Ailun (Allan) Pei

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Education

Arizona State University, Tempe, AZ — Jan 2024 – May 2025
Master of Science in Computer Science — GPA: 3.58

Arizona State University, Tempe, AZ — Aug 2020 – Dec 2023
Bachelor of Science in Computer Science, *magna cum laude* — GPA: 3.61

Jingdezhen Ceramic University, Jingdezhen, China — Sep 2012 – Jun 2016
B.A. in Ceramic Materials Engineering and Intelligent Manufacturing — GPA: 91/100 (Equivalent to 3.9/4.0)

Technical Skills

Graphics Development: Unity, Unreal Engine, WebGL, Three.js, OpenGL, DirectX, Shader Programming, MonoGame
Creative Tools & Automation: Adobe Photoshop, Adobe Illustrator, Adobe After Effects, Sketch, Figma, Blender, Cinema 4D
Languages: C#, C++, Python, JavaScript, TypeScript, Swift, Kotlin, Java, SQL, Bash, HTML/CSS, HLSL, GLSL
Web & Backend: React, Node.js, Vue.js, Flask, FastAPI, RESTful API, Git, GitHub, JSON, XML, MySQL, Docker, AWS, CI/CD
Data & ML: PyTorch, TensorFlow, NumPy, pandas, scikit-learn, Matplotlib, D3.js, Statistical Analysis

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

Unity FPS Game with AI Navigation and Shader Effects — May 2022

- Built a **3D first-person shooter** in **Unity** with **navmesh-based AI enemies** featuring patrol and chase logic, integrating complex state machine behavior for responsive enemy interactions
- Implemented **shader-based visual effects** including explosions and muzzle flashes, handling player input, shooting mechanics, and animation states through modular **C#** scripts
- Designed modular systems including scene transitions, health management logic, and item pickup mechanics, ensuring scalable and maintainable code architecture

MonoGame Game Development Suite with Custom Shaders — Spring 2023

- Developed multiple game prototypes using **MonoGame** framework in **C#**, including a **whack-a-mole arcade game**, a **2D side-scrolling FPS**, and a **3D shooter**, demonstrating versatility across different game genres and dimensions
- Implemented particle systems, enemy spawning logic, and collision detection from scratch; integrated **custom compute shaders** for physics calculations in 3D shooter prototype
- Designed **modular shader pipeline** enabling designers to swap visual effects without touching core gameplay code, promoting separation of concerns between technical and creative teams

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 1,000 iterations, producing stable spherical embedding with uniform coverage and no fold-overs

WebGL Visualization Suite – Interactive Shader Playground — Spring 2023

- Engineered interactive **WebGL demos** from scratch with custom **GLSL vertex/fragment shaders** supporting **Phong and Gouraud shading**, including parametric geometry generation (torus, sphere, cube)
- Implemented **camera control system** with spherical coordinate transforms, supporting rotation and zoom via mouse interaction with gimbal lock handling and viewport normalization
- Developed **real-time lighting system** with dynamic light positioning, material parameter adjustment, and reflection/collision detection for interactive object morphing

Academic Experience

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
- Delivered guest lectures on advanced shader techniques, graded **200+** assignments with detailed feedback, improving students' shader programming proficiency and maintaining strong class attendance