James Bray

Aerospace Engineering Student, MEng, 3rd year

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Professional Experience

2024/07 - 2024/10 **Assistant Project Engineer** *The University of Sheffield AMRC, summer placement*
The AMRC is a leading research hub for advanced manufacturing, specialising in aerospace

- Designed and manufactured a £4000 partial discharge testing cell for 20kV motor coils
- Co-ordinated and liaised with 6 suppliers to source components for manufacturing
- Managed project deliverables, mitigated risks and produced supporting documentation
- Used Ansys FEA to evaluate the feasibility of geometries in slinky stator manufacture
- Utilised Ansys' design optimisation for the pneumatic end effector of a sorting robot
- Planned the automated disassembly of a Siemens servo motor to extract valuable parts

2021/06 - 2021/07 **Catalogue Executive** *MinsterFB, temporary full-time*
MinsterFB is an end-to-end agency helping brands grow on the Amazon platform

- Created and optimised listings for maximum engagement and profitability
- Used Excel to make an automated product name generator based on supplier data
- Designed enhanced graphical content for 5 brands using Canva and Inkscape
- Gained a good understanding of SEO for Amazon listings to help maximise conversions
- Adapted to working in a fast-paced environment both independently and in virtual teams

Education & Qualifications

2022/09 - present **Aerospace Engineering Degree MEng** *University of Sheffield, predicted first-class*
Five-year course with a year in industry, currently in 3rd year

Relevant completed modules:

- Quadcopter Project: Control lead on a quadcopter project which won lightest in the cohort
- Electrical Energy Management: Studied electrical infrastructure and motor performance
- Systems Engineering: Built and coded a search robot in C with obstacle avoidance
- Control Systems: Analysed and designed basic control methods for various systems

Relevant current modules:

- Space Systems Engineering: Exploring the concepts of space system and mission design
- VTOL quad plane: Taking on 2 roles, leading all avionics aspects of the quad plane
- State-space control: Learning how to implement state-space control for MIMO systems
- Machine Learning: Studying regression, classification and reinforcement learning.

2020/09 - 2022/07 **A-Levels** *George Spencer Academy, Nottingham (references available)*
Achieved grades:

- A*AAA in Maths, Further Maths, Computer Science and Physics respectfully

2015/09 - 2020/07 **GCSEs** *George Spencer Academy, Nottingham*
Achieved grades:

- Grade 9: Maths, Biology, Chemistry, Physics
- Grade 7-8: Computer Science, Design & Technology, Geography, English

Highlighted Projects

2024/10 - present **Project Sunride - Avionics (propulsion)** *Extra-Curricular University Project*
Student-led team, building rockets and rocket engines with the end goal of reaching space

- Designing avionic systems for the university's first liquid rocket engine test stand
- Utilising LabJack DAQ systems to interface sensors and actuators for precise control
- Built a SIMULINK fluid model with PID control to regulate fuel and ox flow to engines
- Implementing fault detection and safety protocols for the rocket engine test procedures
- Exploring engine gimbaling systems on the test stand to control thrust direction

2024/02 - 2024/05 **Control Lead - Quadcopter Design Build and Test** *University Project*
Student teams compete to win a contract for drone manufacture with a fictitious company

- Won the contract for the lightest flying drone out of a cohort of 31 teams
- Led control team, optimising flight behaviour through PID controller BetaFlight
- Used Google Sheets to analyse and predict motor performance with different components
- Modelled a digital twin in Fusion 360 to optimise the strength-to-weight ratio using FEA
- Manufactured drone using laser cut or 3D printed parts, and soldered electronics

2022/10 - 2023/06 **UKSEDS Rocketry Competition** *Extra-Curricular University Project*
Design team member in UKSEDS, where teams design and build model rockets.

- Designed and 3D printed a whistling rocket nosecone using Fusion 360 and Prusa
- Modelled the rocket performance using OpenRocket to ensure maximum apogee
- Handled subteam conflicts regarding rocket dimensions and features
- Utilised MATLAB to perform Fast Fourier Transform (FFT) on launch audio data
- Evaluated the Doppler effect to compare with acceleration data in the telemetry

2022/09 - 2022/10 **Self-Sustaining TurboJet Engine** *Personal Project*
Recycled a car turbo into a turbojet engine using tools in my garage.

- Researched existing designs and systems to inspire my sketches and prototypes
- Used Fusion 360 to model the assembly of the turbo and the combustion chamber
- Powered and coupled a 20,000 rpm starter motor to get the engine to operating speeds
- Manufactured a combustion chamber using tools like a pillar drill and an angle grinder
- Practised safety measures and mitigated hazards (high voltages, high temperatures)

2021/06 - 2021/07 **Topology Optimisation with Finite Element Analysis** *A-Level Coursework*
Developed an application for FEA and Topology Optimisation in 2D

- Designed and built UI/UX interfaces for my application in Unity game engine
- Programmed the backend processing using C# and Math.NET libraries (for linear algebra)
- Coded algorithms like FEA, Marching Squares, Filtering, Binary Search and Serialisation
- Used project planning methods like Flowcharts, Gantt Charts, DFDs and Class Diagrams
- Created an extensive document that outlines and justifies every step of the development

Proficiencies

A summary of my current skillsets demonstrated in my curricular and extra-curricular experiences.

Technical Skills

- CAD/CAM & simulation
- Iterative design & analysis
- Advanced manufacturing
- Programming
- Documentation

Soft Skills

- Effective communication
- Analytical thinking
- Leadership and Collaboration
- Attention to detail
- Quick learning aptitude

Software

- Fusion 360
- MATLAB and Simulink
- Python, C, C#
- Unity & Blender
- Google & Microsoft Suites