

# Zhiheng Jiang

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## Education

### University of California, Los Angeles

Bachelor of Science in Computer Science and Engineering (GPA: 4.00 / 4.00, Dean's Honors List)

Los Angeles, CA

- **Courses:** Data Structures and Algorithms, Software Construction, Multivariable Calculus, Differential Equations, Discrete Math

## Experience

### Institute for Creative Technologies, University of Southern California

June 2025 – Sep 2025

Visiting Academic

Playa Vista, CA

- Led a reinforcement learning research project at the Human-inspired Adaptive Teaming Systems lab, advised by Dr. Volkan Ustun
- Created a benchmark suite of combinatorial problems for Preference-Driven Multi-Objective Reinforcement Learning (PD-MORL)
- Reduced action space of combinatorial allocation environment by 50+%, boosting hypervolume metric by up to 200%
- Designed Heterogeneous Graph Neural Network-based knowledge distillation framework for Proximal Policy Optimization (PPO)
- Developed training and evaluation pipelines with Gymnasium, Stable Baselines3, PyTorch Geometric, Wandb and PyMOO

### Structures-Computer Interaction Lab at UCLA

Oct 2024 – June 2025

Undergraduate Researcher

Los Angeles, CA

- Developed digital twin simulation of springs using Large Language Models and Robot Tool Calling, advised by Prof. Khalid Jawed
- Worked with scientist from Amazon AWS to develop multi-agent, multimodal LLM-robot workflows with memory and reasoning
- Created LLM agentic pipelines for Physics-informed Neural Architecture Search for 2D Reduced-Order Beam Simulations
- Developed a control system connecting LLM workflows, Intel RealSense video input and ROS-based Sawyer Collaborative Robots
- Deployed computer vision algorithms using OpenCV and ArUco marker detection to capture dynamics of deformable structures

### Institute of High Performance Computing, A\*STAR

June 2020 – Feb 2022

Research Assistant

Singapore

- First-author publication on music genre communities with Dr. Hoai Nguyen Huynh, cited by Spotify Research (2024)
- Improved upon Louvain Community Detection Algorithm on large social networks of 90,000+ users on music review website
- Performed text mining using Natural Language Tool Kit to extract meaningful textual information from genre communities

## Publications and Talks

- [1] **Zhiheng Jiang**, Volkan Ustun, "A Combinatorial Test Suite for Preference-Driven Multi-Objective Reinforcement Learning" *SoCal CS REU Symposium 2025 at Harvey Mudd College*
- [2] Mason Zhao, **Zhiheng Jiang**, Henry Braid, M. Khalid Jawed, "LLM-Guided Model Development of Elastic Structures" *UCLA Undergraduate Research Week 2025 (Presenters: Zhiheng Jiang and Henry Braid)*.
- [3] **Zhiheng Jiang** and Hoai Nguyen Huynh, "Unveiling music genre structure through common-interest communities" *Social Network Analysis and Mining*, Vol. 12, No. 35 (2022).

## Projects

### Today I Learnt AI Competition –Advanced Category Champion | LLMs, VLMs, Finetuning, PyTorch, HuggingFace, VertexAI, Docker 2024

- Team leader of champion team, winning 10,000 SGD (7,500 USD) cash prize competing against 60 university-level finalist teams
- Finetuned large deep learning models with high test scores, for audio (99.5%), Vision-Language Models and object detection (86.3%) and Transformer Question Answering (99.9%), with quantization, to achieve high inference speeds on a DJI robot
- Finetuned SOTA models such as YOLO, DETR, RoBERTa and OpenAI Whisper on VertexAI and Google Cloud Platform (GCP)
- Prize presented by Senior Minister of State for Defence of Singapore, Heng Chee How

### ACM AI - Atari Reinforcement Learning Project | Reinforcement Learning, OpenAI Gym, CNNs, PyTorch

2025

- Implemented Deep Reinforcement Learning algorithms (REINFORCE and DQN) from scratch to play Atari games
- Experimented with CNN and MLP-based RL function approximators to play Atari Surround on OpenAI Gym

### When2Fly Scheduling Web App | ReactJS, ExpressJS, CI/CD, PostgreSQL, Git, GitHub Actions, Vercel, Render

2025

- Designed a full-stack web app for Software Construction Lab Final Project, to connect students for Uber ride-sharing to LAX
- Developed comprehensive backend integration tests using Jest and Supertest to validate REST API endpoints (including authentication, CRUD and time-based queries), integrating them into a CI/CD pipeline for automated testing and deployment.
- Ensured robust foreign key and data integrity constraints in a PostgreSQL environment through automated testing.

## Technical Skills

**Languages:** Python, C++, MATLAB, Java, Javascript, LaTeX

**Technologies:** PyTorch, OpenAI Gym, HuggingFace, LangGraph, LangChain, Scikit-Learn, Pandas, Numpy, ReactJS, NodeJS, FastAPI

**Concepts:** Reinforcement Learning, Large Language Models, Machine Learning, Computer Vision, Natural Language Processing