SONG ZHANG

✉ song.zhang@utah.edu   in linkedin.com/in/song-zhang   ⌂ github.com/guiqi134

Education

University of Utah	**Sep. 2022 – Now**
PhD in Computing	*Salt Lake City, UT*
University of Utah	**Sep. 2020 – May 2022**
Master of Science in Computer Science	*Salt Lake City, UT*
New York Institute of Technology	**Sep. 2016 – May 2020**
Bachelor of Science in Computer Science	*New York, NY*

Experience

Research Intern	**May 2023 – Aug. 2023**
NVIDIA	*Redmond, WA, USA*

- Worked with real-time rendering group on path sampling research project to improve rendering quality in games.
- With a specific focus on extending ReSTIR algorithm to better sample high-frequency contents.

Research Assistant	**Sep. 2022 – Now**
Realistic Computer Graphics Group, University of Utah	*Salt Lake City, UT, USA*

- Working on real-time rendering, and knitting visualization in Dr. Cem Yuksel's Realistic Computer Graphics Group.

Projects

Area ReSTIR for Real-time Antialiasing and Defocus (research project) | *C++, Falcor, Slang*   May. 2023

- Extending ReSTIR-based algorithm to importance sampling pixel footprint and depth of field.
- Introducing new subpixel-tracking temporal reuse, and new shift mapping to improve sample reuse for depth of field
- This robustifies ReSTIR against high-frequency content, allows real-time path tracer to handle bokeh, foliage, hair and detailed normal maps all with one sample per pixel.

ReSTIR Shadow Maps (research project) | *C++, Falcor, Slang*   Sep. 2022

- Extended ReSTIR algorithm to handle the shadows in many-light scene without hardware ray tracing support.
- Used ReSTIR sampling results as guidance to pick most important lights in the scene and only render shadow maps for those lights.
- With only a few (i.e. 10 - 24) shadow maps, we achieved real-time quality close to use all (hundreds of) shadow maps in various complex scenes.

Using ReSTIR for Area Light Soft Shadows (research project) | *C++, Falcor, Slang*   Sep. 2021

- Integrated a modified PCSS method into ReSTIR pipeline for shadow approximation.
- Some comparison tests are being done with other shadow mapping methods like Variance Shadow Map (VSM), Exponential Shadow Map (ESM), and Moment Shadow Map (MSM).

Real-time Area Light Implementation with Linear Transformed Cosines | *C++, OpenGL*   Feb. 2021

- Realized four types of area lights – rectangular, cylindrical, elliptic and ellipsoid using the techniques described in the LTC paper.

Technical Skills

Technologies: Computer Graphics, Real-time Rendering, Physically-based Rendering
Languages: C/C++, Python, C#, Javascript
Developer Tools: VS & VS Code, Unity, Git
Frameworks: Falcor, DirectX, OpenGL, CUDA