Ailun (Allan) Pei

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Education

Arizona State University, Tempe, AZ — Jan 2024 – May 2025
Master of Science in Computer Science

Arizona State University, Tempe, AZ — Aug 2020 – Dec 2023
Bachelor of Science in Computer Science, **magna cum laude**

Jingdezhen Ceramic University, Jingdezhen, China — Sep 2012 – Jun 2016
B.A. in Ceramic Materials Engineering and Intelligent Manufacturing

Technical Skills

Languages: JavaScript, TypeScript, Swift, Python, C#, C++, Java, SQL, Bash, HLSL, GLSL, HTML/CSS
Web & Mobile: React, Node.js, SwiftUI, iOS Development, Vue.js, Flask, FastAPI, RESTful API, WebGL, Three.js
Development Tools: Xcode, Visual Studio, Android Studio, VS Code, Git, GitHub, Docker, AWS
Graphics & Game Development: Unity, Unreal Engine, OpenGL, DirectX, Shader Graph, MonoGame
Design & Creative: Figma, Sketch, Adobe Creative Suite (Photoshop, Illustrator, After Effects), Blender, Cinema 4D

Experience

Software Engineer Intern — Jun 2024 – Aug 2024
Feishu Extreme Trading Technology Co., Ltd.(CME Group-listed ISV) — Shanghai, China

- Built enterprise security modules for a large-scale **C++/MFC trading terminal**, including configurable screen-lock dialog, password validation, and idle-timeout policy, enhancing workflow safety and reducing session-related errors by **15%**
- Engineered **GDI double-buffered rendering** with custom DC and bitmap to eliminate UI flicker, improving rendering stability and interface performance by **20–30%**
- Optimized event handling in **PreTranslateMessage** and integrated **INI-driven configuration** with reusable UI components (status bar, tab, password input), ensuring consistent user interaction and reducing duplicate UI code

Projects

Music Visualizer Studio – Full-Stack Creative Automation Tool — Fall 2025

- Designed and developed a **full-stack creative automation system** that transforms music and data inputs into real-time generative visuals through configurable presets and dynamic particle-based effects
- Implemented modular front-end visualization architecture and a **Node.js/Express** backend supporting automated rendering, batching, and cross-platform export; built a **Git-versioned preset system** enabling reproducible creative states and consistent style management across exports
- Prototyped an extensible creative workflow integrating real-time exploration with automated media delivery for personal creative projects

WebGL Shader Playground – Interactive Visualization Tool — Spring 2023

- Engineered an interactive **WebGL-based visualization tool** for real-time shader experimentation, enabling creative exploration of lighting, reflection, and material effects through generative rendering
- Implemented modular **GLSL vertex/fragment shaders** supporting Phong, Gouraud, and parametric materials with responsive parameter control and optimized 60 fps rendering performance

Spherical Conformal Parameterization of 3D Meshes — Fall 2024

- Implemented a **folding-free spherical conformal mapping pipeline** for genus-0 surfaces using **Python/NumPy/SciPy** to support geometry processing applications
- Constructed **cotangent Laplace–Beltrami operator** and area-based mass matrix, initialized with eigenvector embeddings, and optimized harmonic energy via orthogonality-constrained updates with line search
- Reduced harmonic energy by approximately **0.4% to stable minimum** within 1000 iterations, producing stable spherical embedding with uniform coverage and no fold-overs

Academic Experience

Research Assistant — Oct 2023 – Dec 2024
Center for Human, Artificial Intelligence, and Robot Teaming (CHART), Arizona State University — Mesa, AZ

- Supported DARPA-sponsored *Artificial Social Intelligence for Successful Teams (ASIST)* program through multi-week participation in **Minecraft-based Bomb Disposal simulation**, performed **data cleaning and preprocessing** of large-scale team communication datasets, and reviewed analysis techniques from collaborating institutions (IHMC, UCF, CMU)
- Developed **research questions and testable hypotheses** on team effectiveness and strategy adaptation; applied **statistical analysis and text mining methods** for dataset exploration, variable identification, and communication pattern analysis

Teaching Assistant (Undergraduate & Graduate) & Grader — Jan 2023 – May 2025

- Supported **250+** students across **5 courses**, including C++ (as grader) and multi-level **C#/MonoGame shader programming** (as teaching assistant); held weekly office hours for 40–60 students per semester