

# BENRAN HU

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## EDUCATION

### Carnegie Mellon University

Master of Science in Computer Science

Pittsburgh, PA

Dec 2024 (Expected)

### Hong Kong University of Science and Technology


Bachelor of Science in Data Science and Technology, and in Computer Science


Hong Kong SAR

Jun 2023

- Achieved CGA: 4.14/4.30, Major CGA: 4.19/4.30.

## PUBLICATIONS

Yichen Liu\*, **Benran Hu\***, Junkai Huang\*, Yu-Wing Tai, and Chi-Keung Tang. Instance Neural Radiance Field. In *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV)*, October 2023. | 

**Benran Hu\***, Junkai Huang\*, Yichen Liu\*, Yu-Wing Tai, and Chi-Keung Tang. NeRF-RPN: A general framework for object detection in NeRFs. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, June 2023. | 

## RESEARCH EXPERIENCE

### NeRF Instance Segmentation [ICCV'23] |

Advisors: Prof. Chi-Keung Tang and Prof. Yu-Wing Tai

HKUST, Hong Kong SAR

Dec 2022 - Jul 2023

- Proposed one the first 3D instance segmentation methods in NeRFs by optimizing a Neural Instance Field.

### Shading Reprojection Scheduling

Advisor: Prof. Pedro Sander

HKUST, Hong Kong SAR

Sep 2022 - Present

- Maximized rendering quality under performance constraints by scheduling temporal reprojection of shading based on error prediction.

### Object Detection in NeRF [CVPR'23] |

Advisors: Prof. Chi-Keung Tang and Prof. Yu-Wing Tai

HKUST, Hong Kong SAR

May 2022 - Nov 2022

- Proposed the first significant 3D object detection method in Neural Radiance Fields and created the first dataset for NeRF 3D object detection.

### Perception-Driven Stereo Rendering

Advisor: Prof. Pedro Sander

HKUST, Hong Kong SAR

Sep 2021 - Sep 2022

- Devised a perception-driven rendering algorithm for VR utilizing binocular fusion and reprojection to improve rendering performance while minimizing visual quality loss.

## TECHNICAL PROJECTS

### Metarenderer

- Developed a rendering playground for introductory graphics courses based on three.js and WebGL, featuring interactive experiments of camera and shading models, lighting and illumination, culling, textures, and shadow mapping.
- Implemented PCSS, microfacet materials, and PRT with interreflection and glossy BRDF.

### Geometry Processing Pipeline

- Implemented the whole pipeline from shape acquisition to rigged models, including surface reconstruction, mesh smoothing, mesh parametrization, mesh deformation, skinning, and skeletal animation.

### Trace

- Implemented a CPU renderer supporting path tracing, microfacet materials, and photon mapping.

## DEPARTMENTAL SERVICE

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### Student Helper of Honors Object-Oriented Programming and Data Structures

- Designed lab exercises and a programming assignment on implementing a Git-like version control system.

## HONORS & AWARDS

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<b>Tse Cheuk Ng Tai Scholarship</b> for students with research achievement in Vision and Graphics	<i>2022</i>
<b>Lee Hysan Foundation Exchange Scholarship</b>	<i>2021</i>
<b>Chiaphua Industries Limited Scholarship for Chinese Mainland Undergraduate Students</b>	<i>2021 - 2022</i>
<b>The Joseph Lau Luen Hung Charitable Trust Scholarship</b>	<i>2020</i>
<b>University's Scholarship Scheme for Continuing Undergraduate Students</b>	<i>2020 - 2022</i>
<b>Dean's List</b>	<i>2019 - 2022</i>