

HUI REN

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EDUCATION

ShanghaiTech University

Bachelor of Engineering, Computer Science

- Overall GPA: 3.92/4.0 (rank 2/234 in school)
- Major GPA: 4.0/4.0

Shanghai, China

Sept. 2021 – Present

(Projected graduation date: July 2025)

- Selected coursework: Deep Learning(A+), Artificial Intelligence(A+), Computer Graphics(A+), Computer Architecture(A+), Algorithms and Data Structures(A+), Numerical Optimization(A+), Probability and Statistics(A+)

Massachusetts Institute of Technology (MIT)

Undergraduate Exchange Student, Computer Science

- GPA: 5.0/5.0
- Coursework: Advances in Computer Vision(A+), Matrix Methods(A+)

Cambridge, MA

Feb. 2024 – May 2024

RESEARCH INTERESTS

I am interested in representation learning and its application in semantic and related scenarios. My current research focuses on **Generative AI** and **3D Vision**. Previously, I explored Optimal Transport theory for **Unsupervised Deep Clustering** and **3D Semi-Supervised Learning**, with a focus on imbalanced and open-world scenarios.

PUBLICATION (* Equal contribution)

- **Art-Free Generative Models: Art Creation Without Graphic Art Knowledge**
*Hui Ren**, Joanna Materzyńska*, Rohit Gandikota, David Bau, Antonio Torralba [Paper] [Website] *Under Review*
- **Feature4X: Bridging Any Monocular Video to 4D Agentic AI with Versatile Gaussian Feature Fields**
*Shijie Zhou**, *Hui Ren**, Yijia Weng, Shuwang Zhang, Zhen Wang, Dejia Xu, Zhiwen Fan, Suyu You, Zhangyang Wang, Leonidas Guibas, Achuta Kadambi [Website] *CVPR, 2025*
- **P²OT: Progressive Partial Optimal Transport for Deep Imbalanced Clustering**
*Chuyu Zhang**, *Hui Ren**, Xuming He [Paper][Code] *ICLR, 2024*
- **SP²OT: Semantic-Regularized Progressive Partial Optimal Transport for Imbalanced Clustering**
Chuyu Zhang, *Hui Ren*, Xuming He [Paper][Code] *Under Review of TPAMI*
- **Dual-level Adaptive Self-Labeling for Novel Class Discovery in Point Cloud Segmentation**
*Ruijie Xu**, *Chuyu Zhang**, *Hui Ren*, Xuming He [Paper][Code] *ECCV, 2024*
- **Cascade Sparse Feature Propagation Network for Interactive Segmentation**
*Chuyu Zhang**, Chuanyang Hu*, *Hui Ren*, Yongfei Liu, Xuming He [Paper][Code] *BMVC, 2023*

RESEARCH EXPERIENCE

MIT CSAIL, Vision Group

Undergraduate Research Assistant, advised by Prof. Antonio Torralba and Prof. David Bau

Cambridge, MA

Feb. 2024 - Present

• Domain Adaption for Generative Models

- * Conducted an innovative study on the role of prior art knowledge in text-to-image generation, challenging traditional reliance on art-rich datasets.
- * Introduced an art-agnostic text-to-image generative diffusion model, trained without access to art-related content.
- * Proposed and developed a simple yet effective method to learn an art adapter capable of generating diverse artistic styles with minimal examples.

UCLA, Visual Machines Group

Visiting Student, advised by Prof. Achuta Kadambi

Remote

Aug. 2024 - Present

• 4D Scene Reconstruction and Feature Field Distillation

- * Proposed general 4D feature field distillation technique to expand the capabilities of any 2D vision foundation models into the 4D realm, relying solely on monocular video input.
- * Proposed a compact latent 4D feature representation that accelerates training and inference by over 5x compared to naive non-compact approach.
- * Proposed an LLM-powered agentic AI that interprets natural language prompts, and iteratively refines results through trial and feedback, achieving intelligent 4D scene manipulation.

ShanghaiTech Visual & Data Intelligence Center, PLUS Lab

Undergraduate Research Assistant, advised by Prof. Xuming He

Shanghai, China

Feb. 2023 - Jan. 2024

• Deep Imbalanced Clustering

- * Proposed to generalize deep clustering problem to more realistic and challenging imbalanced scenarios and established a new benchmark.
- * Proposed a novel OT formulation with an efficient solver for pseudo-labeling-based learning framework, considering class imbalance distribution and progressive learning concurrently, surpassing SOTA methods by 2%.
- * Proposed introducing semantic guidance from feature space for pseudo label generation, improving another 2%.
- * Performed comprehensive analysis and comparisons of the proposed method against various baselines on the challenging imbalanced datasets.

• Novel Class Discovery in Point Cloud

- * Proposed a novel adaptive self-labeling framework for novel class discovery in point cloud segmentation, better modeling imbalanced novel classes.
- * Proposed an adaptive regulation strategy for self-labeling, making the algorithm more flexible and capable of better modeling imbalanced novel classes, improving performance by over 10%.

COURSE PROJECTS

Business War Policy Exploration [\[code\]](#)

Shanghai, China

ShanghaiTech CS181: Artificial Intelligence

Apr. 2023 – Jun. 2023

- Proposed a business war model in which restaurants must balance attracting customers and making profits to maximize revenue and even defeat competitors.
- Implemented and compared various AI strategies, including Expectimax search, Neural-Network prediction, and Reinforcement learning algorithms to explore the optimal policy.

Lattice Boltzmann Methods Program Acceleration [\[code\]](#)

Shanghai, China

ShanghaiTech CS110: Computer Architecture I

May 2023

- Utilized multiple optimization techniques, including SIMD, OMP, thread blocking elimination, and memory access optimization to accelerate the LBM program.
- Achieved top 3 performance in the class.

Ray tracing based multi-resolution iso-surface rendering [\[code\]](#)

Shanghai, China

ShanghaiTech CS171: Computer Graphics I

Dec. 2022 – Jan. 2023

- Rendered the iso-surface of vortices in a multi-resolution fluid velocity field based on ExaBricks data structure.
- Implemented a bitmap accelerated KD-tree and BVH for multi-resolution data to support fast ray marching.
- Proposed an advanced adaptive sampling strategy to solve the problem of rendering surface discontinuity, improving the rendering speed by more than 50x at the same precision.
- Created a UI for conveniently adjusting the parameters and rendering.

Direction of arrival (DoA) estimation [\[code\]](#) [\[demo\]](#)

Shanghai, China

ShanghaiTech SI100B: Introduction to Information Science and Technology

Nov. 2021 – Dec. 2021

- Implemented a DoA estimation algorithm to locate the source of sounds in Matlab based on the MUSIC algorithm.
- Created a UI for real-time localization and visualization of sound sources using a microphone array.

Activities

- **Teaching Assistant**, CS182 Introduction to Machine Learning, ShanghaiTech University **Spring 2025**
- **Teaching Assistant**, SI100B Introduction to Information Science and Technology, ShanghaiTech University **Fall 2022**

Awards and Honors

- **National Scholarship** (Top 0.2% nationwide, highest scholarship in China) **Nov. 2024**
- **Outstanding Student**, ShanghaiTech University (Top 2% in school) **Dec. 2024**
- **International Exchange Program First-class Scholarship**, ShanghaiTech University (Top 2% in school) **June 2024**
- **Outstanding Student**, ShanghaiTech University (Top 2% in school) **Dec. 2023**
- **Third prize**, The 14th Chinese Mathematics Competition **Jan. 2023**
- **Merit Student**, ShanghaiTech University (Top 3%-7% in school) **Dec. 2022**
- **First prize**, The 5th Annual International Mathematical Modeling Challenge **Jan. 2019**

Skills

- **Programming Languages:** Python, C, C++, MATLAB, RISC-V, AMPL
- **Tools & Frameworks:** PyTorch, OpenGL, git, L^AT_EX, Markdown