Shuang Zhao

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Education	Ph.D. in Computer Science **Cornell University**	August 2008 – August 2014 Ithaca, NY, USA
	B.Eng. in Computer Science **Shanghai Jiao Tong University**	September 2003 – July 2007 Shanghai, China
Experience	Assistant Professor **University of California, Irvine**	July 2015 – Present Irvine, CA, USA
	Postdoctoral Associate **Massachusetts Institute of Technology**	September 2014 – June 2015 Cambridge, MA, USA
	Research Assistant **Cornell University**	August 2008 – August 2014 Ithaca, NY, USA

Publications

Refereed Journal Articles

J1. Jiaping Wang, **Shuang Zhao**, Xin Tong, Stephen Lin, Zhouchen Lin, Yue Dong, Baining Guo, Heung-Yeung Shum. *Modeling and Rendering Heterogeneous Translucent Materials using Diffusion Equation*. ACM Transactions on Graphics, 27(1), 9:1–9:18, March 2008. (Presented at SIGGRAPH 2009.)

J2. Jiaping Wang, **Shuang Zhao**, Xin Tong, John Snyder, Baining Guo. *Modeling Anisotropic Surface Reflectance with Example-Based Microfacet Synthesis*. ACM Transactions on Graphics, 27(3), 41:1–41:9, August 2008. (Presented at SIGGRAPH 2008.)

J3. Bruce Walter, **Shuang Zhao**, Nicolas Holzschuch, Kavita Bala. *Single Scattering in Refractive Media with Triangle Mesh Boundaries*. ACM Transactions on Graphics, 28(3), 92:1–92:8, August 2009. (Presented at SIGGRAPH 2009.)

J4. Edgar Velázquez-Armendáriz, **Shuang Zhao**, Miloš Hašan, Bruce Walter, Kavita Bala. *Automatic Bounding of Programmable Shaders for Efficient Global Illumination*. ACM Transactions on Graphics, 28(5), 142:1–142:9, December 2009. (Presented at SIGGRAPH Asia 2009.)

J5. **Shuang Zhao**, Wenzel Jakob, Steve Marschner, Kavita Bala. *Building Volumetric Appearance Models of Fabric using Micro CT Imaging*. ACM Transactions on Graphics, 30(4), 44:1–44:10, July 2011. (Presented at SIGGRAPH 2011.)

J6. Nikhil Naik, **Shuang Zhao**, Andreas Velten, Ramesh Raskar, Kavita Bala. *Single View Reflectance Capture using Multiplexed Scattering and Time-of-Flight Imaging*. ACM Transactions on Graphics, 30(6), 171:1–171:10, December 2011. (Presented at SIGGRAPH Asia 2011.)

J7. **Shuang Zhao**, Wenzel Jakob, Steve Marschner, Kavita Bala. *Structure-Aware Synthesis for Predictive Woven Fabric Appearance*. ACM Transactions on Graphics, 31(4), 75:1–75:10, July 2012. (Presented at SIGGRAPH 2012.)

J8. **Shuang Zhao**, Miloš Hašan, Ravi Ramamoorthi, Kavita Bala. *Modular Flux Transfer: Efficient Rendering of High-Resolution Volumes with Repeated Structures*. ACM Transactions on Graphics, 32(4), 131:1–131:12, July 2013. (Presented at SIGGRAPH 2013.)

J9. Ioannis Gkioulekas, Bei Xiao, **Shuang Zhao**, Edward Adelson, Todd Zickler, Kavita Bala. *Understanding the Role of Phase Function in Translucent Appearance*. ACM Transactions on Graphics, 32(5), 147:1–147:19, September 2013. (Presented at SIGGRAPH 2013.)

J10. Ioannis Gkioulekas, **Shuang Zhao**, Kavita Bala, Todd Zickler, Anat Levin. *Inverse Volume Rendering with Material Dictionaries*. ACM Transactions on Graphics, 32(6), 162:1–162:13, November 2013. (Presented at SIGGRAPH Asia 2013.)

J11. **Shuang Zhao**, Ravi Ramamoorthi, Kavita Bala. *High-Order Similarity Relations in Radiative Transfer*. ACM Transactions on Graphics, 33(4), 104:1–104:12, July 2014. (Presented at SIGGRAPH 2014.)

J12. **Shuang Zhao**, Wenzel Jakob, Steve Marschner, Kavita Bala. *Building Volumetric Appearance Models of Fabric using Micro CT Imaging*. Communications of the ACM (Research Highlights), 57(11), 98–105, November 2014.

J13. Pramook Khungurn, Daniel Schroeder, **Shuang Zhao**, Kavita Bala, Steve Marschner. *Matching Real Fabrics with Micro-Appearance Models*. ACM Transactions on Graphics, 35(1), 1:1–1:26, December 2015. (Presented at SIGGRAPH 2016.)

J14. **Shuang Zhao**, Fujun Luan, Kavita Bala. *Fitting Procedural Yarn Models for Realistic Cloth Rendering*. ACM Transactions on Graphics, 35(4), 51:1–51:11, July 2016. (Presented at SIGGRAPH 2016.)

J15. **Shuang Zhao***, Lifan Wu*, Frédo Durand, Ravi Ramamoorthi (*: joint first authors). *Downsampling Scattering Parameters for Rendering Anisotropic Media*. ACM Transactions on Graphics, 35(6), 166:1–166:11, November 2016. (Presented at SIGGRAPH Asia 2016.)

J16. Chao Xu, Rui Wang, **Shuang Zhao**, Hujun Bao. *Real-Time Linear BRDF MIP-Mapping*. Computer Graphics Forum, 36(4), 27–34, July 2017. (Presented at Eurographics Symposium on Rendering (EGSR) 2017.)

J17. Fujun Luan, **Shuang Zhao**, Kavita Bala. *Fiber-Level On-the-Fly Procedural Textiles*. Computer Graphics Forum, 36(4), 123–135, July 2017. (Presented at Eurographics Symposium on Rendering (EGSR) 2017.)

J18. **Shuang Zhao**, Frédo Durand, Changxi Zheng. *Inverse Diffusion Curves using Shape Optimization*. IEEE Transactions on Visualization and Computer Graphics, 24(7), 2153–2166, July 2018.

J19. Yu Guo, Miloš Hašan, **Shuang Zhao**. *Position-Free Monte Carlo Simulation for Arbitrary Layered BSDFs*. ACM Transactions on Graphics, 37(6), 279:1–279:14, November 2018. (Presented at SIGGRAPH Asia 2018.)

J20. Lifan Wu, **Shuang Zhao**, Ling-Qi Yan, Ravi Ramamoorthi. *Accurate Appearance Preserving Prefiltering for Rendering Displacement-Mapped Surfaces*. ACM Transactions on Graphics, 38(4), 137:1–137:14, July 2019. (Presented at SIGGRAPH 2019.)

J21. Zahra Montazeri, Chang Xiao, Yun (Raymond) Fei, Changxi Zheng, **Shuang Zhao**. *Mechanics-Aware Modeling of Cloth Appearance*. IEEE Transactions on Visualization and Computer Graphics, 27(1), 137–150, January 2021 (Date of Publication: August 26, 2019).

J22. Cheng Zhang, Lifan Wu, Changxi Zheng, Ioannis Gkioulekas, Ravi Ramamoorthi, **Shuang Zhao**. *A Differential Theory of Radiative Transfer*. ACM Transactions on Graphics, 38(6), 227:1–227:16, November 2019. (Presented at SIGGRAPH Asia 2019.)

J23. Chao Xu, Rui Wang, **Shuang Zhao**, Hujun Bao. *Multi-Scale Hybrid Micro-Appearance Modeling and Realtime Rendering of Thin Fabrics*. EEE Transactions on Visualization and Computer Graphics, 27(4), 2409–2420, April 2021 (Date of Publication: October 30, 2019).

J24. Marco (Zhanhang) Liang, **Shuang Zhao**, Michael T. Goodrich. *Inverse-Rendering Based Analysis of the Fine Illumination Effects in the Salvator Mundi*. Leonardo, 53(4), 380–386, July 2020. (Presented at SIGGRAPH 2020.)

J25. Lifan Wu, Guangyan Cai, **Shuang Zhao**, Ravi Ramamoorthi. *Analytic Spherical Harmonic Gradients for Real-Time Rendering with Many Polygonal Area Lights*. ACM Transactions on Graphics, 39(4), 134:1–134:14, July 2020. (Presented at SIGGRAPH 2020.)

J26. Fujun Luan, **Shuang Zhao**, Kavita Bala, Ioannis Gkioulekas. *Langevin Monte Carlo Rendering with Gradient-Based Adaptation*. ACM Transactions on Graphics, 39(4), 140:1–140:15, July 2020. (Presented at SIGGRAPH 2020.)

J27. Cheng Zhang, Bailey Miller, Kai Yan, Ioannis Gkioulekas, **Shuang Zhao**. *Path-Space Differentiable Rendering*. ACM Transactions on Graphics, 39(4), 143:1–143:19, July 2020. (Presented at SIGGRAPH 2020.)

J28. Bei Xiao, **Shuang Zhao**, Ioannis Gkioulekas, Wenyan Bi, Kavita Bala. *Effect of Geometric Sharpness on Translucent Material Perception*. Journal of Vision, 20(7), July 2020.

J29. Zahra Montazeri, Søren B. Gammelmark, **Shuang Zhao**, Henrik Wann Jensen. *A Practical Ply-Based Appearance Model of Woven Fabrics*. ACM Transactions on Graphics, 39(6), 251:1–251:13, November 2020. (Presented at SIGGRAPH Asia 2020.)

J30. Yu Guo, Cameron Smith, Miloš Hašan, Kalyan Sunkavalli, **Shuang Zhao**. *MaterialGAN: Reflectance Capture using a Generative SVBRDF Model*. ACM Transactions on Graphics, 39(6), 254:1–254:13, November 2020. (Presented at SIGGRAPH Asia 2020.)

J31. Yu Guo, Miloš Hašan, Lingqi Yan, **Shuang Zhao**. *A Bayesian Inference Framework for Procedural Material Parameter Estimation*. Computer Graphics Forum, 39(7), 255–266, December 2020. (Presented at Pacific Graphics 2020.)

J32. **Shuang Zhao**, Jerome Spanier. *Hybrid Monte Carlo Estimators for Multilayer Transport Problems*. Journal of Computational Physics, 431, 1–15, April 2021.

J33. Fujun Luan, **Shuang Zhao**, Kavita Bala, Zhao Dong. *Unified Shape and SVBRDF Recovery using Differentiable Monte Carlo Rendering*. Computer Graphics Forum, 40(4), 101–113, July 2021. (Presented at Eurographics Symposium on Rendering (EGSR) 2021.)

J34. Cheng Zhang, Zihan Yu, **Shuang Zhao**. *Path-Space Differentiable Rendering of Participating Media*. ACM Transactions on Graphics, 40(4), 76:1–76:15, August 2021. (Presented at SIGGRAPH 2021.)

J35. Cheng Zhang, Zhao Dong, Michael Doggett, **Shuang Zhao**. *Antithetic Sampling for Monte Carlo Differentiable Rendering*. ACM Transactions on Graphics, 40(4), 77:1–77:12, August 2021. (Presented at SIGGRAPH 2021.)

J36. Lifan Wu, Guangyan Cai, Ravi Ramamoorthi, **Shuang Zhao**. *Differentiable Time-Gated Rendering*. ACM Transactions on Graphics, 40(6), 287:1–287:16, December 2021. (Presented at SIGGRAPH Asia 2021.)

J37. Yu Guo, Adrian Jarabo, **Shuang Zhao**. *Beyond Mie Theory: Systematic Computation of Bulk Scattering Parameters based on Microphysical Wave Optics*. ACM Transactions on Graphics, 40(6), 284:1–284:12, December 2021. (Presented at SIGGRAPH Asia 2021.)

J38. Chuankun Zheng, Ruzhang Zheng, Rui Wang, **Shuang Zhao**, Hujun Bao. *A Compact Representation of Measured BRDFs Using Neural Processes*. ACM Transactions on Graphics, 41(2), 14:1–14:15, April 2022. (Presented at SIGGRAPH 2022.)

J39. Guangyan Cai, Kai Yan, Zhao Dong, Ioannis Gkioulekas, **Shuang Zhao**. *Physics-Based Inverse Rendering using Combined Implicit and Explicit Geometries*. Computer Graphics Forum, 41(4), 129–138, July 2022. (Presented at Eurographics Symposium on Rendering (EGSR) 2022.)

J40. Kai Yan, Christoph Lassner, Brian Budge, Zhao Dong, **Shuang Zhao**. *Efficient Estimation of Boundary Integrals for Path-Space Differentiable Rendering*. ACM Transactions on Graphics, 41(4), 123:1–123:13, July 2022. (Presented at SIGGRAPH 2022.)

J41. Zihan Yu, Cheng Zhang, Derek Nowrouzezahra, Zhao Dong, **Shuang Zhao**. *Efficient Estimation of Boundary Integrals for Path-Space Differentiable Rendering*. ACM Transactions on Graphics, 41(6), 191:1–191:16, December 2022. (Presented at SIGGRAPH Asia 2022.)

Conference Papers

C1. Bei Xiao, Ioannis Gkioulekas, Asher Dunn, **Shuang Zhao**, Todd Zickler, Edward Adelson, Kavita Bala. *Effects of Shape and Color on the Perception of Translucency*. Vision Science Society Annual Meeting, 1–1, May 2012.

C2. Ioannis Gkioulekas, Kavita Bala, Frédo Durand, Anat Levin, **Shuang Zhao**, Todd Zickler. *Computational Imaging for Inverse Scattering*. Electronic Imaging, 351:1, Feb 2016.

C3. **Shuang Zhao**, Rong Kong, Jerome Spanier. *Towards Real-Time Monte Carlo for Biomedicine*. Monte Carlo and Quasi-Monte Carlo Methods. Springer Proceedings in Mathematics & Statistics, 241, 447–463, July 2018.

C4. Chengqian Che, Fujun Luan, **Shuang Zhao**, Kavita Bala, Ioannis Gkioulekas. *Towards Learning-Based Inverse Subsurface Scattering*. IEEE International Conference on Computational Photography (ICCP), 1–12, April 2020.

C5. Cheng Zhang, **Shuang Zhao**. *Multi-Scale Appearance Modeling of Granular Materials with Continuously Varying Grain Properties*. Eurographics Symposium on Rendering (EGSR), 1–13, June 2020.

C6. Zahra Montazeri, Søren B. Gammelmark, Henrik Wann Jensen, **Shuang Zhao**. *Practical Ply-Based Appearance Modeling for Knitted Fabrics*. Eurographics Symposium on Rendering (EGSR), 1–8, July 2021.

C7. Qiushi Bai, Sadeem Alsudais, Chen Li, **Shuang Zhao**. *Efficient Differentiation of Pixel Reconstruction Filters for Path-Space Differentiable Rendering*. Eurographics Symposium on Parallel Graphics and Visualization (EGSPGV), 1–5, June 2022.

C8. Sadeem Alsudais, Qiushi Bai, **Shuang Zhao**, Chen Li. *GSViz: Progressive Visualization of Geospatial Influences in Social Networks*. ACM SIGSPATIAL 2022, 130:1–130:12, November 2022.

Patents

Fujun Luan, Kavita Bala, **Shuang Zhao**. *Fitting Procedural Yarn Models for Realistic Cloth Rendering*. U.S. Patent No. 10,410,380.

Zahra Montazeri, Søren B. Gammelmark, **Shuang Zhao**, Henrik Wann Jensen. *Systems and Methods to Compute the Appearance of Woven and Knitted Textiles At the Ply-Level*. U.S. Patent No. 11,049,291 B1.

Teaching   *UCI Courses*

CS 114	Projects in Advanced 3D Computer Graphics	Spring 2016
ICS 162	Modeling and World Building	Winter 2017
CS 114	Projects in Advanced 3D Computer Graphics	Spring 2017
CS 295	Realistic Image Synthesis	Spring 2017
ICS 162	Modeling and World Building	Winter 2018
CS 114	Projects in Advanced 3D Computer Graphics	Spring 2018
ICS 162	Modeling and World Building	Winter 2019
CS 114	Projects in Advanced 3D Computer Graphics	Spring 2019
CS 295	Realistic Image Synthesis	Spring 2019
CS 112	Introduction to Computer Graphics	Fall 2019
ICS 162	Modeling and World Building	Winter 2020
CS 114	Projects in Advanced 3D Computer Graphics	Spring 2020
CS 112	Introduction to Computer Graphics	Fall 2020
ICS 162	Modeling and World Building	Winter 2021
CS 112	Introduction to Computer Graphics	Fall 2021
ICS 162	Modeling and World Building	Winter 2022
CS 114	Projects in Advanced 3D Computer Graphics	Spring 2022
CS 211C	Realistic Image Synthesis	Spring 2022
CS 112	Introduction to Computer Graphics	Fall 2022

Conference Courses

Kai Schröder, **Shuang Zhao**, Arno Zinke. *Recent Advances in Physically-Based Appearance Modeling of Cloth*. SIGGRAPH Asia 2012 Course.

Shuang Zhao, Wenzel Jakob, Tzu-mao Li. *Physics-Based Differentiable Rendering: A Comprehensive Introduction*. SIGGRAPH 2020 Course.

Shuang Zhao, Ioannis Gkioulekas, Sai Bangaru. *Physics-Based Differentiable Rendering*. CVPR 2021 Tutorial.

Professional Activities

Papers Program Committee

ACM SIGGRAPH: 2019, 2020, 2022, 2023
ACM SIGGRAPH Asia: 2018, 2022
ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games (I3D): 2016–2022
ACM Symposium on Virtual Reality Software and Technology (VRST): 2018, 2022
CAD/Graphics: 2017, 2019, 2021
Eurographics: 2019
Eurographics Symposium on Rendering (EGSR): 2017–2019, 2021
High-Performance Graphics: 2020–2022
Pacific Graphics: 2018–2020, 2022

Courses Program Committee

ACM SIGGRAPH Asia, 2015–2016

Information Director

ACM Transactions on Graphics, 2015–2018

Reviewer

ACM SIGGRAPH, ACM SIGGRAPH Asia, Eurographics, Pacific Graphics

ACM Transactions on Graphics (TOG), ACM Transactions on Applied Perception (TAP), IEEE Transactions on Visualization and Computer Graphics (TVCG), IEEE Transactions on Image Processing (TIP)