Luke Winters

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Project Portfolio Website: https://lukeandwinters.github.io/project_portfolio_luke/

WORK EXPERIENCE / PROJECTS

Machine Learning / AI Internship | Computer Vision and Particle Analysis   **July 2023 – Current**
Coogee Chemicals – Intern   Melbourne, VIC

- Use AI, Machine Learning, and Computer Vision, approaches to analyse titanium powder samples
- Real-time object detection and instance segmentation via live camera footage of industrial machinery to optimize operational performance. Full ML pipeline, labelling, training, inference and deployment.
- Application of Python, OpenCV, PyTorch, TensorFlow, YOLOv8, Detectron2, PLCs for automation.

Mechatronics Capstone Project | Multi Agent Drone Beach Patrol Safety System   **Feb 2024 – Dec 2024**
Capstone Project Team Member   Melbourne, VIC

- Proof-of-concept drone patrol network in collaboration with Queensland / NSW Surf Life Savers (SLS)
- Detects beach hazards in real-time (sharks, rip currents and swimmers) and applies a multi-agent control coverage problem to optimally path drones for risk mapping and beach surveillance – assisting emergency response.
- YOLOv8/OpenCV for detection, Unity HDRP for simulation, and Multi-agent Optimal Control for drone paths

Melbourne Space Program (MSP) | Designing Humanoid Robotic Arm   **Feb 2023 – Feb 2024**
Mechatronics Engineer – Robotics Team Lead   Melbourne, VIC

- Tasked with designing and building a scalable 4-axis robotic arm.
- Allocated budget of $10000
- End Effector – 3D printed humanoid soft robotic hand in collaboration with the Melbourne Human Robotics Lab.
  - Application of forward / inverse kinematics, CAD modeling and closed loop control.

Mechatronics Systems Design Project | Designing/Building Boring Drill   **July 2023 – Nov 2023**
Team Member   Melbourne, VIC

- Full design pipeline: Stakeholder analysis, needs generation, engineering requirements, then solution generation, with relative component analysis to decide on prototyping and final successful development of drill.
- Experience with design for manufacturing (CAD, laser cutting, milling, 3D printing, CNC machining and soldering)

EDUCATION

The University of Melbourne | Masters of Mechatronics Engineering   **Expected Grad. May 2025**
- Current weighted average mark - *First Class Honours (H1)*   Melbourne, VIC
- Scholarships - Boeing Awards for Excellence

New York University (Tandon School of Engineering) | Masters of Mechatronics Engineering   **Jan 2025 – Current**
- Current exchange semester at NYU Tandon School of Engineering   New York, NY
- Scholarships – Global Mobility Award / FEIT Exchange

The University of Melbourne | Bachelor of Science in Mechanical Systems   **Grad. Dec 2022**
- Graduated with *First Class Honours (H1)*   Melbourne, VIC
- Scholarship – Residential Bursary Triple Academic College
- State Volleyball – Division I

The University of British Columbia | Mechanical Engineering Exchange Program   **Jan 2022 – Apr 2022**
- Graduated with *First Class Honours (H1)*   Vancouver, Canada
- Exchange semester – Mobility Award Scholarship

VOLUNTEERING / LEADERSHIP

Trinity International Student Committee | International Student Society   **Oct 2021 – Oct 2022**
President of TISC   Melbourne, VIC

- Elected by ~300 students for dedication and innovation to the international cohort at Trinity College
- Liaised with Trinity College's Dean for greater international integration and inclusion in the wider community.

SKILLS: Python, C, Java, MATLAB, CAD, SolidWorks, Machine Learning, (104 WPM), PyTorch, Computer Vision