

## EDUCATION

- **Massachusetts Institute of Technology** Cambridge, MA  
*B.S. in Physics and Computer Science (intended)* Expected May 2028
- **Tsinghua University, Institute for Interdisciplinary Information Sciences (IIIS)** Beijing, China  
*Freshman Year; GPA: 3.95/4.00* Aug. 2024 – July. 2025
- **Tsinghua University, Institute for Interdisciplinary Information Sciences (IIIS)** Beijing, China  
*Preparatory Program; GPA: 4.00/4.00* Feb. 2024 – July. 2024

## HONORS & AWARDS

- **54th International Physics Olympiad (IPhO): Gold Medal, 1st Place in Theoretical Round** July 2024
- **9th Romanian Master of Physics (RMPH): Gold Medal, 3rd Place** March 2023
- **40th Chinese Physics Olympiad (CPhO): Gold Medal** Oct 2023
- **39th Chinese Physics Olympiad (CPhO): Gold Medal** Oct 2022
- **China Young Physicists' Tournament: Team First Place (Team Leader)** March 2023
- **Tsinghua University: Xuetaoguan Scholarship & Freshman Scholarship** Dec 2024

## EXPERIENCE

- **Undergraduate Researcher, Learning-based Control** Beijing, China  
*Tsinghua University; Supervised by Prof. Huazhe Xu* Anticipated: Oct. 2024 – June 2025
  - Investigated a novel RIR (Reinforcement Learning to Imitation Learning to Real-world) framework for robot manipulation on a Franka robotic arm (simulated), leveraging PPO and DrQ-v2 for initial RL training.
  - Designed a multi-stage approach for specialist training in simulation and multitask generalization via imitation learning, addressing complexities of sim-to-real transfer and policy generalization.
  - Conducted comprehensive literature reviews on advanced robot learning, informing experimental design and gaining experience in problem formulation and conceptual design.

## PROJECTS

- **Enhancing Diffusion Models with RL and Adversarial Rewards:** Developed a novel framework leveraging Reinforcement Learning and adversarial discriminators to enhance pre-trained diffusion models. Formulated the reverse diffusion process as an MDP to optimize perceptual quality, achieving up to a **21.7% FID score reduction** compared to baseline. Demonstrated a plug-and-play enhancement for existing models. [Code & Report]
- **Consistent Local Edits in Videos via Attention Manipulation in Diffusion Models (CLEVAM-DM):** Engineered CLEVAM-DM, a novel training-free framework for consistent local video editing with diffusion models. Designed a multi-stage pipeline integrating **BrushNet inpainting**, **DDIM inversion**, **full attention sharing**, and **PerVFI** for temporal coherence. [Code & Report]
- **Algorithm Design for the Metric k-Center Problem:** Authored a comprehensive survey and developed a unified evaluation framework for the metric k-center problem. Proposed three novel algorithms, one achieving a significant performance increase, reaching an empirical approximation ratio of **1.049** (compared to SOTA SCR's 1.064). [Code & Survey]
- **LLM-Powered Knowledge Database:** Initiated and led development of an AI agent-driven file-to-knowledge system using Llama 3. Architected and implemented core knowledge inference module, demonstrating foresight in knowledge management and AI applications. [Code] [Demo]
- **Minimal Reinforcement Learning Framework (RL-Zero):** Developed a modular RL framework in Python from scratch for reproducible experimentation and fundamental understanding. Implemented key features like configuration-driven training, experiment tracking, and video logging. [Code]
- **Centralized Visual Package Router (CVPR):** Led full-stack development of Centralized Visual Package Router (CVPR), a type-safe logistics management and visualization system. Engineered type-safe backend in Scala and responsive frontend in TypeScript with React, emphasizing functional programming principles. [Code]

## RELEVANT COURSEWORK

- **Deep Learning:** Mastered theoretical foundations (convergence analysis, DDPMs) and modern architectures (Transformers, GNNs). Applied through projects: implemented autograd, trained VAEs/GANs, and fine-tuned a 1B+ parameter LLM.
- **Computer Vision:** Implemented classical and modern algorithms (e.g., SIFT for panorama stitching, 3D-to-2D projections for autonomous driving visualization) from scratch, and trained a semantic segmentation model.
- **Algorithm Design:** Rigorous study of algorithm design and analysis (Kleinberg & Tardos), covering approximation and randomized algorithms.
- **Intro to Computer Systems:** Explored OS, computer architecture, and networking concepts. Projects: optimized performance on Raspberry Pi with SIMD (**40x speedup**), implemented concurrent data structures, and built a distributed service with gRPC.