Jack Gardiner

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Skills

CAD: Siemens NX, Teamcenter, SolidWorks, OnShape, Fusion
CAE: NX CAM, Fusion CAM, ANSYS (Mechanical, Thermal, Fluent), ABAQUS
Test: NI LabVIEW, NI cDAQ, LabJack, Jama, Synnax, Epsilon3
Programming: Python, C, MATLAB

Experience

Propulsion Development Intern, Rocket Lab – Auckland, NZ January 2024 – July 2024

- Propulsion development and testing for NASA ESCAPADE (link), a twin spacecraft mission to Mars.
- Completed physical build, DAQ system development, and commissioning of fluid system qualification rig, and ran tests to inform fill and on-orbit operations.
- Responsible for component-level qualification campaign and acceptance testing (thermal, vacuum, vibration, functional testing).
- Developed and used custom tools (python) for rapid analysis of test data.

Team Lead, ARES Rocketry Team – Melbourne, Australia July 2023 – July 2024

- Led team of 100+ students in the design, manufacture, and test of sounding rockets.
- Achieved overall 4th in the largest rocket competition in the world; Spaceport America Cup, flying our rocket Florence to 29,782ft with a maximum velocity of Mach 2 (link).
- Personally brought on more than AUD$80,000 of industrial sponsorship.
- Previously led mechanical/composites development as Chief Engineer.

Mechanical Engineering Intern, HeliMods – Caloundra, QLD November 2022 – March 2023

- Mechanical development of aircraft components (metallic, composite) for Royal Flying Doctor Service (RFDS) aircraft fitout, including design, installation, and federal aviation certification documentation.

Propulsion Lead, ARES Rocketry Team – Melbourne, Australia July 2024 – Current

- Lead team of 20 engineering students in development of hybrid rocket engine and associated test infrastructure.
- Particularly, responsible for fluid system, data acquisition system, test planning, and software development including graphical application for complete simulation of engine dynamics.

Research Assistant, The University of Melbourne – Melbourne, VIC June 2022 – August 2023

- Developed programs on Spartan Cluster (Linux HPC) to evaluate hyperparameters of physics-informed neural network (PINN) for CFD applications.
- Developed experimental setup for testing hydraulic jump phenomena in thin fluid film.
- Used MATLAB to develop custom computer vision process for unobtrusively calculating film thickness.

Projects

High Powered Sounding Rockets

- Developed and flown multiple personal high-powered sounding rockets, utilising skills across rocket dynamics, composites, flight electronics, and recovery.

MIT/ASME - Space Propulsion & Power Platform

- Selected to be one of two attendees representing Australasian region, hosted at MIT AeroAstro.
- Presented to industry (Blue Origin, Agile Space, NIST) on research and projects undertaken at university.
- Experimental labs focusing on lander flight dynamics, advanced additive manufacturing, and turbomachinery.

Education

The University of Melbourne – MMechEng (Aerospace) Expected 2026
The University of Melbourne – BSc (Mechanical Engineering Systems) 1st Class Honours 2023
Melbourne Conservatorium of Music – DMus (Music Performance) 2023