JIANING ZHANG

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EDUCATION

Carnegie Mellon University **Incoming Class of 2027**
M.S. in Computer Vision

University of Washington **GPA: 3.94/4.00**
B.S. in Computer Science
Cum Laude
Honors in Computer Science

RESEARCH INTERESTS

Multimodal Language Models — Integrating vision, text, and other modalities for grounded understanding and reasoning.

3D/4D Understanding — Representation learning and generative modeling for spatiotemporal and 3D/4D data.

Embodied AI — Developing intelligent agents capable of perception, reasoning, and action in interactive environments.

PUBLICATIONS

MolmoMotion: Forecasting Point Trajectories in 3D with Language Instruction

Jianing Zhang, Chenhao Zheng*, Yajun Yang, Rustin Soraki, Winson Han, Chun-Liang Li, Jason Ren, Max Argus, Jieyu Zhang, Ranjay Krishna (In Submission to NeurIPS 2026)*

TrajTok: Learning Trajectory Tokens enables better Video Understanding

*Chenhao Zheng, Jieyu Zhang, **Jianing Zhang**, Weikai Huang, Quan Kong, Oncel Tuzel, Chun-Liang Li, Ranjay Krishna (CVPR 2026)*

RESEARCH EXPERIENCE

Allen Institute for AI (Ai2) January 2026 - Present
Student Researcher

- Built a scalable annotation pipeline extracting object-grounded 3D point trajectories from 1.16M unconstrained videos, producing the largest action-described 3D point trajectory dataset spanning 736 motion types and 5,692 objects.
- Developed MolmoMotion, a language-guided 3D motion forecasting model with autoregressive and flow-matching heads, significantly outperforming all baselines on PointMotionBench across 111 object categories and 61 motion types.
- Demonstrated downstream transfer to robot manipulation (+20.3% avg. success rate over Molmo2) and trajectory-conditioned video generation, outperforming Wan2.2-I2V-A14B on 4 of 5 video quality metrics.

RAIVN Lab @ University of Washington April 2025 - Present
Student Researcher *Mentors: Chenhao Zheng, Ranjay Krishna*

- Contributed to TrajTok, a trajectory-based tokenizer replacing patch tokens with object-centric representations, improving video understanding by +4.8% on Kinetics-400 and +4.1% on SSv2.

- Developed components of TrajAdapter for efficient feature utilization, boosting probing accuracy to 82.5% (Kinetics-400) and 75.1% (SSv2), outperforming linear, attentive, and Perceiver baselines.
- Integrated TrajTok into video-language models (TrajVLM), achieving +8.8% gains on LongVideoBench for long-horizon reasoning tasks.

ZERO Lab @ Peking University June 2024 - September 2024
Student Researcher *Mentor: Zhouchen Lin*

- Conducted research on model optimization, focusing on zeroth-order methods to address training challenges in 3 real-world datasets where backpropagation is not applicable, including scenarios like quantum physics simulations, robotic motion planning.
- Compared and evaluated 4 first-order and zeroth-order optimization methods, analyzing their strengths and weaknesses in practical applications.
- Proposed a novel optimization method with potential to enhance model training efficiency and performance.

Shanghai AI Lab & Shanghai Jiaotong University June 2023 - September 2023
Student Researcher *Mentor: Fang Yan — Supervisor: Wei Liu*

- Led research on deep learning-based whole-slide image classification for tumor cells and cancer subtypes, benchmarking 3 architectures for digital pathology applications.
- Designed and optimized attention-based networks for tumor cell detection, achieving 88% accuracy on public TCGA kidney cancer dataset, and fine-tuned for private lung cancer datasets, improving performance to 91% , which surpassed 80% doctor baseline.
- Developed tumor subtype detection models, achieving 98% AUC score, enhancing diagnostic support for clinical workflows.

PROJECTS

Jane Street Market Data Forecasting Competition November 2024 - January 2025

- Designed and implemented a predictive model for financial market forecasting, processing over 40 million rows of time-series data to enhance automated trading strategies.
- Applied advanced architectures, including Transformer models and XGBoost, with extensive hyperparameter tuning for improved model performance.
- Optimized resource usage to operate efficiently within limited RAM and GPU constraints, achieving a score just 0.003 below the competition winner, demonstrating strong performance and competitiveness despite hardware limitations.

CIRCLE Official Application June 2023 - June 2024

- Spearheaded the development of the official UW CIRCLE application, leveraging cross-platform capabilities informed by user research from 200+ students.
- Utilized React Native, React, and JavaScript to deliver a seamless experience on both Android and iOS systems.
- Focused on serving the international student community, enhancing the efficiency of official university departments while fostering students' sense of belonging. Addressed and mitigated misinformation to improve communication.

TECHNICAL STRENGTHS

Programming Languages	Python, Java, TypeScript, C, C#, C++, Shell, R, MATLAB
Databases/Tools	AWS, DynamoDB, Azure MySQL, Git, Ali Cloud Platform, GCP
Frameworks	PyTorch, TensorFlow, NumPy, Docker, SQLite, React, React Native, Node.js