Shilin Zhu | Curriculum Vitae

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Final-year PhD candidate in computer graphics and 3D computer vision. Also have background of 3D deep learning. Interested in animation and visual effects in film entertainment industry.

Research interest

- Physically-based rendering
- 3D shape and geometry processing
- Neural rendering using machine learning
- 3D capture and computational sensing

Academic history

- **Doctor of Philosophy, Google PhD Fellow** — **San Diego, CA**
  Computer Science, University of California San Diego, USA — *2016 - now*
  Research Area: Graphics and 3D vision
  Project Supervisors: Hao Su, Ravi Ramamoorthi, Henrik Wann Jensen, Xinyu Zhang

- **Master of Science** — **San Diego, CA**
  Computer Science, University of California San Diego, USA — *2016-2018*
  Research Area: Graphics and 3D vision

- **Visiting Scholar** — **Berkeley, CA**
  Computer Science, University of California Berkeley, USA — *2015 - 2016*

- **Research Consultant** — **Boston, MA**
  Harvard University, USA — *2014 - 2015*
  Research Area: Data visualization

- **Bachelor of Science** — **Hefei, CHN**
  Electrical Engineering (in honor), University of Science and Technology of China — *2012-2016*
  (Distinguished thesis, top 5%)
  Research Area: Optimization and heuristic algorithm

Industry employment

- **Pixar Animation Studios** — **Emeryville, CA**
  Research Scientist, Full-Time (Incoming) — *2022-*

  Description: will be working on various studio technology and tools to make artists life easier.

- **Pixar Animation Studios** — **Emeryville, CA**
  Research Intern — *Summer 2021*

  Description: worked on denoising algorithms which will be applied to future animation shows.

- **Weta Digital VFX** — **Wellington, NZ**
  Rendering Intern — *Spring 2021*

  Description: worked on light transport algorithms which has been adopted in generating visual effects in films.

- **Disney Research Los Angeles (DRLA)** — **Glendale, CA**
  Lab Associate Intern — *Summer 2019*

  Description: worked on real-time neural rendering algorithms for Disney related products.

- **Walt Disney Imagineering (WDI)** — **Glendale, CA**
  R&D Intern — *Summer 2019*

  Description: worked on 3D human capture technology for Disney theme parks.

- **Apple VR and Display** — **Cupertino, CA**
  R&D Intern — *Summer 2018*

  Description: worked on image restoration and particle rendering algorithms for Apple related products.

- **Google Research** — **Mountain View, CA**
  Fellowship PhD Researcher — *2018-Present*

  Description: research projects funded by Google Inc.

Technical skills

- **Programming Languages:**
  C/C++, Python, MATLAB, 3rd-party libraries (Numpy, Scipy, etc)
- **Industry Software Skills:**
  Advanced algorithm, Deep learning framework (PyTorch, TensorFlow, Caffe, MatConvNet, CoreML), OpenCV, Renderers (Mitsuba, Nvidia Optix, OpenGL, PBRT, personalized C++/CUDA path tracer), Tools (Blender, Maya, Katana), Software development (C/C++, Python)
- **Research:** Good research skills, can write well organized and structured papers

Awards

Google PhD Fellowship, Google Research, 2018-2020
Research Highlights, Communications of ACM, ACM, 2019
ACM SIGMOBILE Research Highlights, ACM SIGMOBILE, 2018
Championship, National Innovation Competition, Chinese Ministry of Education, 2016
Distinguished Bachelor Thesis, University of Science and Technology of China, 2016
Scholarship for Outstanding Students (Silver Award), University of Science and Technology of China, 2013

Selected publications

Please go to end of this list for the links to the complete publication records.
Computer vision and computer graphics:

- [C0] **Deep Kernel Density Estimation for Photon Mapping**
  Shilin Zhu, Zexiang Xu, Henrik Wann Jensen, Hao Su, Ravi Ramamoorthi
  2020 Eurographics Symposium on Rendering (Best paper nominee) **(EGSR)**

- [C1] **Photon-Driven Neural Reconstruction for Path Guiding**
  Shilin Zhu, Zexiang Xu, Tiancheng Sun, Alexandr Kuznetsov, Mark Meyer, Henrik Wann Jensen, Hao Su, Ravi Ramamoorthi
  2021 ACM Transactions on Graphics **(Siggraph Asia 2021)**

- [C2] **Hierarchical Neural Reconstruction for Path Guiding Using Hybrid Path and Photon Samples**
  Shilin Zhu, Zexiang Xu, Tiancheng Sun, Alexandr Kuznetsov, Mark Meyer, Henrik Wann Jensen, Hao Su, Ravi Ramamoorthi
  2021 ACM Transactions on Graphics **(Siggraph 2021)**

- [C3] **Robust Multimodal Vehicle Detection in Foggy Weather using Complementary Lidar and Radar Signals**
  Kun Qian, Shilin Zhu, Xinyu Zhang, Li Erran Li
  2021 Computer Vision and Pattern Recognition **(CVPR)**

- [C4] **Deep Stereo Using Adaptive Thin Volume Representation With Uncertainty Awareness**
  Shuo Cheng, Zexiang Xu, Shilin Zhu, Zhuwen Li, Li Erran Li, Ravi Ramamoorthi, Hao Su
  2020 Computer Vision and Pattern Recognition **(CVPR)**

- [C5] **PartNet: A Large-scale Benchmark for Fine-grained and Hierarchical Part-level 3D Object Understanding**
  Kaichun Mo, Shilin Zhu, Angel Chang, Li Yi, Subarna Tripathi, Leonidas Guibas, and Hao Su
  2019 Computer Vision and Pattern Recognition **(CVPR)**

- [C6] **Deep Real-Time Global Illumination**
  Kenneth Mitchell, Yue Li, Shilin Zhu
  Disney Research Project

- [C7] **Adaptive Image Data Bit-Depth Adjustment Systems and Methods**
  Sheng Zhang, Chaohao Wang, Shilin Zhu
  (US Patented)
  Apple Project

Capture, lighting, and camera:

- [C8] **Intelligent Computational Image Degradation Using a Smart LED**
  Shilin Zhu, Chi Zhang and Xinyu Zhang
  (US Patented)
  Research Highlights, Communications of ACM
  ACM SIGMOBILE Research Highlights
  2017 International Conference on Mobile Computing and Networking **(MobiCom)**

- [C9] **High-Precision Visible Light Localization**
  Shilin Zhu, Xinyu Zhang
  2017 International Conference on Mobile Systems, Applications, and Services **(MobiSys)**

- [C10] **Invisible Image Hijacking using Smart LED**
  Guangyuan Su, Shilin Zhu and Anfu Zhou
  2019 International Joint Conference on Pervasive and Ubiquitous Computing **(UbiComp)**

- [C11] **3D Human Gait Recognition with Point Clouds**
  Zhen Meng, Shilin Zhu and Anfu Zhou
  2020 Association for the Advancement of Artificial Intelligence Annual Conference **(AAAI)**

- [C12] **Real-Time Robust 3D Human Capture and Tracking**
  Jack Yang, Shilin Zhu
  Disney Research Project

Machine learning Acceleration:

- [C13] **Binary Ensemble Neural Network: More Bits per Network or More Networks per Bit?**
  Shilin Zhu, Xin Dong and Hao Su
  2019 Computer Vision and Pattern Recognition **(CVPR)**

- [C14] **Towards Fast, Accurate and Robust Binary Neural Network on FPGAs**
  Shilin Zhu, Cheng Fu, Hao Su and Jishen Zhao
  2019 International Symposium on Field-Programmable Gate Arrays **(FPGA)**

- [C15] **SimBNN: A Similarity-Aware Binarized Neural Network Acceleration Framework**
  Cheng Fu, Shilin Zhu, Huili Chen, Farinaz Koushanfar, Hao Su, Jishen Zhao
  2019 International Symposium On Field-Programmable Custom Computing Machines **(FCCM)**

Data visualization and processing:

- [C16] **Denoising 2D NMR spectra of Natural Products Using Deep Learning**
  Chen Zhang, Shilin Zhu, Garrison Cottrell, William H. Gerwick, Raphael Reher, and Preston B. Landon
  (US Patented)
  Scripps Institution of Oceanography Project, UCSD

- [C17] **SMART: a FHIR-based visualization app to provide genomic information at the point of care**
  Jeremy L. Warner, Matthew J. Rioth, Kenneth D. Mandl, Joshua C. Mandel, David A. Kreda, Isaac S. Kohane, Daniel Carbone, Ross Oreto, Lucy Wang, Shilin Zhu, Heming Yao, Gil Alterovitz
  (President Obama's Cancer Panel Points to SMART On FHIR for Connected Health)
  Journal of the American Medical Informatics Association **(JAMIA)**

- [C18] **MICROST: A mixed approach for heart rate monitoring using wrist-type PPG Signals**
  Shilin Zhu, Ke Tan, Xinyu Zhang, Zhiqiang Liu, Bin Liu
  2015 International Conference of the IEEE Engineering in Medicine and Biology Society **(EMBC)**

Manuscripts:
- [C18] **Survey: Machine Learning in Production Rendering**
  Shilin Zhu
  Computing Research Repository (CoRR), Arxiv

Published works in other fields (computer networking, graph-based algorithms, etc.):
Please go to:
- **ResearchGate:** https://www.researchgate.net/profile/Shilin-Zhu-2
- **Dblp:** https://dblp.org/pid/118/5807.html

for a complete list of publications in those areas (around 35 records until 09/2021).

On-going:
- [C19] **Accelerating Unbiased Dynamic Scene Rendering**
  UCSD Project, Details are confidential

- [C20] **Denoising Volumetric Effects**
  Pixar Project, Details are confidential

Professional service

Technical Paper Reviewer: SIGGRAPH, NeurIPS, CVPR, ICCV/ECCV, WACV, ACCV

Reference

Ravi Ramamoorthi, Professor, UC San Diego
Henrik Wann Jensen, Professor Emeritus, UC San Diego and Luxion
Hao Su, Assistant Professor, UC San Diego
Xinyu Zhang, Associate Professor, UC San Diego
Zexiang Xu, Research Scientist, Adobe Research
Jirka Vorba, Rendering Researcher, Weta Digital
Marc Droske, Head of Rendering Research, Weta Digital
Mark Meyer, Supervising Lead Scientist, Pixar Animation Studios
Chaohao Wang, Senior Display Technology Manager, Apple Inc.
Marios Papas, Research Scientist (Rendering Group Lead), Disney Research Studios
Kenneth Mitchell, Senior Research Scientist, Disney Research
Jack Yang, Research Engineer, Disney Research