LIFAN WU

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EDUCATION

University of California, San Diego, La Jolla, CA Sept. 2015 – present
PhD candidate in CSE Department
Advisor: Prof. Ravi Ramamoorthi

University of California, San Diego, La Jolla, CA Sept. 2015 – June 2018
MS in Computer Science
Computer Science & Engineering Department

Tsinghua University, Beijing, China Aug. 2011 – Jul. 2015
B.Eng. in Computer Science & Technology
Institute for Interdisciplinary Information Sciences
Special Pilot Computer Science Class (Yao Class)

PUBLICATION

A Differential Theory of Radiative Transfer
Cheng Zhang, **Lifan Wu**, Changxi Zheng, Ioannis Gkioulekas, Ravi Ramamoorthi, Shuang Zhao
ACM Transactions on Graphics (SIGGRAPH Asia 2019), 38(6), November 2019

Accurate Appearance Preserving Prefiltering for Rendering Displacement-Mapped Surfaces
Lifan Wu, Shuang Zhao, Ling-Qi Yan, Ravi Ramamoorthi
ACM Transactions on Graphics (SIGGRAPH 2019), 38(4), July 2019

Multiple Axis-Aligned Filters for Rendering of Combined Distribution Effects
Lifan Wu, Ling-Qi Yan, Alexandr Kuznetsov, Ravi Ramamoorthi
Computer Graphics Forum (EGSR 2017), 36(4), June 2017

Downsampling Scattering Parameters for Rendering Anisotropic Media
Shuang Zhao*, **Lifan Wu***, Frédo Durand, Ravi Ramamoorthi (* Joint first authors)
ACM Transactions on Graphics (SIGGRAPH Asia 2016), 35(6), November 2016

RESEARCH EXPERIENCES

A Differential Theory of Radiative Transfer Mar. 2019 – May 2019
Research Assistant *Center for Visual Computing, UCSD*

· We introduce a differential theory of radiative transfer, which shows how individual components of the radiative transfer equation (RTE) can be differentiated with respect to arbitrary differentiable changes of a scene, allowing differentiation while accurately handling a large range of light transport phenomena. To numerically estimate the derivatives given by our theory, we develop an unbiased Monte Carlo estimator supporting arbitrary surface and volumetric configurations.

Accurate Appearance Preserving Prefiltering for Rendering Displacement-Mapped Surfaces
Jan. 2018 – Jan. 2019
Research Assistant *Center for Visual Computing, UCSD*

· We introduce a new method that prefilters displacement maps and BRDFs jointly and constructs SVBRDFs at reduced resolutions. These SVBRDFs preserve the appearance of the input models by capturing both shadowing-masking and interreflection effects. Our method generalizes well to different types of geometries beyond Gaussian/GGX surfaces. Models prefiltered using our method at different scales can be combined to form mipmaps, allowing accurate and anti-aliased level-of-detail (LoD) rendering.

Multiple Axis-Aligned Filters for Rendering of Combined Distribution Effects Jan. 2016 – Mar. 2017
Research Assistant *Center for Visual Computing, UCSD*

· We develop multiple axis-aligned filters (MAAF) for near-interactive rendering of combined distribution effects, including soft shadows and depth of field, with global illumination. We analyze MAAF for 2D wedge spectra in the frequency domain, and show better performance comparing to previous methods. We design practical algorithms for rendering with MAAF and implement them in NVIDIA OptiX.

Downsampling Scattering Parameters for Rendering Anisotropic Media Nov. 2015 – May 2016
Research Assistant *Center for Visual Computing, UCSD*

· We introduce scaled phase functions that combine albedos and phase functions, and develop an optimization method to downsample scaled phase functions, which can offer orders of magnitude reduction in storage while maintaining appearance accuracy. We show how modularity can be exploited by reusing a single set of optimized parameters for multiple objects, significantly reducing the amortized optimization overhead.

INTERNSHIPS

NVIDIA Research, real-time rendering group June 2019 – Sept. 2019
NVIDIA Research, real-time rendering group June 2018 – Sept. 2018
Disney Research Zurich, rendering group June 2017 – Sept. 2017
Google, map group June 2016 – Sept. 2016

TEACHING

Teaching Assistant CSE 167, Computer Graphics Winter 2019
Course Staff CSE 167x, Computer Graphics on edX 2018 – present

REVIEWER

ACM SIGGRAPH, ACM SIGGRAPH Asia, Pacific Graphics, ACM Symposium on Virtual Reality Software and Technology (VRST)

HONORS AND AWARDS

NVIDIA Graduate Fellowship 2019 – 2020
Professional Excellence Scholarship, Tsinghua University 2014
Tsinghua-Baidu Scholarship, Tsinghua University 2013
Fellowship of Tsinghua Xuetang Talents Program, Tsinghua University 2012 – 2015
Among top 300 / 3000 Tsinghua students each year.
Silver Medal, Chinese National Olympiad in Informatics Aug. 2010
Gold Medal, Asia-Pacific Informatics Olympiad May 2010
Ranked 2nd place out of 350 contestants.

SKILLS

Programming Languages C/C++, Python, Matlab, Java, Ruby
Softwares & Applications Mitsuba, PyTorch, TensorFlow, OptiX, PBRT, CUDA