

David Hua

🌐 davidhua.me | ✉ david.hua@uwaterloo.ca | 🗣 [q-ata](#) | **in** [david-hua0320](#) |

Education

University of Waterloo

September 2020 – Present

Bachelor of Software Engineering

95% GPA (3.98/4.00)

4×Term Dean's Honor List (Top ~10%)

ETH Zürich

September 2023 – February 2024

Academic exchange semester

Courses: Parallel and High-Performance Computing, Advanced Encryption Schemes, Control Systems I

Research Experience

Undergraduate Research Assistant

January 2023 – Present

University of Waterloo

Waterloo, Canada

- Improved the object initialization safety checker in the **Dotty Scala compiler** by fixing bugs and implementing optimizations.
- Contributed to a research paper and prepared a code artifact for the initialization checker which was published in OOPSLA 2023 and won a **distinguished paper award**.
- Supervised by Professor Ondřej Lhoták.

Research Intern

May 2024 – August 2024

Swiss Federal Institute of Technology Lausanne (EPFL)

Lausanne, Switzerland

- Researched use cases and programmed proof of concepts for a symbolic execution based approach for determining the memory usage of C programs, with work presented as a poster at OSDI 2024.
- Implemented a unit testing and mocking framework into the **KLEE** dynamic symbolic execution engine to easily mock out portions of code for faster execution and verification.
- Supervised by Professor George Candea.

Undergraduate Research Fellow

May 2023 – August 2023

University of Waterloo

Waterloo, Canada

- Wrote proposals to amend the WebAssembly specification to support two new extensions for algebraic effects: lexical scoping and bidirectionality.
- Implemented the proposals into the WebAssembly **OCaml** reference interpreter and created test cases, providing a proof of concept for the two extensions.
- Supervised by Professor Yizhou Zhang.

Publications

2023 Fengyun Liu, Ondřej Lhoták, **David Hua**, and Enze Xing. 2023. Initializing Global Objects: Time and Order. Proc. ACM Program. Lang. 7, OOPSLA2, Article 268 (October 2023), 28 pages. <https://doi.org/10.1145/3622844>

Posters

2024 Yonghao Zou, **David Hua**, and George Candea. 2024. Memory Usage Interfaces for Serverless Functions. Poster presented at OSDI '24. <https://davidhua.me/files/osdi24.pdf>

Work Experience

Software Engineer Intern

Jane Street Capital

January 2024 – April 2024

New York, United States

- Used **OCaml** and various internal tooling.

Computer Graphics Developer Intern

SideFX Software

September 2022 – December 2022

Toronto, Canada

- Optimized the Houdini plugin for Unreal Engine 5 using **C++** by serializing and compressing data, improving transfer rate across pipelines.
- Designed performance improvements in the plugin's model renderer, increasing the number of polygons it can render for a single mesh by **over 100%**.
- Expanded the functionality of an **automation server** built into the Houdini software using **C++** interfacing with **Python** via **PyBind11**, adding features to streamline creation of dependency graphs.

Full Stack Developer Intern

Immigrate.ai

January 2022 – April 2022

Toronto, Canada

- Engineered and tested a wide variety of full stack applications using **React** and **Node.js** for various clients seeking external aid on their startups.

Big Data Engineer Intern

Huawei Technologies

May 2021 – August 2021

Toronto, Canada

- Created optimizations for a distributed SQL query engine based on **PrestoSQL** in **Java** and **C++**, reducing query execution time by **over 30%** through **LLVM** code generation.
- Developed a comprehensive **C++** and **Java** test suite using **Google Test** with **100%** function coverage.

Backend Software Developer (Freelance)

Podcrash Ltd.

June 2018 – March 2019

Toronto, Canada

- Produced tools using the **LWJGL Java** library to enhance the performance of video games on lower end hardware, resulting in frame rate improvements of up to **100%**.
- Developed a support ticketing backend with **Java** and **MySQL**, streamlining communication between customers and developers, resolving technical problems for **hundreds of users**.

Projects

VeggieTales 2 (First Person Shooter Game) [↗](#) | Java, OpenGL (LWJGL Library)

- Built a 3D first person video game using **Java** and **OpenGL** API.
- Created a physics engine for handling 3D movement and collision detection.

Alpha Beaver [↗](#) | React, MongoDB, Express.js

- Led team of 4 to create a **MERN** stack web app facilitating interactions between educators and students.
- Implemented sessionless user authentication and access control using **JSON Web Tokens**.

Daily Journey [↗](#) | Python (Django), JavaScript (React), HTML/CSS, PostgreSQL

- Managed a team of 4 to build a single page web app that uses the Overpass API to generate nearby jogging paths, complete with **Django** session authentication and stored usage history for users.
- Utilized **Google Maps API** to graphically plot paths on an interactive map embed.

More projects can be viewed on my [website](#).

Skills

Programming Languages: C, C++, Java, Python, TypeScript/JavaScript, OCaml, Scala, Kotlin

Web: HTML/CSS, Node.js, React, Django, Express.js, AWS

Databases: MySQL, PostgreSQL, SQLite, MongoDB

Other: LLVM, JavaFX, Latex, Git