

Jack Le

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Skills

Electronics: PCB Design (KiCad), Soldering, ESP32, Stepper Motor Control

Programming and Software: C, C++, Python, MATLAB, HTML, CSS, JavaScript

Mechanical and CAD: Fusion360, 3D Printing, Design for 3D Printing

Control and Vision Systems: PID Control, Computer Vision (OpenCV, HSV Analysis, ESP32-CAM), Inverse Kinematics, Real-Time Systems

Education

UOW

Graduating December 2027

Bachelor of Engineering in Electrical and Electronics Engineering (Honors)

WAM: 92

Awards

Outstanding Achievement Award – UOW College

2025

Awarded to the student with the highest WAM in the Engineering Diploma Cohort

Projects

Ball Balancing Robot

[Find Out more](#) [Demo Video](#)

- Led a team of six to build a high-precision ball-balancing robot using stepper motors, ESP32s, and a vision system, achieving <1 mm steady-state error.
- Designed and optimized a 3RRS parallel manipulator in Fusion 360 for stiff, support-free 3D printing.
- Implemented a real-time PID controller in C++ with dynamically gain scheduling for improved performance.
- Built a 40 FPS ESP32-CAM computer-vision pipeline for ball tracking.
- Designed a custom PCB in KiCad to improve electrical reliability and reduce wiring complexity.
- Used MATLAB to optimize manipulator geometry and avoid singularities for faster, larger tilt motion.
- Built a Python calibration tool for the vision system.
- Built a web-based control panel to visualise the live ball position and provide real-time control of PID gains, target points, and path-following modes.
- Awarded \$10,000 as the winning project of the 10K Club Competition.

High Speed Rubik's Cube Solving Robot

[Find Out more](#) [Demo Video](#)

- Built a fully automated Rubik's Cube solver with a camera, five stepper motors, drivers, and an ESP32,
- Modelled a precise, constraint-based 3D assembly in Fusion 360 and produced full electrical schematics and PCB designs in KiCad.
- Printed and assembled the mechanical frame; soldered and wired all electronics for a reliable, compact system.
- Implemented HSV analysis computer vision in Python, reaching 95% color detection accuracy under varied lighting.
- Generated ≤ 22 -move solutions in under 2 seconds using Kociemba's two-phase algorithm.
- Programmed an ESP32 in C++ to drive five steppers with backlash compensation for fast, repeatable motion execution, achieving 3.6-second solves on average.

Experience

Peer Assistant Tutor, UOW College

Jan 2024 – Present

- Acted as a teacher's assistant, supporting students in foundational math and report writing, improving their analytical and problem-solving skills.

UOW Mechatronics Society – Rover Team

- Built an ESP32-based control system (C/C++) for an end effector, integrating sensors for position feedback and reliable actuation.
- Analyzed sensor data to validate performance and iterate on the design, improving system stability and troubleshooting accuracy.
- Implemented ESP-NOW wireless communication for remote control and real-time telemetry during testing.