

TIANHAO WANG

5th Year PhD Student in Mathematics

@ tianhw11@uci.edu

☎ 858-699-6710

🔗 tianhaow.github.io

📍 Irvine, CA, US

EDUCATION

University of California Irvine

PhD in Mathematics

📅 Sept 2020 – June 2026 (expected)

- Advisor: Nathan Kaplan
- Research Focus: Arithmetic Algebraic Geometry

University of California San Diego

B.S in Mathematics, M.A in Mathematics

📅 Sept 2014 – Dec 2019

- Cumulative GPA: 3.76/4, Major GPA: 3.91/4
- Cum Laude Honor, Dean's Award for Excellence

SKILLS

- **Math:** statistics, stochastic processes, Martingale theory, itô calculus, and SDEs.
- **Programming:** Python and C/C++.
- **Data Science:** SQL, pandas, geopandas, polars, numpy, statsmodels, seaborn, matplotlib.
- **Machine Learning:** PyTorch, LSTM, Encoder-Decoder Architectures, ViT, DQN, PPO, and transfer learning.
- **Others:** LaTeX, Git, Docker, Jekyll, Flask

PAST EMPLOYMENT

Associate Instructor

📅 2024 Summer

📍 UC Irvine

- Instructor for the upper division Linear Algebra class.

Teaching Assistant

📅 2016 -

📍 UC Irvine, UC San Diego

- Teaching assistant for Calculus, Linear Algebra, Abstract Algebra, Number Theory, Math Finance Classes
- Received Excellent TA award in June 2018.

HONORS & AWARDS

- Nominated for the **Most Promising Future Faculty Award** (June 2024, UC Irvine).
- **Finalist in the Alibaba Global Mathematics Competition** (June 2023, one of the 685 finalist out of more than 50,000 competitors).
- **Department Fellowship** (Sept 2021, UC Irvine)
- **Dean's Awards for Excellence** (June 2018, UC San Diego).
- **Excellent Teaching Award** (June 2018, UC San Diego).
- **Member of Phi Beta Kappa Honor Society** (Since 2018).

PUBLICATIONS

1. T. Wang, *Counting pairs of conics over finite fields that satisfy the Poncelet n -gon condition*. 29pp. Submitted to JTNB. arxiv.org/abs/2309.16978

PROJECT EXPERIENCES

RL in Extremal Combinatorics

📅 Spring 2025

📍 UC Irvine

- Developed a flexible Gymnasium-based RL environment to study point configurations in $m \times n$ grids and vector spaces \mathbb{F}_q^n avoiding certain geometric patterns.
- Implemented **Deep Q-Networks** with both **Convolutional Neural Networks** and **Vision Transformers**, as well as the **Proximal Policy Optimization** algorithm.
- Integrated **transfer learning** to pretrain on small-scale grids and fine-tune on larger domains, improving generalization and training efficiency.
- Used trained agents to construct lower bounds and provide empirical evidence for or against conjectures in Extremal Combinatorics.

U.S. Agricultural Futures Price Prediction

📅 Spring 2025

📍 Erdos Institute Bootcamp

- Built an end-to-end pipeline to forecast U.S. agricultural futures prices and short-term volatility by combining market data, USDA reports, and weather data.
- Applied **anomaly detection** to climate signals using Z-scores for temperature and a modified SPI for precipitation and snowfall.
- Engineered spatial features by aggregating weather station data based on proximity to cropland, identifying signals with > 0.1 correlation to future log returns.
- Trained and evaluated an **LSTM** model using **PyTorch**, optimizing for RMSE and directional accuracy.

Independent Game Development

📅 2019-2020

- Designed and developed a 2D platformer action RPG from scratch using **C++** and **SDL**, without relying on existing game engines.
- Engineered a custom game engine based on the **Entity-Component-System (ECS)** architecture
- Achieved over 4,000 views and 500 downloads to date.