Zhaoyang Li

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Education

MS **University of California San Diego** Sep 2023 - Jun 2025
- Electrical and Computer Engineering (Intelligent Systems, Robotics & Control)

BS **University of Wisconsin-Madison**, Jan 2021 - May 2023
- **Double Major** in Computer Science & Mathematics

Research Interests

My research focuses on developing embodied agents that perceive, reason, and act in the physical world. I work at the intersection of **multimodal learning**, **robot learning**, and **preference alignment**, with a focus on **(1).** improving the robustness of vision–language models and their applications in healthcare, **(2).** developing efficient control and planning policies, and **(3).** aligning agent behavior with human intentions through feedback and preferences. Ultimately, I aim to build reliable, interpretable agents that generalize to real-world environments.

Publications & Preprints

* indicates equal contributions.

- 1. **Zhaoyang Li***, Zhan Ling*, Yuchen Zhou, Litian Gong, Erdem Bıyık, Hao Su. "ORIC: Benchmarking Object Recognition under Contextual Incongruity in Large Vision-Language Models." ICCV 2025 Workshop on Multi-Modal Reasoning for Agentic Intelligence (MMRAgI); extended version in submission. [Paper] [Code]
- 2. **Zhaoyang Li**, Sushaanth Srinivasan, Ninad Ekbote, Pengtao Xie. "A Multi-modal Large Language Model for Predicting Mechanisms of Drug Interactions." Under review, 2025.
- 3. Tongzhou Mu*, **Zhaoyang Li***, Stanisław Wiktor Strzelecki*, Xiu Yuan, Yunchao Yao, Litian Liang, Aditya Gulati, Hao Su. "When Should We Prefer State-to-Visual DAgger Over Visual Reinforcement Learning?" AAAI 2025. [Paper] [Code]
- 4. Yifei Zhang, Yusen Jiao, Jiayi Chen, **Zhaoyang Li**, Huaxiu Yao, Jieyu Zhang, Frederic Sala. "Just Select Twice: Leveraging Low-Quality Data to Improve Data Selection." ATTRIB Workshop at NeurIPS 2024; extended version in submission. [Paper]

Research Experience & Project

Preference Guidance for Diffusion Policy via Energy-Based Model (Led project)
Advisor: Prof. Erdem Bıyık, USC Sep 2025 – present
Los Angeles, CA
- Designed an energy-based preference model to score action trajectories based on human preferences and to shape diffusion policy learning.
- Building an end-to-end pipeline for preference-based robot control across RoboMimic and OpenAI Gym tasks (HalfCheetah, Hopper, Walker2d), PushT, and real-robot evaluation on WidowX.
- Project ongoing; targeting a submission to the International Conference on Intelligent Robots and Systems (IROS) 2026.

Vision-Language Model Benchmarking (Led project) Aug 2024 - Sep 2025
Advisor: Prof. Hao Su, UC-San Diego San Diego, CA
- Developed ORIC, a framework that generates context-incongruous object-recognition data for training and evaluation, revealing uncertainty-driven failures in LVLMs.
- Designed dual LLM- and CLIP-guided sampling to construct challenging ORIC-Bench and ORIC-style datasets, and evaluated 18 LVLMs and 2 open-vocabulary detectors under contextual incongruity.
- Fine-tuned Qwen3-VL-8B-Instruct with Visual-RFT on ORIC-style data, improving benchmark performance and aligning predictions with human reasoning.

Multi-modal Language Model for Drug Interaction Prediction (Led project) Dec 2024 - May 2025
Advisor: Prof. Pengtao Xie; UC-San Diego San Diego, CA

- Fine-tuned a multi-modal LLM with SMILES inputs to predict drug interaction status, degree, and mechanisms, integrating chemical informatics and NLP.
- Achieved strong performance: METEOR 0.42, BLEU-1 0.25, semantic similarity 0.57; outperforming GPT-4o (METEOR 0.16, BLEU-1 0.11, semantic similarity 0.30).

Empirical Analysis of State-to-Visual (S2V) Imitation vs. Visual RL (Co-leading project) Feb 2024 - Sep 2024
Advisor: Prof. Hao Su, UC-San Diego San Diego, CA

- Benchmarked State-to-Visual DAgger vs. visual RL across 16 tasks from ManiSkill, DMControl, and Adroit.
- Analyzed performance trade-offs, efficiency, and computational costs.
- Built a standardized S2V pipeline and derived practical recommendations.

Modality Transfer for PET and MRI Images May 2022 - Jun 2023
Advisor: Prof. Vikas Singh; UW–Madison Medical Science Center, Computer Vision Group Madison, WI

- Enhanced image translation with self-attention, MobileNetV2, and total variance loss in the pix2pix framework.
- Proposed U-TransGan model achieving PSNR 32, 0.98 correlation, and 0.92 SSIM.

Simulation of the Connected and Automated Driving Systems Sep 2021 - May 2022
Advisor: Prof. Bin Ran; The Connected Automated Vehicle Highway System Group Madison, WI

- Simulated and optimized traffic systems in CARLA, enhancing traffic management models for improved efficiency.
- Refined object detection algorithms, including YOLO and Faster R-CNN, to improve vehicle detection and traffic control systems.

Industry Experiences

Computer Vision Algorithm Engineer | Mech-Mind Robotics Technologies Ltd. Jun 2023 - Sep 2023
Beijing, China

- Developed algorithms for structured light 3D cameras, improving image accuracy and optimizing point cloud reconstruction for laser systems.
- Led the refinement of internal camera distortion models, significantly enhancing imaging fidelity and calibration precision.

Backend Engineer | Quanzhou YouGouZan Network Technology Co., Ltd. Jun 2020 - Aug 2020
Quanzhou, China

- Developed an online shopping mall on WeChat using SQL and Java, enabling functionalities like product search, browsing, recommendations, ordering, and payment.

Teaching

Teaching Assistant at UW-Madison Spring 2023

- CS540: Introduction to Artificial Intelligence

Peer Mentor at UW-Madison Fall 2022

- CS537: Introduction to Operating System

Professional Services

Reviewer

- AAAI Conference on Artificial Intelligence
- AAAI Workshop: Large Language Models and Generative AI for Health

Technical Skills

- **Languages**: English (Proficient; TOEFL 108, GRE 325 + 3.5), Chinese (Native)
- **Programming**: Python, C++, C, Java, Matlab, R, LaTeX, SQL
- **ML / Vision Frameworks**: PyTorch, TensorFlow, OpenCV, scikit-learn, SimpleITK, SPM12, TorchIO
- **Simulation / Robotics**: CARLA, MuJoCo, ManiSkill, DMControl, RoboMimic, WidowX, Adroit.
- **Developer Tools**: VS Code, Vim, IntelliJ IDEA, Visual Studio, Git, Docker, Kubernetes