Yiyang Lu

Tsinghua University, Beijing, China

## EDUCATION

**IIIS**, Tsinghua University Undergraduate Study

## **IIIS**, Tsinghua University

Pre-College Program

## **Research interests**

Computer Vision, Robotics, Reinforcement Learning

## **EXPERIENCES**

#### Undergraduate Research in Computer Vision Supervised by Professor Kaiming He, Massachusetts Institute of Technology Feb 2025 - Now

- Conduct research on generative models, including Diffusion models, Flow matching, and Normalizing Flows.
- Develop and deploy models on Google Cloud Platform using TPU and JAX.

#### **Undergraduate Research in Robotics**

Supervised by Professor Huazhe Xu, Tsinghua University

- Gain experiences on robotics and computer vision, especially designing diffusion models and vision encoder for imitation learning.
- Implementing ideas and training models on real robots and simulators, such as Metaworld, Maniskill, Robotwin.

#### Internship in Computer Vision

Supervised by Dong Wei, Tencent

- Worked on multi-modal AI, especially extracting features from images and texts.
- Selected as "Challenging Star" in the internship program.

## **PUBLICATIONS**

H<sup>3</sup>DP: Triply-Hierarchical Diffusion Policy for Visuomotor Learning Yiyang Lu\*, Yufeng Tian\*, Zhecheng Yuan\*, Xianbang Wang, Pu Hua, Zhengrong Xue, Huazhe Xu

https://arxiv.org/abs/2505.07819

## AWARDS

Tsinghua Academy Talent Development Program Scholarship Tsinghua University	2024
Freshman Scholarship (Second Prize) Tsinghua University	2024
Gold Medal (Top 10) 39th Chinese Physics Olympiad	2022

1

Sep 2024 - Now

(+86) 180-5166-0139

luyy24@mails.tsinghua.edu.cn

Sep 2023 - Jun 2024

Sep 2024 - Now

Jul 2024

## Projects

#### Realistic Multi-Material Interaction Simulation Pipeline 2024.12 https://

https://github.com/Lyy-iiis/ACG-Project

Project for the course Advanced Computer Graphics at IIIS, Tsinghua University, completed in a team of 2. This project is selected for class oral presentation (top 3) and most popular project (top 3).

- Implement a comprehensive simulation pipeline that supports multiple materials and their interactions, including rigid body, fluid, cloth and smoke simulation.
- Leverages GPU acceleration and spatial hashing to achieve high simulation performance and scalability, produce real-time visual effects.

#### Do LLMs Outperform Multi-task Learning Expert in Medical Report Generation? 2024.12 https://github.com/Lyy-iiis/Crayon-new

Project for the course *Natural Language Processing* at IIIS, Tsinghua University, completed in a team of 3. This project is selected for class **oral presentation**.

- Compare the performance of Large Language Models and Multi-task Learning Expert in medical report generation, revealing the weaknesses of LLMs in domain-specific tasks even with fine-tuning.
- Implement a multi-task learning expert for medical report generation, which achieves competitive performance on IU-X-Ray dataset.

#### Randomized Techniques in Graph Algorithms

2024.10

https://github.com/PeppaKing8/algdesign-project

Project for the course *Algorithm Design* at IIIS, Tsinghua University, completed in a team of 2. This project receives **6 bonus points** for creativity.

- Investigate the application of randomized techniques in graph algorithms, as well as implementation in C++.
- Propose a new NPC problem, Optimal Point Traversing Path, and present a sublinear randomized algorithm to solve the special case, completed with a correctness proof and complexity analysis.

# Music Image Transfer 2024.6

https://github.com/Lyy-iiis/LLM\_project

Project for the course *Introduction to Large Language Model Application* at IIIS, Tsinghua University, completed in a team of 3. The project is further developed by **ZhiPu AI**.

- Build a pipeline of Large Language Models to generate an image according to the content of a piece of music.
- Achieve high correlation between the contents and rather high speed of generation.
- Use Docker to build an API on Kubernetes server and use gradio to build up a website for the application.

## SKILLS

**Programming Languages:** Python, C/C++, Bash, Assembly **Tools:** PyTorch, JAX, MATLAB, Git, LaTeX, Docker, GDB **Languages:** English (Fluent), Chinese (Native)

## ADDITIONAL INFORMATION

## Transript at IIIS, Tsinghua University

All of my **professional courses** taken at IIIS, Tsinghua University is shown below.

Year-Semester	Course Title	Credit	Grade
2023-Autumn	Introduction to Computer Science	3	A+
	Introduction to Programming in C/C++	2	A+
	Calculus A (1)	5	A
	Linear Algebra	4	A+
	General Physics (2)	4	A+
2024-Spring	Introduction to Computer Systems	4	A+
	Introduction to Large Language Model Application	2	A
	Mathematics for Computer Science and Artificial Intelligence	4	A+
	Calculus A (2)	5	A+
	General Physics (1)	4	A
	Quantum Computer Science	4	A+
2024-Autumn	Advanced Computer Graphics	3	A+
	Natural Language Processing	3	A+
	Machine Learning	4	A+
	Algorithm Design	4	A+
	Artificial Intelligence: Principles and Techniques	3	A+

#### Self-Studied/Audited courses

- Deep Learning, IIIS, Tsinghua University
- Abstract Algebra, IIIS, Tsinghua University
- The Missing Semester of Your CS Education, MIT, https://missing.csail.mit.edu/
- Introduction to Algorithms, MIT, https://ocw.mit.edu/courses/6-006-introduction-to-algorithms-spring-2020/
- Design and Analysis of Algorithms, MIT, https://ocw.mit.edu/courses/6-046j-design-and-analysis-of-algorithms-spring-2015/
- CS224n: Natural Language Processing with Deep Learning, Stanford, http://web.stanford.edu/ class/cs224n/
- CS231n: Deep Learning for Computer Vision, Stanford, http://cs231n.stanford.edu/
- Intro to Computer Systems, CMU, https://www.cs.cmu.edu/afs/cs/academic/class/15213-f15/ www/schedule.html
- CS285: Deep Reinforcement Learning, UC Berkeley, https://rail.eecs.berkeley.edu/deeprlcourse