Tracy (Yixin) Zhu

Email | Website

Education

University of Chicago — Chicago, IL
M.S. in Statistics — *Sept 2023 - Mar 2025*

- GPA: 3.8
- Relevant courses: Past Meets Present: A Tale of Two Visions, Introduction to Computer Vision, Information and Coding Theory, etc.

New York University — New York, NY
B.A. in Data Science and Mathematics — *Sept 2019 - May 2023*

- GPA: 3.75
- Honors: Dean's List of Year 2023 and 2022; 4 graduate-level courses

Peer-Reviewed Papers

* indicates equal contributions.

Peer-Reviewed Papers

[1] **Tracy Zhu***, Yukai Yang*, Marco Morucci, Tim G.J. Rudner. **A Systematic Assessment of Weak-to-strong Confidence Prediction in Large Language Models**.
Under Review.

[2] **Tracy Zhu***, Yukai Yang*, Marco Morucci, Tim G.J. Rudner. **Weak-to-strong Confidence Prediction**.
Workshop on Statistical Foundations of Large Language Models, Attributing Model Behavior at Scale, Safe Generative AI, and Regulatable ML, NeurIPS 2024.

[3] Hongyi Zheng, **Tracy Zhu**, Lavender Yao Jiang, Kyunghyun Cho, Eric Karl Oermann. **Making the Most Out of the Limited Context Length: Predictive Power Varies with Clinical Note Type and Note Section**.
ACL Student Research Workshop, 2023.

Projects

Spatial and 3D Aware Vision Encoders for Vision Language Action Models |
Multimodal Learning, Representation Learning

- Research advised by Prof. Chen Wei
- Developed a controlled evaluation protocol for swapping vision encoders in SOTA VLAs, finding that a single encoder can reach parity with the dual encoder setup under matched training conditions
- Operationalized "3D awareness" in VLA representations via a lightweight probing over multiple latent 3D properties, enabling model level comparisons beyond task success metrics
- Studied how injecting 3D aware visual features into the perception stack affects action prediction and generalization across viewpoint and scene variations

Weak-to-Strong Confidence Prediction | *Uncertainty Quantification, Representation Learning*

- Research advised by Prof. Tim G. J. Rudner and Prof. Marco Morucci
- Examined the weak-to-strong confidence prediction framework for LLMs and empirically demonstrated that the behavior of a "stronger" language model can be predicted using embeddings from "weaker" open-access models, improving generator reliability in selective prediction
- Analyzed key determinants of weak-to-strong confidence prediction, revealing that performance depends more on alignment between weak-model embeddings and strong-model decision boundaries than on model scale alone
- Conducted extensive ablation studies, demonstrating that the evaluation results are robust across label distributions and embedding aggregation strategies
- Constructed six question answering datasets that contain external signals of LLM answer-correctness uncertainty

Enhancing Geometry Consistency in Generative Vision Models | *Generative models, Diffusion models*

- Research advised by Prof. Anand Bhattad, Prof. David Forsyth, and Prof. Svetlana Lazebnik
- Enhanced diffusion model generation by conditioning on projective geometry cues to improve geometry consistency
- Demonstrated that SOTA models fail to preserve consistent perspective geometry between inputs and outputs

- Developed an evaluation framework using MMD and Relative Density to Ratio metrics to quantify geometric fidelity

3D Scene Reconstruction through Structure from Motion (SfM) | *3D reconstruction*
- Reconstructed 3D scenes with two sets of 2D photos
- Implemented incremental SfM with global bundle adjustment
- Visualized 3D points cloud through Trimesh

Interest Point Detection in Generative Models with SIFT | *Interest Point Detection, SIFT, Generative Models*
- Adapted SIFT to label ground truth images with point-wise and distribution-wise interest point mappings
- Trained offsets in StyleGAN with labeled interest points for enhanced control
- Combined k-means clustering with SIFT to improve quality of labels

Active Learning on Protest Images Using Function-Space VI | *Social Science Image Labeling, Active Learning*
- Implemented active learning heuristics using function-space variational inference model to label social science protest images
- Benchmarked the performance of HARA-based heuristics in active learning
- Applied informative Gaussian priors on deep Bayesian models to select informative images

Grants

NYU Summer Research Grant Jun-Aug 2024
Center for Data Science, New York University *New York, NY*
- $4800 award supported by Prof. Tim G. J. Rudner
- Contributed to a paper on Weak-to-Strong Confidence Prediction of Large Language Models

NYU Dean's Undergraduate Research Fund Jan-May 2022
Wasserman Center for Career Development, New York University *New York, NY*
- $1000 research grant to support undergraduate research
- Studied active learning with entropy-based heuristic for vision models

Academic Experience

Reviewer Oct 2024
Remote
- Served as a reviewer for NeurIPS 2024 & 2025, AISTATS 2026

Student Researcher (Remote) Feb 2024 - Oct 2024
Center for Data Science, New York University *New York, NY*
- Conducted experiments with a linear probe to evaluate LLM uncertainty using representations from white-box LLMs in a generalizable evaluation framework and analyzed the learned information
- Drafted manuscripts and created visualizations, including plots and tables, for a resulting workshop paper

Student Research Assistant Jun – Sept 2023
Center for Data Science, New York University *New York, NY*
- Implemented and experimented with heuristics functions in active learning for image classification for social science
- Mentored two undergraduate students from the Center for Data Science Undergraduate Research Program at NYU

Teaching Assistantship Jun 2022 - May 2023
Center for Data Science, New York University *New York, NY*
- 2023: DS-UA 301 Advanced Topics in Data Science: Techniques in Deep Learning, Jan 2023 - May 2023
- 2022: DS-UA 201 Causal Inference, Jun 2022 - Aug 2022