

Harry Waugh

harry.waugh@bristol.ac.uk | 07714190277 | <https://harrywaugh.com/>

Profile

A driven and ambitious PhD student at the University of Bristol, particularly interested in High Performance Computing and Computer Architecture.

Education

PHD HIGH PERFORMANCE COMPUTING | 2019 - PRESENT | UNIVERSITY OF BRISTOL

- Advanced Computer Architecture - Developed a Superscalar Processor Simulator. Featuring n-way superscalar design, dynamic branch prediction, Tomasulo's Algorithm with register renaming.
- Working on Rolls Royce's ASiMoV project. Currently looking into how top UK science codes use BLAS, and how this changes at scale.

BSC COMPUTER SCIENCE (1ST CLASS) | 2016 - 2019 | UNIVERSITY OF BRISTOL

- Dissertation 71% - Using Sensor Fusion and Deep Learning to Improve Activity Tracking
- Advanced High Performance Computing 80% - (3rd Year) Optimization with OpenMP, MPI, OpenCL.
- Computer Graphics 82% - (3rd Year) Created a 'Real-Time' Raytracer with OpenCL, GLM and SDL.
- Applied Security 87% - (3rd Year) Developed an AES-128 implementation & Differential Power Attack.

GCSE, A LEVEL | 2009 - 2016

- A2 Mathematics (A*), A2 Further Mathematics (A), A2 Computing (B), AS Physics (B)
- 11 GCSEs (A* - B), incl. Mathematics (A*) and English Language (A)

Experience

INTERN | ADVANCED COMPUTING RESEARCH CENTRE | MAY 2019 - PRESENT

- Responsible for identifying bottlenecks within scientific codes, and then applying techniques to improve performance.
- Evaluated the performance of Phylogenetics code, PhyloBayes-MPI, on both Intel and ARM systems. Optimized the code to achieve over a 2x speedup, and wrote a comprehensive report on the code's current performance along with any future improvements.
- Worked with the Chemistry department to improve how they ran the Met Office's NAME code (Dispersion Model) on Blue Crystal.

MATHS TUTOR | BRISTOL TUTORS | ST MARY REDCLIFFE SCHOOL | FEBRUARY 2017 - MAY 2019

- Organised engaging lesson plans, and taught students in preparation for their GCSEs.

PROJECTS

- **Sensor Fusion.** Research project looking at how GPS activity tracking can be improved by utilizing a phone's accelerometer. Implemented a Kalman Filter and a GRU neural network using tensorflow and Keras. Key Technologies: Python, Numpy, Tensorflow.
- **Lattice Boltzmann (LBM)** Applied serial and parallel optimizations to an LBM code. Care was taken to align arrays in memory and ensure that loops vectorized, before developing MPI and OpenMP implementations to further increase performance. The code was also optimized using OpenCL to exploit the superior memory bandwidth of a GPU. Key Technologies: C, MPI, OpenMP, OpenCL.
- **Raytracer** This project involved building a Real-Time Raytracer from scratch using OpenCL, GLM and SDL. The raytracer was used to render the Cornell Box, with reflection and refraction phenomena being showcased on spheres and other objects. The realism of the rendered image was further improved using anti-aliasing and soft shadows. Key Technologies: C++, OpenCL, GLM.

Skills & Abilities

- Programming Languages and Scripting- Proficient in C, C++, Python. Experience in Bash and Java.
- Ran and came 8th in the Dartmoor 50 Mile Ultramarathon, showing self-discipline and a drive to train and work hard every day.

References

PROF. S MCINTOSH-SMITH | BRISTOL UNIVERSITY

Email: S.McIntosh-Smith@bristol.ac.uk

DR. G WILLIAMS | ACRC

Email: Gethin.Williams@bristol.ac.uk