Daqi Lin

Computer Graphics Researcher

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Research Interests

I'm a research scientist at NVIDIA working on real-time rendering algorithms. My recent work focuses on path sampling for light transport. I have led several projects on ReSTIR (Reservoir-based Spatiotemporal Resampling) for real-time rendering. I'm also interested in ray tracing hardware and acceleration structures, rasterization-based techniques, and material appearance modelling.

Education

PhD in Computing

Salt Lake City, USA

The University of Utah

May. 2019 - May. 2022

- Member of Realistic Computer Graphics Group led by Dr. Cem Yuksel
- Thesis: High-Quality Sampling for Complex Effects in Real-Time Ray Tracing

Master of Science in Computing

Salt Lake City, USA

The University of Utah

Aug. 2017 - May. 2019

- Graphics and Visualization Track, School of Computing
- Project: Dual-Split Trees for High Performance Ray Tracing

Bachelor of Computing (Honors with Highest Distinction)

Singapore

National University of Singapore

Aug. 2013 - Jun. 2017

- Computer Science Program, School of Computing (Specialization: Visual Computing)
- Thesis: GPU Accelerated Path Tracing

Work Experience

Senior Research Scientist

Redmond, WA, USA

NVIDIA Research

Apr. 2024 - Now

Research Scientist

Redmond, WA, USA

NVIDIA Research

Jul. 2022 - Apr. 2024

- Working with the real-time rendering group on research and development of real-time ray tracing algorithms to improve rendering quality of games, with a focus on path sampling for light transport.

Research Intern

Redmond, WA, USA (remote)

NVIDIA Research

Jun. 2020 - Aug. 2020 and Jun. 2021 - Aug. 2021

- Worked in several research projects that uses real-time ray tracing to accelerate global illumination in games.

Rendering Programmer Intern

Cary, NC, USA

Epic Games, Inc.

May. 2019 - Aug. 2019

- Developed new real-time ray tracing functions for future versions of Unreal Engine.
- Contributed to bug fixes in real-time ray tracing in Unreal Engine 4.23.

Software Engineering Intern

Natick, MA, USA

MathWorks, Inc.

May. 2018 - Aug. 2018

- Participated in the design and development of new functions in MATLAB's virtual globe system.
- Contributed to multiple components to improve the usability and speed of the current 3D workflow in MATLAB.
- Researched and developed fast terrain mapping techniques to embed 3D objects in terrain.

Teaching Assistant

Salt Lake City, USA

School of Computing, University of Utah

Jan. 2018 - Now

- Teaching assistant of two graduate courses, CS6610 Spring 2018, Spring 2019, Spring 2021 (Interactive Computer Graphics) and CS6620 Fall 2019 (Ray Tracing for Graphics).

Research Assistant

Salt Lake City, USA

Realistic Computer Graphics Group, University of Utah

Sep. 2017 - Now

- Working on GPU algorithms, real-time rendering, and high performance ray tracing in Dr. Cem Yuksel's Realistic Computer Graphics Group.

Graphics R&D Intern

Singapore

Hong Wei Global

May. 2015 - Nov. 2015

- Developed a light-weight physically based rendering tool for game development on OpenGL-ES2, which was used for 3D training simulation systems of government agencies including the Singapore Civil Defence Force.
- Extended the functionality of Godot - an open source game engine, including subsurface scattering and depth of field. Collaborated with other software engineering team members to make the game engine more efficient.

Publications

- **Reservoir Splatting for Temporal Path Resampling and Motion Blur**, by Jeffrey Liu, ***Daqi Lin***, Markus Kettunen, Chris Wyman, and Ravi Ramamoorthi.
  To be presented in SIGGRAPH 2025 (Conference Track).
- **Real-Time Level-of-Detail Strand-Based Rendering**, by Tao Huang, Yang Zhou, ***Daqi Lin***, Junqiu Zhu, Lingqi Yan, and Kui Wu.
  In Computer Graphics Forum (Proceedings of EGSR 2025).
- **ReSTIR BDPT: Bidirectional ReSTIR Path Tracing with Caustics**, by Trevor Hedstrom, Markus Kettunen, ***Daqi Lin***, Benedikt Bitterli, Ravi Ramamoorthi, Chris Wyman, and Tzu-Mao Li.
  In ACM Transactions on Graphics (Just Accepted).
- **Many-Light Rendering Using ReSTIR-Sampled Shadow Maps**, by Song Zhang, ***Daqi Lin***, Chris Wyman, and Cem Yuksel.
  In Computer Graphics Forum (Proceedings of Eurographics 2025).
- **Area ReSTIR: Resampling for Real-Time Defocus and Antialiasing**, by Song Zhang*, ***Daqi Lin****, Markus Kettunen, Cem Yuksel, and Chris Wyman. (* joint first authors)
  In ACM Transactions on Graphics (Proceedings of SIGGRAPH 2024).
- **Decorrelating ReSTIR Samplers via MCMC Mutations**, by Rohan Sawhney, ***Daqi Lin***, Markus Kettunen, Benedikt Bitterli, Ravi Ramamoorthi, Chris Wyman, and Matt Pharr.
  In ACM Transactions on Graphics (presented in SIGGRAPH 2024).
- **Conditional Resampled Importance Sampling and ReSTIR**, by Markus Kettunen*, ***Daqi Lin****, Ravi Ramamoorthi, Thomas Bashford-Rogers, Chris Wyman. (* joint first authors)
  In SIGGRAPH Asia 2023 (Conference Track).
- **A Gentle Introduction to ReSTIR**, by Chris Wyman, Markus Kettunen, ***Daqi Lin***, Cem Yuksel, and Pawel Kozlowski.
  SIGGRAPH 2023 Courses.
- **Generalized Resampled Importance Sampling: Foundations of ReSTIR**, by ***Daqi Lin****, Markus Kettunen*, Benedikt Bitterli, Jacopo Pantalenoi, Cem Yuksel, and Chris Wyman. (* joint first authors)
  In ACM Transactions on Graphics (Proceedings of SIGGRAPH 2022).
- **Virtual Blue Noise Lighting**, by Tianyu Li, Wenyou Wang, ***Daqi Lin***, and Cem Yuksel.
  In Proceedings of ACM on Computer Graphics and Interactive Techniques (Proceedings of HPG 2022). Wolfgang Straßer Best Paper Award, 3rd place
- **Fast Volume Rendering with Spatiotemporal Reservoir Resampling**, by ***Daqi Lin***, Chris Wyman, and Cem Yuksel.
  In ACM Transactions on Graphics (Proceedings of SIGGRAPH Asia 2021).
- **Hardware Adaptive High-Order Interpolation for Real-Time Graphics**, by ***Daqi Lin***, Larry Seiler, and Cem Yuksel.
  In Computer Graphics Forum (Proceedings of HPG 2021). Wolfgang Straßer Best Paper Award, 2nd place
- **Hardware-Accelerated Dual-Split Trees**, by ***Daqi Lin***, Elena Vasiou, Cem Yuksel, Daniel Kopta, and Erik Brunvand.
  In Proceedings of ACM on Computer Graphics and Interactive Techniques (Proceedings of HPG 2020).
- **Compacted CPU/GPU Data Compression via Modified Virtual Address Translation**, by Larry Seiler, ***Daqi Lin***, and Cem Yuksel.
  In Proceedings of ACM on Computer Graphics and Interactive Techniques (Proceedings of HPG 2020).
- **Real-Time Stochastic Lightcuts**, by ***Daqi Lin*** and Cem Yuksel.
  In Proceedings of ACM on Computer Graphics and Interactive Techniques (Proceedings of I3D 2020). Best Paper Award
- **Automatic GPU Data Compression and Address Swizzling for CPUs via Modified Virtual Address Translation**, by Larry Seiler, ***Daqi Lin*** and Cem Yuksel.
  In Symposium on Interactive 3D Graphics and Games (I3D 2020).

- **Dual-Split Trees**, by ***Daqi Lin***, Konstantin Shkurko, Ian Mallett, and Cem Yuksel.
  In Symposium on Interactive 3D Graphics and Games (I3D 2019). The Best Conference Paper Award
- **Real-Time Rendering with Lighting Grid Hierarchy**, by ***Daqi Lin*** and Cem Yuksel.
  In Proceedings of ACM on Computer Graphics and Interactive Techniques (Proceedings of I3D 2019)

Academic Services

- Conference Reviewer: EGSR 2025, SIGGRAPH Asia 2025/2024/2023/2022, SIGGRAPH 2025/2024/2023/2022, Pacific Graphics 2023/2021, EuroGraphics 2021, ISMAR 2021
- Journal Reviewer: TVCG, Journal of Computer Graphics Techniques , Computer Graphics Forum, Computers & Graphics
- Publicity Chair of HPG 2024, Program Committee of EGSR 2025

Honors & Awards

2022 **Wolfgang Straßer Best Paper Award, 3rd place** High-Performance Graphics 2022
- For the paper "Virtual Blue Noise Lighting".

2021 **Wolfgang Straßer Best Paper Award, 2nd place** High-Performance Graphics 2021
- For the paper "Hardware Adaptive High-Order Interpolation for Real-Time Graphics".

2020 **Best Paper Award** I3D 2020
- For the paper "Real-Time Stochastic Lightcuts".

2019 **The Best Conference Paper Award** I3D 2019
- For the paper "Dual-Split Trees".

2018 **Best Project Award** University of Utah Scientific Visualization Course
- Web-Based Visualization of Bidirectional Reflectance Distribution Functions (BRDFs)

2017 **Juror & Student Choice / Best In Class Awards** University of Utah Teapot Rendering Competition
- Created a ray tracing method to produce crescent-shaped shadows of tree leaves under solar eclipse.

2015 **Dean's List Award** Semester 2, Year 14/15, School of Computing, NUS
- Awarded only to top 5% students in the cohort.

2013 **Silver Prize** Orbital Program, held by School of Computing, NUS
- Developed an Online Karaoke platform which can perform real-time pitch shifting and human voice removal.