

EDUCATION

University of Virginia	Charlottesville, US
Ph.D. in Computer Science, Co-advised by Dr. Hongning Wang and Dr. Haifeng Xu	2019–Current
– Research Interest: Online Learning in multi-agent environments, Bandit Algorithm, Recommender System	
Peking University	Beijing, China
M.S. in Applied and Computational Mathematics, Advisor: Dr. Tiejun Li	2013–2016
B.S. in Mathematics, double major in Philosophy	2009–2013

EXPERIENCE

University of Chicago	Chicago, IL, US
Visiting Student at Computer Science Department Advisor: Dr. Haifeng Xu	2023.5–present
– Multi-agent modeling for digital content market.	
Meta Research	Menlo Park, CA, US
Student Researcher at Modern Recommender System Group Host: Dr. Qifan Wang	2023.12–2024.7
– Deploy mechanism design solutions for improving user engagement on Instagram Reels.	
Google Research	Mountain View, CA, US
Student Researcher at Foresight Manager: Dr. Craig Boutilier, Host: Dr. Chih-wei Hsu	2022.5–2022.9
– Work on Bayesian preference elicitation in interactive recommender systems using Concept Activation Vectors.	
ByteDance	Remote in US
Research Intern at AML Lab Manager: Dr. Chong Wang, Host: Dr. Taiqing Wang	2021.5–2021.8
– Enhance the recommendation diversity and mitigate the Echo chamber effect of TikTok via collaborative Thompson sampling approach and gradient-based Determinantal Point Processes.	
Alibaba Group	Beijing, China
Algorithm Engineer at Taobao Manager: Dr. Xin Li	2017.8–2019.7
– Design and maintain content recommendation system for Taobao main page, mainly focusing on deep-learning based match/ranking solution.	

AWARDS

- UVa Copenhaver Bicentennial Graduate Research Fellowship (\$12k). 2024
- UVa Graduate Teaching Award. 2020
- Outstanding Graduate Student Award of Peking University. 2016
- Bronze Medalist in Team Contest of Applied and Computational Mathematics, Shing-Tung Yau College Student Mathematics Contests (Ranked top 6 nation-wide). 2012
- Gold Medalist in Chinese Mathematics Olympics (Ranked top 40 individually nation-wide). 2009

WORKING PAPERS

4. ***F. Yao**, *Y. Cheng, E. Wei, and H. Xu, “Single-Agent Poisoning Attacks Suffice to Ruin Multi-Agent Learning”, *under review*.
3. *S. Ahmadi, *A. Blum, *H. Xu, ***F. Yao**, “Strategic Filtering for Content Moderation: Free Speech or Free of Distortion?”, *under review*.
2. Y. Cheng, **F. Yao**, X. Liu, and H. Xu, “Learning from Imperfect Human Feedback: a Tale from Corruption-Robust Dueling”, arXiv preprint, arXiv:2405.11204.
Selected for **NSF poster awards** (15 out of 116 accepted posters) at the Midwest Machine Learning Symposium, 2024.
1. E. Biyik, **F. Yao**, A. Haig, Y. Chow, C. Hsu, M. Ghavamzadeh, and C. Boutilier, “Preference Elicitation with Soft Attributes in Interactive Recommendation”, arXiv preprint arXiv:2311.02085.

JOURNAL ARTICLES

- J2. *J. Wu, *H. Xu, and ***F. Yao**, “Multi-Agent Learning for Iterative Dominance Elimination: Formal Barriers and New Algorithms”, *under major revision at JMLR*. (Supersedes C3.)
- J1. *R. Sundaram, *A. Vullikanti, *H. Xu, and ***F. Yao**, “Pac-Learning for Strategic Classification”, Journal of Machine Learning Research, **JMLR**, 2023. (Supersedes C1.)

SELECTED CONFERENCE PUBLICATIONS

- C10. **F. Yao**, Y. Liao, J. Liu, S. Nie, Q. Wang, H. Wang, “Mechanism Design Through Exploration Control: Optimizing the Trade-Off Between User and Creator Engagement”, **Neurips**, 2024.
- C9. **F. Yao**, Y. Liao, M. Wu, C. Li, Y. Zhu, J. Yang, J. Liu, Q. Wang, H. Xu, and H. Wang, “User Welfare Optimization in Recommender Systems with Competing Content Creators”, **KDD**, 2024.
- C8. **F. Yao**, C. Li, D. Nekipelov, H. Wang, and H. Xu, “Human vs. Generative AI in Content Creation Competition: Symbiosis or Conflict?”, **ICML**, 2024.
- C7. **F. Yao**, C. Li, K. Sankararaman, Y. Liao, Y. Zhu, Q. Wang, H. Wang, and H. Xu, “Rethinking Incentives in Recommender Systems: Are Monotone Rewards Always Beneficial?”, **Neurips**, 2023.
- C6. **F. Yao**, C. Li, D. Nekipelov, H. Wang, and H. Xu, “How Bad is Top- K Recommendation under Competing Content Creators?”, **ICML**, **Oral (2.4%)**, 2023.
- C5. M. Wu, **F. Yao**, and H. Wang, “An End-to-End Solution for Spatial Inference in Smart Buildings”, **BuildSys**, **Best Paper Nomination**, 2023.
- C4. **F. Yao**, C. Li, D. Nekipelov, H. Wang, and H. Xu, “Learning from a Learning User for Optimal Recommendations”, **ICML**, 2022.
Also selected for **spotlight presentation** (5 out of 38 accepted posters) at the ICML 2023 Workshop on Interactive Learning with Implicit Human Feedback.
- C3. *J. Wu, *H. Xu, and ***F. Yao**, “Multi-Agent Learning for Iterative Dominance Elimination: Formal Barriers and New Algorithms”, **COLT**, 2022.
- C2. **F. Yao**, C. Li, D. Nekipelov, H. Wang, and H. Xu, “Learning the Optimal Recommendation from Revealed Preferences”, **AAAI**, 2022.

- C1. *R. Sundaram, *A. Vullikanti, *H. Xu, and *F. Yao, “Pac-Learning for Strategic Classification”, **ICML**, **Oral (3%)**, 2021.

WORKSHOP PAPERS

- W1. F. Yao, R. Cai, and H. Wang, “Reversible Action Design for Combinatorial Optimization with Reinforcement Learning”, Workshop on Machine Learning for Operations Research, **AAAI**, 2022.

*Equal contribution; authors listed in alphabetical order.

IMPACT ON REAL-WORLD SYSTEMS

- Optimizing Incentivize Mechanisms for Instagram Content Creators
To promote desirable content distribution across Instagram Reels, I successfully live-tested a novel mechanism impacting over 5 million content creators and 5 million users. This system delivered a 1.13% improvement in the industry-standard metric, the like-through-rate (LTR)—the probability a user will “like” the content after viewing it. For context, a 1% improvement in LTR is already considered top-tier performance in real-world systems. Additionally, our mechanism consistently enhanced key metrics such as content consumption diversity and daily active users (DAU) among creators, demonstrating robust, scalable impact. (see C9.)

INVITED TALKS

- Cornell University, ESIF Economics and AI+ML Meeting, “Human v.s. GenAI Competition”. 2024.8
- George Mason University, “Understanding Competition-Driven Content Ecosystems”. 2024.6
- Northwestern University, Midwest Workshop on Control and Game Theory, “Understanding Competition-Driven Content Ecosystems”. 2024.4
- Mila & Vector Institute, Seminar talk, “Understanding Competition-Driven Content Ecosystems”. 2024.4
- Cornell University, Seminar talk, “Understanding Competition-Driven Content Ecosystems”. 2024.2
- Meta Research, “How Bad is Top-K Recommendation under Competing Content Creators?”. 2023.8
- Uber Research, “Learning from a Learning User for Optimal Recommendations”. 2022.6

TEACHING

- Teaching Assistant** at University of Virginia Spring 2023
Introduction to Algorithmic Economics
- Teaching Assistant** at University of Virginia Fall 2022
Introduction to Reinforcement Learning
- Teaching Assistant** at University of Virginia Spring 2021
Learning and Games
- Teaching Assistant** at University of Virginia Fall 2020
Algorithms
- Teaching Assistant** at Peking University Spring 2016
Linear Algebra

SERVICES

• ICML PC	2021,2022,2023,2024
• Neurips PC	2022,2023,2024
• KDD PC	2022,2023,2024
• AAAI PC	2021,2022,2023,2024
• IJCAI PC	2022,2023,2024