Xingyu Zhu

Ph.D. Student · Princeton University

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Education

Princeton University *Princeton, NJ*
Ph.D. in Computer Science *2023 -*

- Advisor: Prof. Sanjeev Arora

Duke University *Durham, NC*
Bachelor of Science in Mathematics and Computer Science *2018 - 2022*

- GPA: 3.972 / 4.0, Magna Cum Laude
- Undergraduate Research Advisor: Prof. Rong Ge

Research Interests

- I am broadly interested in **Theoretical Machine Learning** and **Language Modeling**. Recently I am interested in studying modern large language models and their optimization through a theoretical lens. I have also worked on optimization dynamics for deep neural nets (edge of stability, Hessians of neural nets) and computational economics (briefly).

Publications and Preprints

(* : Equal Contribution.)

Xingyu Zhu*, Abhishek Panigrahi*, and Sanjeev Arora. "On the Power of Context-Enhanced Learning in LLMs." (Preprint, 2025).

Zeyu Shen, Zhiyi Wang, Xingyu Zhu, Brandon Fain, and Kamesh Munagala. "Fairness in the assignment problem with uncertain priorities." (AAMAS, 2023).

Xingyu Zhu*, Zixuan Wang*, Xiang Wang, Mo Zhou, and Rong Ge. "Understanding Edge-of-Stability Training Dynamics with a Minimalist Example." (ICLR 2023).

Yikai Wu*, **Xingyu Zhu***, Chenwei Wu, Annie Wang, and Rong Ge. "Dissecting hessian: Understanding common structure of hessian in neural networks." (Preprint, 2020).

Awards, Fellowships

2023 **Gordon Y.S. Wu Fellowship**, Princeton University
2023 **Elected to Phi Beta Kappa**, Duke University
2023 **Alex Vasilos Memorial Award**, Duke University
2022 **Graduation with Highest Distinction**, Duke University

Teaching

Spring 2025	**Neural Networks, Theory and Practices (C0S485)** **Head TA:** PSET & Exam Design, OH, Grading	*Princeton University* *Instructor: Sebastian Seung*
Fall 2024	**Introduction to Machine Learning (COS324)** **TA:** PSET & Exam Design, Precept, OH	*Princeton University* *Instructor: Jia Deng, Adji Dieng*
Fall 2022	**Discrete Math for Computer Science(CS230)** **TA:** Recitation, Office Hours, Grading	*Duke University* *Instructor: Bruce Donald*
Fall 2022	**Design and Analysis of Algorithms (CS330)** **TA:** Recitation, Grading	*Duke University* *Instructor: Debmalya Panigrahi*
Spring 2022	**Design and Analysis of Algorithms (CS330)** **TA:** Office Hours, Grading	*Duke University* *Instructor: Rong Ge*