JASPER JAPP

MECHATRONICS ENGINEER

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CAREER SUMMARY

Results-driven engineering professional pursuing a Bachelor of Engineering (Honours) at the Australian National University, majoring in Electronic and Communication Systems with a minor in Mechatronic Systems. Proven experience in power systems modelling, control system integration, and AI-based sensor networks through high-impact projects and an internship at BP. Skilled in embedded systems, deep learning algorithms, and IoT architecture for real-time applications. Brings a strong foundation in multidisciplinary collaboration, operational efficiency, and data-driven design, delivering scalable solutions in autonomous systems, instrumentation, and performance-critical environments.

EDUCATION

Bachelor of Engineering (Honours) /Australian National University　　　　**Expected Nov 2025**
GPA: 6.6/7.0 | WAM: 81
Majoring in Electronic and Communication Systems | Minor in Mechatronic Systems
Multidisciplinary Systems Engineering approach focus.

WACE (ATAR) Scotch College Perth　　　　**Nov 2020**

SKILLS

- Strategic Planning
- Team Leadership
- Circuit Design
- Power Systems
- Control Theory
- Signal Processing
- Embedded Systems
- Motor Control
- System Modelling

- Sensor Integration
- Hardware Debugging
- Microcontroller Programming
- Thermal Management
- Power Electronics
- Mechatronic Design
- SolidWorks
- Python

- C
- ANSYS Fluent
- MATLAB Simulink
- Sensor Fusion
- Technical Documentation
- Sensor Calibration
- Real-time logic development

PROFESSIONAL EXPERIENCE

Electrical Engineer Intern / BP　　　　**Nov 2023 – Feb 2024**
- Designed and enhanced an Excel-based modelling tool to compare high-voltage (HV) electrical transmission lines vs hydrogen pipelines for green hydrogen projects, integrating Australian transmission standards, surge impedance loading (SIL), and reactive compensation.
- Engineered advanced loss modelling incorporating corona discharge, skin effect, conductor bundling, and tower phase spacing, increasing technical accuracy and allowing inputs up to 500 km and 30 GW.
- Expanded tool capability to support n-1 redundancy and multiple-line configurations, improving system reliability analysis for AREH and GERI hydrogen infrastructure.
- Collaborated with cross-functional teams, including finance and engineering, to integrate lifecycle cost analysis (CAPEX + OPEX) over 50+ years, with inflation-adjusted maintenance and replacement modelling, resulting in refined Net Present Value (NPV) projections.
- Achieved ~$400M projected cost savings by identifying 10% lifecycle cost benefits through scenario modelling of transmission vs pipeline infrastructure.
- Conducted feasibility studies on Dynamic Line Rating (DLR) using real-time wind data and thermal rating algorithms, revealing potential $20M cost savings through optimal conductor sizing.

- Delivered technical documentation and a comprehensive user guide for the tool, ensuring continuity and usability for both technical and non-technical stakeholders.
- Presented findings to senior electrical engineers and participated in sprint reviews and agile stand-ups, contributing to project milestones for AREH.
- Utilised engineering standards and AEMO cost databases to derive real-world parameters, validating modelling outputs against ETAP simulations and consultant benchmarks.
- Initiated secondary research and analysis on Aluminium-Conductor Composite Reinforced (ACCR) vs traditional ACSR conductors to support grid optimisation decisions.

Team Member – Structures / ANU Solar Racing   **Mar 2022 – Present**
- Engineered aerodynamic and structural systems as part of a cross-functional team designing a solar-powered vehicle for the 2023 and 2025 Bridgestone World Solar Challenge, targeting a 3,000 km endurance run across Australia.
- Reduced aerodynamic drag by 20% by leading iterative ANSYS Fluent CFD simulations and optimisation, directly enhancing vehicle performance and energy efficiency under real-world conditions.
- Automated CFD workflows using Python scripting, slashing processing time for simulation iterations and accelerating design validation cycles by 40%.
- Designed structural and aerodynamic body components in SolidWorks, aligning models with composite manufacturing constraints to ensure durability and lightweight performance.
- Integrated structural and electrical system considerations, enabling compatibility of chassis design with solar array placement, battery enclosures, and control system mounts.

Researcher / Individual Honours Project   **Feb 2025 – Present**
- Designed a GRU-based Gaussian Mixture Variational Autoencoder (GGM-VAE) model to enable unsupervised early wildfire detection using eCO_2 and VOC signals from low-cost IoT sensor nodes.
- Improved real-time anomaly detection performance by training models exclusively on normal conditions, achieving high sensitivity with reduced false positives in early ignition scenarios.
- Programmed scalable deep learning pipelines in Python and TensorFlow, enabling deployment of models on resource-constrained microcontroller-based IoT platforms.
- Integrated gas sensing and environmental data streams into a unified anomaly detection framework, enhancing latency response and detection accuracy compared to satellite or camera-based methods.
- Evaluated trade-offs between neural network complexity, detection accuracy, and hardware limitations, identifying optimal models for real-world field deployment in bushfire-prone areas.

Barista / Little Garran Café   **Aug 2024 – Dec 2024**

Barista / Patissez Café Canberra   **Sep 2022 – Sep 2023**

Driver & Warehouse Labourer / Hire Society Perth   **Nov 2020 – Jan 2021, Nov 2021 – Jan 2022**