Alexander Steffen

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PROFESSIONAL SUMMARY

1st Class Honors Mechatronics & Robotics graduate driven by a curiosity for challenging technical problems and a passion for building practical, elegant solutions in academia, industry and at home. Experienced in integrating mechanical, electrical, and software systems across robotics, aerospace, and industrial automation. Thrives in fast-paced, multidisciplinary environments — from designing multi-robot navigation systems with Airbus to developing precision manufacturing test equipment from scratch. Excited by the opportunity to learn, push technical boundaries and contribute to innovative, action-oriented teams shaping the future of robotics technology.

EDUCATION

University of Sheffield – BEng Mechatronics & Robotics Engineering (2021–2024)
Classification: 1st Class Honors
Dissertation – "Multiple Mobile Robot Aerostructure Transportation" (76%)

- Designed a decentralized multi-robot system using 2D LiDAR for collaborative large aerostructure transport.
- Partnered with Sheffield Robotics, Airbus, and the AMRC; validated with Vicon motion capture on industrial AMRs with ROS-based navigation and motion planning.
- Programmatically generated and labeled Gazebo simulation-based ground truth data sets to test and optimize LiDAR clustering and feature extraction algorithms for robustness and computational efficiency, enabling scalable, low-cost peer-to-peer localization.

- **Hardware-in-the-Loop & Rapid Control Prototyping (84%)** – Designed and tested feedback controllers on hardware in the loop using MATLAB, Simulink, and LabVIEW. Developed and validated simulated system models to formulate and optimize a full state estimator feedback controller through rapid control prototyping. Integrated hardware and software for real-world control challenges, refining solutions iteratively via agile working.
- **Machine Learning (76%)** – Developed end-to-end ML pipelines, applied regression, classification, neural networks, and reinforcement learning in Python and MATLAB to real-world optimization problems.
- **Robotics (69%) –** Completed projects on core robotics principles including kinematics, actuation, perception, control, motion planning, and programming; validated in MATLAB/Simulink and deployed on a 6DOF robot arm.

CORE COMPETENCIES

Technical Expertise

• **Robotics:** ROS, LiDAR, Actuation, Gazebo, motion planning, CV, MATLAB/Simulink
• **Algorithms & AI:** Python, SciKit, Numpy, MATLAB, Docker, APIs
• **Embedded Systems & Electronics:** C++, PCB design, microcontrollers (AVR/Rpi/ESP32), sensor integration, serial & wireless coms
• **CAD:** SolidWorks/Edge, F360, FEA, KiCAD, EasyEDA, CNC, DFM
• **Fabrication:** 3DP, CNC manufacturing, soldering & SMD assembly, manual machining
• **Broad Engineering Proficiency:** Systems, controls, aerospace, and robotics design from concept to validation

Collaboration & Leadership

• **Multidisciplinary Team Leadership:** Led 20+ engineers in propulsion, avionics, robotics and R&D teams across multiple projects.
• **Secured R&D Funding:** Presented technical projects to officials and academics, directly contributing to successful grant applications
• **Agile Project Execution:** Managed projects from design to deployment in fast-paced R&D and industrial settings
• **Academic & Industry Collaboration:** Partnered with Airbus, patent holders, academics, the AMRC, and Sheffield Robotics labs on R&D

INDUSTRY EXPERIENCE

Undergraduate Engineer | Magnomatics Ltd. UK | Jun 2023 – Aug 2023

- Led mechanical, electronic, and software development of a CNC Gaussmeter rig, reducing QA costs by over 90% compared to commercial alternatives. Designed in CAD, manufactured via rapid prototyping and machining, and integrated AVR microcontroller control with a LabVIEW state-machine interface.
- Presented design and results to government funding officials and University of Warwick academics, contributing to successful funding acquisition.
- Developed IoT systems: debugged SPI comms with oscilloscope/logic analyzer, automated QR-based stock control system.
- Designed RVDT signal conditioner from schematic and component selection to PCB production, including seamless integration with existing stacked PCB architecture.
- Prototyped novel FOC stepper-motor based wire-tensioning system for precision stator winding.
- Secured job offer for part time working student and a full-time graduate position.

Mechanical Design Undergraduate Engineer | AESSEAL UK | Jun 2022 – Sep 2022

- Developed mechanical seals for global clients across oil & gas, water, and pharmaceutical industries while designing for manufacturing and in accordance with DIN 24960, ISO 21049 & 3601 standards.
- Developed novel OCR-based automation software integrating CAD, SAP, PDM, and procurement systems, eliminating human error and saving over 30 hours per month in repetitive tasks.
- Produced user documentation for company-wide tool deployment to improve legacy part reusability and efficiency.
- Secured an immediate employment offer as a mechanical design engineer.

STUDENT LED PROJECTS

Future Technology Lead Engineer | Project Falcon | Sep 2021–Aug 2023
Developed a novel large-scale VTOL prototype to validate a patented (GB2554977) variable incidence wing multirotor design. Developed IMU-based real-time incidence control software and integrated hardware for performance testing.
Propulsion & Avionics Lead Engineer | Project Hex | Aug 2022–Dec 2023
Led propulsion and avionics teams for UAV competition entry; ran payload/flight-time simulations to guide component selection under strict budget constraints.
Structures & Avionics Engineer | Project Kestrel | Aug 2022–Dec 2023
Designed and analyzed UAV airframe via CAD & FEA as part of a large interdisciplinary engineering team. Specified and integrated avionics and power systems, employing rapid prototyping techniques including CNC machining, composite layup, laser cutting, and 3D printing.

ADDITIONAL EXPERIENCE

• **BMW Parts Recycling Business** – Founded and operated a small business buying and selling used automotive parts, managing sourcing, sales, and customer service.
• **Triumph Motorcycles & Thai Trafo Internships –** Early exposure to manufacturing and electrical engineering environments working with experienced engineers.
• **Thai Friendly Design Competition Finalist (2019) –** Designed user-centered educational products for children with disabilities.

LANGUAGES

• **English** – Native
• **German** – B1 (Actively improving)

INTERESTS

FDM 3D printing, hiking, automotive modifications, gravel cycling, electronic music, skateboarding, robotic locomotion, electronics, and embedded systems.