

Gaoxiang Zhao

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Education

University of Pennsylvania <i>MS in Scientific Computing</i>	August 2025 – May 2027 Philadelphia, USA
• Related Courses: Machine Learning, Computer Animation, Learning in Robotics	
Wuhan University <i>BEng in Communication Engineering</i>	September 2021 – July 2025 Wuhan, China

Experience

University of Pennsylvania Research Intern (Advisor: Kostas Daniilidis)	December 2025 – Present Philadelphia, USA
• Working on event-based computer vision and its applications in robotics.	
ZJU-Coohom Joint Lab of CG&AI Research Intern	August 2024 – November 2024 Hangzhou, China
• Worked on cutting-edge algorithms in high performance GPU Monte-Carlo ray tracing.	

Projects

Physics-Based Character Animation System	September 2025 – November 2025
• Developed character animation toolkit in C++ with forward/inverse kinematics, quaternion-based orientation interpolation, and constraint satisfaction.	
• Implemented three IK solvers (Limb-based, CCD, Pseudo-Inverse Jacobian).	
• Captured and blended 10+ motion clips using Captury and MotionBuilder with cross-dissolve transitions and character retargeting.	
Monte-Carlo Rendering Engine	December 2023 – January 2025
• Developed a high-performance simulation engine in C++ to solve high-dimensional light transport equations via Monte-Carlo integration with variance reduction.	
• Implemented advanced algorithms including Path Tracing, BDPT, and photon mapping variants for complex indirect lighting scenes.	
• Optimized performance via multi-threaded ray tracing, BVH acceleration structures, and arena-based memory allocation for large-scale rendering.	

Diffraction Simulation	June 2024 – August 2024
• Implemented wave-optical rendering framework for physical light transport simulation beyond geometric optics.	
• Derived closed-form edge-based Fraunhofer diffraction formulation, enabling free-space diffraction in path tracing without phase-carrying rays.	
• Conducted convergence analysis comparing discretized RGB and continuous spectral wavelength models.	

Technical Skills

- Programming: C++, Python, CUDA, MATLAB
- Tools: L^AT_EX, Linux, Git, PyTorch, JAX, Unity, OpenGL, Vulkan
- Language: English (Proficient), Mandarin (Native)