

Mellon M. Zhang

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EDUCATION

Georgia Institute of Technology

Atlanta, GA

PhD in Machine Learning

Aug 2023 - Expected May 2025

- **Advisor:** Prof. Glen Chou
- **Coursework:** Advanced Programming Techniques, Mathematical Foundations of Machine Learning, Statistical Machine Learning, Probabilistic Graphical Models, Deep Learning, Conversational AI

University of California, Berkeley

Berkeley, CA

B.A. in Computer Science

Aug 2019 – May 2023

- **Coursework:** Linear Algebra & Differential Equations, Data Science, Database Systems, Algorithms, Data Structures, Robotics, Optimization, Artificial Intelligence, Computer Architecture, Discrete Mathematics, CS Theory, Operating Systems, Deep Learning, Machine Learning

REFEREED WORKSHOP PAPERS

- M. M. Zhang and G. Chou. **Polar Hierarchical Mamba: Towards Streaming LiDAR Object Detection with Point Clouds as Egocentric Sequences**, *Workshop on 4D Vision: Modeling the Dynamic World @ CVPR 2025*

PREPRINTS

- M. M. Zhang, G. Chou, and S. Mukhopadhyay. **Polar Hierarchical Mamba: Streaming LiDAR Object Detection with Point Clouds as Egocentric Sequences**. *Under Review at NeurIPS 2025*. [arXiv]
- M. M. Zhang, H. Kumawat, and S. Mukhopadhyay. **DFDNet: Directional Feature Diffusion for Efficient Fully-Sparse LiDAR Object Detection**. *Under Review at ICCV 2025*. [Paper]

RESEARCH EXPERIENCE

Georgia Institute of Technology

Atlanta, GA

Graduate Research Assistant - Advisor: Prof. Glen Chou

Aug 2023 – Current

- **Visual reasoning of vision-language-action models**
- **Uncertainty-aware temporal LiDAR perception**
- **Streaming LiDAR Object Detection**
 - * **Keywords:** Pytorch, Mamba, DDP, LiDAR, HPC
 - * Developed a novel streaming neural network for real-time processing of LiDAR sectors, achieving 10% improvement over existing SOTA and 2x throughput
 - * Implemented in Pytorch and trained on HPC SLURM cluster using Distributed Data Parallel (DDP)
 - * Under preparation for NeurIPS 2025, accepted to 4DV @ CVPR 2025
- **Efficient Fully-Sparse LiDAR Object Detection**
 - * **Keywords:** Pytorch, convnets, DDP, self-driving, SLURM, HPC
 - * Proposed a novel neural network for efficient point cloud object detection achieving SOTA performance with 2x reduction in computational cost (floating point operations)
 - * Designed and implemented in Pytorch, trained on HPC cluster using SLURM and Distributed Data Parallel (DDP)
 - * First-author manuscript under review at TMLR

Knight Lab

Berkeley, CA

Undergraduate Research Assistant - Advisor: Prof. Robert T. Knight

Aug 2021 – Aug 2022

- **Explaining Large Language Models from Neuroscience Perspective**
- **Keywords:** Prompt engineering, fine-tuning, dataset creation, explainable AI

- Designed a novel dataset from neuroscience logic puzzles and finetuned T5 model.
- Awarded UC Berkeley Rose Hills Fellowship for independent research.

Gigascale Reliable Energy-Efficient Nanosystem (GREEN) Lab

Gatech SURE Research Intern - Advisor: Prof. Saibal Mukhopadhyay

Atlanta, GA

May 2021 – Aug 2021

- **Associative Memories for Robust Image Classification**
- **Keywords:** hopfield networks, Tensorflow, image classification, network design
- Novel multilayer perceptron model with an associative memory layer for image retrieval and denoising, outperforms convnets on MNIST dataset with 10x reduction in training samples.
- 2nd place of 50 in Georgia Tech SURE Symposium

PERSONAL PROJECTS

- **sphan - Sparse Convolutions with Kolmogorov-Arnold Networks:** Custom C++/CUDA kernels with Pybind11 for fast sparse convolutions with trainable activation functions inspired by the Kolmogorov-Arnold representation theorem. First sparse Kanvolution PyPI package and features 7x speedup from previous Kanvolution implementation.
- **Turtlecups - Maze-solving Mobile Robot:** Mobile robot designed to traverse mazes constructed from SOLO cups. End-to-end with perception (Canny edge detection), planning (RRT*), control (PID), and intercommunication (ROS).

HONORS AND AWARDS

- **Berkeley Rose Hills Fellowship (One of 45 recipients selected university-wide)** 2022
- **Georgia Tech SURE Fellowship (One of 50 recipients selected nationally)** 2021

PROFESSIONAL ACTIVITIES

- **Program Committee:** CoRL ('25)
- **Informal Reviewer:** CVPR ('25), ICCV ('25), NeurIPS ('25)
- **Project ENGAGES** 2025 - 2026
 - One-on-one research mentorship with high school student from Atlanta area.
 - Best presentation runner-up at Project ENGAGES summer finale.

INVITED TALKS

- **Project ENGAGES Mentor Lecture Series.** Securing Modern Robotics. June 2025

PRESENTATIONS

- **CVPR Workshop on 4D Vision, 2025.** Polar Hierarchical Mamba: Towards Streaming LiDAR Object Detection with Point Clouds as Egocentric Sequences. *Poster presentation.* June 2025
- **Gatech SURE Symposium.** Integrating Unsupervised and Supervised Techniques for Robust Image Classification. *Oral presentation, Best presentation runner-up (#2/50).* July 2021

SKILLS

Programming: Python (PyTorch, Tensorflow, Scikit-learn etc.), C++, CUDA, LaTeX, Java, Javascript, C, RISC-V

Development: Linux, bash, Git, SLURM, HPC

Hobbies: Volleyball, tennis, hiking, piano