

# William Powell

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## EDUCATION

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### **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, Laboratory in Applied Machine Learning, Topics in Control Systems, Deep Learning, Advanced Deep Learning, Computer Vision and Pattern Recognition.
- Final Year Project: Closed Loop Brain Stimulation with Stress Detection using Reinforcement Learning.

### **University of Bath**

September 2019 – June 2023

*Integrated Mechanical and Electrical Engineering BEng (Hons)*

- 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](#).

## EXPERIENCE

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### **Product Development Contractor at BrainPatch.AI**

January 2021 – Present

- Assembled and tested a prototype PCB that will be used in a commercial brain stimulation device.
- Designed the circuitry, firmware and software to wirelessly stream EEG/ECG recording device to the cloud and web interface in real time.
- Device used in trials for monitoring the real-time participant biosensing information remotely.
- Repurposed for stress detection using supervised machine learning.

### **Software Engineer Intern at AB Dynamics**

September 2021 – August 2022

- Embedded lead for a new MISRA compliant product using CAN for the various peripherals of the STM32 microcontroller. Device developed and launched to customers in six months, sold at £10k per piece.
- Identified the vast potential for using vestibular stimulation on the static driving simulator that could emulate dynamic motion and integrated a brain stimulation device with the physics of the driving simulator to create the sensation of rotational forces (roll, pitch, yaw).
- Research project still being investigated at AB Dynamics in collaboration with BrainPatch.

### **Founder and CEO of PhoneCave ([phonecave.co.uk](http://phonecave.co.uk))**

November 2019 – September 2020

- Created a start-up, PhoneCave, that aims to get people off their phones.
- Designed circuitry, casing, firmware, electronics to produce a commercial product.
- Shipped PhoneCaves to over 10 countries worldwide, held a promotional campaign on Kickstarter, and sought investors.

## PROJECTS

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### COVID Volunteering - 3d printing PPE for National Health Service

- Collaborated in a 3d printing community to print PPE for NHS staff. Saved an estimated 20,000 additional face shields due to slicer optimizations.

### Design of a Self-Organising Multi-Agent System [Code Available Here](#)

- Co-lead the infrastructure team to design a base platform architecture for 70+ students to utilize.
- Six publications are currently being written using the system environment.

### Performance and Optimisation of a Closed Loop Fan Controller [Code Available Here](#) / [Report Available Here](#)

- Utilized the artifact of coil whine to play music through a fan, using an SD card to read music and data log the fan speed, particularly useful for PID/LQR tuning.

### Modelling the Thickness of Heat Resistant Tiles During Atmospheric Re-Entry [Report Available Here](#)

- Calculated the minimum tile thickness of a heat resistant tile during re-entry to Earth's atmosphere, developing mathematical skills by investigating numerical approximation methods derived from Partial Differential Equations. Modelling and GUI written in MATLAB.

### Programming a Chess Engine with Artificial Intelligence [Code Available Here](#)

- Programmed a chess game environment and engine, implementing Minimax Recursion, Negamax, and Alpha Beta Pruning, with variable search depth. Optimized using transposition tables through Zobrist hashing and move prioritization algorithms.

## TECHNICAL SKILLS

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

**Programming Languages:** C, C++, Python, Go, MATLAB, Julia, JS, ReactJS, Bash, System Verilog, VBA.

**Computer Skills:**

- **Deep Learning:** PyTorch, TensorFlow, Keras, MASE.
- **Developer Tools:** Git, Linux, Docker, RTOS.
- **Engineering:** PCB Design (Altium, Eagle), CAD (Autodesk Inventor, Solidworks, NX, Fusion 360), Circuit Simulation (OrCAD PSpice, LTSpice), Multiphysics Simulation (Simulink, COMSOL, ModelSim).

## ACTIVITIES AND INTERESTS

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- **Neural Interfaces:** From restoration of spinal cord diseases, treating neurodegeneration, or cognitive enhancement, the potential of BCIs have intrigued me.
- **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 Thibaud Duchosal.
- **Sailing:** Helmed at RS Feva Nationals, Assistant Dinghy Instructor, Flotilla Lead Boat Crew, RYA Day Skipper.
- **Duke of Edinburgh Awards and Cadet Camps:** Completed Bronze, Silver, and Gold DofE, 2 Marine camps, 2 Army cadet camps.
- **Other Interests:** Photography, golf, chess, investing, and philosophy, particularly Stoicism and Existentialism.