

ZHAORUI (JAYSON) ZHANG

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EDUCATION

University of Southern California — Los Angeles, CA

August 2025 – Present

Master of Science in Computer Science (Game Development) (Expected May 2027)

Northeastern University — Boston, MA

August 2021 - April 2025

Bachelor of Science in Computer Science & Game Development

- **GPA:** 3.88 / 4.0
- **Honor:** Dean's List (Four Semesters)
- **Core Courses:**
- Game Programming, Object-Oriented Design, Computer Systems, Networks & Distributed System, Computer Graphics, Human Computer Interaction, Algorithms & Data, Fundamentals of Software Engineering, Building Game Engines

INTERNSHIP EXPERIENCE

Xellar Biosystems

Boston, MA

Backend Engineer Intern

May 2024 - August 2024

- Designed and implemented a PostgreSQL-based database and created an entity-relationship diagram (ERD) to structure experimental data and medical images stored in a cloud-based object storage service (Linux-based).
- Developed a 2D Z-layer stacking cell browser using Django (backend) and React (frontend) for precise viewing and analysis of cell images across different Z-axis planes.
- Utilized VTK (Visualization Toolkit) to develop a 3D volume rendering viewer, enabling visualization and interactive manipulation of complex 3D data sets.

Beijing Lenovo Hyperconverged Technology Co., Ltd.

Beijing, China

Documentation Development Engineer

September 2024 - December 2024

- Designed and created a Sphinx multi-document project, with ReStructuredText as the markup language to document a new system version based on Red Hat Enterprise Linux 8 (RHEL 8).
- Developed a master directory project to link individual documents into a cohesive documentation structure, supporting inter-document references for better navigation.
- Enhanced document interactivity and user experience by customizing themes, CSS files, and utilizing Sphinx plugins, to ensure the visual presentation and usability of documentation.
- Optimized HTML documentation for conversion into PDF format and achieve cross-platform compatible.
- Supported automation of documentation generation and publication by configuring CI/CD pipelines, ensuring seamless updates with system code changes.

RESEARCH EXPERIENCE

Algorithm for Game Design

March 2024 - September 2024

Group Leader; Supervisor: William Nace

- Completed an advanced course on game design algorithms, covering maze generation, collision detection, 3D rendering, multiplayer synchronization, and optimization techniques.
- Led a team of four members to make an in-depth literature review on fluid simulation methods for video games, focusing on balancing real-time performance and visual accuracy.
- Explored and compared four key methodologies: DCGrid, ISPH vs. WCSPH, IISPH, and the Finite Volume Method, and analyzed their strengths, limitations, and applicability in diverse gaming scenarios.

- Synthesized fundamental principles such as the Eulerian and Lagrangian viewpoints and Navier-Stokes equations to provide a foundation for understanding simulation techniques in game development.
- **Publication:** Z. Zhang, Y. Zhuang, Y. Zhong, B. Chen. Fluid Dynamics for Games: A Literature Review. In Proceedings of the 4th International Conference on Computing Innovation and Applied Physics (CONF-CIAP 2025), Eskişehir, Turkey, January 17–23, 2025. EAI. doi: 10.4108/eai.17-1-2025.2355245

SELECTED COURSE PROJECTS

Pawfect Match | TypeScript/React/MongoDB | Full Stack Engineer *January 2025 – May 2025*

- Built a full-stack dating app with Random, Preference, and Music-based matchmaking.
- Implemented Date Room with real-time chat, AI-guided prompts, anonymity toggling, and connection workflows.
- Integrated Spotify API for music-based matches, shared playlists, and in-room collaborative song sharing.

Brick Breaker Game Engine | C++/SDL2 | Game Engine Engineer *April 2025 – May 2025*

- Developed a custom 2D game engine with a modular component system (Transform, Input, Collision, Texture).
- Implemented multi-level scene management, brick mechanics, power-ups, and real-time score tracking.
- Designed physics-based collisions for ball-paddle interactions and extensible entity architecture.
- Documented the entire engine with Doxygen and optimized resource management via texture caching.

Echoes of the Labyrinth | C++/OpenGL/SDL | Game Engine Engineer *January 2024 – May 2024*

- Mastered rendering graphics libraries based on OpenGL and SDL, managing the rendering pipeline and writing shaders.
- Implemented core game functionalities including map and model loading, player movement, collision detection, and audio triggers.

The Little Boy: Quei | Unity/C# | Game Development Engineer *January 2023 – June 2023*

- Acted as the lead programmer, led the creation and ongoing maintenance of game scripts, focusing on player movement, attack dynamics, collision detection, and basic game mechanics.
- Coordinated the integration between the game engine and underlying codebase, ensuring smooth animation and interaction between game systems.

PROFESSIONAL SKILLS

Programming Languages: C# (tens of thousands of lines of code), C++ (tens of thousands of lines of code), Java (tens of thousands of lines of code), C, Python, JavaScript/TypeScript, SQL, CSS, HTML

Game Development Engines: Unity, Unreal Engine, RPG Maker, Godot

Libraries/APIs: OpenGL, Simple DirectMedia Layer (SDL), WebGL, Django, React, VTK, PostgreSQL, Sphinx
 Proficient in game design with extensive experience in Unity, having completed 3-5 independent game projects, including an award-winning game.

Demonstrated expertise in shader programming and graphical rendering using OpenGL and SDL, showed through a developed game demo.

OTHER INFORMATION

Hidden Hero Jam — *Global Game Development Challenge (March 20, 2023)*

- Independently responsible for all aspects of program development.
- Placed 7th out of 33 teams in Visual Effects and Sound Design.
- Also ranked 7th in Story Design and Immersion for creativity and narrative depth.

Languages: Chinese (Native); English (Proficient)

Interests: Tabletop Role-Playing Games (TTRPGs) such as Dungeons & Dragons and Call of Cthulhu.

Passionate about Metroidvania video games, especially titles like *Hollow Knight* and *Blasphemous*.