to simulate and analyse controller development. The initial prototype for the User Control Interface (UCI) will be modelled within CAD software and fabricated in the lab using 3D printer rapid-prototyping techniques, allowing observation and refinement of the UCI. Additional components such as sensors will be integrated into the system. The efficacy of the UCI and controller will be further investigated through experimental analysis using a multi-axis robotic manipulator.

a. **Minimum requirements:** Intermediate Programming Skills in MATLAB. Intermediate CAD skills

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29. This project focuses on the development of an AI-driven Advanced Driver Assistance System (ADAS) for electric vehicles (EVs), designed to enhance energy efficiency through optimized driving behaviour. Using simulation-based environments such as CARLA and MATLAB/Simulink, the system will provide real-time recommendations for acceleration, coasting, and regenerative braking to extend battery range and improve overall vehicle performance. The ADAS will incorporate human behaviour modelling and machine learning, allowing it to predict driver actions and adapt guidance dynamically for improved compliance and energy savings.

a. **Minimum requirements:** Simulation & Programming Skills (Experience with simulation environments (e.g., CARLA, MATLAB/Simulink) and programming in Python or MATLAB).Data Analysis & Feature Extraction (Ability to preprocess datasets, extract relevant features, and perform statistical or machine learning analyses).Understanding of Human Behaviour & Driver Modelling (Knowledge of driver behaviour, human-in-the-loop systems, or cognitive modelling for realistic ADAS integration).Research & Communication Skills (Capability to conduct literature reviews, document methods, and prepare reports or visualizations summarizing findings).

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30. This project focuses on developing lightweight, real-time Artificial Intelligence (AI) frameworks for Synthetic Aperture Radar (SAR) imagery, with a primary application in maritime domain awareness. The goal is to design and optimize novel detection architectures and evaluation pipelines that can run directly on edge hardware onboard satellites (e.g., Jetson Orin/Nano), enabling autonomous ship detection, tracking of dark vessels, and rapid response to maritime activities. Key innovations include: Integrating classical radar signal processing methods (e.g., CFAR filters, speckle reduction) with modern deep learning models for robust detection in noisy SAR environments. Curating a new benchmark dataset (SARShipBench) with diverse geographic and maritime scenarios. Proposing advanced evaluation metrics (e.g., Maritime Surveillance Score) that capture accuracy, false alarms, latency, and operational relevance. Exploring vision–language and foundation models to extend SAR AI towards multimodal understanding and explainable EO analysis.The project sits at the intersection of SpaceTech, Earth Observation, AI, and maritime security, with strong applications in climate resilience, ocean sustainability, and defence intelligence.

a. **Minimum requirements:** The intern should have a strong foundation in programming with Python, along with familiarity in machine learning and deep learning frameworks (PyTorch/TensorFlow). Basic knowledge of computer vision or remote sensing (image preprocessing, GIS, SAR concepts) is desirable, as well as skills in data handling, Linux environments, and version control (Git). Exposure to edge AI deployment (Jetson/ONNX/TensorRT), algorithm optimisation, or signal/image processing would be highly beneficial. Strong analytical thinking, problem-solving, and research communication skills are also important.

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31. This project offers a unique opportunity. It puts students at the forefront of autonomous vehicle (AV) technology. They will explore how data shapes the intelligence of self-driving cars. This is an end-to-end journey. They will contribute to (1) collection of real-world data from vehicle sensors, (2) processing and analysis of data for the perception and control systems, and (3) simulating driving scenarios in virtual environments. This project blends hands-on engineering with data analysis science. Students will work on perception subsystems (depth camera, lidar, ...) and will ensure they can handle a variety of challenges. These include urban traffic and adverse weather conditions. The main objective is to develop the next generation of safe and reliable autonomous systems!

a. **Minimum requirements:** Programming with Matlab/Python; Basic mechatronics skills; Hands-on experience.

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32. Hydrogen fuel cells provide a significant opportunity for zero emissions energy for several sectors, including transport and sectors - e.g. cars, trucks, rail, marine, aircraft, energy, mining, etc. Deakin University and the Australian federal government have recently started investing heavily in this area as there is significant potential for growth, research outcomes, community benefit, and for Australia to become a world leader in this area. Student(s) that select this project can work with the team at Deakin's Hycel Technology Hub to develop a project that is aligned with the hydrogen fuel cell research and testing capability at Hycel.

a. **Minimum requirements:** It is essential that applicants can work independently and proactively, with strong communication and project management skills. Depending on the chosen project area, strong CAD and computer simulation skills may be beneficial. Similarly, strengths in conducting and developing experiments and hands-on prototyping skills may

be beneficial. In all cases, it is strongly desirable if applicants have a desire and willingness to learn and necessary technical skills that may be lacking.
