

# Anran Hu

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## POSITION

**Columbia University** *July.2024-*  
Assistant Professor, Industrial Engineering and Operations Research

**University of Oxford** *Sept.2022 - present*  
Hooke Research Fellow, Mathematical Institute

## EDUCATION

**University of California, Berkeley** *Aug.2016 - Aug.2022*  
Ph.D., Industrial Engineering and Operations Research  
M.S., Industrial Engineering and Operations Research

**Peking University** *Sept.2012 - July.2016*  
B.S., Mathematics

## RESEARCH INTERESTS

- Mathematical finance, financial engineering and FinTech
- Applied probability, stochastic control and games
- Reinforcement learning and machine learning

## RESEARCH

- Anran Hu and Junzi Zhang. [MF-OML: Online Mean-Field Reinforcement Learning with Occupation Measures for Large Population Games](#). Submitted.
- Xin Guo, Anran Hu, Matteo Santamaria, Mahan Tajrobekkar and Junzi Zhang. [MFGLib: A Library for Mean-Field Games](#).
  - [MFGLib](#): open-source Python library for computing Nash equilibria of mean-field games.
- Xin Guo, Anran Hu and Jiacheng Zhang. [Optimization Frameworks and Sensitivity Analysis of Stackelberg Mean-Field Games](#). Submitted.

- Xin Guo, Anran Hu and Junzi Zhang. [MF-OMO: An Optimization Formulation of Mean-Field Games](#). *SIAM Journal on Control and Optimization*, 62(1), 243-270.
- Xin Guo, Anran Hu and Junzi Zhang. [Theoretical Guarantees of Fictitious Discount Algorithms for Episodic Reinforcement Learning and Global Convergence of Policy Gradient Methods](#). *Proceedings of the AAAI Conference on Artificial Intelligence* 36 (6), 6774-6782.
- Xin Guo , Anran Hu and Yufei Zhang. [Reinforcement Learning for Linear-Convex Models with Jumps via Stability Analysis of Feedback Controls](#). *SIAM Journal on Control and Optimization*, 61(2), 755-787.
- Matteo Basei, Xin Guo, Anran Hu and Yufei Zhang. [Logarithmic Regret for Episodic Continuous-Time Linear-Quadratic Reinforcement Learning over a Finite-Time Horizon](#). *Journal of Machine Learning Research*, 23 (178), 1-34.
- Xin Guo, Anran Hu, Renyuan Xu and Junzi Zhang. [A General Framework for Learning Mean-Field Games](#). *Mathematics of Operations Research*, 48(2), 656-686.
- Xin Guo, Anran Hu, Renyuan Xu and Junzi Zhang. [Learning Mean-Field Games](#). *Advances in Neural Information Processing Systems*, 32 (NeurIPS 2019).
- Xin Guo, Anran Hu, Renyuan Xu and Junzi Zhang. [Consistency and Computation of Regularized MLEs for Multivariate Hawkes Processes](#). *NeurIPS 2018 Workshop on Causal Learning*.

## INDUSTRY EXPERIENCE

**Amazon.com LLC, Seattle, WA**

Applied Scientist Intern

May.2019 - Aug.2019

Manager: Dr. Xinyang Shen

Data-Driven Large-Scale Inbound Behavior Prediction for Third-Party Sellers.

## INVITED TALKS

- IMSI Workshop on Decision Making and Uncertainty, Chicago, IL, 2024
- Finance and Stochastic Seminar, Imperial College London, London, UK, 2023.
- Stochastic Finance Seminar, University of Warwick, Coventry, UK, 2023
- INFORMS Annual Meeting, Phoenix, AZ, 2023.
- Advances in Stochastic Analysis for Handling Risks in Finance and Insurance, CIRM, Marseille, France, 2023.

- Recent Advances on Quantitative Finance, Hong Kong, 2023
- 10th International Congress on Industrial and Applied Mathematics, Tokyo, Japan, 2023.
- 11th General AMaMeF Conference, Bielefeld, Germany, 2023.
- Women in Mathematical Finance, New Brunswick, NJ, 2023.
- SIAM Conference on Financial Mathematics and Engineering, Philadelphia, 2023
- Oxford-Princeton Workshop on Stochastic Analysis and Mathematical Finance, Oxford, 2022.
- Mathematical and Computational Finance Seminar, University of Oxford, Oxford, 2022.
- North-East and Midlands Stochastic Analysis Seminar, Oxford, 2022.
- SIAM Annual Meeting, Pittsburgh, PA, 2022.
- IMSI Workshop on Machine Learning and Mean-Field Games, Chicago, IL, 2022.
- INFORMS Annual Meeting, Virtual, 2020.
- Neural Information Processing Systems, Poster, Vancouver, 2019.
- INFORMS Annual Meeting, Seattle, WA, 2019.
- INFORMS Annual Meeting, Phoenix, AZ, 2018.
- Berkeley-Stanford Workshop on Mathematical and Computational Finance, Stanford University, CA, 2018.

## **TEACHING EXPERIENCE**

### **Instructor, University of Oxford**

- MCF Statistics and Financial Data Analysis, Michaelmas Term 2023.
- MCF Introduction to Statistics, Michaelmas Term 2023.

### **Tutor, University of Oxford**

- MCF Market Microstructure and Algorithmic Trading, Hilary Term 2023.
- MCF Asset Pricing, Hilary Term 2023.
- MCF Quantitative Risk Management, Hilary Term 2023.
- MCF Optimization, Hilary Term 2023.

- B8.1 Probability, Measure and Martingales, Michaelmas Term 2022.

### **Instructor, UC Berkeley**

- IEOR 242: Applications in Data Analysis (Graduate), Spring 2022.

### **Graduate Student Instructor, UC Berkeley**

- IEOR 263B: Applied Stochastic Process II (Graduate), Spring 2020.
- IEOR 241: Risk Modeling, Simulation, and Data Analysis (Graduate), Fall 2019, Fall 2021.
- IEOR 221: Introduction to Financial Engineering (Graduate), Fall 2020.
- IEOR 172: Probability and Risk Analysis for Engineers, Fall 2017.
- IEOR 120: Principles of Engineering Economics, Fall 2018, Spring 2019.
- IEOR 170: Industrial Design and Human Factors, Spring 2018.

### **ACTIVITIES**

- Co-organizer of Mathematical and Computational Finance Seminar, University of Oxford.
- Reviewer of Mathematics of Operations Research, Quantitative Finance, Mathematical Finance, SIAM Journal on Control and Optimization, Applied Probability, Journal of Economic Dynamics and Control, Journal of Optimization Theory and Applications, Transactions on Machine Learning Research, Journal of Machine Learning, ICML, NeurIPS, AAAI, ICLR, ICAIF.

### **HONORS & AWARDS**

- Outstanding Graduate Student Instructor, UC Berkeley 2021
- Berkeley Marshall-Oliver-Rosenberger Fellowship, UC Berkeley 2020
- NeurIPS Travel Award 2019
- Berkeley IEOR First Year Faculty Fellowship Award 2017
- Baosteel Scholarship, Peking University 2015
- Meritorious Award of 2015 ICM 2015
- First Prize of 2015 Challenge Cup, Peking University 2015