Alden Wu

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Education

University of California, San Diego — San Diego, CA
Computer Science & Pure Mathematics B.S., GPA 3.96 — *September 2022 – June 2026*

Experience

Amazon – Software Engineer (Intern) | *C++, Python, AWS, LLMs (Bedrock), WebDriver* — June 2025 – September 2025
- Worked on LLM-powered action model and automation framework for Kindle device
- Increased performance by 7x for common actions (e.g. navigation, text input) by adding new capabilities to the action model
- Decreased cost by 5.5x for common actions by improving efficiency of LLM interaction logic
- Improved stability of on-device daemon by fixing several bugs related to memory buffer management

Marvell – Software Engineer (Intern) | *PHP, HTML/CSS, JavaScript, Subversion, XAMPP* — June 2024 – September 2024
- Refactored and simplified large portions of code to improve maintainability, reducing bloat and repetition
- Coordinated with other team members to make transition to new structure seamless and painless
- Used MySQL to display more detailed and useful information to end users

Coursework

CSE Data Structures, Algorithms, Software Engineering (OOP), Operating Systems, Networked Services, Computability, Cryptography, Optimization (ML), Differentiable Programming, Computer Vision, Virtual Reality, Computer Graphics, Animation, Rendering (PBR), Discrete Differential Geometry, Physics Simulation

MATH Linear Algebra, Vector Calculus, Probability, Abstract Algebra, Logic, Graph Theory, Computational Stochastics, Numerical Analysis, Real Analysis, Functional Analysis, Fourier Analysis, Lie Groups, Algebraic Topology

Technical Skills

Languages C#, Java, C/C++, Python, JavaScript, HTML/CSS, PHP, PostgreSQL, MATLAB, ARM Assembly
Frameworks Unreal Engine, Unity, React.js, Express.js, Win32, JUnit, GoogleTest, Appium/Selenium
Developer Tools git, ssh, gdb, AWS, AWS Bedrock, NVIDIA Nsight, CMake, vcpkg, NuGet, Maven, Linux, Apache HTTP
Libraries/etc. .NET, OpenGL, CUDA, NVIDIA OptiX, Node.js, Passport.js, PyTorch, OpenCV, NumPy, SciPy

Projects

Path tracer, 3D renderer – "Moth" | *C++, NVIDIA OptiX, CUDA, CMake* — March 2024 – June 2024
sample images
- Programmed a physically based Monte-Carlo ray tracer, GPU accelerated with NVIDIA OptiX
- Implemented the Smith-GGX microfacet model for reflection and transmission
- Improved performance with BSDF importance sampling and next event estimation (MIS)
- Volumetric rendering of chromatic heterogeneous media (e.g. colored smoke)

Study website – "rote" | *TypeScript, HTML/CSS, PostgreSQL, Node.js, React, Oracle Cloud* — August 2023 – September 2023
github.com/goodtrailer/rote
- Implemented a React front-end communicating with a Node.js/Express.js back-end via REST API
- Strengthened authentication security using password hashing, HTTPS (SSL/TLS) encrypted cookies, and CORS
- Designed a scalable database schema in PostgreSQL

Audio capture tool – "obs-app-audio" | *C++, Win32 API, CMake/Make, gdb, Audacity* — December 2020 – October 2021
github.com/goodtrailer/obs-app-audio
- Facilitated low latency (~50µs) IPC by coding a lightweight library for Win32 pipes
- Performed real-time audio processing from concurrent sources using efficient data structures (e.g. ring buffer)
- Created a DLL injector to hook application APIs and intercept audio data

Open-Source Contributions

Rhythm game – "osu!" | *C#, OpenGL, SDL, NUnit, RenderDoc, .NET* — July 2022 – February 2023
github.com/ppy/osu, github.com/ppy/osu-framework — *13 PRs merged, 74 commits*
- Collaborated and contributed to a large open-source project
- Implemented various real-time graphical effects, e.g. interactive "smoke trails" and more accurate animations
- Optimized performance by reducing polygon counts by ~15% for certain objects ("sliders")