

LACHLAN WHITEHEAD

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EDUCATION

UNIVERSITY OF MELBOURNE

March 2026

Bachelor of Science in Mechanical Engineering Systems

Chancellor's Scholarship; Dean's List 2023, 2025; 2024 David Silver Prize; 2025 Wright Prize in Mechanical Engineering

UNIVERSITY OF MELBOURNE

November 2027

Master of Mechanical Engineering; 2026 Boeing Award for Excellence

EXPERIENCE

UNIVERSITY OF MELBOURNE – ARES ROCKETRY TEAM

Chief Engineer

July 2024 – June 2025

- Oversaw development of and led decision making process for all subsystems of a supersonic sounding rocket which flew at the 2025 International Rocket Engineering Competition, ensuring each aspect of the design was optimised for performance and safety standards.
- Spearheaded documentation of rocket design optimisation, avionics framework, manufacturing methods, and recovery system design, culminating in authoring a comprehensive competition project technical report.
- Led the organisation of a flight-testing campaign crucial for validation of rocket recovery and airbrakes control systems. The team flew four Level 3 test launches over a 6-month period, including two within 48 hours, the most frequent launch cadence of any Australian university rocketry team to date.

Aerodynamics Lead

July 2023 – June 2024

- Led a sub-team of student engineers dedicated to investigating the aerodynamics of rocket aerostructure, accurately modelling the drag at all flow regimes of rocket flight as aerostructure was iterated upon.
- Developed from the ground up a workflow to efficiently generate accurate drag data using CFD tools that were fed into simulations of rocket trajectory that informed rocket design choices and control systems.
- Later worked with open-source software such as RocketPy as well as developed my own tools for trajectory simulation for the purposes of airframe design, control system development, and recovery characterisation.

JAPAN AEROSPACE EXPLORATION AGENCY (JAXA) VIA UNIVERSITY OF MELBOURNE – SAMPLE RETURN CAPSULE AERODYNAMICS – RESEARCH INTERNSHIP

Research Assistant

November 2025 – March 2026

- Ran preliminary trajectory simulations in Python using GFS weather data as an atmospheric model and Ansys-based CFD for drag modelling. These simulations served as platforms to establish transonic boundary conditions for high-fidelity LES simulations investigating non-damped oscillations.
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SKILLS

COMPUTER-AIDED DESIGN

- Experience with OnShape CAD in collaborative, iterative design on rocket aerostructure. SolidWorks and Ansys Spaceclaim for FEA and CFD-specific CAD.

PROGRAMMING

- Experience in MATLAB, Simulink, Python for control system design, trajectory simulation, flight data analysis, and higher-order simulation post processing. Used Git for version control and collaboration.

NUMERICAL SIMULATION (CFD & FEA)

- With the guidance of academics and my own research, used Ansys software and later OpenFOAM on HPC clusters to run accurate and flight-data verified fluid simulations of a competition rocket at subsonic, transonic and supersonic flow regimes. Trajectory simulations using drag data from these simulations predicted to within 10 m of a 10 km apogee.
- Conducted FEA analysis on sounding rocket bulkheads, thermal FEM of combustion chamber TPS performance in comparison to subscale data, and resonant analysis of combustion chamber.

MACHINERY OPERATION & MANUFACTURING

- Taken training from The Creator Space in electronics, laser cutting, and metal shop, using all three for university, project team, and personal projects.
 - Took part in fibreglass wet layup manufacturing of sounding rocket boat tail. Designed composite manufacturing process of sounding rocket fin can. Designed composite sanding jig for fin chamfer.
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PAPERS

Bellamy, P., & Whitehead, L. (2025). Specialised Engineering and Optimisation in High-Powered Student Competition Rocketry. 53rd IAF Student Conference, 412–422. <https://doi.org/10.52202/083098-0037>