Harry Waugh

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Profile

A driven, ambitious and rounded graduate from the University of Bristol, particularly interested in High Performance Computing and Computer Graphics.

Education

UNDERGRADUATE COMPUTER SCIENCE | 2016 - 2019 | UNIVERSITY OF BRISTOL

- Current Average Mark 70% - Awaiting Dissertation Mark
- Advanced High Performance Computing 80% - (3rd Year Unit) Optimization with OpenMP, MPI, OpenCL and MPI+OpenCL.
- Computer Graphics 82% - (3nd Year Unit) Created a 'Real-Time' Raytracer with OpenCL, GLM and SDL.
- Applied Security 87% - (3rd Year Unit) Developed an AES-128 implementation and a Differential Power Attack.

A2/AS LEVELS (A* - B) | 2015 - 2016 | RICHARD HUISH COLLEGE, TAUNTON

- A2 Mathematics (A*), A2 Further Mathematics (A), A2 Computing (B), AS Physics (B)

11 GCSE (A* - B) | 2009 - 2014 | THE CASTLE SCHOOL, TAUNTON

- Including A* in Mathematics, and A English Language

Experience

INTERN |ADVANCED COMPUTING RESEARCH CENTRE |MAY 2019 - PRESENT

- Responsible for identifying bottlenecks within scientific codes, and then applying techniques to improve performance.
- Evaluated PhyloBayes-MPI performance on Intel and ARM clusters, modified project to achieve over a 2x speedup.
- Routinely created jobs with slurm and PBS, and experimented with a variety of tools such as TAU, Intel Amplifier and CrayPAT.

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

- Organised engaging lesson plans, and then taught students to maximise their GCSE performance.

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 in tensorflow and Keras. Key Technologies: Python, Numpy, Tensorflow.
- **Optimizing Lattice Boltzmann** Performed serial and parallel optimizations to an LBM code. Care was taken to align arrays in memory to maximise the effectiveness of AVX2 instructions when vectorizing loops, performance was further increased by developing MPI and OpenMP implementations.. The code was also optimized for a GPU using OpenCL, where the GPU's superior memory bandwidth allowed to outperform all CPU implementations. 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 where phenomena such as reflection and refraction were showcased using spherical objects. The realism of the rendered image was improved further using anti-aliasing and soft shadows. Key Technologies: C++, OpenCL, GLM.

Skills & Abilities

- Programming Languages - Proficient in C, Java. Experience in Python, C++ and Bash.
- Worked with web technologies Spring Boot, Thymeleaf alongside a MySQL database.
- Ran and came 8th in the Dartmoor 50 Mile Ultramarathon, highlighting self-discipline to train and work hard every day, alongside my drive to never give up.

References

DR. SION HANNUNA | UNIVERSITY OF BRISTOL

- Email: sh1670@bristol.ac.uk

DR. GETHIN WILLIAMS | ACRC

- Email: gethin.williams@bristol.ac.uk