

# Ailun (Allan) Pei

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## Education

<b>Arizona State University</b> , Tempe, AZ Master of Science in Computer Science	Jan 2024 – May 2025
<b>Arizona State University</b> , Tempe, AZ Bachelor of Science in Computer Science, <b>magna cum laude</b>	Aug 2020 – Dec 2023

## Technical Skills

<b>Game Engines &amp; Graphics:</b> Unity, Unreal Engine, MonoGame, WebGL, OpenGL, DirectX
<b>Languages &amp; Shaders:</b> C#, C++, Python, JavaScript, TypeScript, HLSL, GLSL, HTML/CSS
<b>Art &amp; DCC Tools:</b> Blender, Cinema 4D, Adobe Photoshop, Adobe Illustrator, Adobe After Effects, Figma
<b>Systems &amp; Web:</b> Git, GitHub, React, Node.js, Flask, FastAPI, RESTful API, Docker, AWS

## Experience

<b>Software Engineer Intern</b> Feishu Extreme Trading Technology Co., Ltd.(CME Group-listed ISV)	Jun 2024 – Aug 2024
<ul style="list-style-type: none"><li>Built enterprise security modules for a large-scale <b>C++/MFC trading terminal</b>, including configurable screen-lock dialog, password validation, and idle-timeout policy, enhancing workflow safety and reducing session-related errors by <b>15%</b></li><li>Engineered <b>GDI double-buffered rendering</b> with custom DC and bitmap to eliminate UI flicker, improving rendering stability and interface performance by <b>20–30%</b></li><li>Optimized event handling in <b>PreTranslateMessage</b> and integrated <b>INI-driven configuration</b> with reusable UI components (status bar, tab, password input), ensuring consistent user interaction and reducing duplicate UI code</li></ul>	Shanghai, China

## Projects

<b>Unity FPS Game with AI Navigation and Shader Effects</b>	May 2022
<ul style="list-style-type: none"><li>Built a <b>3D first-person shooter</b> in Unity with <b>navmesh-based AI enemies</b> featuring patrol and chase logic, integrating complex state machine behavior for responsive enemy interactions</li><li>Implemented <b>shader-based visual effects</b> including explosions and muzzle flashes, handling player input, shooting mechanics, and animation states through modular C# scripts</li><li>Designed modular systems including scene transitions, health management logic, and item pickup mechanics, ensuring scalable and maintainable code architecture</li></ul>	

<b>MonoGame Game Development Suite with Custom Shaders</b>	Spring 2023
<ul style="list-style-type: none"><li>Developed multiple game prototypes using <b>MonoGame</b> framework in C#, including a <b>whack-a-mole arcade game</b>, a <b>2D side-scrolling FPS</b>, and a <b>3D shooter</b>, demonstrating versatility across different game genres and dimensions</li><li>Implemented particle systems, enemy spawning logic, and collision detection from scratch; integrated <b>custom compute shaders</b> for physics calculations in 3D shooter prototype</li><li>Designed <b>modular shader pipeline</b> enabling designers to swap visual effects without touching core gameplay code, promoting separation of concerns between technical and creative teams</li></ul>	

<b>Spherical Conformal Parameterization of 3D Meshes</b>	Fall 2024
<ul style="list-style-type: none"><li>Implemented a <b>folding-free spherical conformal mapping pipeline</b> for genus-0 surfaces using <b>Python/NumPy/SciPy</b> to support geometry processing applications</li><li>Constructed <b>cotangent Laplace–Beltrami operator</b> and area-based mass matrix, initialized with eigenvector embeddings, and optimized harmonic energy via orthogonality-constrained updates with line search</li><li>Reduced harmonic energy by approximately <b>0.4% to stable minimum</b> within 1,000 iterations, producing stable spherical embedding with uniform coverage and no fold-overs</li></ul>	

<b>WebGL Visualization Suite – Interactive Shader Playground</b>	Spring 2023
<ul style="list-style-type: none"><li>Engineered interactive <b>WebGL demos</b> from scratch with custom <b>GLSL vertex/fragment shaders</b> supporting <b>Phong and Gouraud shading</b>, including parametric geometry generation (torus, sphere, cube)</li><li>Implemented <b>camera control system</b> with spherical coordinate transforms, supporting rotation and zoom via mouse interaction with gimbal lock handling and viewport normalization</li><li>Developed <b>real-time lighting system</b> with dynamic light positioning, material parameter adjustment, and reflection/collision detection for interactive object morphing</li></ul>	

## Academic Experience

<b>Teaching Assistant (Undergraduate &amp; Graduate) &amp; Grader</b>	Jan 2023 – May 2025
<ul style="list-style-type: none"><li>Supported <b>250+</b> students across <b>5 courses</b>, including C++ (as grader) and multi-level C#/MonoGame shader programming (as teaching assistant); held weekly office hours for 40–60 students per semester</li><li>Delivered guest lectures on advanced shader techniques, graded <b>200+</b> assignments with detailed feedback, improving students' shader programming proficiency and maintaining strong class attendance</li></ul>	