

# Tracy (Yixin) Zhu

[Email](#) | [Website](#)

## EDUCATION

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### University of Chicago

*M.S. in Statistics*

Chicago, IL

*Sept 2023 - Mar 2025*

- Current 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

*B.A. in Data Science and Mathematics*

New York, NY

*Sept 2019 - May 2023*

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

## PEER-REVIEWED PAPERS

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\* 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

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### Studying Spatially Aware Visual Features in VLAs | *Multimodal Learning, Representation Learning*

- Research advised by Prof. Chen Wei
- Systematically evaluated vision encoders in SOTA VLAs and showed that a single encoder achieves comparable performance rather than the widely adopted joint-encoder setting, suggesting that the added complexity is often unnecessary
- Integrated 3D-aware visual representations into the perception stack to improve broader generalizability

### 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 benchmark datasets that contains 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