

Haolan Xu

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EDUCATION

University of Florida

Master in Computer Science; GPA: 3.88/4.00

Gainesville, FL, USA

Sept.2022 - Present

Sichuan University

B.E. in Chemical Engineering and Technology; GPA: 3.75/4.00

Chengdu, SC, China

Sept.2018 - June.2022

SKILLS SUMMARY

Languages: Python, C/C++, JavaScript, Julia

Frameworks: OpenGL, WebGL, Pytorch(3D)

Tools: Blender, Mitsuba, Cmake, L^AT_EX, GIT

Platforms: Windows, Ubuntu

RESEARCH

Rendering the smooth silhouette using Point Normal triangles

June. 2023 - Present

- Implemented **Point Normal (PN) triangles**, leveraging principles of **Gouraud shading**
- Identified silhouette points using **orthogonality checks** between normal vectors and the view direction
- Employed **Berstein-Bézier form** and **barycentric coordinates** to render accurate silhouettes efficiently

Parametric Modeling of Smooth Biological Cells

Jan. 2023 - May. 2023

- Developed a deep understanding of the **Berstein-Bézier form** through practical implementation in Python
- Constructed a 2D model of axisymmetric spread cells using the **cubic piecewise Bézier curve**
- Extended the 2D model into 3D by implementing **a rotation algorithm** around the central axis
- Adapted the 3D model based on constant mean curvature, enhancing the model's predictability and application to general 3D cell formations

Predicting Performance of Organic Photovoltaic Materials Using Deep Learning

Oct. 2020 - Oct. 2021

- Creatively propose **a language-like molecular descriptor(SMILES string)** as inputs
- Predict the potential photoelectric conversion efficiency(PCE) of OPVs through **deep learning(Bi-LSTM network model)**
- Introduce **the attention mechanism** to identify the segments that are important to PCE, which can provide guidance for the design experiments of OPVs

PROJECTS

Precompute radiance transfer with spherical harmonics rotation

July. 2023 - Aug. 2023

- Implemented **Precomputed Radiance Transfer (PRT)** in the **Nori** framework
- Achieved **real-time** rendering of the Stanford bunny across various scenes utilizing spherical harmonics coefficients
- Enabled **dynamic light rotation** leveraging the **rotationally invariant** properties of spherical harmonics.

Implement soft shadow using PCF & PCSS

June. 2023 - July. 2023

- Implemented a robust hard shadow system using the two-passes approach
- Introduced **adaptive shadow bias algorithm** to solve shadow Acne
- Developed soft shadow using **Percentage Closer Filtering (PCF)**
- Further refined the visual fidelity of shadows by implementing **Percentage Closer Soft Shadows (PCSS)**
- Enabled the support of **multiple dynamic light sources**

A tiny software path tracer rendering Cornell Box

May. 2023 - June. 2023

- Implemented a **path tracer** with **Russian roulette** and **Sampling light source**
- Rendered the Cornell Box with different samples per pixel (SPP)
- Optimized the path tracer by **Multi-threaded acceleration**, **Microfacet materials**, and **Perfect mirror reflection**

HONORS AND AWARDS

University of Florida Achievement Award Scholarship

2022

Outstanding Graduates of Sichuan University

2022

Outstanding Student of the Year in Sichuan University

2019, 2020

The First Prize Scholarship in Sichuan University

2019, 2020