Yun Zhang

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EDUCATION

University of California, Los Angeles (UCLA) ***Starting Sept. 2025***
Ph.D. Student in ***Mobility Lab*****,** advised by Professor Jiaqi Ma
Honors:
- Graduate Dean's Scholar Award (GDSA), UCLA Division of Graduate Education (2025–2027)

University of California, Los Angeles (UCLA) ***Sep. 2021 – Expected Jun. 2025***
B.S. in ***Mathematics of Computer Science*** *and B.S. in* ***Statistics and Data Science*** Cumulative GPA: **3.75/4.0**
Honors:
- Dean's Honors List for Fall 2021/Winter/Spring/Fall 2022, Winter/Spring 2023
- Robotics: Science and Systems (RSS) Pathway Fellowship 2025
- Selected Member of Upsilon Pi Epsilon, the International Honor Society for Computing

RESEARCH EXPERIENCE

Mobility Lab, UCLA | Incoming PhD, *advised by Prof. Jiaqi Ma* *Mar. 2023 – Present*
- Led database creation, scenario design, and comprehensive analysis of multi-camera sensor configurations at smart intersections using **CARLA, OPENCDA,** and **ScenarioRunner** to simulate and evaluate performance in diverse environments.
- Participated in various projects, including sensor placement, perception, prediction, mapping, and real-world implementations.
- Developed a **ROS package** with detailed documentation, improving sensor system integration and functionality.
- Participated in the **U.S. DOT Intersection Safety Challenge**, developed and tested a **trajectory UI tool** to improve the accuracy of real-time vehicle and road user trajectory predictions, contributing to safer and smarter transportation solutions.

Vwani Roychowdhury's Lab, UCLA | Research Assistant, *Feb. 2023 – Dec. 2025*
- Contributed to the development of deep learning models using VGG (Visual Geometry Group) for PyHFO, a multi-window desktop application designed to provide **efficient neuro-biomarker detection** for artifact and spike classification.
- Developed and integrated the **Hilbert (HIL) detector** for HFO detection and the **Latent State (LS) detector** for spindle detection into PyHFO.
- **Enhanced detection run-time** performance by reducing processing time **50-fold** compared to state-of-the-art solutions, ensuring comparable accuracy through comprehensive validation.
- **Led model testing and benchmarking**, refining detection processes, and ensuring that PyHFO's algorithms achieved optimal performance against existing solutions.

HKU Summer Research Program | Researcher*, advised by Professor Liangqiong Qu* *2024 Summer*
- Selected from over 1,800 candidates for a program with an acceptance rate of only **5.7%** (104 accepted).
- Conducted cutting-edge research on **brain tumor segmentation** using MiniGPT-4, applying Large Language Models (LLMs) to integrate MRI modalities (T1c, T1w, T2c, and FLAIR) for improved segmentation accuracy in medical imaging.
- Awarded **Best Presenter** and invited to shoot next year's **campaign video** for outstanding contributions.
- Received a **PhD offer** with a Presidential Scholarship for exceptional performance and research potential.

PUBLICATIONS

InSPE: ***Rapid Evaluation of Heterogeneous Multi-Modal Infrastructure Sensor Placement***
- Yun Zhang*, Zhaoliang Zheng*, Zonglin Meng, Johnson Liu, Xin Xia, Jiaqi Ma
- Submitted to the International Conference on Computer Vision on March 9th, 2025.

[1] *These authors contributed equally to this work.

***AgentAlign*: Misalignment-Adapted Multi-Agent Perception for Resilient Inter-Agent Sensor Correlations**
- Zonglin Meng, Yun Zhang, Zhaoliang Zheng, Seth Z. Zhao, Jiaqi Ma
- Submitted to the International Conference on Computer Vision on March 9th, 2025.

RelMap: Enhancing Online Map Construction with Class-Aware Spatial Relation and Semantic Priors
- Tianhui Cai, Yun Zhang, Zewei Zhou, Zhiyu Huang, Jiaqi Ma
- Submitted to the International Conference on Computer Vision on March 9th, 2025.

V2XPnP: Vehicle-to-Everything Spatio-Temporal Fusion for Multi-Agent Perception and Prediction
- Zewei Zhou, Hao Xiang, Zhaoliang Zheng, Seth Z. Zhao, Mingyue Lei, Yun Zhang, Tianhui Cai, Xinyi Liu, Johnson Liu, Maheswari Bajji, Xin Xia, Zhiyu Huang, Bolei Zhou, Jiaqi M
- Submitted to the International Conference on Computer Vision on March 9th, 2025.

PyHFO 2.0: A Comprehensive Lightweight End-to-end Clinical HFO Research and Analysis Tool
- Yuanyi Ding, Yipeng Zhang, Chenda Duan, Atsuro Daida, Yun Zhang, Sotaro Kanai, Minjian Lu, Shaun Hussain, Richard J. Staba, Hiroki Nariaib, and Vwani Roychowdhury
- Submitted to the Journal of Neuroscience Methods on Apr. 9th, 2025.

CDA.AI for OpenCDA: AI Pathways for Cooperative Driving Automation Research
- Xu Han, Zhaoliang Zheng, Zewei Zhou, Yun Zhang, Tiahui Cai, Yifan Liu, Hao Xiang, Camila Correa-Jullian, Zonglin Meng, Zhiyu Huang, Letian Gao, Xin Xia, Jiaqi Ma*
- Submitted to the Artificial Intelligence for Transportation on April 7th, 2025.

V2X-ReaLO: An Open Online Framework and Dataset for Cooperative Perception in Reality
- Hao Xiang, Zhaoliang Zheng, Xin Xia, Seth Z. Zhao, Letian Gao, Zewei Zhou, Tianhui Cai, Yun Zhang, Jiaqi Ma
- Submitted to the International Conference on Computer Vision on March 9th, 2025.

PROJECTS

Large-Scale CARLA Scenario Design | Core Designer *Feb. 2024 – Mar. 2025*
- Built a **flexible data-generation tool** that allows **configurable sensor positions and parameters**, enabling scalable benchmarking for **Infrastructure-to-Infrastructure (I2I) perception**.
- **Designed and developed Infra-Set**, a large-scale dataset covering **10 intersections** with diverse **geometries, traffic densities, and environmental conditions** to evaluate **multi-modal sensor placement** in autonomous driving.
- Created a **simulation pipeline in CARLA** to test **centralized, semi-distributed, and fully distributed** sensor configurations under diverse environmental and traffic conditions.
- Simulated **heterogeneous sensor configurations** (camera & LiDAR) using the **CARLA simulator**, generating **144,000 scenario frames (2.6TB of data)** for **sensor coverage, occlusion, and object detection analysis**.

Benchmarking Infrastructure-Based Sensor Placement | Core Developer *Sept. 2024 – Mar. 2025*
- Designed and implemented a **scalable benchmarking framework** to evaluate **multi-modal infrastructure sensor placement** in autonomous driving scenarios.
- Developed a **flexible Infrastructure Unit (IU) formulation** to systematically model sensor placements across heterogeneous urban environments.
- Integrated **LiDAR and camera sensor fusion** into a **Heterogeneous Multi-Modal (HM) Perception Framework**, improving detection accuracy in occluded environments.
- Conducted benchmarking experiments using state-of-the-art (SOTA) infrastructure-based multi-modal perceptional algorithms, resulting in a **comprehensive evaluation of infrastructure-aware perception models**.

Multi-Agent Multi-Modal Fusion on V2X Real Dataset | Developer *Sep. 2024*

- Implemented a multi-agent multi-modal fusion framework for the V2X-Real dataset in a Vehicle-to-Vehicle (V2V) context, enhancing simulations and real-time communication for **Vehicle-to-Everything (V2X) technologies.**
- Integrated **camera data** into the existing fusion model, independently modifying critical components such as the **dataloader, loss function, and internal modules** to ensure seamless multi-modal data inclusion.
- Tested and evaluated **benchmark models** for object detection and tracking algorithms, showing significant performance improvements from the fusion of camera and LiDAR data.
- Worked on using **camera data** solely for **3D car detection**, advancing the model's capability for 3D object detection with only camera inputs.
- Introduced **noise simulation** on both **camera and LiDAR data** to enhance the model's robustness, improving its ability to handle sensor misalignment and real-world noise variability.

Model Design & Training Optimization for Map Generation | Research Contributor *Jan. 2025 – Mar. 2025*

- Assisted in designing **RelMap's Transformer-based architecture**, optimizing **relation-aware learning** for **online map generation**.
- Developed a **feature extraction pipeline** integrating **LiDAR, camera, and radar** data.
- Designed **custom loss functions** to penalize **spatial inconsistencies** and improve mapping accuracy.
- Optimized training with **data augmentation**, **contrastive learning**, and **adaptive learning rates**.
- Conducted **hyperparameter tuning** and **cross-validation** to refine the model, leading to **SOTA results on benchmark datasets**. Developed **automated training and evaluation scripts**, streamlining the benchmarking process and ensuring **reproducible experiments**.

Data Generation & Trajectory Correction for V2XPnP | Research Contributor *Sept. 2024 – Dec. 2025*

- Automated the **data generation pipeline** for the V2XPnP dataset, ensuring efficient multi-agent perception and prediction.
- Utilized **localization techniques** and obtained LiDAR pose estimation within the V2X-PnP dataset.
- Resolved **incorrect detection coordinates**, implemented **trajectory modifications,** and ensured **consistent IDs** for detected objects across different agents, improving tracking stability and multi-frame association.

WORK

Office of Palo Alto Councilmember Greg Tanaka | AI/Data Analyst Intern *Jun. – Dec. 2023*

- Analyzed voter data from multiple sources, including **social media**, HubSpot, and public records, to detect trends and develop predictive models for voter behavior in California's congressional district.
- Applied **LLMs** to personalize campaign emails, improving engagement and enhancing campaign efficiency through targeted outreach.
- Led the development of AI-based tools to streamline campaign services, optimizing outreach strategies and decision-making processes for the campaign team.

Uber, Hong Kong | Data Analysis Intern *Dec. 2022 – Mar. 2023*

- Participated in Uber's COVID-19 **facial mask recognition project**, ensuring the backend infrastructure and utility functions were optimized for performance.
- Conducted comprehensive **analysis and forecasting**, evaluating factors like weather conditions, time of day, and demand fluctuations in regional operations, helping Uber refine its service strategies.
- Built predictive models to **analyze customer behavior** and optimize driver allocation during peak hours, resulting in improved efficiency and customer satisfaction.

TECHNICAL SKILLS

Programming Languages: Python, C++, JavaScript, C#, R, LaTeX, Bash/Shell Scripting
Machine Learning & Data Science: Pytorch, TensorFlow, Scikit-learn, Pandas, NumPy, MATLAB, Jupyter Notebooks
Autonomous Systems & Simulation: CARLA, OpenCDAScenario Runner, ROS
Medical Imaging & Biomedical Analysis: Segment Anything Model (SAM), nnUNet, BraTS, Image Segmentation
DevOps & Cloud Computing: Docker, AWS, Git, GitKraken
Web Development & Frontend Technologies: React, Node.jsm HTML, CSS, JavaScript, Tableau