# Alden Wu

+1 (408) 832-8816 | aldenwu18@gmail.com | aldw.net | github.com/goodtrailer

## Education

**University of California, San Diego** — San Diego, CA
*Computer Science B.S., GPA 3.98* — *September 2022 – June 2025*

## Relevant Coursework

**CSE** Data Structures, Object-Oriented Design, Software Tools, Algorithms, Systems and Architecture, Theory of Computation, Optimization and Machine Learning, Natural Language Processing, Computer Vision, Computer Graphics, 3D User Interaction (VR/AR HCI), Discrete Differential Geometry, Physical Simulation

**Math** Linear Algebra, Vector Calculus, Differential Equations, Probability and Statistics, Graph Theory, Combinatorics, Numerical Analysis, Real Analysis, Fourier Analysis

## Technical Skills

**Languages** C#, Java, C++, C, Python, Haskell, JavaScript/TypeScript, HTML/CSS, PHP, SQL (PostgreSQL), NoSQL (MongoDB), MATLAB, ARM Assembly, Powershell/Bash, CMake

**Frameworks** Unreal Engine, Unity, React.js, Express.js, Win32 API, WinForms, JUnit, GoogleTest, doctest, NUnit

**Developer Tools** git, ssh, gdb, Amazon Web Services, Oracle Cloud, NVIDIA Nsight, RenderDoc, vcpkg, NuGet, Apache Maven, UNIX/POSIX, Ubuntu Linux, Blender, Houdini

**Libraries/etc.** .NET, OpenGL, DirectX, Node.js, Passport.js, CUDA, OptiX, HIP, PyTorch, OpenCV, NumPy, SciPy

## Projects

**Study website – "rote"** | *TypeScript, HTML/CSS, PostgreSQL, Node.js, Passport.js, React, Oracle Cloud* — August 2023 – Present

- Built a full-stack web application for creating, studying, and sharing flashcards
- 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
- Improved reliability by deploying the backend on Oracle Cloud with a load balancer

**Wallpaper automation tool – "Daily Desktop"** | *C#, .NET, WinForms, Win32 API, NUnit, GitHub Actions* — April 2021 – Present

- Programmed an async GUI app for automating tasks
- Implemented a modular and extensible interface (over 10 plugins) using OOP design patterns
- Increased reliability by unit testing code and using GitHub Actions for CI/CD
- Published release builds, gaining over 1.2K downloads

**Audio capture tool – "obs-app-audio"** | *C++, Win32 API, CMake/Make, gdb, Audacity* — December 2020 – October 2021

- Wrote a tool for capturing audio from selected processes
- Facilitated low latency (~50µs) IPC by coding a lightweight library for Win32 pipes
- Performed real-time audio processing from concurrent sources using relevant data structures (e.g. ring buffer)
- Created a DLL module injector to hook application APIs and intercept audio data

**Strategy game – "Paper"** | *C++, Unreal Engine, Blueprints, NVIDIA NSight, Blender* — November 2019 – February 2021

- Developed an online turn-based strategy game with 3D graphics using Unreal Engine
- Supported online play with over 3000 pieces and 6 players simultaneously using UE4's replication API
- Boosted performance by implementing efficient algorithms (e.g. A* pathfinding, Bresenham line drawing)
- Handled all areas of game development, e.g. modeling, texturing, animating, and scripting

## 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*

- Contributed to a large open-source project
- Implemented various real-time graphical effects, e.g. interactive "smoke trails" and more accurate animations
- Collaborated on fixing bugs, e.g. pixel gaps; optimized performance by reducing polygon counts by ~15% for certain objects
- Improved test coverage in several areas, including GUI and gameplay logic