

# LIFAN WU

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## EDUCATION

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- 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

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- 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](#)<sup>\*</sup>, **Lifan Wu**<sup>\*</sup>, [Frédo Durand](#), [Ravi Ramamoorthi](#) (\* Joint first authors)  
ACM Transactions on Graphics (SIGGRAPH Asia 2016), 35(6), November 2016
- Anisotropic Density Estimation for Photon Mapping**  
[Fujun Luan](#), **Lifan Wu**, [Kun Xu](#)  
IEEE Journal of Computational Visual Media, September 2015

## INTERNSHIPS

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- 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

## RESEARCH EXPERIENCES

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

- Developed *multiple axis-aligned filters* (MAAF) for near-interactive rendering of combined distribution effects, including soft shadows and depth of field, with global illumination.
- We analyzed MAAF for 2D wedge spectra in the frequency domain, and showed that MAAF achieved better performance comparing to previous methods.
- We designed practical algorithms for rendering with MAAF and implemented in a modern GPU rendering framework.

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

- Introduced *scaled phase functions* combining albedos and phase functions.
- Developed an optimization based method to *downsample* scaled phase functions, which can offer several orders of magnitude reduction in storage while maintaining appearance accuracy.
- Showed how *modularity* can be exploited by reusing a single set of optimized parameters for multiple objects, significantly reducing the amortized optimization overhead.

**Interactive Surface Reconstruction on Point Clouds** Jul. 2014 – Jul. 2015  
*Visiting Undergraduate Researcher* *Washington University in St. Louis*

- Built an interactive tool to help users draw sketches and reconstruct surfaces on point clouds.
- Designed a novel anisotropic tensor-based metric to capture sharp features of a point cloud model.
- Proposed an optimization algorithm to regularize the curve network drawn by users.
- Extended our algorithm for interactive point cloud segmentation.

**Intermediate Path Tracing and Merging** Sept. 2013 – Jun. 2015  
*Research Assistant* *Graphics and Geometry Computing Group, Tsinghua University*

- Introduced *intermediate paths* and *path merging graph* to increase path samples exponentially.
- Designed and implemented the key algorithm of iterative path merging via *path merging graph*.
- Proposed the Multiple Importance Sampling (MIS) technique to combine an exponential number of path samples by introducing partial weights of subpaths.

## HONORS AND AWARDS

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

## SKILLS

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<b>Programming Languages</b>	C/C++, Python, Matlab, Java, Ruby
<b>Softwares &amp; Applications</b>	Mitsuba, PyTorch, TensorFlow, OptiX, PBRT, CUDA