

Josh Jennings

ELECTRICAL ENGINEERING STUDENT

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Education

Imperial College London

South Kensington, London

MENG ELECTRICAL AND ELECTRONIC ENGINEERING

Oct 2016 - Jul 2020

- **Expected Result:** Upper Second Class Honours.
- **Modules include:** Artificial Intelligence, Machine Learning, High Level Programming, Deep Learning, Embedded Systems, Digital Image Processing, Computer Architecture, and Verification.

Boston Spa School

Boston Spa, Leeds

SECONDARY SCHOOL AND SIXTH FORM

Sept 2009 - Jun 2016

- **A Levels:** Mathematics (A*), Further Mathematics (A), Physics (A)
- **GCSE:** 10 Grade A* to C, including 4 A*
- **Other:** OCR Level 2 National First Certificate in ICT (Distinction)

Professional Experience

ICL Digital Learning Hub

South Kensington, London

JAVASCRIPT PROGRAMMER

Jun 2019 - Aug 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.
- Worked with a multidisciplinary team including physicists, computer scientists, and mathematicians.
- Developed interactive visualisations and tutorials on topics including: Support Vector Machines, Stochastic Gradient Descent, and Violin Plots.
- Produced fully featured web pages using JavaScript and HTML.
- Liaised with lecturers and other academics to make sure visualisations were of an excellent standard.

SensUs 2018 Competition

South Kensington, London

LEAD ENGINEER AND PROGRAMMER

Jan 2018 - Sep 2018

- Worked in an interdisciplinary group with the Department of Chemistry at Imperial College London to develop a smartphone based biosensor that would detect Vancomycin concentration in blood plasma.
- Led the engineering subgroup, managing electrical and biomedical engineers.
- Negotiated with prospective sponsors for project funding.
- Developed an Android application that implements an image processing neural network for use with Lateral Flow Assays.
- Represented Imperial College London in an international competition in Eindhoven.
- Pitched the biosensor to a panel of professionals and ran a stand to promote and explain how the biosensor worked to the public.

Technical Skills

Programming F#, C++, Python (including Keras), ARM Assembly, JavaScript

Hardware Arduino Development, PCB Design

Miscellaneous Linux, Microsoft Office, LaTeX, Hardware and Software Verification

Projects

Event-Driven Spike Neural Network (Final Year Project)

- Designing a Spiking Neural Network simulator in C++ that can scale to millions of simulated neurons for use with the large-scale 50k thread POETS computer platform.
- Developing more efficient algorithms to train the large number of weights in the concurrent system.
- Spiking neural networks differ from deep neural networks in that they encode information in the timing of energy spikes moving between neurons, thus acting more like a brain than a standard neural network.

GNU Assembler export options for the VisUAL2 ARM Emulator

- Added the ability to export ARM UAL instructions as GNU Assembler for the VisUAL2 ARM emulator.
- This involved parsing the UAL ARM assembly language code in the current tab, modifying it so that the code would satisfy the specifications of GNU Assembler, and ensuring the syntax was valid.
- Used F# in the back-end as well as JavaScript to interface with an Electron GUI.

Intermittent Claudication Health Application

- Developed a cross-platform application using JavaScript and React Native, designed to improve quality of life for patients that suffer from the condition known as Intermittent Claudication.
- Designed an events system, activity tracking, and a detailed statistics section for the application. These provide a social platform that allows patients to exercise together, countering the effects of Intermittent Claudication whilst being monitored remotely by a health practitioner.
- Documented the project using a GitHub wiki containing frequently asked questions, onboarding information, and troubleshooting advice.
- Won first prize for the best third year EEE group project.

F# Neural Network Library

- Implemented a library for building and training 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.
- Documented with a GitHub wiki and tutorial explaining how the library was designed and built.

Smartphone Based Biosensor Application

- Developed an Android application for smartphones that can find and extract the intensity of a coloured line from an image and assign to it a concentration.
- The application was used in conjunction with lateral flow assay membranes designed by chemistry students to detect Vancomycin concentrations in blood plasma. This was achieved by taking real time images from the phone's camera and feeding a histogram based on the colour and intensity into a neural network trained to assign a concentration value to the input.
- Won third place for innovation out of the thirteen universities competing in SensUs 2018.

Extra Curricular Interests

Imperial College Space Society

- Designed software to view images received from CubeSats for a Space Society project.
- Built an antenna for a communications ground station for Imperial College London.

Miscellaneous

- Currently learning Norwegian.
- Keen hiker; have organised trips across Europe.