William Powell

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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, 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 Active 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

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) 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

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

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

- **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 Thibuad 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.