David Hua

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Experience

Software Engineer Intern — Incoming January 2024
Jane Street Capital

Undergraduate Research Fellow — May 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 creation of a research paper for a novel method of initialization checking global objects in **Scala** by preparing an artifact using **Docker**, researching and documenting prior art, as well as fixing bugs.

Computer Graphics Developer Intern — September 2022 – December 2022
SideFX Software
- Optimized the Houdini plugin for Unreal Engine 5 using **C++** by serializing and compressing data, 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.

Big Data Engineer Intern — 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 2019
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**, 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.

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.

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.

More projects can be viewed on my website and GitHub.

Education

University of Waterloo — September 2020 – Present
Bachelor of Software Engineering
95% CAV, 4.0 GPA

Technical Skills

Languages: C/C++, Python, Java, Kotlin, Scala, SQL, TypeScript/JavaScript, PHP, HTML/CSS
Libraries/Frameworks: React, Node.js, Express.js, Django, JavaFX, Numpy
Technologies: LLVM, AWS, Docker, MySQL, PostgreSQL, MongoDB, Git