

BEN MCMILLEN

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CAREER SUMMARY

Computer Science and Mechatronics Engineering student with experience in embedded systems design, data acquisition development, and simulation-based analysis through an internship at Endeavour Aerospace. Strong technical communication and leadership skills developed as a Casual Academic at UNSW, teaching robotics, computing, and engineering mechanics. Skilled in translating complex engineering concepts into practical solutions, with a proven ability to manage competing workloads and deliver high-quality work.

EDUCATION

Bachelor of Mechatronics Engineering (Honours) and Bachelor of Science (Computer Science) (BE (Hons) BSc) 2021 - Ongoing
University of New South Wales, Sydney, NSW

WORK EXPERIENCE

Embedded Systems Engineering Intern at Endeavour Aerospace, Nov 2024 - Jun 2025
Dispersion Analysis Software and Rocket Test Stand Design *Python, OpenRocket, onShape*

- Conducted dispersion analysis using specialised software, interpreting results to inform engineering decisions and presenting findings to the team.
- Designed and implemented a data acquisition system for a rocket test stand, ensuring accurate measurement and recording of critical test parameters.
- Assisted in the design and development of a rocket motor test stand, contributing to structural layout, safety considerations, and functionality optimisation.

Casual Academic at the University of New South Wales, May 2024 - Ongoing
Academic Demonstrator / Tutor *C++, Arduino*

- Academic Demonstrator for MMAN2300 (Engineering Mechanics 2), MTRN3500 (Computing Applications in Mechatronics systems), MTRN3100 (Robot Design), and DESN2000 (Engineering Design and Professional Practice).
- Conducted in-person workshops and lab sessions to classes of 30-100 students, working through individual engineering questions and providing guidance and assistance on group project activities.
- Demonstrated leadership qualities when providing academic support to students including answering questions, offering feedback, and facilitating group discussions.
- Managed time effectively when balancing responsibilities of the role along with university responsibilities.

Private High School Mathematics and Physics Tutor, Jan 2021 - Ongoing
Tutor

- Tutored 40+ students in mathematics and physics across Years 7–12 over three years.
- Managed a growing client load alongside university study, strengthening time-management and organisation.
- Built strong communication and leadership skills by teaching students aged 11–18 with varied abilities.
- Enhanced critical thinking by providing clear, accurate solutions to complex student questions.

RELEVANT PROJECTS

Design and Simulation of a Low Power Piezoelectric Energy Harvesting System for Underwater Beacons on ROVs through Vortex Induced Vibrations, Aug 2024 - Aug 2025
Undergraduate Thesis Project *Python, ANSYS, SolidWorks*

- Developed a vortex-induced vibration (VIV) piezoelectric energy harvester for an underwater ROV using full CFD and structural simulation workflows in ANSYS Fluent and Mechanical.

- Modelled single-harvester behaviour to determine oscillation modes, strain distributions, and expected AlN voltage output, then extended the analysis to multi-harvester configurations to study phase differences and flow interactions.
 - Designed and simulated a compact harvester enclosure to ensure minimal drag and negligible impact on overall ROV hydrodynamics, validated through optimised CFD analysis.
 - Evaluated and compared material and geometric design choices (AlN, polyimide, polystyrene, bluff-body dimensions) to match structural resonance with vortex-shedding frequency and maximise simulated energy output.

System and Software for Smart Vehicle Parking Management: Park Pilot, Oct 2025 - Dec 2025
Computer Science Project *JavaScript, React, Node.js, Express.js, Nest.js, Python*

- Developed the front-end and back-end of a mobile application that optimised parking allocation using shortest-path algorithms and real-time occupancy tracking.
 - Analysed the performance of A* and Dijkstra's shortest-path algorithms across varying car park sizes, finding A* to be $0.9\times$ slower on smaller networks but $1.8\times$ faster on larger, more realistic car parks.
 - Modelled carbon emission reductions and simulated revenue generation through carbon credit earnings.

Engineering Portfolio Website, Dec 2023 - Jan 2024
Full-Stack Development Project *Next.js, React, TypeScript, Tailwind CSS, Vercel*

- Designed and developed a modern, responsive personal portfolio website to showcase mechatronics and computer science projects.
 - Built the site using React and Vite with component-based architecture, clean routing, and reusable UI patterns.
 - Implemented smooth animations, interactive project filtering, and full mobile responsiveness using Framer Motion and custom styling.

Hand Gesture Robot,
Automated Mechatronics Project Dec 2023 - Jan 2024
Arduino, Python

- Developed a hand-gesture-controlled robot, utilizing both Arduino and Python programming.
 - Application of machine learning software (mediapipe and opencv library in python) to interpret hand movements through an external camera.
 - Implemented both hardware and software based skills to produce a final product.

Robot Implementation,
Embedded Systems Implementation Aug 2023 - Dec 2023
SolidWorks, MATLAB

- Developed the backend for UNSW Weeder robot implementation.
 - Working with complex object oriented programming principles including abstraction, polymorphism and encapsulation.
 - Ability to work with threads when programming.
 - Capable of working with and understanding detailed user manuals.

Maze Solver,
Software Implementation Aug 2023 - Nov 2023 C

- Maze generation and solving program in multi-file project.
 - Demonstrates use of both Depth First Search and Breadth First Search Algorithms.
 - Working with Abstract Data Types such as Queues and Stacks.

EXTRA-CURRICULAR ACTIVITIES

UNSW CSE Society	2024 - Ongoing
UNSW Robotics and Mechatronics Society	2024 - Ongoing
UNSW Golf Society	2025 - Ongoing