# Martin Walls

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As I work towards my masters degree in computer science, I am seeking employment opportunities that will allow me to use the academic and industrial experience I have gained over the past three years. I am interested in producing systems that not are not only secure, robust, and accessible, but that also add value to the end users, empowering them through technology. My internship company, Propel Tech, were impressed with the efficiency of my coding and my creativity in solving complex problems. I intend to bring the same expertise to future projects.

## Employment Experience

2023 — Supervising Undergraduates, *Cambridge University*

I supervised several groups of undergraduates for the *Databases* course of the Computer Science Tripos. This involved delivering small-group teaching which supplemented and consolidated the lecture material.

July–August 2022 — Summer placement, *Propel Tech*

I completed a software development project, going through the entire process of research, development, and deployment. I developed a sales website with advanced search features, using the Laravel PHP framework, and deployed it to the cloud with AWS Elastic Beanstalk. I built a MySQL database to hold product and user information, and wrote complex search queries to allow users to browse, filter and sort products with ease.

May 2019 — Junior Developer, *IT Partnering and Innovation, Lancaster University*

I worked on fixing accessibility issues for the university intranet, using React and accessibility tools such as Lighthouse. I also evaluated the effectiveness of using Raspberry Pis to remotely monitor sensor data.

July 2018 — iCompetence GmbH, *Hamburg*

I developed a marketing dashboard to visualise website traffic data for clients, using Python with Pandas, PostgreSQL, and the Bokeh library. I assessed the effectiveness of Bokeh as a potential tool for the company to use.

## Education

2023+ — MSc Computer Science, *University of St Andrews*

— I am currently studying for a masters degree, finishing August 2024.

2020–2023 — BA Computer Science, *Churchill College, University of Cambridge*

— Bachelor of Arts: Class 1

2016–2020 — A-Levels/GCSEs, *Ripley St Thomas CE Academy, Lancaster*

— A-Levels: 4 A*s (Maths, Further Maths, Computer Science, Chemistry)

## Skills

I have experience with multiple programming languages, including Java, C, Rust, PHP, JavaScript/TypeScript, and Python. I have used technologies including AWS and Firebase, as well as database systems. Additionally, I have used tools such as Jira and Git to enable effective software development.

## Projects

2022–2023 C to WebAssembly Compiler

My bachelor dissertation project was to build a compiler from C to WebAssembly. This involved parsing the C language to an abstract syntax tree, then transforming this into a three-address code intermediate language, before applying the Relooper algorithm and converting to target code.

2020 IoT connected pair of lamps

I built a pair of LED lamps, that synchronise their colour over the Internet. When one user changes the colour of their lamp, the other updates its colour to match. I programmed this in C on ESP32 boards.

2020 LED matrix display

I built a 3D matrix of LEDs and programmed an Arduino to control it. I wrote low-level interrupt and timing code to individually control a single row of the matrix at a time, exploiting persistence-of-vision to display text and patterns across the entire display. The microcontroller also runs a server as an interface for controlling the display. I programmed this in C on an Arduino.

## Academic Inquiry

2022–2023 C to WebAssembly Compiler, *BA dissertation project*

I researched, implemented and evaluated a compiler from a subset of C to WebAssembly, written in Rust. I wrote a context-free, unambiguous abstract grammar for C as input to the parser. I defined my own abstract syntax tree and intermediate representation, and defined the transformations that convert the input code between each step. I implemented optimisations at several stages, before generating the output WebAssembly binary. I researched multiple algorithms, critically evaluated the benefit they would add, and successfully applied them in the project. I evaluated the compiler with a suite of test programs, comparing correctness, efficiency, and code size against a reference compiler.

2022 The NTP Algorithm, *technical presentation*

I extensively researched the details of the Network Time Protocol, examining how it uses statistical filtering to achieve accurate synchronisation in the presence of variable network latency and jitter. I evaluated its effectiveness and compared it against several other algorithms designed to improve on the accuracy.

I eloquently delivered a clear technical presentation, balancing the use of visual, spoken, and mathematical information to keep the audience engaged. I was awarded the prize for the *Best Talk in the Practice of Computer Science*. A recording can be found at *https://youtu.be/_Kuxmu7WkD8*.

## Awards

2022–2024 Academic Prize Scholarship, *Churchill College*

2022 Best Talk in the Practice of Computer Science, *Churchill Computer Science Talks Series*

2021 Duke of Edinburgh's Award, *Gold*

2020 George Phythian Award for Best A-Level Results, *Ripley St Thomas*

## References

Available on request.