Edwin Balani

Engineering student at Cambridge University

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Education

2016–2020 **University of Cambridge**, *Magdalene College*.

MEng and BA(Hons) in Information & Computer Engineering

- Part I (two years of broad engineering studies): overall grade 2.i
- Part IIa (3rd year): specialisation in Information Engineering (control theory, signals & signal processing, data & communications, inference), with some Electronic Engineering modules (RF, digital logic, FPGAs).
- Part IIb (final year): 50% of time spent on modules and 50% on final-year project.

Final year modules: computer systems, deep learning, software engineering & design, statistical signal analysis, advanced information theory & coding, computer vision, image processing & coding, project management

Master's degree project: "Data-driven inference of software developer practices and techniques"
Application of machine learning, particularly recurrent neural networks, on keystroke and mouse-movement recordings of successful attempts at JavaScript coding tasks in an online editor. My goal is to make meaningful machine-led inferences of *what* the programmer is doing at any moment in time (reading the rubric, coding, writing a comment, prettifying their code, *etc.*), and to see if there are any 'hidden' predictors of performance.

2009–2016 **King Edward's School, Birmingham**.

International Baccalaureate (IB) Diploma

- Scored 43 points out of 45, equivalent to 4–5 A* grades at A Level

Higher Level:	Mathematics (7)	Physics (7)	Chemistry (7)
Standard Level:	French (7)	Economics (6)	English Lit. (6)

Diploma Core work: Extended Essay in Physics (A), Theory of Knowledge (A). Two A grades in Core together contribute 3 points (the maximum) to overall points total.

GCSEs/IGCSEs
10 subjects, grade A*
Includes Mathematics, Physics, English, French, and Design & Technology (Systems and Control)

Summer internships

2019 **Software engineer intern**, *Teamline (part of StarLeaf Ltd.)*, Cambridge.

- Application-level work in a Windows environment, with C# and C++/CLI
- Integrated a third-party competitor's Windows platform SDK to add new 'native' support for their conferences to Teamline MultiJoin, replacing a less optimal Lync-based integration

2018 **Software engineer intern**, *StarLeaf Ltd.*, Great Shelford (near Cambridge).

- Implemented a baseline JPEG encoder with adjustable quality factor
- With heavy reference to the H.264 specification, started a from-scratch implementation in C of context-adaptive binary arithmetic coding (CABAC) for StarLeaf's H.264 codec

2017 **Converged Networks Research Intern**, *BT Research & Innovation*, Adastral Park, Ipswich.

- Broke ground on BT's first research into Arm-based network function virtualisation (NFV) solutions
- Architected and deployed a virtualised cloud network performance testing environment
- Gained experience with Terraform, OpenStack, Open vSwitch, Open Platform for NFV (OPNFV)

Skills

Languages — Strong in Python (experience ranging from web applications to scientific computing), and in C for hosted and bare-metal. Productive in C# and C++. Often working on personal projects in HTML, CSS/Sass, JavaScript. I'm having fun learning Elixir: https://github.com/edwinbalani/aoc2019.

Technologies — Wrangling with lots of protocols and encodings regularly: HTTP, DNS, JSON, CSV (for data science). Experience with PostgreSQL and MySQL. I've brought it all together with Flask and SQLAlchemy.

Dev tools — Heavy user of vim, git, svn (and git-svn). I've written a few Makefiles and `setup.py`'s. Some experience with CMake, Webpack, and other exotic build systems.

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Computing — Debian power user on my laptop. I help look after many Debian & Ubuntu servers, some of which live on a Xen/XCP-ng cluster. Experience with Buildbot for continuous integration.

CAD — Comfortable with 3D and electrical CAD packages — trained in parametric design with Creo; experience with Altium and KiCAD.

Documents — Comfortable using Microsoft Office and LibreOffice suites, and LaTeX for reports, papers and CVs.

Technical projects

`ucam-wls` — A Python library implementing the University's internal Ucam-Webauth protocol for single sign-on, which lets you use existing authentication integrations, but against a custom user base.

SRCF Goose — Inspired by the University's *Raven* authentication service, a protocol-compatible implementation using open-source technologies: `ucam-wls`, Flask and NIS (via PAM) for the authentication backend. In active use by the SRCF Control Panel. https://auth.srcf.net/

Web dev. — I maintain a number of websites for myself, friends and Cambridge student groups:

- My personal website. Static site, with Sass/SCSS for styling. https://www.balani.xyz/
- Cambridge University Eco Racing, a student-run solar car team. Hugo-generated static site with a customised responsive theme. https://www.cuer.co.uk/
- https://cal.lt0.uk: a tiny Flask webapp to 'prettify' the iCalendar lecture timetable feeds provided by my department into events that are more human-readable.

Self-hosted — I run a few servers for mail, web hosting, VPN when on the road, DNS zone hosting, offsite backups, remote monitoring, and persistent connections to IRC. I also have a small fleet of Raspberry Pis!

Activities

Eco Racing — In charge of software development for Cambridge University Eco Racing (CUER), the university's student-run solar car team. https://www.cuer.co.uk

- **Deployed continuous integration**, built on Buildbot and integrated with our GitHub repositories to cross-compile every commit of the embedded software tree.
- Overseeing **migration to a new hardware platform** for all in-car electronics, with the inevitable tweaks (or rewrites!) of the firmware
- **Primary mentor** for newer members in the software team: CUER has high turnover (like any student society), so learning and knowledge sharing are essential for sustainability. No 'experts'!

SRCF — Volunteer system administrator for the Student-Run Computing Facility (SRCF), a society that offers free computing services (shell access to an Ubuntu server, email, web hosting, databases, file storage, mailing lists etc.) to thousands of societies and individuals at the University. My experiences and responsibilities have been diverse: user support over email, acting as postmaster, upgrades to network infrastructure and server hardware, and serving as Chair of the Committee in 2019/20.

Downtime — I practise piano when I get a chance, having done Grade 8. Occasional player for College pool team.

Positions held

2018– — **SSJC year-group rep**, Cambridge University Engineering Department.
While in my penultimate and final years, I have been an elected student representative on the Staff-Student Joint Committee, which fosters student-led improvement of teaching, welfare, and facilities.

2018–2019 — **Faculty Board representative**, Cambridge University Engineering Department.
An elected undergraduate representative sitting on the Faculty Board of Engineering, the Department's highest committee, which reports to the University's General Board.

2017–2018 — **IT Officer**, Magdalene College JCR (undergraduate students' union).
Worked to improve the undergraduate experience in College using technology, *e.g.* creating an anonymous welfare contact form, running the JCR website, pressing for good Wi-Fi around college, and representing JCR in IT Committee meetings. Provided technical support to students, and helped run social 'bop' nights.

Other notables

- French language: conversational proficiency
- Full, clean UK car licence