Jason Zheng

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Education

Imperial College London *London, UK*

MEng Electronic and Information Engineering (Computer Engineering) *Sept 2018 – July 2022*

- Predicted for First-Class Honours; 3rd Year: 77.46% (Dean's List), 2nd Year: 71.22%, 1st Year: 68.27%.

Auckland Grammar School *Auckland, NZ*

GCE A Levels *Jan 2013 – Dec 2017*

- NZ Scholarships: Calculus and Statistics (awarded to top 3% of country).
- A Levels: A*s in Biology, Chemistry, Physics, Mathematics; A in Further Mathematics.

Experience

Arm *Cambridge, UK*

Part-Time Undergraduate – Software Engineering *Dec 2020 – present*

- Extended Compiler Explorer (written in **JavaScript**) to compile OpenCL C and C++ for OpenCL to Arm assembly and SPIR-V assembly, resulting in improved productivity for the GPU Compiler team.
- Fixed bugs in open-source software, including **Clang** and the **SPIR-V/LLVM Translator**, to correctly produce debugging info when compiling OpenCL languages.
- Used **Docker** to add infrastructure support for SPIR-V/LLVM Translator in Compiler Explorer.
- Investigated an **OpenCL C** extension to allow dynamic memory allocation from kernel functions running on OpenCL devices.
- Implemented a basic version of `malloc` and `free` to run on single-threaded OpenCL devices.

GPU Software Engineering Intern *June 2020 – Sept 2020*

- Integrated the ARM GPU software model with **QEMU** to enable testing via the kernel driver, with the goal of deprecating their usermode driver.
- Investigated its feasibility by writing a **Bash** script to automate testing and comparing execution times and the number of passing test cases.
- Extended a **kernel driver** written in **C** to allow it to interoperate with QEMU.
- Used a memory-backend-file to share memory between the Host and Guest, taking into account their different memory mappings.
- Added new interrupt requests to facilitate reading and writing to GPU registers via shared memory.
- Implemented virtio-serial consoles to raise interrupt requests using FIFO queues.

Imperial College London *London, UK*

Undergraduate Teaching Assistant *Sept 2020 – present*

- Responsible for teaching students C++ programming concepts in a clear and concise manner.

STEM Outreach Ambassador *Nov 2018 – present*

- Duties involve giving tours of campus to visitors and prospective students, answering questions and providing insights about the College, assisting with virtual and in-person events, mentoring students to promote STEM, tutoring students in A-Level Maths.

Projects

The Platform-Playing Platform *Self-Organising Multi-Agent Systems*

- Chaired a group project of 47 people split into 7 teams to build a platform for simulating a self-organising multi-agent system using **Go**.
- Assisted with program architecture design and implementation of treaty creation, message passing, and health tracking.
- Designed an agent capable of self-organising with other agents of different strategies to maximise collective utility.

Draw2D Library for ISSIE *High Level Programming*

- Developed a circuit-drawing library in the functional programming language **F#** for use in ISSIE, a teaching tool for digital circuit design.
- Acted as project manager, reviewing pull requests, running meetings, and managing deadlines and deliverables.

Keyboard Music Synthesiser *Embedded Systems*

- Implemented firmware for a multi-threaded keyboard synthesiser, with support for volume control, octave control, and multiple timbres.
- Acted as project manager to ensure code quality and timely completion of deliverables.

C to MIPS Compiler and MIPS CPU Simulator *Computer Architecture & Language Processors*

- Built a compiler in **C++** to generate **MIPS assembly** from subset of pre-processed C90.
- Developed a transpiler to translate a subset of C into equivalent **Python**.
- Implemented lexing and parsing functionality using **Flex** and **Yacc**.
- Developed CPU simulator in **C++** to execute MIPS-1 big-endian binaries, and created a testbench to verify correctness of the simulator.
- Referenced the MIPS ISA specification to ensure parity between emulated instructions and the real hardware.

Skills and Interests

Programming **F#, Go, C/C++**, Python, JavaScript, Verilog, MATLAB

Tools Git, Linux, Docker, SQL, CAD (Autodesk Inventor, Fusion 360)

Other Skills English (native), Mandarin Chinese (proficient), First Aid, Full UK and NZ driving licences

Volunteering **EIE Department Rep ('21/22), EIE3 Rep ('20/21)**; elected to advocate for students and pursue course improvements
Treasurer ('21/22), Secretary ('20/21), Publicity Officer ('19/20) of Imperial College Wind Band

Music ABRSM Grade 8 Piano and Clarinet; previous member of Symphony Orchestra, Concert Band, Production Orchestras