

# Nicholas Campbell

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## Education

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<b>MEng (Cum Laude)</b>	<b>Stellenbosch University</b> , Mechatronic Engineering	2024 – 2025
	<ul style="list-style-type: none"> <li>• Thesis: An Architecture for a Federated Digital Twin System for an Automotive Enterprise (80%)</li> <li>• Conducted in close collaboration with BMW IT Hub South Africa</li> <li>• Presented conference paper at SOHOMA 2025, Aix-en-Provence, France (Oct 2025)</li> </ul>	
<b>BEng</b>	<b>Stellenbosch University</b> , Mechatronic Engineering	2020 – 2023
	<ul style="list-style-type: none"> <li>• Best Final Year Biomedical Project — Institute of Biomedical Engineering (Wearable Cardiopulmonary Exercise System, 90%), Dec 2023</li> </ul>	

## Experience

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	<b>SpatialEdge</b> , Junior Data Engineer	2026 – present
	<ul style="list-style-type: none"> <li>• Migrated legacy data infrastructure to a cloud-native architecture on GCP, ingesting on-premises relational databases, SaaS platforms (Salesforce, Jira), ERP systems, and internal case management systems into BigQuery</li> <li>• Architected and deployed an automated Salesforce → BigQuery ingestion pipeline using Python and BigQuery Data Transfer Service; built a CLI utility that auto-generates YAML configs from the Salesforce API, reducing new-asset onboarding from hours to minutes</li> <li>• Engineered BigQuery optimisations — transforming standard views into sharded tables and using table cloning to provide high-performance writable environments without additional storage costs</li> <li>• Automated GitLab CI/CD pipelines to streamline deployment cycles and synchronise configurations with cloud infrastructure, incorporating dual-stage validation and POPIA compliance tagging</li> <li>• Led production deployments and participated fully in Agile sprint ceremonies</li> </ul>	
	<b>BMW IT Hub South Africa</b> , Graduate Researcher	2024 – 2025
	<ul style="list-style-type: none"> <li>• Collaborated with multiple stakeholders to derive business requirements, translating them into technical requirements for a system.</li> <li>• Designed software architectures integrating heterogeneous digital twin platforms across the vehicle lifecycle, applying cloud services and knowledge graphs for DevOps integration and lifecycle analytics.</li> <li>• Participated in the BMW Automotive IT Colloquium (Jun 2025) on AI, Digital Twins, and Automation; contributed to a hackathon building a VS Code extension that integrates an LLM with the GitHub API to enhance developer efficiency across the DevOps lifecycle</li> </ul>	
	<b>Stellenbosch University</b> , Head Teaching Assistant — Mechatronics 424	2025 – 2025
	<ul style="list-style-type: none"> <li>• Oversaw execution of Mechatronics 424 group projects; coordinated demonstrators, managing tasks, timelines, and team communication</li> </ul>	
	<b>Zutari</b> , Engineering Intern	2022 – 2023
	<ul style="list-style-type: none"> <li>• Rotated through Industrial Automation and Water teams</li> <li>• Developed a GeoFencing application in Ignition Perspective using phone-based location data to demonstrate safety and control strategies</li> </ul>	

## Projects

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### Personal Finance Tracker

2026

- Full-stack personal finance dashboard built with Next.js (TypeScript), Supabase (PostgreSQL), and deployed on Vercel; ingests bank transactions nightly via a Gmail Apps Script integration
- Engineered a nightly ETL pipeline (raw → prepared) with multi-currency FX conversion, a three-pass categorisation engine (rules → LLM → manual overrides), and Vercel Cron Jobs for scheduling
- Features net worth tracking, budget management, recurring transaction detection, and a GitHub-style spend heatmap across 8 dashboard pages

### Wearable Cardiopulmonary Exercise System

2023

- Designed, built, and tested a low-cost mobile CPET system with wireless real-time data streaming up to 90 m; strong correlation with reference system
- Awarded Best Final Year Biomedical Project by the Institute of Biomedical Engineering (90%)

### GeoFencing Application

2023

- Built a concept demonstrator in Ignition Perspective during a vacation-work period at Zutari, using phone-based GPS data to implement safety and control strategies for the Industrial Automation team

### Analog Audio Amplifier

2023

- Designed, built, and tested a class AB 2-channel audio amplifier outputting 8W as part of Electronics 315 (undergraduate mechatronics)

## Skills

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**Languages:** Python, SQL, JavaScript, C

**Databases:** BigQuery, PostgreSQL, MongoDB, Firebase, Supabase

**Cloud & Infrastructure:** Google Cloud Platform, Apache Airflow, GitLab CI/CD, GitHub Actions, Docker; some experience with AWS & Azure

**Data Engineering:** ETL pipeline development, data warehouse optimisation, CI/CD automation

**Mechatronics:** Embedded systems, CAD, control systems, signal processing

**Domain Knowledge:** Systems integration, software architectures for data aggregation, digital twins, knowledge graphs

**Professional:** Agile methodology, sprint planning, cross-functional collaboration, technical documentation, production deployment management

## Awards

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**Best Final Year Biomedical Project:** Institute of Biomedical Engineering, Dec 2023 — Wearable Cardiopulmonary Exercise System (90%)

**Data School Hackathon — 2nd Place:** Standard Bank & Mobalyz, Aug 2023 — real-time driver risk-scoring system

**Golden Key Society:** Invited 2021, 2022, 2023