

# William Powell

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## EDUCATION

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### Imperial College London

October 2023 - Present

*Applied Machine Learning MSc*

- On track for a Distinction thus far.
- Modules taken: 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: Modular Sliding Co-Attention Network for Early-Onset Real-time Stress Detection.

### University of Bath

September 2019 – June 2023

*Integrated Mechanical and Electrical Engineering BEng (Hons)*

- First Class Honours with 75% overall (4.0 GPA). 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 and Research Engineer at BrainPatch.ai

June 2021 – Present

- Designed from conception to deployment the machine learning pipeline, software, firmware, and hardware to wirelessly stream EEG/ECG data to the cloud.
- Implemented cloud computing / inference using AWS and SQL to process data and transmit it to a web interface in real time.
- Device used in trials for monitoring the real-time participant biosensing information remotely. Now integrating it into a commercial machine learning consumer product to detect stress.

### 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 written in C++.
- Device developed and launched to customers in six months, sold at £10k per piece.
- Identified the potential of using vestibular stimulation in a static driving simulator to emulate dynamic motion, and integrated a brain stimulation device to simulate 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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### **Contribution to Open Source Machine Learning Accelerator Framework** [Code Available Here](#)

- Contributed to the integration of runtime optimizations such as TensorRT and ONNXRuntime into a 200k+ line codebase Machine-Learning Accelerator System Exploration Tools (MASE).
- Aims to combat the pace of development of ML software models which is much faster than accelerator design cycle, rendering many accelerators obsolete, see paper.

### **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 at Imperial College London.

### **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.

### **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, Golang, MATLAB, Julia, JS, ReactJS, Bash, System Verilog.

**Computer Skills:**

- **Deep Learning:** PyTorch, TensorFlow, Keras, OpenCV, CUDA.
- **Developer Tools:** Git, Linux, Docker, VMs, RTOS, HPC, Cloud Computing (AWS), Databases (SQL).
- **Engineering:** Networking (TCP/IP, UDP), PCB Design (Altium, Eagle), CAD (Autodesk Inventor, Solidworks, NX, Fusion 360), 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:** Represented 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.