ZAKARIYA OULHADJ

Software Engineer

LinkedIn /zoulhadj **Website** zakariyaoulhadj.com
GitHub /zoulhadj **Email** zakariyaoulhadj01@gmail.com

SUMMARY

Aspiring software engineer passionate about low-level programming and high-performance design. I specialise in C and C++, with over six years of experience across these and Python. My primary interests include computer graphics, rendering engine architecture, and systems programming, where I focus on building efficient software from the ground up.

SKILLS

Languages: C11, C++23, Zig, Python

Technologies: OpenGL, Vulkan, DirectX 12, MPI, OpenMP, Django

Tools: Linux, Emacs, Git

Hobbies: Cycling, Hiking, Photography

PROJECTS

Rendering — **Real-time Rendering Engine** — Ongoing
Cross-platform game engine developed in C11, supporting multiple modern rendering APIs and designed for efficiency and low-level engine research. Features include dynamic hot-reloading, memory arenas, command-buffered rendering, and abstraction between game and platform layers.

Dissertation — **Porting and Performance Tuning of SeisSol on Multiple HPC Architectures** — Available on Request
I optimised SeisSol across three HPC architectures, most notably reducing MPI initialisation time on ARCHER2 by up to 81% through targeted UCX and OFI tuning to reach 126.6 TFLOP/s, alongside achieving a 6.7x throughput gain on 16x H100 GPUs.

Benchmarking — **OpenMP Queue Contention Analysis** — https://github.com/ZOulhadj/omp-performance
Analysed OpenMP thread performance and scalability of a divide-and-conquer algorithm across three implementations as part of the EPCC11003 course.

Simulation — **2D Decomposed Cellular Automaton** — https://github.com/ZOulhadj/cellular-automaton
Developed a 2D cellular automata simulation parallelised across MPI ranks and tested on the Cirrus supercomputer as part of the EPCC11002 course.

Rendering — **Vulkan Model Viewer and Exporter** — https://github.com/zoulhadj/vmve
Developed a real-time 3D renderer using Vulkan with a built-in editor supporting model visualisation, import/export and encryption, as part of my undergraduate degree.

EDUCATION

2024 - 2025 — **University of Edinburgh** — First Class (Distinction)
M.Sc. High-Performance Computing

2020 - 2023 — **University of Roehampton** — First Class with Honours (Distinction)
B.Sc. Computer Science

2018 - 2020 — **Kingston College** — A*A*A*
BTEC Level 3 Extended Diploma Computer Science

EXPERIENCE

2022 - 2023 — **Computer Science Teaching Assistant and Student Representative** — The University of Roehampton

- Supported teaching staff by reinforcing course content and assisting students with core concepts.
- Acted as a student representative, liaising with academic staff to address concerns and improve the overall student learning experience.

ACHIEVEMENTS

October 2025 — **On-Campus Class Medal for Outstanding Achievement** — Edinburgh Parallel Computing Centre

- Received the On-Campus Class Medal in High Performance Computing, recognising the highest academic performance in the cohort.

June 2025 — **Top 15 at the ISC 2025 Student Cluster Competition** — University of Edinburgh

- Ported and tuned the SeisSol earthquake simulator on Bridges-2, optimising MPI communication and OpenMP parallelism with attention to NUMA locality, achieving multi-teraflop performance across four compute nodes. Issued by the International Supercomputing Conference (ISC) and HPC Advisory Council.

October 2020 — **South Thames College Group Academic Excellence Scholarship** — Kingston College

- Awarded a scholarship for academic excellence in recognition of achieving the highest grade in my cohort, jointly issued by the South Thames College Group and the University of Roehampton.