Simon Staal

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EDUCATION

09/2019 – 06/2023 **MEng Electronic and Information Engineering** — London, UK
Imperial College London

- Achieved 1st in first, second and third year (84% overall), starting final year
- Obtained the 2021 Head of Department Prize for top academic performance and on the 2021 Dean's List for academic excellence
- Modules of interest: Introduction to Machine Learning (91%), Operations Research (86%), Advanced Computer Architecture (86%), Algorithms and Complexity (100%), Instruction Set Architecture and Compilers (86%), Programming for Engineers (94%)

2014 – 2018 **International Baccalaureate** — Adelaide, Australia
St. Peter's College

- Placed in the top 10 graduates of my year with 41/45
- Relevant subjects: Physics HL (7), Mathematics HL (6), French HL (7), Chemistry SL (7)

PROFESSIONAL EXPERIENCE

Software Engineering Industrial Placement
Optiver
04/2022 – 09/2022 | Amsterdam, NL

Primarily focused on 2 projects in the Option Execution and Risk Technology teams, one focused on scaling out Optibook, a simulated exchange used in training and recruitment, and the other on re-designing Optiver's instrument download pipeline. Developed software engineering skills, participating in code reviews and deployment, as well as improving Python and C++ skills.

Undergraduate Teaching Assistant
Imperial College London
11/2020 – present | London, UK

Worked with the Department of Electrical and Electronic Engineering to provide both one-on-one and group learning support in the following modules:

- Programming for Engineers (1st Year)
- Computer Architecture (1st Year)
- Compilers (2nd Year)

Robotics Program Internship
Amazon
07/2021 – 09/2021 | London, UK

Worked with Amazon's reliability maintenance engineering
robotics program team on a UK/EU project to update processes associated with their robotics stations. Collaborated with teams spanning different business sectors, developing strong communication skills and expanding data gathering and analysis techniques.

SKILLS AND AWARDS

Technical Skills

Languages:

- C++ / Python / F# (Advanced)
- Bash / SQL / Node.js (Intermediate)

Other:

- Experienced with Linux development and Git
- Strong understanding of networks and profiling
- Machine learning (PyTorch, scikit-learn)
- Certified AWS Cloud Practitioner

Other Skills

- Writing clear documentation in markdown
- Fluent in French and English, basic Dutch
- Certified First-Aider
- Creating detailed reports with architectural diagrams in latex
- Background of photo/video editing with the Adobe Suite

Awards

- EIE 2nd Year Head of Department Prize (2021)
- Dean's List for Academic Excellence (2021)
- Australian Institute of Physics SA Bragg Certificate (2019)
- AMT Australian Mathematics Competition Distinction (2018)
- Charles Gillham Memorial Prize for Physics (2018)
- Australian Mathematics Competition Senior Division Distinction (2018)
- Da Costa Scholarship for Best Academic Performance (2017)
- SA/NT Public Speaking Rostrum Voice of Youth Semi-Finalist (2017)

PROJECTS

02/2022 – 04/2022 **ISSIE (A+)**

- The **I**nteractive **S**chematic **S**imulator and **I**ntegrated **E**ditor (ISSIE) is an application for digital circuit design and simulation. Worked in a team of 6 to rewrite and upgrade the DrawBlock, which is the module responsible for rendering the schematics the user interacts with.
- Selected as the highest quality implementation from the 12 teams who completed this project, and was merged into the main ISSIE codebase.
- Personal role was focused on the logic for representing and routing wires between different symbols. Notable improvements included re-implementing the existing wire type to reduce memory consumption by a factor of 4, and extending the routing logic work in any orientation possible.

02/2022 – 03/2022

Music Synthesizer Firmware (A+)

Wrote the embedded software for a music synthesizer keyboard in a team of 4. Added support for a variety of features, including:

- Playing up to 10 notes simultaneously from a range of octaves spanning the human hearing spectrum.
- Automatically configuring multiple keyboards, which can be attached and detached from one another to play notes together.

All tasks were assigned to threads or interrupts depending on priority, and thread safe implementation was designed through the use of mutexes, semaphores and critical sections. Tasks with strict performance requirements were profiled and optimised to ensure all functions were executed within their maximum time intervals.

01/2022 – 03/2022

The Canary

The Canary is an IoT sensor network intended to be used by miners or any other industries which require human labour in confined spaces. Air quality, temperature and pressure data is measured by sensors which are aggregated by a raspberry pi, then sent to our server via encrypted MQTT. Users can interact with this system via a web-app, which allows the sensor sampling rate to be specified, data to be archived, and displays metrics in a digestible format. Personal involvement was centered around:

- Designing and deploying the system architecture, which included provisioning the AWS instance hosting our components
- Encrypting the network communication, ensuring both MQTT and HTTP ran over TLS
- Writing python libraries for the air quality and pressure sensors
- Assisting with the development of the web application.

05/2021 – 06/2021

Debonair (85%)

Worked in a team of 6 to build a fully integrated rover system capable of exploring environments, identifying and navigating around obstacles, record and send data and respond to user input. Personal responsibilities included:

- Designing the entire system architecture, setting up an AWS instance to host the components for the system.
- Developing the back-end of the web app to handle requests from the front-end securely, communicating between the user and the rover.
- Writing a Node.js pathfinding module in C++, allowing for complex pathfinding in micro-seconds of processing time.
- Programming an ESP32 micro-controller in C++ to communicate between the web-app and the other rover subsystems.

A demo is available here

02/2021 – 04/2021

Odyss-C Compiler (80%)

- Developed a preprocessed C90 to MIPS assembly compiler in a pair, with full support for integer and floating point data types, pointers and arrays, as well as limited support for characters.
- Implemented many basic C language features, such as loops, enums, if/else statements and more, as well as internal memory management, scoping, and stack/frame handling. Also worked on automted testing and AST visualization.

11/2020 – 12/2020

MIPS CPU (83%)

- Created a fully functional, synthesizable processor in verilog, compliant with the MIPS instruction set specification (Revision 3.2) and capable of interacting with any Avalon compatible memory interface as part of a team of 5.
- Includes an independent test-bench which can be used to assert the functional correctness of any given CPU.
- Worked on all aspects of implementation, including CPU design, testbenching and workflow automation.

VOLUNTEERING

10/2021 – present

Departmental Representative

London, UK

Imperial College Electronic and Information Engineering

- Represented my cohort as the 3rd Year Wellbeing Representative, and the entire course as the current Academic Department Representative.
- Gathered data on student issues through surveys and one-on-one discussions and co-ordinated with other representatives to raise these problems to the department.
- Overhauled the module feedback system for 3rd and 4th Year modules to provide future students better resources to select modules, and future representatives a more maintainable system.

2020 – present

Mentoring

London, UK

Collaborated with Imperial's Electrical Engineering Society to provide advice to first year students, which developed into 1-1 mentoring about academics, internship applications and maintaining a healthy work-life balance.