

# Yijie Deng

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[yijie21.github.io](https://yijie21.github.io)

## EDUCATION

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**Master of Data Science and Information Technology** September 2021 - Present  
Tsinghua-Berkeley Shenzhen Institute, Tsinghua University  
GPA: 3.85/4.00

**Bachelor of Computer Science** September 2017 - June 2021  
School of Computer Science, Wuhan University  
GPA: 3.89/4.00

## RESEARCH PUBLICATION

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**Yijie Deng**, Lei Han, Tianpeng Lin, Lin Li, Jinzhi Zhang and Lu Fang “*RealLiFe: Real-Time Light Field Reconstruction via Hierarchical Sparse Gradient Descent*” submitted to IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) May 2023

## RESEARCH EXPERIENCES

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**Real-Time Neural Cloud Rendering** April 2023 - Present  
*Supervisor: Lu Fang, Associate Professor*

- Developed a novel rendering system, designed specifically for high-quality, real-time graphics on low-end devices using cloud-based powerful GPUs.
- Innovated in compression techniques and rendering effect decomposition, creating a compact neural network for object-centric radiance transfer fields. This approach enables efficient, user-independent global illumination with low-frequency detail, alongside shared specular importance sampling for dynamic, high-frequency reflections.
- Utilized Mitsuba3 rendering engine for demonstrating capabilities in Python, achieving 5 FPS at 1920x1080 resolution, maintaining quality comparable to ray tracing. Currently implementing a real-time demo using NVIDIA Falcor and CUDA for enhanced performance and efficiency.

**Real-Time Light Field Reconstruction via Hierarchical SGD** October 2022 - April 2023  
*Supervisor: Lu Fang, Associate Professor*

- Develop an algorithm for real-time light field video generation supporting 3D display and VR devices.
- Employed sparse light field gradients to boost performance for a balanced trade-off between quality and efficiency; engineering optimization including custom CUDA kernels and neural network tuning.
- Achieved by far the fastest light field generation methods (**400x** faster than the baseline DeepView) with a **2 dB** higher PSNR compared to baseline novel view synthesis methods (IBRNet, MVSNeRF, ENeRF).

**Explicit Neural Radiance Field Acceleration** June 2021 - December 2021  
*Supervisor: Lu Fang, Associate Professor*

- Develop an algorithm to accelerate the training stage of a neural radiance field.
- Leveraged explicit voxel grids to store vertex features and designed a vertex-image distance field for feature filtering.
- Achieved a 10x speed improvement compared to NeRF, while maintaining comparable rendering quality.

## PROJECTS

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**GLSL/C++ Path Tracer** June 2023 - August 2023  
*Position: Major developer*

- Develop a physically-based rendering path tracer using GLSL/C++.

- Implement the Disney BSDF and integrate support for loading Blender files. Provide detailed code explanations throughout the rendering pipeline.
- Achieve interactive rendering capability and incorporate basic Blender file loading functionality in the PBR (Physically-Based Rendering) path tracer.

### **Virtual Dataset of Pedestrians using Unreal Engine**

January 2021 - June 2021

*Position: Major developer*

- Design a pedestrian dataset platform for computer vision tasks like Pedestrian Tracking and Behavior Prediction.
- Utilized Unreal Engine to build the scene and implemented behavior trees to control the movements and gestures of the pedestrians.
- Successfully generated virtual video datasets of pedestrians with G-buffers, pedestrian trajectories, and multiple behaviors.

### **Automatic Bridge Layout Design Program based on CAD**

January 2021 - April 2021

*Position: Major developer*

- Design a CAD program to automatically generate bridge layouts for varying road conditions.
- Surveyed various road obstacles and aggregated them into a comprehensive dataset. Implemented a flexible, greedy algorithm-based approach to rapidly design layouts.
- The program can automatically produce multiple layout options for complex road conditions. It provides an intuitive interface for users to manually refine designs as needed.

### **Egypt Tomb Escape VR Game using Unity**

June 2020 - August 2020

*Position: Major developer*

- Developed an educational VR escape game focused on ancient Egyptian culture using Unity.
- Designed puzzle mechanics and implemented player behaviors and movements, connected the game to a VR helmet to enable the VR interaction.
- Created an immersive experience bringing Egyptian history to life.

## **INTERNSHIP**

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### **Eon Reality Internship,**

Position: Game designer and programmer of virtual reality

June 2020 - August 2020

## **SKILLS AND RESEARCH INTERESTS**

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<b>Research Interests</b>	Inverse Graphics, Physically-based Rendering, Neural Rendering, Mixed Reality
<b>English Proficiency</b>	IELTS band 7
<b>Skills</b>	Skilled in Python/C++/C#/CUDA/GLSL/Shader Slang, Skilled in game/render engines including Unity and Unreal Engine, Mitsuba3 and Falcor

## **GRANTS AND AWARDS**

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Outstanding Graduate in School of Computer Science	2021
National English Competition for College Students, Second Prize of Hubei Province	2019
National Encouragement Scholarship (5000 CNY * 4 years)	2017-2021
"TianYuanDiKe" Special Scholarship (8000 CNY *1 year)	2018
First-class Scholarship for Excellent Students (3000 CNY * 4 years)	2017-2021
Intermediate Software Design Qualification	2019
National Mathematics Competition for College Students, Second Prize of Hubei Province	2018
Nationally Televised CCTV New Hope English Speech Competition, First Prize of Hubei Province	2018