

# SCOTT STEINFELD

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## | SUMMARY OF QUALIFICATIONS

- Graphics researcher specializing in physically based light transport, Monte Carlo methods, and the simulation of complex phenomena.
- High-Performance Systems Developer with expertise in C++ (OOP) and CUDA, focusing on GPGPU throughput, SIMT optimization, and hardware-aware memory architecture.
- Leveraging an Astrophysics-based mathematical foundation for rigorous BSDF and appearance modeling.
- Technical Leader & Educator with experience mentoring 100+ students in Graphics and a record of optimizing workflows.

## | TECHNICAL SKILLS

### **Programming Languages**

C++, Python, GLSL, C, MATLAB

**Graphics APIs & Frameworks:** CUDA, OpenGL, Mitsuba 3

**Concepts:** PBR & BSDF Modeling, Monte Carlo Methods, Path Tracing, Concurrency, GPGPU Optimization (SIMT), Memory Coalescing, Acceleration Structures (BVH), OOP

**Tools & Software:** Blender, LaTeX, Git

## | EDUCATION

- Master of Computer Science, Computer Graphics** – University of Waterloo Sept 2023 – Present
- Investigating advanced light transport algorithms and BSDF modeling within the Mitsuba 3 framework to simulate complex material appearance and high-fidelity optical phenomena
- Bachelor of Science, Honours Astrophysics, Computing Minor** – University of Waterloo Sept 2016 – Aug 2021

## | PROJECTS

### **C++ Path Tracer**

- Physically based Monte Carlo path tracer built using Object-Oriented Design, featuring global illumination, multiple importance sampling (MIS), and next event estimation (NEE).
- Implemented an extensible material and geometry system using C++ polymorphism, alongside a BVH acceleration structure for efficient ray-primitive intersection.

### **CUDA Path Tracer (C++ / CUDA)**

- Engineered a GPGPU path tracer using the SIMT execution model, achieving a 50x increase in rays-per-second compared to previous multithreaded CPU implementation
- Designed 16-byte-aligned structures and SoA memory layouts for coalesced memory access
- Architected a system to pack complex geometry and material data into contiguous GPU buffers, significantly reducing host-to-device transfer overhead and kernel latency

### **Custom BSDF Plugin – Mitsuba 3 (C++)**

- Developed advanced material interfaces to enable atypical light propagation and visual distortion, integrating them seamlessly into the rendering pipeline.

## | RELEVANT EXPERIENCE

- Teaching Assistant, Computer Graphics** Waterloo, ON
- University of Waterloo Sept 2023 – Present
- Supported 100+ students in C++/OpenGL assignments covering rasterization, ray tracing, and advanced rendering techniques
  - Acted as lead TA, independently resolving complex assignment queries and coordinating 3+ TAs
- Academic Director** North York, ON
- Yuja Sept 2022 – Sept 2023
- Managed 50+ tutors and improved department response time by 33% through workflow optimization
  - Oversaw hiring and quality assurance across personalized academic programs