PETER CHEN

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peterlaulukchen.github.io

RESEARCH STATEMENT

My current focus is LLM reasoning and alignment via optimization theory and reinforcement learning design. My areas of expertise include:

1. **LLM Post Training**: Reasoning via RLVR; Alignment (RLHF/DPO); Agent Training.

2. **Optimization/RL Theory**: Optimal Transport; Non-convex Optimization; Minimax Optimization; Zeroth-order Optimization; Multi-agent Reinforcement Learning.

EDUCATION

Columbia College, Columbia University — New York, NY
B.A in Mathematics, Computer Science — May 2026
Advisor: Andrew Blumberg (Math), Tianyi Lin (IEOR)

EXPERIENCE

Research Intern | AI Lab, Princeton University — Princeton, NJ
Hosted by Prof. Mengdi Wang — Feb 2025 – Dec 2025
Topic: LLM RL Reasoning; LLM Agent Training

Research Intern | Institute of Data Science, HKU — Hong Kong
Hosted by Prof. Yue Xie, Prof. Qingpeng Zhang — May 2024 – Aug 2024
Topic: Neural Optimal Transport, Convex Networks

Teaching Assistant | Department of Mathematics, Columbia University
TA for MATH 2500 Analysis & Optimization over SP24, FA24, SP25, FA25, SP26

PUBLICATIONS

[1] **ComPO: Preference Alignment via Comparison Oracles**
Peter Chen, Xi Chen, Wotao Yin, Tianyi Lin
Advances in Neural Information Processing Systems 38 (NeurIPS 2025)

[2] **Exploration v.s. Exploitation: Rethinking RLVR through Clipping, Entropy, and Spurious Reward**
Peter Chen, Xiaopeng Li, Ziniu Li, Xi Chen, Wotao Yin, Tianyi Lin
Proceedings of the International Conference on Learning Representations (ICLR 2026)

[3] **Reward-free Alignment for Conflicted Objectives**
Peter Chen, Xiaopeng Li, Xi Chen, Tianyi Lin
Under Review, ICML 2026

[4] **GenEnv: Difficulty-Aligned Co-Evolution Between LLM Agents and Environment Simulators**
Jiacheng Guo*, Ling Yang*, Peter Chen*, Qixin Xiao*, Yinjie Wang, Xinzhe Juan, Jiahao Qiu, Ke Shen, Mengdi Wang
arxiv-2512.19682

[5] **Stepwise Guided Policy Optimization: Coloring your Incorrect Reasoning in GRPO**
Peter Chen, Xiaopeng Li, Ziniu Li, Xi Chen, Tianyi Lin
Transactions on Machine Learning Research, Under Review

[6] **Displacement-Sparse Neural Optimal Transport**
Peter Chen, Yue Xie, Qingpeng Zhang
arxiv-2502.01889

[7] **3D Cell Oversegmentation Correction via Geo-Wasserstein Divergence**
Peter Chen, Bryan Chang, Olivia Creasey, Julie Sneddon, Zev Gartner, Yining Liu
Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2026)

[8] **SICNN: Sparsity-induced Input Convex Neural Network for Optimal Transport**
Peter Chen, Yue Xie, Qingpeng Zhang
NeurIPS 2024 Optimization for Machine Learning

TALKS	**2025 INFORMS Annual Meeting, Atlanta** Oct 2025
	Invited Speaker; *LLM Post Training: Turning "Trash" Samples into Value*
SERVICES	**Reviewers for**: *Conference on Neural Information Processing Systems* (NeurIPS), *International Conference on Learning Representaton* (ICLR), *International Conference on Machine Learning* (ICML), *AAAI Conference on Aritificial Intelligence* (AAAI), *Conference on Parsimony and Learning* (CPAL), *Transactions on Machine Learning Research* (TMLR)