# Yixiao Wang

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## Education

- **Duke University** *Aug. 2024 – May. 2026*
  *M.S. in Statistical Science* Durham, NC, United States
  - **GPA: 3.96/4.00**
- **University of Science and Technology of China, School of the Gifted Young** *Sep. 2020 – Jul. 2024*
  *B.S. in Mathematics* Hefei, Anhui, China
  - **Top 10%** in School of the Gifted Young & Mathematics; Outstanding Graduate (2024)
  - Thesis: *Trimmed Mean for Partially Observed Functional Data* (*Advisor:* ***Prof. Xiaohong Lan***)

## Research Interests

- **Machine learning theory**, with emphasis on scalable and theoretically grounded algorithms.
- **Deep learning theory**, aiming to uncover principles for efficient, interpretable, and practically deployable systems.

## Research Experience

- **Duke University, Interpretable Machine Learning Lab** *Jun. 2025 – Present*
  *Supervisor:* ***Prof. Cynthia Rudin*** Durham, NC, United States
  - Developing scalable algorithms for $\epsilon$-optimal sparse regression trees with continuous features, leveraging fast rank-one Cholesky updates to enable efficient and numerically stable split evaluation.
  - Investigating theoretical guarantees and computational trade-offs of sparse lookahead strategies for regression trees.
- **Duke University, Department of Computer Science** *Jun. 2025 – Present*
  *Supervisor:* ***Prof. Anru Zhang*** Durham, NC, United States
  - Established the first rigorous in-context learning theory for time series forecasting, showing that Transformers are fundamentally suboptimal: proved a strictly positive excess-risk gap over linear predictors, quantified its $\mathcal{O}(1/n)$ decay rate, and demonstrated exponential error compounding under Chain-of-Thought rollout.
  - Co-first authored a paper based on this work, currently under review at *ICLR 2026*.
- **Duke Center for Computational Evolutionary Intelligence (CEI)** *Jan. 2025 – Present*
  *Supervisor:* ***Prof. Yiran Chen*** Durham, NC, United States
  - Developed ZEUS, a controllable training-free diffusion acceleration framework achieving comprehensive 2×–4× speedups while maintaining perceptual fidelity. The paper based on this work is currently under review at *ICLR 2026*.
  - Developed SADA (*ICML 2025*), a stability-guided training-free adaptive diffusion accelerator, delivering $\geq 1.8\times$ speedups across SD-2, SDXL, and Flux with LPIPS $\leq 0.10$ and FID $\leq 4.5$.
- **Wake Forest University, Department of Computer Science** *Jan. 2025 – Present*
  *Supervisor:* ***Prof. Aditya Devarakonda*** Winston-Salem, NC, United States
  - Proposed and led the development of **Enhanced Cyclic Coordinate Descent (ECCD)**, a block coordinate descent algorithm with second-order Taylor correction for GLMs, ensuring both efficiency and stability even on large-scale datasets requiring tens of minutes to hours of fitting.
  - Achieved consistent 2–4× speedups over the widely used `glmnet` package while preserving convergence guarantees and solution accuracy.
  - Co-first authored a paper based on this work, accepted at *NeurIPS 2025*.

## Publications and Preprints

C=Conference, S=Submission, P=Preprint, I=In preparation

**[C.1]** **Yixiao Wang***, Zishan Shao*, Ting Jiang, Aditya Devarakonda. **"Enhanced Cyclic Coordinate Descent for Elastic Net GLMs,"** in *NeurIPS*, 2025.

**[C.2]** Ting Jiang*, **Yixiao Wang***, Hancheng Ye*, Zishan Shao, Jingwei Sun, Jingyang Zhang, Zekai Chen, Jianyi Zhang, Yiran Chen, Hai Li. **"SADA: Stability-guided Adaptive Diffusion Acceleration,"** in *ICML*, 2025. [Code] [Page] [Slides]

**[P.1]** Yufa Zhou*, **Yixiao Wang***, Surbhi Goel, Anru Zhang. **"Why Do Transformers Fail to Forecast Time Series In-Context?,"** *arXiv preprint*, 2025. (Submitted to NeurIPS 2025 Workshop on What Can't Transformers Do?)

**[I.1]** **Yixiao Wang***, Ting Jiang*, Zishan Shao*, Hancheng Ye, Jingwei Sun, Mingyuan Ma, Jianyi Zhang, Yiran Chen, Hai Li, 'ZEUS: Zero-shot Efficient Unified Sparsity for Generative Models," Manuscript in preparation (target: *ICLR 2026*). [Code] [Page];

**[S.1]** Zishan Shao, **Yixiao Wang**, Qinsi Wang, Ting Jiang, Zhixu Du, Hancheng Ye, Danyang Zhuo, Yiran Chen, Hai Li. **"FlashSVD: Memory-Efficient Inference with Streaming for Low-Rank Models,"** Manuscript submitted to *AAAI*, 2026. [Code]

* denotes co-first authorship; first-/co-first-authored works listed first.

## Honors and Awards

- **Outstanding Graduate, University of Science and Technology of China (USTC)** *2024*
- **China Petroleum Scholarship (3 awardees, School of the Gifted Young, USTC)** *2023*
- **Excellent Teaching Assistant (Top 3 in the University, USTC)** *2023*
- **Silver Prize, Outstanding Student Scholarship (Top 15%, USTC)** *2022 & 2021*
- **"Qiang Wei Feng Gong De Yu" (Diligence and Moral Conduct) Scholarship (USTC)** *2022*
- **Excellent President of Student Club (Origami Club, USTC)** *2022*
- **First Prize, Chinese Mathematical Competition for University Students (Top 1%)** *2022 & 2021*
- **Bronze Prize, Outstanding Freshmen Scholarship (Top 35%, USTC)** *2020*

## Teaching and Outreach

- **Teaching Assistant: Linear Algebra B1** *Mar. 2023 – Jul. 2023*
  *University of Science and Technology of China (USTC), Hefei, China*
  - Ranked **Top 3** among all teaching assistants at USTC in the university-wide TA evaluation.
  - Built the course homepage and served as the group leader, managing a course group with over 100 students.
  - Organized weekly problem-solving sessions during weekends, spent over 40 hours of personal teaching time, and engaged with more than 200 participants, showcasing strong teaching and communication skills.
  - Independently completed solution sets for over 100 post-course exercises and provided analysis and answers to all past exam papers.
- **Origami Club President** *Jun 2021 – Jun 2022*
  *University of Science and Technology of China*
  - Designed and organized the first origami exhibition "Yue ran zhi shang" (Vividly Comes to Life on Paper) in USTC, responsible for venue decoration and maintaining order for two consecutive weeks.
  - Conducted origami teaching sessions twice per month, sharing the art of origami with over 200 participants.
  - Held special origami activities, such as Origami at Christmas and spray painting origami works.
- **Volunteer** *Sep 2021 – Jan 2022*
  *Hefei Chunyu Parent Support Center for Intellectually Disabled Children*
  - Played basketball with autistic children and helped coaches maintain order in class once per week.

## Selected Course Projects

- **Airbnb Price Prediction in New York City** (CS 671 Theory & Alg Machine Learning, Duke University) – Achieved top 5 of 137 participants using advanced stacking strategies, combining XGBoost, LightGBM, and 20+ weak learners for robust generalization. [Report][Code]

## Additional Information

**Languages:** English, Mandarin, Sichuanese dialect.
**Programming & Software:** Python (primary), C/C++, LaTeX, Linux, HTML/CSS, MATLAB, R.
**Interests:** Origami and other visual arts (selected works available at portfolio link).