Chao Bian

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Computer Graphics and Game Development

Education

University of California, Santa Barbara Fall 2022 - Dec 2025

Bachelor of Science in Computer Science | GPA: 3.94/4.00 | Dean's Honors: 7 quarters

Selected coursework: Computer Graphics (A+), Programming Languages (A+), Introduction to Game Development, Data Structures and Algorithms I and II, Algorithms Engineering

Technical Skills

Languages: C++, C#, Python, HLSL/Cg, OCaml; prior coursework in Java

Graphics and engines: Unity, shader programming, physically based rendering, path tracing, SSAO

Tools and collaboration: Git, CMake, Visual Studio Code, code review, Scrum

Web: Astro, HTML/CSS

Selected Graphics Projects

CPU Path Tracer 2026

Independent project | *C++* | Project page

- Extended an RTIOW-based renderer with textured triangle meshes, OBJ/MTL loading, SAH BVH acceleration, and GGX reflection with importance sampling, including visible-normal sampling.
- Revised the material interface to integrate direction-dependent scattering with sampling PDFs and the integrator while retaining support for existing materials.
- Evaluated correctness and performance on Apple M2: reduced render time by 21.8% against the baseline BVH implementation in a Dragon scene and measured 2.92x speedup with four threads in a Cornell Box test.

Unity PBR Shader 2026

Independent project | *Unity, HLSL/Cg* | Project page

- Implemented physically based material shading with GGX reflection and integrated Unity-provided diffuse and specular environment lighting.
- Validated material response against Unity Standard; resolved smoothness-input and shading-convention mismatches to achieve a close visual match in the tested scene.

Screen Space Ambient Occlusion 2026

Independent project | *Unity, C#, HLSL/Cg* | Project page

- Built an SSAO pipeline covering depth-based position reconstruction, hemisphere sampling, filtering, and camera-side integration.
- Compared Gaussian and normal/depth-guided filtering, demonstrating improved boundary preservation in controlled visual comparisons.

Selected Game Development Projects

Odysseia Sep 2024 - Mar 2025

Puzzle Lead | *Gaucho Game Lab* | *Approximately 15 team members* | Project page

- Owned puzzle design and implementation for tidal, time-acceleration, and modular light systems in a collaborative Unity adventure game.
- Designed two tidal levels and the Minotaur's Labyrinth; built a playable graybox to communicate layout and puzzle dependencies to teammates before final integration.
- Developed reusable, event-driven puzzle components and coordinated with artists on mechanic readability; planned work in weekly Scrum sprints and incorporated Game Lead and Tech Lead code-review feedback.

Echoes of Time 2025

Solo developer | *GMTK Game Jam* | *Unity, C#* | Project page

- Completed a time-rewind puzzle game in two days, independently handling gameplay programming, mechanic design, and level design.
- Implemented physical echoes that replay recorded movement; designed five progressive levels around coordination between the player and echoes.

Shadow Runner Mar - Jun 2024

Solo developer | *Course project* | *Unity, C#* | Project page

- Took a synchronized two-character puzzle game from proposal and prototype through testing and release; built five levels and produced the release trailer.
- Used peer testing to refine movement constraints, completion feedback, and visual clues, keeping development focused on the core mechanic.

Additional Projects

Strange Tales of the Ink Pool 2025

Gameplay Programmer | *CiGA Game Jam* | *Eight-person team* | Project page

- Delivered the core card gameplay in a 48-hour Unity project; collaborated with a designer and another programmer on a CSV-configured content pipeline.

Functional Language Interpreter and Type Inference Winter 2025

Course project | *UCSB CS162* | *OCaml* | Project page

- Implemented evaluation, static type checking, and constraint-based type inference with unification within a supplied language framework.