Yu Guo (update: 02/01/2024) https://tflsguoyu.github.io/ tflsguoyu@gmail.com

About Me

My background is mainly focused on **Computer Graphics**, specially in **Physics-based Rendering** and **Inverse-rendering**. I am also interested in **Material Capture and generation** by using **GAN/Diffusion** model. How to decompose **light/shadow** and material properties from a 3D model (Mesh/NeRF/**3DGS**) and make it **relightable** and **editable** are what I am willing to solve. Besides, I am interested in any project related to **Meta Human**. See last page for more information.

Education

University of California, Irvine — **Irvine, CA, US**
Ph.D in Computer Science — **Sept. 2016 – Aug. 2021**
Dissertation: Multi-scale Appearance Modeling of Complex Materials.
Advisor: Shuang Zhao

University of Chinese Academy of Sciences — **Beijing & Shenzhen, China**
M.S. in Computer Science — **Sept. 2010 – Jul. 2013**
Thesis: GPU-based Soft Body Deformation with Nonlinear Finite Element Method.
Advisor: Pheng Ann Heng (CUHK)

Central South University — **Changsha, China**
B.S. in Mathematics and Applied Mathematics — **Sept. 2006 – Jul. 2010**
Thesis: Forces Distribution with Fractal Theory in High Velocity Compaction Technology.

Working Experiences

Tencent America, IEG *(Senior Researcher)* — **New York & Playa Vista, CA, US**
Projects: — **Sept. 2021 – Jan. 2024**
- 4D Gaussian splatting: *3D Gaussian splatting with changed lighting.*
- Video generation: *Re-stylization and stabilization of rendered MMD model with Stable diffusion.*
- Product photo generation: *We use fine-tuned Diffusion model to generate high quality image, and use image-based relighting technique to make the foreground and background lighting consistant.*
- Texture map delighting: *Remove shadows and highlights in texture maps and make Photogrammetry pipeline more efficient.*
- Unreal Engine 5 plug-in: *Volumetric rendering with multiple scattering and phase function supported.*

Manager: Changxi Zheng and Bo Yang

Facebook Reality Lab *(Internship)* — **Sausalito, CA, US**
Projects: Eye caustics rendering and its inverse problem. — **July. 2020 – Sept. 2020**
Advisor: Christophe Hery, Olivier Maury

Adobe Research *(Internship)* — **San Jose, CA, US**
Projects: Material capture and estimation. — **July. 2019 – Sept. 2019**
Advisor: Miloš Hašan, Kalyan Sunkavalli

Megvii (Face++) Research *(Internship)* — **Redmond, WA, US**
Projects: Human face shadow/highlight removal and face relighting. — **July. 2018 – Sept. 2018**
Advisor: Jue Wang

Autodesk *(Internship)* — **San Francisco, CA, US**
Projects: Efficient volumetric rendering of 3D-printing materials. — **July. 2017 – Sept. 2017**
Advisor: Miloš Hašan

Nanyang Technological University — **Singapore**
Research Associate at BeingThere Centre (BTC), IMI — **Oct. 2013 – Mar. 2016**
(BTC is a US$18 million international research project on 3D Telepresence and Virtual Reality between ETH (Markus Gross), UNC (Henry Fuchs) and NTU (Nadia Magnenat Thalmann).)

Projects: Stereo rendering; Physical-based video manipulation; Virtual try-on system for prescription glasses.
Collaborators: Miriam Reiner, Jean-Charles Bazin, Tobias Martin, Claudia Plüss, Pierre-Yves Laffont, Qian Zhang
Advisor: Tat-Jen Cham

Shenzhen Institutes of Advanced Technology **Shenzhen, China**
Research Assistant at HCI lab **Sept. 2011 – Jul. 2013**
Projects: Mesh processing; Soft body simulation; Virtual surgery; CUDA acceleration.
Advisor: Pheng-Ann Heng, Yongming Xie

Selected Publications

"**Woven Fabric Capture from a Single Photo**" by Wenhua Jin, Beibei Wang, Milos Hasan, **Yu Guo**, Steve Marschner and Lingqi Yan. *SIGGRAPH Asia '22*

"**Beyond Mie Theory: Systematic Computation of Bulk Scattering Parameters based on Microphysical Wave Optics**" by **Yu Guo**, Adrian Jarabo and Shuang Zhao. *ACM Transactions on Graphics (TOG), 2021 (presented at SIGGRAPH Asia '21).*

"**MaterialGAN: Reflectance Capture using a Generative SVBRDF Model**" by **Yu Guo**, Cameron Smith, Miloš Hašan, Kalyan Sunkavalli and Shuang Zhao. *ACM Transactions on Graphics (TOG), 2020 (presented at SIGGRAPH Asia '20).*

"**A Bayesian Inference Framework for Procedural Material Parameter Estimation**" by **Yu Guo**, Miloš Hašan, Lingqi Yan and Shuang Zhao. *Computer Graphics Forum (CGF), 2020 (presented at Pacific Graphics '20).*

"**Position-Free Monte Carlo Simulation for Arbitrary Layered BSDFs**" by **Yu Guo**, Miloš Hašan and Shuang Zhao. *ACM Transactions on Graphics (TOG), 2018 (presented at SIGGRAPH Asia '18).*

"**A Virtual Try-on System for Prescription Eyeglasses**" by Qian Zhang, **Yu Guo**, Pierre-Yves Laffont, Tobias Martin, and Markus Gross. *IEEE Computer Graphics and Applications (CG&A), 2017.*

"**Physically Based Video Editing**" by Jean-Charles Bazin, Claudia Plüss (Kuster), **Yu Guo**, Tobias Martin, Alec Jacobson, and Markus Gross. *Computer Graphics Forum (CGF), 2016 (presented at Pacific Graphics '16).*

"**A GPU-Accelerated Finite Element Solver for Simulation of Soft-Body Deformation**" by **Yu Guo**, Jianying Li, Ping Liu, Qiong Wang, and Jing Qin. *International Conference on Information and Automation (ICIA), 2013.*

"**A Master-Slave Robotic Simulator Based on GPUDirect**" by Jianying Li, **Yu Guo**, Heye Zhang, Yongming Xie. *International Conference on Intelligent Robots and Systems (IROS), 2012.*

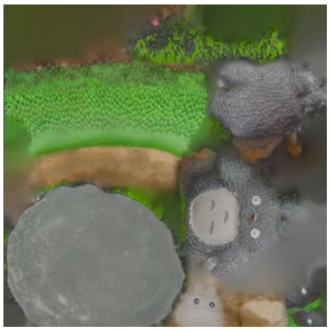
Reviews

TOG, CGF, SIGGRAPH, SIGGRAPH Asia, EG, PG

Previous Projects (main contribution)

Tencent America:

- UE5 plugin
- Snow rendering
- Multiple scattering



- Photogrammetry
- Texture delighting
- Shadow removal

- Image generation
- Diffusion models
- Relighting

- Cartoon stylization
- Stable Diffusion
- Video stabilization

During PhD:

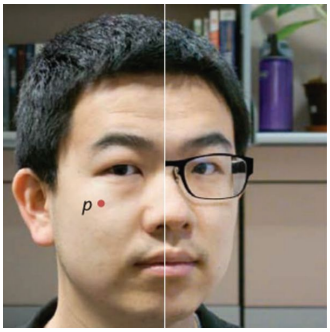
- Forward rendering
- Layered BSDF
- PBRT-v4

- Volume rendering
- Wave optics

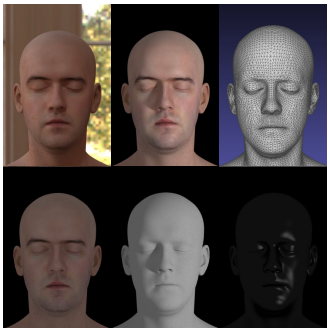
- Inverse-rendering
- SVBRDF
- MaterialGAN

- Procedural material
- Bayesian theory
- MCMC sampling

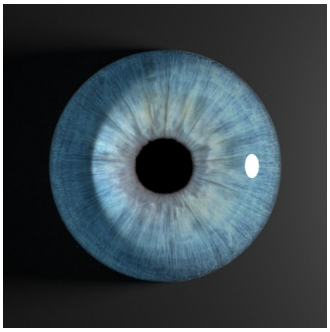
Human face related:



- Virtual try-on
- Prescription glasses



- Face relighting
- Face rendering



- Eye rendering
- Eye reconstruction