

# Qingyuan Liu

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## EDUCATION

### Columbia University in the City of New York

Master of Science in Computer Engineering

Sep. 2023 – May 2025

New York, USA

◦ Overall GPA: 3.92/4.00 (Ranked Top 3/30 [🌐])

### Huazhong University of Science and Technology (Ranked #91 Globally, U.S. News 2025)

Bachelor of Engineering in Computer Science and Technology

Sep. 2019 – Jul. 2023

Wuhan, China

◦ Overall GPA: 3.75/4.00, Last 2 Years GPA: 3.90/4.00

## RESEARCH INTERESTS

- **Interpretability:** Knowledge Mechanisms and Editing, Controllable Generation, Causal Inference.
- **Trustworthy AI:** Data synthesis with LLMs, Hallucination Mitigation, Adversarial ML.
- **AI for Science:** Medical Vision Foundation Models, Physics-informed Diffusion Model.

## PUBLICATIONS

\*EQUAL CONTRIBUTION, C=CONFERENCE, S=IN SUBMISSION

- [S.1] Qingyuan Liu\*, Jiachen Gu\*, Yunzhi Yao, Hong Wang, and Nanyun Peng. **Energy-Regularized Sequential Model Editing on Hyperspheres**. In submission to *The Fourteenth International Conference on Learning Representations (ICLR)*. 2026.
- [S.2] Qingyuan Liu, Yun-Yun Tsai, Ruijian Zha, Pengyuan Shi, Victoria Li, Chengzhi Mao and Junfeng Yang. **LAVID: An Agentic LVLM Framework for Diffusion-Generated Video Detection**. arXiv Preprint. 2025. (ICCV 2025 score: 442)
- [C.1] Baohua Yan, Qingyuan Liu, Zhaobin Mo, Kangrui Ruan, Xuan Di. **Balanced Latent Space of Diffusion Models for Counterfactual Generation**. In *The Thirteenth International Conference on Learning Representations Deep Generative Model in Machine Learning: Theory, Principle and Efficacy Workshop (ICLR DeLTA)*. 2025.
- [C.2] Qingyuan Liu, Pengyuan Shi, Yun-Yun Tsai, Chengzhi Mao, and Junfeng Yang. **Turns Out I'm Not Real: Towards Robust Detection of AI-Generated Videos**. In *IEEE / CVF Computer Vision and Pattern Recognition Conference 2024, (CVPR GenAI)*. **Columbia Engineering Research Highlight**
- [C.3] Zhaobin Mo\*, Qingyuan Liu\*, Baohua Yan, Longxiang Zhang, and Xuan Di. **Causal Adjacency Learning for Spatiotemporal Prediction Over Graphs**. In *Proceeding of 27th IEEE International Conference on Intelligent Transportation Systems (ITSC)*. 2024.
- [C.4] Qingyuan Liu, Yuxuan Zhou, and Shuai Bao. **Accurate Face Swap using CycleGAN**. In *International Conference on Cloud Computing, Internet of Things, and Computer Applications (CICA)*. 2022.

## RESEARCH EXPERIENCE

### 🌐 PLUSLAB, University of California, Los Angeles

Research Assistant advised by Prof. [Nanyun \(Violet\) Peng](#)

Jan. 2025 – Present

Los Angeles, USA

- **Pr. 1: Energy-Regularized Sequential Model Editing on Hyperspheres (Lead Researcher):** Developed SPHERE (Sparse Projection for Hyperspherical Energy-Regularized Editing), projecting new knowledge onto sparse subspaces of edited weight to preserve hyperspherical uniformity with rigorous proof linking hyperspherical uniformity to editing stability; achieved +16.4% average editing capability over baselines while most faithfully preserving general performance on LLaMA3 (8B) and Qwen2.5 (7B). **First-Author Paper submitted to ICLR 2026.**

### 🌐 VLAA LAB, University of California, Santa Cruz

Research Assistant advised by Prof. [Yuyin Zhou](#)

May 2025 – Present

Santa Cruz, USA

- **Pr. 1: Unified Vision-Language Foundation Model for Brain MRI Interpretation (Lead Researcher):** Developed large-scale vision foundation models for 3D brain imaging (i.e., T1, MPRAGE, DWI), trained on 20+ public datasets with 60,000 scans; designed a multi-stage paradigm with self-supervised pretraining, vision-language alignment, and instruction tuning, equipping the model with transferable visual representations, cross-modal reasoning, and robust instruction-following capabilities.

### 🌐 DitecT Lab, Columbia University


Research Assistant advised by Prof. [Xuan \(Sharon\) Di](#)

Sep. 2023 – Present

New York, USA


- **Pr. 1: Causal Adjacency Learning for Spatiotemporal Prediction Over Graphs (Lead Researcher):** Designed the Causal Adjacency Learning (CAL) framework, enhancing prediction performance on the ODD dataset; applied a heuristic method combining correlation calculation and conditional independence testing; achieved +26.7% average RMSE improvement on SafeGraph dataset over baselines based on distance, correlation, and attention matrix. **First-Author Paper accepted by ITSC 2024.**

- **Pr. 2: Balanced Latent Space of Diffusion Models for Counterfactual Generation (Core Researcher):** Proposed a controllable diffusion generation framework that balances latent space via guiding signals, enabling generation of counterfactual data while preserving factual consistency. Experiments on MNIST demonstrate its potential for counterfactual data generation. **Second-Author Paper accepted by ICLR DeLTa 2025.**


**Software Systems Laboratory, Columbia University**


*Sep. 2023 – May 2025*  
 Research Assistant advised by Prof. [Junfeng Yang](#)  
 New York, USA

- **Pr. 1: Turns Out I’m Not Real: Towards Robust Detection of AI-Generated Videos (Lead Researcher):** Developed Diffusion Reconstruction Error (DIRE) based method for detecting AI-generated videos by leveraging video generation models as reconstruction modules and incorporating temporal information; achieving up to 93.7% accuracy on datasets including Stable Video Diffusion, Sora, Pika, and Gen-2. **First-Author Paper accepted by CVPR GenAI 2024; featured as Columbia Engineering Research Highlight.**
- **Pr. 2: LAVID: An Agentic LVLm Framework for Diffusion-Generated Video Detection (Lead Researcher):** Designed LAVID, an agentic framework leveraging LVLms with external tool calls (i.e., Optical flow, Sharpen, SAM) for AI-generated video detection, improving F1 score by 6.2%-30.2% across four state-of-the-art LVLms, including GPT-4o, Gemini-1.5-Pro, Qwen-VL and LLaVA. **First-Author paper with ICCV 2025 score: 442.**


**Department of Computer Science, Illinois Institute of Technology**

*May 2021 – Mar. 2022*  
 Research Assistant advised by Prof. [Binghui \(Alan\) Wang](#)  
 Remote

- **Pr. 1: Robust Node Injection Attack in Graph Neural Networks (Lead Researcher):** Designed a node-injection attack with low inter-perturbation correlation using DeepWalk to filter correlated injected nodes, improving robustness while retaining comparable effectiveness against common defenses.



**School of Computing, National University of Singapore**

*Apr. 2021 – Oct. 2021*  
 Research Assistant advised by Prof. [Anand Bhojan](#)  
 Singapore

- **Pr. 1: NUS School of Computing Summer Workshop 2021 (Lead Researcher):** Developed a multi-factor spatio-temporal GNN to predict stock market trends using Tushare and Yahoo data, and implemented web crawlers for sentiment and corporate relation data collection, enabling more accurate and explainable market forecasts.

## INTERESTING PROJECTS ON HARDWARE

**Bubble Bobble Game on Embedded Systems**

*Jan. 2024 – May 2024*  
 Tools: Verilog, DE1-SoC, Quartus Prime, ARM DS-5 Debugger, libusb, WM8731 Audio CODEC  


- Implemented a Bubble Bobble game on DE1-SoC using ARM for game logic and FPGA for video/audio; integrated VGA, USB controller, and audio codec. **Ranked 1st in CSEE4840 Embedded Systems at Columbia.**

**5G Network Slicing System and Strategy for End Users**

*Apr. 2024 – Sep. 2024*  
 Tools: Android Studio, VMware, ICMP, Linux Traffic Control (tc)

- Developed a 5G network slicing framework with optimized strategy; validated on 12 Android devices, achieving +69.4% throughput and +82.2% document transfer efficiency. **National Second Prize (Top 3% of 1006 teams worldwide) in China Collegiate Computing Contest.**

**Microprocessor without Interlocked Pipeline Stages (MIPS) CPU Design**

*Sep. 2021 – Nov. 2021*  
 Tools: Logisim, Verilog, MIPS Assembly

- Designed a MIPS-based CPU from scratch on Logisim, integrating pipeline stalling and branch history table for hazard resolution.

## HONORS AND AWARDS

**Columbia Engineering Research Highlight**  
 Columbia University

2024  


**2024 Spring MS Honors Students (Top 3)**  
 Columbia University

2024  


**Advanced Master Research Student**  
 Columbia University

2024

**National Second Prize (Top 3%) in the China Collegiate Computing Contest-Network Technology Challenge (C4)**  
 Computer Education Research Association of Chinese Universities

2023

## ADDITIONAL INFORMATION

**Languages:** Chinese (Native), English (Proficiency)  
**Programming Languages:** C/C++, Python, Java, SQL, Matlab, HTML/CSS  
**Packages:** Pytorch, Huggingface, Tensorflow/Keras, WandB, Diffusers, OpenCV, Sklearn, Matplotlib, Seaborn