

# Qiao Sun

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## RESEARCH & PROFESSIONAL EXPERIENCE

### Undergraduate Researcher, He Vision Group

Sep 2024 - Present

Professor: Kaiming He

- Work as a UROP student in He Vision Group on generative models, including diffusion and flow matching, normalizing flows, and fast image generation.
- Collaborate with Hanhong Zhao, Zhicheng Jiang, Xianbang Wang, and Yiyang Lu on a unified direction for vision-language understanding and text-to-image generation.
- Conduct large-scale experiments with JAX on TPUs and PyTorch on GPUs; build training, evaluation, and ablation pipelines for image generation models.
- Serve as one of the group leads and TPU/GCP managers/admins, helping coordinate compute resources, access, and shared training infrastructure.

### Quant Strategy Analyst Intern, Ubiquant Investment (Jiukun Quant)

Jun 20 - Aug 31, 2025

Quantitative research and strategy analysis

- Researched quantitative strategy ideas and backtesting workflows with Python-based data analysis.
- Evaluated factor robustness, risk and turnover characteristics, and strategy diagnostics through statistical tests and visualization.
- Built reproducible research utilities for experiment tracking, factor validation, and portfolio-performance analysis.

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## SELECTED PAPERS

### Is Noise Conditioning Necessary for Denoising Generative Models?

2025

ICML 2025 poster; first author

- Revisited the necessity of noise conditioning in diffusion and flow-matching models by reimplementing eight denoising generative models across multiple datasets.
- Proposed uEDM, a noise-unconditional diffusion model with competitive performance, supported by theory that matches empirical behavior.

### Bidirectional Normalizing Flow: From Data to Noise and Back

2025

Project lead and first author

- Revisited normalizing flows with a learned reverse map, eliminating explicit inverse-flow computation and slow autoregressive inference.
- Guided reverse learning through hidden-state alignment, enabling single-evaluation NF-based generation with state-of-the-art results among NF methods.

### One-step Latent-free Image Generation with Pixel Mean Flows

2026

First author

- Built a strong baseline for one-step, pixel-space, latent-free generation using MeanFlow with x-prediction.
- Reported 2.22 FID on ImageNet 256 and 2.48 FID on ImageNet 512; open-source implementation at Lyy-iiis/pMF.

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## COURSE PROJECTS

### Fast Humanoid Loco-Manipulation via Flow Matching

2025

MIT 6.4210 course project; robotics manipulation

- Reimplemented a BeyondMimic-style humanoid loco-manipulation pipeline with simulated data preparation, diffusion training, and post-hoc control guidance.
- Replaced DDPM sampling with flow matching and demonstrated lower-latency control with 5 sampling steps.

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## EDUCATION

### Massachusetts Institute of Technology

Sep 2024 - Present

Undergraduate in Artificial Intelligence and Mathematics; expected graduation: 2028; GPA: 5.00/5.00

### Tsinghua University, Institute for Interdisciplinary Information Sciences

Sep 2023 - Jul 2024

Pre-college student; GPA: 4.00/4.00

## CERTIFICATES & HONORS

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<b>2nd place, 2024 Putnam Mathematical Competition</b>	2024
<b>Gold Medal and 11th place, International Mathematical Olympiad</b>	2023
<b>Gold Medal and 1st place with perfect score, Chinese Mathematical Olympiad</b>	2022
<b>Excellent Award, Alibaba Global Mathematics Competition; top 70 among 50,000+ participants</b>	2022-2024

## SKILLS

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### Programming

Python, C, PyTorch, JAX, GPU/TPU training and evaluation

### Languages

Mandarin (native), English (fluent)