

Jiayi Zhou

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RESEARCH INTERESTS

Driven to design explainable and accessible machine learning systems that foster trust in real-world applications, with research interests spanning machine learning, computer vision, and interdisciplinary applications focused on transparency and usability.

EDUCATION

Duke University

M.S. in Interdisciplinary Data Science, GPA: **3.96**

Durham, NC

May 2025

Wake Forest University

B.S. in Computer Science & Mathematical Statistics, **Summa Cum Laude**, GPA: **3.92** May 2023

Winston-Salem, NC

Publications

Accepted / Published

1. **On Thin Ice: Towards Explainable Conservation Monitoring via Attribution and Perturbations.** Zhou, J., Aghakishiyeva, G. *et al.* In *NeurIPS 2025, Imageomics Workshop*.
2. **Photorealistic Inpainting for Perturbation-based Explanations in Ecological Monitoring.** Aghakishiyeva, G., Zhou, J. *et al.* In *NeurIPS 2025, Imageomics Workshop*.

Under Review

3. **Det-LIME: Detector-Aware, Multi-Instance LIME for Explainable Object Detection in Ecological Applications.** Zhou, J., Johnston, D. W., & Bent, B. Under review.
4. **Seeing the Forest and the Trees: Explainable AI in Ecology.** Bent, B., Houlston, H., Zhou, J., Aghakishiyeva, G., & Johnston, D. Under review.

RESEARCH EXPERIENCE

Research Assistant, The TRUST Lab, Duke University

May 2025 – Present

Consilience: AI-Augmented Interdisciplinary Research

- Designed and implemented randomized controlled trials to evaluate the effectiveness of a voice-based LLM system (Consilience) in facilitating interdisciplinary collaboration, measuring short- and long-term impacts on team communication and research integration.
- Developed evaluation framework and metrics, including LLM-as-a-judge assessments, faculty reviews, and participant surveys, to systematically analyze the influence of AI-mediated dialogue.

Explainability in Conservation

- Engineered and optimized a computer vision pipeline using YOLOv9, YOLOv8-Seg, and Faster R-CNN to detect and segment marine wildlife from high-resolution drone imagery.
- Evaluated and implemented adaptations of Explainable AI (XAI) methods, including LIME, HiResCam, and LayerCAM, to analyze models and explain predictions for use in ecology.

Graduate Researcher, Applied Ethics+, Duke University

May 2024 – July 2024

- Led a team of four graduate students to build a structured dataset documenting the historical contributions of women in AI.
- Performed data wrangling and created interactive visualizations in Python to reveal longitudinal trends, culminating in 12 actionable policy recommendations to promote equity in AI.

SELECTED PROJECTS

Comparative Benchmarking for Obscured Object Detection (M.S. Capstone)

- Experimented comparing 2D (YOLO) and 3D (BEVFormer) traffic cone detection under partial occlusion, revealing trade-offs between accuracy and computational efficiency.

Juries and Trials in North Carolina Counties (B.S. Capstone)

- Developed interpretable decision-tree and linear models in R to analyze ten years of felony case activity reports, exploring trends and explaining factors influencing criminal trial rate variations.