

# Michael Lin

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## Education

### Carnegie Mellon University

M.S. in Computer Vision (Robotics Institute)

Pittsburgh, PA

August 2025 – December 2026

- Relevant coursework: Machine Learning, Advanced Computer Vision, Learning for 3D Vision, SLAM

### Boston College

B.S. in Computer Science, B.A. in Mathematics

Chestnut Hill, MA

August 2021 – May 2025

## Experience

### Computer Vision Researcher (Near Earth Autonomy)

January 2026 – Present

- Constructed YOLO-based methods for multi-modal runway segmentation from aerial monocular images
- Investigated SIM2Real transfer from simulator data to real-world testing for failure validation testing

### Graduate Research Assistant (Carnegie Mellon University)

January 2026 – Present

- Conducted research in 3D time sequence scene understanding, continuing work from a previous project in Gaussian splatting, with Professor Katia Sycara's Advanced Agent-Robotics Technology Lab

### Undergraduate Research Fellow (Boston College)

January 2022 – August 2025

- Developed UNet-based machine learning pipelines for cell segmentation in electron microscopy imagery. Advised by Professor Donglai Wei and collaborated with labs at USC, Columbia University, and UMichigan to publish multiple papers in high-profile biology conferences (Nature, Cell)
- Organized and facilitated lab's onboarding program and instructed new team members on MLOps tools (Numpy, PyTorch, PyTorch Connectomics, Slurm) through weekly in-person meetings and coding exercises

## Projects

### Open-Vocabulary Scene Understanding for 3D Gaussian Splatting

September 2025 – December 2025

- Developed a 3D Gaussian splatting tool based on OpenGaussian and StreetGaussian for zero-shot semantic understanding. Used masks from Segment Anything to facilitate learning of open vocabulary language embeddings for answering natural language queries

### 3D Cell Segmentation and Center-line Extraction

May 2025 – August 2025

- Designed cell segmentation pipelines using PyTorch Connectomics and Segment Anything to study gene regulation dynamics. Completed in collaboration with the Spatial Biodynamics Lab at UMichigan. Created over 5000 cell instance segmentation with precision/recall scores of 0.6/0.7 during deployment

### Large-scale 3D Segmentation in Electron Microscopy Volumes

May 2024 – March 2025

- Created a machine learning pipeline based on the 3D-UNet architecture to study cell distribution in nervous systems of *Hydra vulgaris* using tools from the PyTorch Connectomics library. Completed in collaboration with Prof. Rafael Yuste's NeuroTechnology Lab at Columbia University
- Automated model deployment (Slurm, sequential job management, bash scripting) on over 1TB of volumetric data on a HPC, producing 40000 instance segmentations with 98% precision

### Real-time Microscopy Object Detection

January 2023 – September 2023

- Developed a UNet model for object detection in STEM images using Pytorch to study electromagnetic spin. Generated over 100 heatmaps of merons detections from EM imagery, achieving over 70% precision and recall during testing at a 1Hz rate. Completed with the Shao Electron Microscopy Group at USC

## Publications (\* indicates shared first author)

Lirong Zheng, ..., Michael Lin, et al (2025). *Scalable and multiplexed recorders of gene regulation dynamics across weeks*. Nature. doi.org/10.1038/s41586-026-10156-9.

Shulin Zhang, ..., Michael Lin, et al (2025). *Ultrastructural reconstruction of the endodermal nerve net of Hydra vulgaris*. Current Biology. doi.org/10.1016/j.cub.2025.10.001.

Michael Lin\*, et al. VesicleEM: A Comprehensive Vesicle Analysis Toolbox for Volumetric Electron Microscopy. In review for PLOS Computational Biology.

Michael Lin, et al (2024). *Real-Time Point of Interest Segmentation for Electron Microscopy Images via Machine Learning*. Microscopy and Microanalysis. doi.org/10.1093/mam/ozae044.215.

## Technical Skills

Python, C, C++, Java, R, Pytorch, OpenCV, Numpy, PIL, Scikit, Matplotlib, Scipy, Git, Slurm, Github, Linux, Jupyter