Guangyan Cai

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Education

University of California, Irvine **Irvine, CA**
Ph.D Candidate in Computer Science *2020–Present*
- Advisor: Shuang Zhao

University of California, San Diego **La Jolla, CA**
B.S. in Computer Science *2016–2020*
- Advisor: Ravi Ramamoorthi
- Cumulative GPA: 3.6 / 4.0 (Major GPA: 3.9 / 4.0)
- Undergraduate Awards for Excellence in Research: 2020
- Provost's Honors: 2016-2020

Experience

Adobe Research **San Jose, CA**
Research Scientist Intern, Graphics *Jun 2023 - Sep 2023*
- Proposed a light-weight lighting representation suitable for representing both distant and non-distant illumination.
- Designed a pipeline to jointly reconstruct the shape and material of glossy objects as well as their surrounding lighting using physics-based based differentiable rendering and the proposed light representation.
- Submitted a paper and it is under review.

Meta Reality Labs **Redmond, WA**
Research Scientist Intern, Graphics *Jun 2022 - Sep 2022*
- Investigated the baking artifacts in material reconstruction with inverse rendering and proposed a method to mitigate them.
- Participated in building a hybrid pipeline that combines NeuS and physics-based differentiable rendering to do high quality 3D reconstruction.
- Showcased our reconstruction results at Meta Connect 2022 (starting at 1:13:20).
- Co-authored a paper [1] and it is accepted to ICCV 2023.

Publications

[1] Cheng Sun*, **Guangyan Cai***, Zhengqin Li, Kai Yan, Cheng Zhang, Carl Marshall, Jia-Bin Huang, Shuang Zhao, and Zhao Dong. 2023. Neural-pbir reconstruction of shape, material, and illumination. In *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV)*. * equal contribution. (October 2023), 18046–18056.

[2] **Guangyan Cai**, Kai Yan, Zhao Dong, Ioannis Gkioulekas, and Shuang. Zhao. 2022. Physics-based inverse rendering using combined implicit and explicit geometries. *Computer Graphics Forum (EGSR 2022)*, 41, 4, 129–138.

[3] Lifan Wu*, **Guangyan Cai***, Ravi Ramamoorthi, and Shuang Zhao. 2021. Differentiable time-gated rendering. *ACM Trans. Graph.* (*SIGGRAPH Asia 2021*), 40, 6, Article 287, (December 2021), 16 pages. * equal contribution.

[4] Lifan Wu, **Guangyan Cai**, Shuang Zhao, and Ravi Ramamoorthi. 2020. Analytic spherical harmonic gradients for real-time rendering with many polygonal area lights. *ACM Trans. Graph.* (*SIGGRAPH 2020*), 39, 4, Article 134, (August 2020), 14 pages.

Projects

Inverse Rendering Toolkit:

- A `Python` library built upon `PyTorch` that facilitates building inverse rendering pipelines.
- Supports multiple (non-neural) differentiable renderers with a unified front end.
- Applied to several research projects and significantly eased the development process.
- To be released soon.

Reviewer

Eurographics: 2022

Teaching

CS112 Introduction to Computer Graphics: TA *2021 Fall, UCI*

CS143A Principles of Operating Systems: TA *2021 Spring, UCI*

CS143B Project in Operating System Organization: TA *2021 Winter, UCI*

CS143B Project in Operating System Organization: Reader *2020 Fall, UCI*

CSE168 Computer Graphics II - Rendering: Tutor *2020 Spring, UCSD*

CSE167 Computer Graphics: Tutor *2019 Fall & 2020 Winter, UCSD*