

Song Shi

Graphics engineer and researcher specializing in physically based rendering, geometry representations, volumetric effects, and GPU-based real-time graphics.

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Education

University of Waterloo <i>PhD in Computer Science</i> <i>Advisor: Prof. Toshiya Hachisuka</i>	<i>Sep 2026 – Jun 2030</i> <i>(Expected)</i>
Dartmouth College <i>Master of Computer Science with Concentration in Digital Arts</i> <i>Thesis advisor: Prof. Wojciech Jarosz</i>	<i>Sep 2024 – Jun 2026</i>
Tongji University <i>Bachelor of Engineering in Environmental Design</i>	<i>Sep 2017 – Jul 2021</i>

Publications

Conditional Product Next Event Estimation for Gaussian Process Implicit Surfaces

Song Shi, [Kehan Xu](#), [Wojciech Jarosz](#)

Computer Graphics Forum (Proceedings of EGSR), 45(4), July 2026

[\[Project page\]](#) [\[PDF\]](#) [\[Code\]](#) [\[DOI\]](#)

Experience

Rendering R&D Intern *Nanjing, China*
D5 Render *Dec 2025 – March 2026, July 2026 – August 2026*

- Developed real-time volumetric cloud rendering for *D5 Lite*, enabling fine-grained artistic control across altitude using vertical density profiles and Perlin–Worley noise. Achieved a **12×** performance improvement via temporal reprojection and improved convergence using spatiotemporal blue noise (STBN). Enhanced visual fidelity with a cascaded multi-scattering approximation.
- Implemented real-time sky and atmosphere rendering on GPU compute shaders, costing **0.7 ms/frame**. Increased the fidelity of cloud and surface rendering by integrating atmosphere distant lighting and aerial perspective. (C++, HLSL)

Research and Teaching Assistant *Hanover, NH*
Dartmouth College *Jan 2025 – July 2026*

- Research assistant in Dartmouth Visual Computing Lab (VCL). Worked on efficient rendering and artistic authoring of Gaussian Process Implicit Surfaces (GPIS). Proposed conditional product NEE for GPISes, reducing variance by 64× at equal render time over standard NEE. Ongoing project: artistic authoring system of GPISes.
- Teaching assistant for 4 CS courses at Dartmouth, including COSC287 Rendering Algorithms, COSC273 Computational Photography, COSC 70 Foundations of Applied Computer Science, and COSC 29.06 Digital Tangible User Interfaces.

Guest Lecturer *Shanghai, China*
University of Shanghai for Science and Technology *Mar 2024 – Apr 2024*

- Taught a first-year graduate course to 25+ students on Intelligent Product–Service Systems (PSS), covering Game Engine (Unity) development, 3D modeling, animation, and object-oriented programming.

Software Engineer *Shanghai, China*
Bigmind *Aug 2022 – Jan 2024*

- Developed high-fidelity real-time graphics for *SimuloCity*, a Unity-based automotive simulation platform, featuring realistic weather effects and GIS-based environments; optimized performance to maintain 120 FPS at 2K resolution on an RTX 3080, expanding extreme-condition scenario coverage.
- Built a data-driven vehicle configuration system using neuroevolution and generative models to augment limited traffic datasets, improving simulation coverage of rare scenarios. Received the Best Innovation Award at the 2023 China International Import Expo.

Software Engineer

FuturePlus

Shenzhen, China

Aug 2021 – Jul 2022

- Designed and implemented 3D procedural generation algorithms in Blender and Unreal Engine, accelerating urban planning workflows by 90% across two development sites totaling over 3,900 hectares.

Projects

Monte Carlo Path Tracing Renderer

[BlogLink](#) 

- Integrated volume path tracing with importance sampling in the framework of null scattering and environmental map with importance sampling, on the Dartmouth College COSC287 path tracing framework.

Ocean Simulation in Unity

[GithubLink](#) 

- Implemented Stockham GPU FFT to simulate ocean waves in Unity with 650+ FPS in 4K with RTX 4090.

Honors and Awards

Dartmouth MSDA Best Thesis Award: [Conditional Product Sampling for Gaussian Process Implicit Surfaces](#) 

Jun 2026

1st place in Rendering Competition at Dartmouth College

Dec 2024

Dartmouth 75% Tuition Based Scholarship

Sep 2024 - Jun 2026

Third-class Scholarship for Outstanding Students at Tongji University

Nov 2020

Skills

Languages: C++, C#, Python, JavaScript.

Core Expertise: PBR, Real-Time Rendering, Geometric Representation, Volumetric Rendering

Graphics & GPU: HLSL, Vulkan, OpenGL, Compute Shaders, PIX

Tools: Unity, Unreal Engine, Blender, Git