Zhi Wang

Contact me at wangzhi0467@outlook.com. See also my Personal page and GitHub.

University of Science and Technology of China, Hefei
Sept. 2021 - Expected Graduation: Jun. 2025 *GPA: 89.5 / 100*
Bachelor in Mathematics from the School of Gifted Young.

Visiting student, University of California, Berkeley *Jan. 2023 - Dec. 2023*

Research Interests

Learning theory, emergent behaviors (e.g. grokking), learning regimes and transitions in over-parameterized models, and feature learning. I'm also generally interested in analysis, optimization, and physicist way of viewing machine learning.

Research Experience

Ehrhart Theory of Special Order Polytopes, June 2023 to June 2024

- **Mentor:** *Andrés R. Vindas Meléndez, department of mathematics, UC Berkeley*
- I worked with another undergraduate researcher closely and obtained closed formulas for two extreme cases, a combinatorial formula for general cases, a monotonicity result, and conjectures based on computational evidence.
- **Outcome:** *Paper on Arxiv. Submitted to XXX.*

Grokking and Escape Kernel Regime Faster, May 2024 to ongoing

- **Mentor:** *Difan Zou, University of Hong Kong, department of computer science*
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- **Outcome:** *Paper on XXX.*

Publications

Projects

Please go to my homepage and my GitHub for the notes, presentations, code and videos mentioned below.

- (UC Berkeley Math Department) Directed Reading Program on game theory from a rigorous pure math point of view, with a final presentation to the mentors.

- Various projects either done for or started from classes:
  1. (C++, Python) Position based dynamics simulation and accompanying Manim expository video. *Video submission to Chinagraph 2024, Huangshan, Anhui.*
  2. (Java) Build Your Own World. I designed and implemented a 2D tile-based world exploration game from scratch, with a UI interface.
  3. (Matlab) Image compression and Loop lifting wavelets algorithm.
  4. (Python) Deep learning models for movie recommendation systems.
  5. (Review Paper) *On Ehrhart Polynomial of Birkhoff Polytopes.*
  6. (Python, Review Paper) *Numerical Methods for Differential Equations*, I investigated various aspects of methods such as Euler, Crank-Nicolson, Runge Kutta with examples implemented in Python.

Skills

▲: familiar; ■: did a few projects; ●: quite experienced

- **Programming Languages:** Java ■, Python ●, C ▲, C++ ●, Lean ▲.
- **Software and Tools:** Matlab ■, LaTeX●
- **Languages:** Mandarin Chinese, English, French (B2), Spanish (B1).

Volunteering and Seminars

- APEC 2023 volunteer, San Francisco; Berkeley AI Hackathon 2023 volunteer.
- AI for Mathematics: Formalization and Theorem Proving Seminar (Peking University BICMR, Jan 14th - 27th, 2024)