ZHANHANG LIANG

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EDUCATION

University of California Irvine, Irvine, CA

Ph.D. in Computer Science   *09/2018 - Present*

M.S. in Computer Science, GPA 3.75   *03/2018*

Beijing Jiaotong University, Beijing, China

B.S. in Computer Science and Technology (Railway Information Technology), GPA 3.67   *06/2016*

RESEARCH EXPERIENCE

A Pressure-Based Geometric Acoustics Framework   *Ongoing*

Advised by Prof. Shuang Zhao, Dr. Tim Langlois   *Irvine, CA*

- Conducted transient pressure acoustics simulation with COMSOL Multiphysics software for generating reference results.
- Implemented a path tracing algorithm that reuses light paths to simulate room acoustics with binaural auralization. C++.
- Constructed and interpolated BRDF based on the scattering pressure field from BEM results. MATLAB, COMSOL.

On the Optical Accuracy of Leonardo da Vinci's Salvator Mundi   *03/2018 - 01/2020*

Advised by Prof. Michael Goodrich and Prof. Shuang Zhao   *Irvine, CA*

- Set up a virtual scene with proper light configuration and an approximated geometry gleaned from the painting. Maya.
- Regenerated three white spots on orb's surface as specular reflections with trapezoidal baffles that limit the spread of light.
- Recreated the spots with alternative setup that used concave reflectors concentrating light into desired conical shapes.

Implementation of Global Illumination Algorithms   *06/2017 - 09/2017*

Advised by Prof. Shuang Zhao | Irvine, CA   *Irvine, CA*

- Implemented Bidirectional Path Tracing (BDPT), connecting light and eye paths via multiple importance sampling (MIS).
- Realized final gathering by doing radiance estimation on global photon map as the light source for indirect illumination.
- Accomplished Vertex Connection and Merging (VCM) by integrating BDPT and Photon Mapping (PM), using MIS to connect the eye path with light path and photons' paths which are collected by density estimation on the photon map. C++.

PROJECT EXPERIENCE

Realistic Image Synthesis   *04/2017 - 06/2017*

- Completed the Ambient occlusion, direct illumination, and microfacet Bidirectional Reflectance Distribution Function (BRDF).
- Implemented volume path tracing algorithm and the Bidirectional Surface Scattering Reflectance Distribution Function (BSSRDF).
- Wrote a Monte Carlo path tracer with MIS which combines the area light sampling and BRDF sampling strategies. C++, Nori.

PUBLICATIONS

- **Marco(Zhanhang) Liang**, Michael T. Goodrich, Shuang Zhao. *Inverse-Rendering Based Analysis of the Fine Illumination Effects in the Salvator Mundi*. Leonardo (SIGGRAPH 2020 Art Paper), July 2020.
- **Marco(Zhanhang) Liang**, Michael T. Goodrich, Shuang Zhao. *On the Optical Accuracy of the Salvator Mundi*. Technical report (arXiv:1912.03416), December 2019.

SKILLS & INTERESTS

Skills : COMSOL, MATLAB, Python, C/C++   **Interests :** Tennis, swimming, euphonium