# 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: 88.7 / 100*
Bachelor in Mathematics from the School of Gifted Young

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

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## Research Interests

Learning theory, emergent behaviors, learning regimes, over-parameterized models, and feature learning. I'm also generally interested in optimization and computational neuroscience.

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## Research Experience and Publications

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

- **Mentor:** *Andrés R. Vindas Meléndez, department of mathematics, UC Berkeley*
- We obtained closed formulas for two extreme cases, a combinatorial formula for general cases, several monotonicity result, and conjectures based on computational evidence.
- **Outcome:** *Paper on Arxiv.*

***Grokking and Escape Kernel Regime Faster, April 2024 to ongoing***

- **Mentor:** *Difan Zou, University of Hong Kong, department of computer science*
- We drew inspiration from neuroscience and used low-rank structures to accelerate grokking and enable richer learning.

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## 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.*

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## 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 (A2).

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## 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)