

Ainsley Rutterford

London, NW10

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Interested in Deep Learning, Computer Architecture, and High Performance Computing. Proficient in JavaScript, TypeScript, and Python. Experience with C, C++, Fortran, Java, and Haskell.

Work Experience

Amazon

London

SOFTWARE DEVELOPMENT ENGINEER II

Apr. 2022 – Present

- Backend service development in Python, Java, and TypeScript.
- Infrastructure as code using AWS CDK in TypeScript.
- Developing service backends with AWS Lambda, DynamoDB, OpenSearch, SQS, CloudWatch, S3, etc.
- On-call duty, fixing systems in real time when alarms trigger.

BX

London

SOFTWARE ENGINEER (FULL STACK)

Jan. 2021 – Mar. 2022

- Web development in TypeScript using the Next.js React framework.
- Native mobile app development in TypeScript using React Native.
- Developing a serverless backend using AWS Lambda, API Gateway, DynamoDB, etc.
- Deploying resources within AWS using the Pulumi infrastructure as code SDK.
- Creating and editing assets on the Algorand blockchain using the Algorand SDK.

University of Bristol

Bristol

COMPUTER ARCHITECTURE INTERN

Jul. 2020 – Oct. 2020

- Extended the University of Bristol's ARM processor simulator (*SimEng*) to include a model of the memory hierarchy using the C++ SST library.

HIGH PERFORMANCE COMPUTING TEACHING ASSISTANT

Sep. 2019 – Dec. 2019

- Taught third year students taking the High Performance Computing unit. Helped students parallelise stencil codes using the MPI and OpenMP libraries to run on multiple nodes of the Blue Crystal Phase 4 supercomputer.

Education

University of Bristol

Bristol

MENG COMPUTER SCIENCE (FIRST CLASS 77%)

Sep. 2016 – Jun. 2020

- Thesis: Coral Density Analysis using Deep Learning 78%
- Advanced Computer Architecture 78%
- Advanced High Performance Computing 82% (top of class)
- Computational Neuroscience 92%
- Applied Cryptography 98% (top of class)
- Theory of Computation 78%
- Web Technologies 80%

Portland Place School

London

A LEVELS

Sep. 2012 – Jul. 2015

- Maths (A), Physics (A), Computing (A), AS Graphic Design (A)

Projects

- **High Performance Computing:** parallelised Lattice-Boltzmann codes with the OpenCL, OpenMP and MPI libraries to run on both GPUs and CPUs. All implementations were written in C. Achieved the highest grade in the class. Available on [GitHub](#).
- **Computer Architecture:** implemented a simulation of a superscalar, out-of-order processor with register renaming and dynamic branch prediction. From scratch using Python. Available on [GitHub](#).
- **Deep Learning (thesis project):** implemented and ablated the U-Net CNN architecture using Keras. It successfully extracts the density banding information present in coral skeleton CT scans, enabling researchers to more accurately calculate coral growth rates. Available on [GitHub](#).
- **Deep Learning:** wrote a small deep learning library from scratch in Python enabling the creation, training, and inference of fully connected neural networks. Available on [GitHub](#).
- **Cryptography:** implemented a Differential Power Analysis (DPA) attack in Python that targets software AES implementations. Wrote an AES software implementation in C that utilises various DPA countermeasures such as 'masking'.
- **Computer Graphics:** created a 3D rasteriser using C++ and the SDL, and GLM libraries. Implemented full triangle clipping, shadow volumes, and anti-aliasing. Also using C++, SDL, and GLM, implemented a real-time raytracer with soft shadows and anti-aliasing. Available on [GitHub](#).

Achievements

- Awarded the Cray prize for achieving the highest grade in the Advanced High Performance Computing unit at the University of Bristol.
- Awarded the Bloomberg prize for achieving a top five grade in the third year of the Computer Science course at the University of Bristol.
- Selected as part of a team to fly to Switzerland to take part in the START Hack 2019 Hackathon.
- Part of the team that won the Amazon Prime Video 2022 Internal Hackathon.