

RAAGHAV BATRA

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EDUCATION

University of Auckland

Bachelor of Engineering (Honours), Mechatronics Engineering – Penultimate Year

Expected Nov. 2026

GPA: 8.00 (A)

PROJECTS

Dual-Axis Rocket Control System | ANSYS FEA & CFD, OpenRocket

June 2025 – Present

- **Leading technical direction** of a fully custom active control system for the **2026 Australian Universities Rocket Competition (AURC)**, targeting a **10,000ft apogee with $\pm 1\%$ accuracy**.
- Designing a **small-scale test rocket** to quantify stability and altitude performance; results will drive **iterative refinement and optimisation** for the mission-critical subsystem, with launch scheduled for September 2025.
- Implementing **airbrakes for drag control** and **reaction wheels for roll stabilisation** by advancing OpenRocket flight dynamics simulations, while planning ANSYS suite modelling and EasyEDA PCB development.
- Collaborating with **5 other teams** within the University of Auckland Rocketry Club to ensure **successful system integration** of the full-scale rocket and compliance with AURC specifications.

Off-Grid Weather Station | ESP32, C, Fusion 360, EasyEDA

Dec. 2024 – Present

- Designed a **self-sustaining weather station** featuring separate **ESP32-based internal and external nodes** communicating wirelessly over ESPNOW to log temperature, humidity, and pressure.
- Programmed an **end-to-end firmware solution written in C**: external node handles sensor acquisition, while internal node drives an OLED display while hosting a web interface for remote access.
- Engineered a **custom off-grid power system** in EasyEDA, combining solar charging, Li-ion battery backup, and power-optimized firmware, delivering a predicted 99% uptime across variable conditions.
- Developed a **weatherproof enclosure** in Fusion 360, incorporating a Stevenson-screen ventilation system, ensuring accurate sensor readings and protection against environmental elements.

Custom RetroPie Games Console | Raspberry Pi, Fusion 360, Linux

Dec. 2023 – July 2024

- Built a **handheld system** using a Raspberry Pi 3B+ within a custom-made 3D-printed Gameboy-inspired chassis.
- Developed an **integrated hardware-software stack** that includes Linux (RetroPie), active thermal management, custom power delivery, and GPIO-driven button control.
- Configured and **optimised the Linux framebuffer** using the fbcp-ili9341 library to drive a 3.2" SPI TFT display at **30 FPS** while **maintaining $< 60^{\circ}\text{C}$** under load.
- Assembled and documented the system, delivering a **plug-and-play retro gaming experience**.

LEADERSHIP & EXTRACURRICULAR

University of Auckland Rocketry Club (UARC)

Control Systems Team Lead

June 2025 – Present

- **Leading a team of 3** to develop the rocket control system by **coordinating design decisions and deliverables** to ensure the team achieves the September 2025 test launch milestone.
- Directed **project initiation** by leading **early-stage research** into rocket dynamics, stability, and control methods
- Established **future-proof project management practices** by documenting relevant design decisions, calculations, and simulations in a beginner-friendly manner, ensuring **knowledge transfer** for new team members.
- Will oversee **cross-team system integration** of the control system into the full-scale rocket.

Exec Team Member

Aug. 2024 – Present

- **Founding Exec Member**, helped **establish UARC's operations** in its inaugural year (**now 120 members**).
- **Co-organised UARC's first-ever build workshop**, introducing rocketry to **84 beginners across 13 teams**, enabling them to pursue NZRA Level 1 certification by building compliant rockets.

SKILLS

Embedded Systems & Programming: Git, Embedded C, ATmega328P, ESP32, Raspberry Pi, System Architecture, Oscilloscope and Multimeter Validation, Hardware Interface Design, Wireless Communication

Design & Manufacturing: Autodesk Fusion 360, 3D Printing, Mechanics of Materials, PCB Prototyping, Oscilloscope and Multimeter testing, Soldering, Laser Cutting, Design for Manufacturability

Technical: MATLAB, Simulink, PID Control, Analog/Digital Signal Processing, Interrupt Based Programming