

David Hua

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Education

University of Waterloo

September 2020 – Present

Bachelor of Software Engineering

95% CAV, 4.0 GPA

Skills

Languages: C/C++, Java, Python, SQL, TypeScript/JavaScript, Kotlin, Scala, PHP, HTML/CSS

Libraries/Tools: LLVM, AWS, MySQL, PostgreSQL, Numpy, MongoDB, JavaFX, Node.js, React, Django

Research Experience

Undergraduate Research Fellow

April 2023 – Present

University of Waterloo

- Researched approaches and wrote proposals for adding statically scoped algebraic effects in WebAssembly and modified the reference interpreter in **OCaml** to implement the proposals.

Undergraduate Research Assistant

January 2023 – April 2023

University of Waterloo

- Improved the initialization checker in the **Dotty Scala compiler** by optimizing its caching mechanism, reducing the number of cache entries by up to **90%** and increasing efficiency by up to **15%**.
- Contributed to the implementation and creation of a research paper for a novel method for initialization checking global objects in **Scala** by researching and applying prior art as well as fixing bugs.

Work Experience

Computer Graphics Developer

September 2022 – December 2022

SideFX Software

- 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

January 2022 – April 2022

Immigrate.ai

- Improved the functionality of a cloud based Enterprise Resource Planning software using **jQuery**, **PHP**, and **MySQL** while enhancing existing features, resulting in **4 new clients**.
- Engineered and tested a wide variety of full stack applications using **React**, **PHP**, and **Node.js** with **TypeScript** for various clients seeking external aid on their startups.
- Designed micro-services written in **JavaScript** and **Python** hosted with Amazon **AWS**.

Big Data Engineer

May 2021 – August 2021

Huawei Technologies

- 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

June 2018 – March 2020

Podcrash Ltd.

- 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**.

Other Experience

CS Club Executive Member

September 2018 – June 2020

Thornhill Secondary School

- Contributed to the development of an online judge used by the school's Computer Science faculty to administer homework with automatic grading.
- Organized events such as hackathons, contests, and other after school club activities.
- Taught **Python** programming basics and game development in **PyGame**.

Private Tutor

September 2018 – June 2020

Self Employed

- Tutored Math, Computer Science, and Physics to over a dozen high school students, maintaining and reinforcing understanding of course material.
- Prepared students for tests and exams with supplemental home and aid on practice problems.

Projects

Seefood [↗](#) | *Python, Java, Tensorflow, Numpy*

- Trained a **convolutional neural net** to determine if an image depicts a hotdog, achieving **83%** accuracy.
- Designed a **Java** frontend to use the model for evaluating user submitted pictures.

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.

Allison (Top Down Dungeon Crawler) [↗](#) | *Java, JavaFX*

- Top down rogue-like dungeon crawler game with GJK collision detection, built using **JavaFX**.

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**.
- Created a web based rich text editor with **Slate.js** to render user made content.

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.

Awards

Undergraduate Research Fellowship - \$7,500

May 2023

University of Waterloo

NSERC Undergraduate Student Research Award - \$6,000

May 2023

Natural Sciences and Engineering Research Council of Canada

President's Research Award - \$1,500 × 2

January 2023, April 2023

University of Waterloo

Term Dean's Honor List × 4

April 2021, December 2021, August 2022, April 2023

University of Waterloo

RBC Scholarship - \$2,500 <i>RBC Royal Bank</i>	January 2021
Term Distinction <i>University of Waterloo</i>	December 2020
President's Scholarship of Distinction - \$2,000 <i>University of Waterloo</i>	September 2020
Thornhill Secondary School Accounting Award - \$50 <i>Thornhill Secondary School</i>	June 2020
Thornhill Secondary School Honor Roll <i>Thornhill Secondary School</i>	June 2020