Josh Jennings

Electrical and Electronics Engineer

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Education

Imperial College London (MEng Electrical and Electronic Engineering) *(Oct 2016 - Jul 2020)*

- **Result:** Upper Second Class Honours (2:1)

Boston Spa School (Secondary School and Sixth Form) *(Sep 2009 - Jun 2016)*

- **A Levels:** Mathematics (A*), Further Mathematics (A), Physics (A)
- **GCSE:** 10 Grade A* to C, including 4 A*

Professional Experience

JavaScript Developer (ICL Digital Learning Hub) *(Jun 2019 - Sep 2019)*

- Worked in conjunction with the Digital Learning Hub at Imperial College to create online interactive visualisations to be used with Imperial College's online Machine Learning Masters Degree Course.
- Developed interactive visualisations and tutorials on several different machine learning topics including: support vector machines, stochastic gradient descent, neural networks, and other statistical methods.
- Liaised with lecturers and other academics to make sure visualisations were of an excellent standard.
- Produced fully featured web applications utilising JavaScript (with the plotly and p5 libraries), HTML, and CSS.

Android Developer (Department of Chemistry, Imperial College London) *(Jan 2018 – Sep 2018)*

- Worked for the Department of Chemistry in an interdisciplinary group to develop a smartphone based biosensor for use with Lateral Flow Assays to detect Vancomycin concentration in blood plasma.
- Implemented using OpenCV and a convolutional neural network to measure colour intensity and map it to a concentration.
- Negotiated with prospective sponsors for project funding, represented Imperial College London at the international SensUs 2018 competition (came 3rd in innovation), pitched the biosensor to professionals, and promoted it to the public.
- Developed the application using Java, Android Studio, and OpenCV. Used Python with Keras to generate the neural network model.

Projects

(More details and full portfolio available on my website.)

- **Event Driven Spiking Neural Networks**
  Developed software, using C++ and Python, for easily generating spiking neural networks for the Cambridge Computer Laboratory's Partially-Ordered Event-Triggered Systems. Designed more efficient algorithms to increase simulation efficiency and improved the current implementations. Investigated whether POETS provided sufficient performance gains over conventional architectures.
- **Complex Impedance Analyser**
  Designed and built a complex impedance analyser using a Nucleo-F446RE, as well as an optional desktop program for using it with computers. Works in a range of frequencies from 1Hz to 1MHz and can differentiate between the types of impedance. Developed using C for the embedded programming, CircuitMaker for designing the PCB, and C# for the companion desktop application.
- **Chess Game with AI**
  Designed and built a desktop chess game using C++. It features an AI opponent that utilises the negamax algorithm with alpha-beta pruning to efficiently decide its next move. Features a GUI that was developed using the SDL2 library for C++.
- **F# Neural Network Library**
  Created a small library for creating neural networks designed for and built with F#. The library allows for the creation of neural networks of any size with a large selection of activation functions, optimisers, loss functions, and initialisers to choose from.
- **Game Boy Emulator**
  Built a Game Boy emulator using C++ and SDL2. It supports different cartridge types, and accurately emulates Game Boy games.
- **Intermittent Claudication Health App**
  Developed a cross-platform smartphone app using JavaScript with the goal to improve the quality of life for patients suffering from Intermittent Claudication. Leveraged React Native and Firebase to create a social platform that allows patients to exercise together countering the effects of Intermittent Claudication. The patients progress can be monitored remotely by a health practitioner.

Technical Skills

Programming *Proficient*: C++, Python, F#. *Familiar*: JavaScript, C#, ARM Assembly, Verilog, MATLAB.

Miscellaneous Linux, Git, Embedded Systems Development, PCB Design, Hardware Prototyping, Microsoft Office, LaTeX.