

# Luke Birchenough

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## Mechatronics Engineer

Linkedin | Website | [luke.birchenough@outlook.com](mailto:luke.birchenough@outlook.com) | 0466574979 | Perth, WA

## Summary

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Mechatronics Engineer with 5 years of experience building industrial measurement systems in the railway industry. Skilled in software development, from computer vision and machine learning to building full-stack web applications. Combines strong analytical and technical abilities with an engineering mindset and hands-on experience in R&D, troubleshooting, hardware and system integration, calibration and end-to-end testing. A fast learner and practical problem-solver with an education background that supports clear communication and collaboration across multidisciplinary teams. Motivated by challenging problems and complex systems.

## Skills

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- **Programming:** C++, C#, Python, JS/TS, PHP, Go
- **Front-End:** React, Angular, Svelte, EJS, Blade Templates, HTML, CSS, Tailwind, Shadcn/ui, Bootstrap
- **Back-End:** ASP.NET Core, Node.js, Express, Laravel, Gin, Next.js, Supabase, REST APIs, SQL (PostgreSQL, MySQL, SQLite)
- **Computer Vision & Machine Learning:** Camera/Laser Measurement, Camera Calibration, OpenCV, TensorFlow, Keras, Object Detection, Image Segmentation, YOLO, MobileNet
- **Robotics & Embedded:** ROS, Arduino, Raspberry Pi, ESP32
- **Cloud and DevOps:** AWS, Docker, Git, CI/CD Pipelines
- **Tools & Platforms:** Jira, Confluence, Linux, Vite, Jest

## Professional Experience

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### Software Solutions Engineer | Siemens Mobility MRX

2022 – 2025

Member of the Measurement Software team supporting computer vision and laser-based systems for automated measurement and detection of train components, including Vehicle Equipment Measurement Systems (VEMS) and Visual Inspection Systems (VIS).

## Responsibilities

- **Developed** and maintained measurement processing software and supporting microservices (C++) for the Next-Generation (NxG) and legacy measurement products.
- **Built** UIs (React, PyQt) and scripts (Python, Bash) to streamline troubleshooting and automate workflows.
- **Orchestrated** deployment of containerised microservices using Docker and CI/CD pipelines.
- **Managed** site configurations and resolved inter-service communication and backend integration issues during deployments.
- **Handled** system integration to achieve end-to-end functionality from sensor triggering and data capture to measurement processing and front-end reporting.
- **Delivered** remote technical support for VEMS and VIS systems, resolving critical hardware and software issues across international deployments.
- **Trained** object detection and segmentation deep learning models for integration into VIS products.

## Achievements

- **Played** a key role in the development of the Next-Generation (NxG) Wheel Profile Measurement System (WPMS) from prototype to first shipment, contributing across software development, R&D, and system integration.
- **Engineered** a Python/Qt UI to visualise and analyse WPMS debug data that was instrumental in performance analysis and troubleshooting of Next Generation WPMS systems, later redeveloped as a performant React SPA designed for integration with the browser-based results platform.
- **Acted** as software technical lead on a project with a two-month delivery window, identifying a critical software incompatibility and led a small team to deliver a successful solution within schedule.

## Graduate Systems Engineer | Siemens Mobility MRX

2020 – 2022

Graduate engineer supporting the development, integration, testing, and validation of next-generation railway measurement systems.

### Responsibilities

- **Performed** hands-on camera calibration, sensor alignment, and measurement validation across multiple systems.
- **Executed** Factory Acceptance Testing (FAT) and Site Acceptance Testing (SAT), producing detailed technical documentation and customer reports.
- **Supported** hardware builds, system integration, and end-to-end validation activities.
- **Collaborated** with engineering and production teams to meet delivery milestones.
- **Produced** 3D models, assemblies, and renders for measurement processing simulation.

## Achievements

- **Created** the core FAT procedures and documentation used across the NxG product line, personally performing FAT and enabling the successful shipment of six systems.
- **Completed** SAT and reporting across five separate projects, navigating customer feedback cycles and achieving acceptance at each site.
- **Designed** and retrofitted a physical attachment to eliminate a safety hazard and significantly reduce validation time during on-site WPMS validation.

## Robotics Intern | Woodside Energy

2019 - 2020

- **Developed** python-based ROS nodes to interface with an embedded microcontroller, enabling dynamic LED pattern control for real-time robot status indication and operational safety.
- **Integrated** a roller door controller with an IP camera to enable remote operation and visual verification. Implemented control logic enabling autonomous robot facility access.

## Digital Imaging Support Officer | Henry Schein Halas

2013 - 2015

- **Provided** technical support for installation and troubleshooting of dental x-ray imaging systems across Western and South Australia.
- **Executed** preventive maintenance programs including routine calibrations increasing system reliability.

## High School Teacher | Darling Range Sports College

2011 - 2012

- **Delivered** IT curriculum for Years 9–12, teaching computing and digital technologies to secondary students.
- **Collaborated** with teaching staff to develop and enhance learning programs.

## Education

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**Bachelor of Engineering (Honours, First Class) – Mechatronic Engineering**

Curtin University, 2016 – 2020

**Bachelor of Arts / Bachelor of Communications (Education & Interactive Multimedia)**

Edith Cowan University, 2007 – 2011

## Projects

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Heavy focus on web technologies and expanding full-stack development capabilities. See [projects](#).

## Certificates

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- [AWS Certified Cloud Practitioner](#) - Developed cloud fluency and foundational AWS knowledge.
- [Robotics Software Engineer](#) - Localization, mapping and navigation using ROS.

## References

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Available upon request.