JOYCE ZHOU

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EDUCATION

Purdue University   **West Lafayette, IN**
Master of Science in Computer Graphics Technology   Aug 2024, GPA: 4.00/4.0
Bachelor of Science in Computer Science / Bachelor of Art in Film and Theater Production   May 2022, GPA: 3.73/4.0
Selected Relevant Coursework: Object-Oriented Programming, Programming In C, Data Structures and Algorithms, System Programming, Data Mining and Machine Learning, Algorithm Analysis, Virtual Reality & Augmented Reality, Real-Time Computer Graphics, Scientific Visualization, Compute Shader Programming

SKILLS

Programming: C, C++, C#, Java, Python
Graphics APIs & Tools: OpenGL, GLSL, Unity, VTK, Compute Shaders, CUDA, Metal, Vulkan
Development Tools: MATLAB, R, Visual Studio, Oculus SDK

EXPERIENCE

Blinn College: Instructor, Game and Simulation Programming II   Jan 2025 – Present
- Designed and taught advanced undergraduate curriculum on game development and real-time computer graphics, including the graphics pipeline, lighting models, ray tracing, shaders, and modern graphics APIs such as OpenGL and GLSL.
- Led hands-on programming in Python with PyGame, guiding students through object-oriented design, game loop architecture, performance profiling, and debugging strategies rooted in industry practices.

Purdue Envision Center: Unity Programmer/Research Assistant   Mar 2021 – May 2024
- Specialized in developing real-time simulations and toolsets using Unity, with a focus on multi-platform development including web, Virtual Reality (VR), Augmented Reality (AR), mobile, and standalone systems.
- Engage in collaborative efforts with cross-disciplinary teams, including 2D/3D artists, User Experience (UX) designers, and sound experts, to create innovative applications tailored for research, educational, and outreach purposes.

Key Projects:

Nuclear Engineering Lab Simulator   Aug 2021 – May 2024
- Developed a high-fidelity, nuclear reactor simulator in Unity with two deployments for windows and web applications, designed for operator training and research analysis
- Applied real-time game development techniques and Integrated MATLAB for complex calculations, such as point kinetics algorithms to achieve interactive simulation and accurate reactor behavior modeling.
- Collaborated with nuclear engineering researchers and presented the project at NESTet and ANS CONTE conferences, supporting adoption of the simulation in academic and professional training context.

PUBLICATIONS

- McGraw, T., Zhou, X. *Real-time voxelized mesh fracture with Gram-Schmidt constraints. Computers and Graphics*, Elsevier, **accepted with minor revisions, to appear 2025**.

PROJECTS

Interactive XPBD Simulation in Compute Shaders (Master's Thesis)   Aug 2023 – May 2024
- Developed a GPU-accelerated Extended Position-Based Dynamics (XPBD) framework leveraging voxelization and compute shaders to simulate deformable soft bodies in real time, achieving higher performance and stiffness than traditional tetrahedral approaches.
- Proposed LoD-aware voxel constraint generation and partitioning techniques that improved simulation fidelity and efficiency; demonstrated automatic long-range constraint synthesis enabling stable self-supporting complex models.

Ocean Surface Velocity Visualization   Mar 2023 – May 2023
- Engineered a VTK-based interactive tool using python to visualize ocean surface velocity and vorticity in the Gulf of Mexico, covering a 5-month dataset.
- Designed a user-friendly interface for effective data navigation and time-specific analysis. Implemented advanced visualization techniques, including color-coded velocity magnitude and vorticity vectors, to enhance data interpretation.

Neural Path Tracing   Oct 2022 – Jan 2023
- Prototyped a CPU-based path tracer in C++ and explored noise reduction using a neural network to improve image quality
- Experimented with CUDA to accelerate ray sampling and denoising, gaining familiarity with GPU-based rendering workflows.