Nuoya Xiong

Email: nuoyaxiong@gmail.com

Research Interest

- **Research Interest**: Post-Training of Large Language Model, Reinforcement Learning with Human Feedback, Reinforcement Learning Theory.

Education

- **Carnegie Mellon University** — Pittsburgh, PA, United States
  Machine Learning Department — *Sep 2024-Jun 2029*
- **Tsinghua University** — Beijing, China
  Institute for Interdisciplinary Information Sciences, Yao Class — *Sep 2020 - Jun 2024*
- **Grades**: **GPA:** 3.93/4.00 (rank 13 in Yao Class),

Publications (* stands for equal contribution)

- **Nuoya Xiong**, Aarti Singh. Projection Optimization: A General Framework for Multi-Objective and Multi-Group RLHF, *ICML 2025*.
- **Nuoya Xiong**, Zhaoran Wang, Zhuoran Yang. A General Framework for Sequential Decision-Making under Adaptivity Constraints, *ICML 2024*.
- **Nuoya Xiong**, Lijun Ding, Simon S. Du. How Over-Parameterization Slows Down Gradient Descent in Matrix Sensing: The Curses of Symmetry and Initialization, *ICLR 2024 Spotlight*.
- **Nuoya Xiong***, Zhihan Liu*, Zhaoran Wang, Zhuoran Yang. Sample-Efficient Multi-Agent RL: An Optimization Perspective *ICLR 2024*.
- **Nuoya Xiong**, Wei Chen. Combinatorial Pure Exploration of Causal Bandits, *ICLR 2023*.
- **Nuoya Xiong**, Yihan Du, Longbo Huang. Provably Safe Reinforcement Learning with Step-wise Violation Constraints, *NeurIPS 2023*.
- Feng Shi*, **Nuoya Xiong***, Wei Chen. Combinatorial Causal Bandits without Graph Skeleton, *ACML 2024*.

Research/Work Experience

- **Research Intern**
  Meta NYC — *Jun 2025 - Aug 2025*
  - **Mentor**: Zhuokai Zhao
  - **Research Contents**:
    - Develop a more efficient multi-agent, token-level collaboration framework that supports both routing and complementary generation.
    - Provide theoretical analysis and empirical studies of multi-agent token-level collaboration.
- **Ph.D.**
  Carnegie Mellon University — *Sep 2024-Present*
  - **Advisor**: Aarti Singh
  - **Research Contents**:
    - Derive the RLHF algorithm framework for the multi-group and multi-objective general aggregated problem.
    - Construct a multi-agent RL algorithm with both lower communication cost and lower sample complexity.
- **Visiting Student**
  University of Washington — *Feb 2023 - Aug2023*
  - **Advisor**: Simon S. Du
  - **Research Contents**:
    - Construct the first rigorous polynomial convergence theoretically lower bound of gradient descent on symmetric matrix sensing.
    - Show the gradient descent of asymmetric matrix sensing with imbalance initialization converges linearly with an initialization-dependent rate.
    - Provide a simple and fast algorithm to accelerate the gradient descent.

- **Research Assistant** Remote
  Yale University & Northwestern University *Mar 2022 - Aug 2023*
  - **Advisor**: Zhuoran Yang, Zhaoran Wang
  - **Research Contents**:
    * Provide a math framework that can learn NE/CCE/CE of general-sum Markov Games for both model-based and model-free RL problems under general function approximation.
    * Propose a math complexity measure that captures the learning hardness of a general-sum Markov Game.
- **Intern**
  Microsoft Asia *Feb 2022 - Aug 2022*
  - **Mentor**: Wei Chen
  - **Research Contents**:
    * Propose the first combinatorial pure exploration algorithm of causal bandit that achieves gap-dependent sample complexity.
    * Extend our algorithm to general graphs with hidden variables using the causal inference technique.
    * Provide a gap-dependent lower bound that matches the sample complexity results on the parallel graph.

Awards

- Tsinghua University Comprehensive Excellence Award (top 10% in Yao Class) - Nov, 2023
- Yao Award (Bronze Metal) (top 9 in Yao Class) - Sep, 2023
- Tsinghua University Academic Excellence Scholarship - May, 2022
- Tsinghua University Comprehensive Excellence Award (top 10 % in Yao Class) - May, 2021
- China National Mathematical Olympiad gold medal (29th in China) - Nov, 2018
- China National Mathematical Olympiad gold medal (top 60 in China) - Nov, 2019

Skills

- **Language**: Chinese (native language), English (fluent)
- **Programming Languages**: C++, Python, Assembly language
- **Other Skills**: Latex, Github, Pytorch