William Powell

Email: me@willpowell.uk LinkedIn: www.linkedin.com/in/william-f-powell Website: www.willpowell.uk

EDUCATION

Imperial College London *October 2023 - Present*

Applied Machine Learning MSc

- Modules taken as present: Machine Learning, Self-Organising Multi-Agent Systems, Topics in Large Dimensional Data Processing, Digital Image Processing and Laboratory in Applied Machine Learning

University of Bath

Integrated Mechanical and Electrical Engineering BEng (Hons) *September 2019 – June 2023*

- First Class Honours with 75% overall. Transcript available here.
- Final Year Project: Design and Implementation of a Single-Lead Chest Strap ECG Recorder for Stress Classification using Lightweight Machine Learning Methods. Available here.

Sevenoaks School

International Baccalaureate Diploma *August 2012 – May 2019*

- 37 points with HL Maths (5), HL Physics (6), HL Biology (6), SL Russian (6), SL Psychology (6), SL English (6).
- Extended Essay: How does the Frequency of Photons, and thus Energy, Absorbed by the Solar Cell Influence the Power Output of the Cell? Available here.

IGCSE's

- 11 A*'s, including Maths, English, Additional Maths, Russian and French

WORK EXPERIENCE

Product Development Contractor at BrainPatch, Neural Interface Company *January 2021 – Present*

BrainPatch is a cutting edge neurotech start-up who aim to create an app store for the brain. After a previous internship working alongside the CTO to assemble and test a prototype circuit that will be used for vestibular stimulation, I then went on to design a wireless EEG/ECG recording device. This involved writing firmware in C++ to remotely record and stream data to a server and subsequently web-app written in HTML with a Python and JS back-end. I also developed the electronics and PCB for this device. I cannot detail further as BrainPatch is filing for a patent on this design. I am continuing to work on its development, alongside other contracted work.

Software Engineer Intern at AB Dynamics *September 2021 – August 2022*

AB Dynamics is an automotive testing company, with a vast range of products from steering robots to driving simulators. I joined as a software engineer and was the embedded lead for a new MISRA compliant product. This involved processing real-time automotive data using CAN and writing drivers, in C++, for the various peripherals of the STM32 microcontroller. Additionally, to this project, I identified the vast potential for using vestibular stimulation on the static driving simulator that could emulate dynamic motion. After the approval for a feasibility study, I integrated the simulator's environment with BrainPatch's stimulators with the driving simulators to create the sensation of rotational forces. I worked closely with the embedded team, writing C++ for both the stimulator's firmware and the server software.

Founder and CEO of PhoneCave (phonecave.co.uk) *November 2019 – September 2020*

After being frustrated with my friends' (and my own) obsession with smartphones, I created a start-up, PhoneCave, that aims to get people off their phones. I wanted to design a gadget that can be used for social situations, to have conversations without distractions, to improve productivity and mindfulness. I learnt enormously from starting this business – greatly improving my programming (firmware written in C++), CAD skills, electronics, and PCB design. I also learnt new skills like 3d printing manufacturing, web design and marketing. PhoneCave has also increased my entrepreneurial grit. There were an enormous number of problems to overcome, crucially finding suppliers to cut costs and streamlining manufacturing. I have shipped PhoneCaves to over 10 countries worldwide, held a promotional campaign on Kickstarter and seeked investors. This start-up is on hold, as it requires significant funding for injection moulding.

Prototype Design Intern at Joseph Joseph *July 2019*

Shadowing a product designer at Joseph Joseph, a modern kitchen design company.

Manufacturing at Workshop Science *January 2017 – July 2019*

Working with a school friend to manufacture camera equipment with integrated electronics and 3d printed cases.

ENGINEERING PROJECTS

COVID Volunteering - 3d printing PPE for National Health Service

- Collaborated in a 3d printing community to print PPE for NHS staff in our region, where an immediate production of face shields were required in April and May 2020.
- Worked in the slicer team whereby we managed to reduce the print time from 4 hours to 1, by experimenting with slicing variables until the time was minimised. An estimated 20,000 additional face shields were created due to our optimisation.

Design of a Self-Organising Multi-Agent System Code Available Here / Report Available Here**:**

- Working alongside 40+ students, I helped to lead the infrastructure team to design an environment the for a Self-Organising Multi-Agent system to operate in.
- The project was entirely student lead and therefore required us to self-organise and take initiative. I designed the base platform architecture, and lead others to contribute onto the platform and implement agents. In the end the codebase was over 19 thousand lines of code, written mainly in Go.

Performance and Optimisation of a Closed Loop Fan Controller Code Available Here / Design Doc Available Here

- Built a fan controller controlled through both PID and LQR control methods.
- I used the artifact of coil whine to play music through the fan, using an SD card to read music and data log the fan speed, particularly useful for PID tuning.
- Designed for the STM32, using MBED-OS and its RTOS to run tasks concurrently.

Modelling the Thickness of Heat Resistant Tiles During Atmospheric Re-Entry Technical Report Available Here

- Calculating the minimum tile thickness of a heat resistant tile during re-entry to earth's atmosphere. Investigation into numerical approximation methods derived from Partial Differential Equations. Modelling and GUI written in MATLAB. Code available here.

Programming a Chess Engine with Artificial Intelligence Code Available Here

- Having learnt python independently, I decided to combine my love for chess and programme a chess engine.
- I have implemented Minimax Recursion, Negamax and Alpha Beta Pruning, with variable search depth.
- I am currently optimising using transposition tables through Zobrist hashing and move prioritisations algorithms.

ADDITIONAL SKILLS

Languages: English (native), Russian (B1), French (B1)

Programming languages: C, C++, Python, MATLAB, Julia, Go, System Verilog (HDL)

Computer Skills: PCB Design (Altium, Eagle), CAD (Autodesk Inventor, Solidworks, NX, Fusion 360), Circuit Simulation (Orcad PSpice, LTSpice), Multiphysics Simulation (Simulink, Comsol, ModelSim), Excel (including VBA)

ACTIVITIES AND INTERESTS

- Neural interfaces – from restoration of spinal cord diseases, treating neurodegeneration or cognitive enhancement, the potential of BCI's have intrigued me. I am sure it will be a household name in a decade or two.
- Triathlon – represent Bath University at BUCS level, ran 2 marathons, several half marathons, competed in an olympic distance triathlon and aim to complete an Iron Man.
- Skiing – skied with French locals for 5 years, achieved 'Or' in GSs, and freeride skiing with Thibuad Duchosal.
- Sailing – helmed at RS Feva Nationals, Assistant Dinghy Instructor, Flotilla Lead Boat Crew, RYA Day Skipper.
- Completed Bronze, Silver and Gold DofE, 2 Marines and 2 Army cadet camps.
- Other interests include golf, chess, photography, investing, and philosophy, particularly Stoicism and existentialism.