Baoxiang Wang

Personal Data

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Current Appointment

2020.8 - **Assistant Professor**, School of Data Science,
The Chinese University of Hong Kong, Shenzhen
- Research interest: *Reinforcement learning* and *Online learning*

Education

2014.8 - 2020.7 **Ph.D. in Computer Science and Engineering**,
The Chinese University of Hong Kong
- Research interest: *Reinforcement learning* and *Online learning*
- Advised by Siu On Chan and Andrej Bogdanov
- Thesis: Improving Policy Optimization: Algorithms and Foundations

2010.9 - 2014.7 **B.E. in Information Security**,
Shanghai Jiao Tong University
- GPA: 87.0/100 (5%)
- Capstone: Deep Learning for Language Models

Visiting

2024.1 - Visiting Researcher
Vector Institute.

2023.5 - 2023.9 Visiting Assistant Professor, David R. Cheriton School of Computer Science
University of Waterloo.

2018.8 - 2019.8 Visiting Student, Department of Computing Science
University of Alberta.

Publications

See [23] and [4] for representative works.

[1] Carbon Market Simulation with Adaptive Mechanism Design
Han Wang, Wenhao Li, Hongyuan Zha, **Baoxiang Wang**.
International Joint Conference on Artificial Intelligence (IJCAI) 2024 (Demonstration Track).

[2] Convergence to Nash Equilibrium and No-regret Guarantee in (Markov) Potential Games
Jing Dong, **Baoxiang Wang**, Yaoliang Yu.
Artificial Intelligence and Statistics Conference (AISTATS) 2024.

[3] On Stationary Point Convergence of PPO-Clip [pdf]
Ruinan Jin, Shuai Li, **Baoxiang Wang**.
International Conference on Learning Representations (ICLR) 2024.

[4] Relative Policy-Transition Optimization for Fast Policy Transfer [pdf]
Jiawei Xu, Cheng Zhou, Yizheng Zhang, **Baoxiang Wang**, Lei Han.
AAAI Conference on Artificial Intelligence (AAAI) 2024.

[5] Improved Regret Bounds for Linear Adversarial MDPs via Linear Optimization [pdf]
Fang Kong, Xiangcheng Zhang, **Baoxiang Wang**, Shuai Li.
Transactions on Machine Learning Research (TMLR) 2023.

[6] Information Design in Multi-Agent Reinforcement Learning [pdf][talk]
Yue Lin, Wenhao Li, Hongyuan Zha, **Baoxiang Wang**.
Advances in Neural Information Processing Systems (NeurIPS) 2023.

[7] Learning Adversarial Low-rank Markov Decision Processes with Unknown Transition and Full-information Feedback [pdf]
Canzhe Zhao, Ruofeng Yang, **Baoxiang Wang**, Xuezhou Zhang, Shuai Li.
Advances in Neural Information Processing Systems (NeurIPS) 2023.

[8] Two Heads are Better Than One: A Simple Exploration Framework for Efficient Multi-Agent Reinforcement Learning [pdf]
Jiahui Li, Kun Kuang, **Baoxiang Wang**, Xingchen Li, Long Chen, Fei Wu, Jun Xiao.
Advances in Neural Information Processing Systems (NeurIPS) 2023.

[9] Learning to Boost Resilience of Complex Networks via Neural Edge Rewiring [pdf]
Shanchao Yang, Kaili Ma, **Baoxiang Wang**, Tianshu Yu, Hongyuan Zha.
Transactions on Machine Learning Research (TMLR) 2023.

[10] DPMAC: Differentially Private Communication for Cooperative Multi-Agent Reinforcement Learning [pdf]
Canzhe Zhao, Yanjie Ze, Jing Dong, **Baoxiang Wang**, Shuai Li.
International Joint Conference on Artificial Intelligence (IJCAI) 2023.

[11] Learning Adversarial Linear Mixture Markov Decision Processes with Bandit Feedback and Unknown Transition [pdf]
Canzhe Zhao, Ruofeng Yang, **Baoxiang Wang**, Shuai Li.
International Conference on Learning Representations (ICLR) 2023.

[12] Provably Efficient Convergence of Primal-Dual Actor-Critic with Nonlinear Function Approximation [pdf]
Jing Dong, Li Shen, Yinggan Xu, **Baoxiang Wang**.
International Conference on Autonomous Agents and Multiagent Systems (AAMAS) 2023.

[13] Diverse Policy Optimization for Structured Action Space [pdf]
Wenhao Li, **Baoxiang Wang**, Shanchao Yang, Hongyuan Zha.
International Conference on Autonomous Agents and Multiagent Systems (AAMAS) 2023.

[14] Online Influence Maximization under Decreasing Cascade Model [pdf]
Fang Kong, Jize Xie, **Baoxiang Wang**, Tao Yao, Shuai Li.
International Conference on Autonomous Agents and Multiagent Systems (AAMAS) 2023.

[15] Learning from Good Trajectories in Offline Multi-Agent Reinforcement Learning [pdf]
Qi Tian, Kun Kuang, Furui Liu, **Baoxiang Wang**.
AAAI Conference on Artificial Intelligence (AAAI) 2023.

[16] Differentially Private Temporal Difference Learning with Stochastic Nonconvex-Strongly-Concave Optimization. [pdf]
Canzhe Zhao, Yanjie Ze, Jing Dong, **Baoxiang Wang**, Shuai Li.
International Conference on Web Search and Data Mining (WSDM) 2023.

[17] Algorithms and Theory for Supervised Gradual Domain Adaptation [pdf]
Jing Dong, Shiji Zhou, **Baoxiang Wang**, Han Zhao.
Transactions on Machine Learning Research (TMLR) 2022.

[18] Learning Fair Representations via Distance Correlation Minimization. [pdf]
Dandan Guo, Chaojie Wang, **Baoxiang Wang**, Hongyuan Zha.
IEEE Transactions on Neural Networks and Learning Systems (TNNLS) 2022.

[19] Deconfounded Value Decomposition for Multi-Agent Reinforcement Learning [pdf]
Jiahui Li, Kun Kuang, **Baoxiang Wang**, Furui Liu, Long Chen, Changjie Fan, Fei Wu, Jun Xiao.
International Conference on Machine Learning (ICML) 2022.

[20] Cascading Bandit under Differential Privacy [pdf]
Kun Wang, Jing Dong, **Baoxiang Wang**, Shuai Li, and Shuo Shao.
International Conference on Acoustics, Speech, & Signal Processing (ICASSP) 2022.

[21] Combinatorial Bandits under Strategic Manipulations [pdf]
Jing Dong, Ke Li, Shuai Li, **Baoxiang Wang**.
International Conference on Web Search and Data Mining (WSDM) 2022.

[22] Shapley Counterfactual Credits for Multi-Agent Reinforcement Learning [pdf]
Jiahui Li, Kun Kuang, **Baoxiang Wang**, Furui Liu, Long Chen, Fei Wu, Jun Xiao.
Conference on Knowledge Discovery and Data Mining (KDD) 2021.

[23] The Gambler's Problem and Beyond [pdf]
Baoxiang Wang, Shuai Li, Jiajin Li, Siu On Chan.
International Conference on Learning Representations (ICLR) 2020.

[24] Learning and Testing Variable Partitions [pdf]
with Andrej Bogdanov.
Innovations in Theoretical Computer Science (ITCS) 2020.

[25] Privacy-preserving Q-Learning with Functional Noise in Continuous Spaces [pdf]
Baoxiang Wang and Nidhi Hegde.
Advances in Neural Information Processing Systems (NeurIPS) 2019.

[26] Recurrent Existence Determination Through Policy Optimization [pdf]
International Joint Conference on Artificial Intelligence (IJCAI) 2019.

[27] Metatrace Actor-Critic: Online Step-Size Tuning by Meta-Gradient Descent for Reinforcement Learning Control [pdf]
Kenny Young, **Baoxiang Wang**, Matthew E. Taylor.
International Joint Conference on Artificial Intelligence (IJCAI) 2019.

[28] Beyond Winning and Losing: Modeling Human Motivations and Behaviors with Vector-valued Inverse Reinforcement Learning [pdf]
Baoxiang Wang, Tongfang Sun, Xianjun Sam Zheng.
Artificial Intelligence and Interactive Digital Entertainment (AAAI-AIIDE) 2019.

[29] Policy Optimization with Second-Order Advantage Information [pdf]
with Jiajin Li.
International Joint Conference on Artificial Intelligence (IJCAI) 2018.

[30] Contextual Combinatorial Cascading Bandit [pdf]
Shuai Li, **Baoxiang Wang**, Shengyu Zhang, Wei Chen.
International Conference on Machine Learning (ICML) 2016.

[31] PAID: Prioritizing App Issues for Developers by Tracking User Reviews Over Versions [pdf]
Cuiyun Gao, **Baoxiang Wang**, Pinjia He, Jieming Zhu, Yangfan Zhou, Michael R. Lyu.
International Symposium on Software Reliability Engineering (ISSRE) 2015.

Projects

2024.2 - 2025.1	Online Learning Methods for Network Cost Minimization. Funded by ByteDance. **Baoxiang Wang**, Hongyuan Zha. CNY 0.45M.
2024.1 - 2028.12	Data-and-Model-Driven Decision Theory and Methods. Funded by the National Natural Science Foundation of China (72394361). Zizhuo Wang, Xinyun Chen, Jianfeng Mao, **Baoxiang Wang**, Yilun Chen, Lun Yu. CNY 2.28M. Distributed to Baoxiang: 0.38M.
2023.10 - 2026.9	Multi-Agent Systems and Applications in Smart Cities and Biomedicine. Funded by Shenzhen Science and Technology Program as an extended support to previous projects (non-competitive). Hongyuan Zha, Jianfeng Mao, Ming Yan, Jin Liu, **Baoxiang Wang**. CNY 2M. Distributed to Baoxiang Wang: 0.5M.
2022.1 - 2024.12	Privacy-Preserving Reinforcement Learning via Functional Mechanisms. Funded by the National Natural Science Foundation of China (62106213). CNY 0.3M.
2021.1 - 2023.12	Online Learning and Optimization Algorithms under Data-Scarce and Non-Stationary Model Scenarios. Funded by the National Natural Science Foundation of China (72150002). Jan 2022 - Dec 2024. Zizhuo Wang, **Baoxiang Wang**, Xiao Li. CNY 3.075M. Distributed to Baoxiang: 0.43M.
2022.4 - 2024.3	Privacy-Preserving Mechanisms for Reinforcement Learning via Functional Analysis. Funded by Shenzhen Science and Technology Program (RCBS20210609104356063). CNY 0.3M.
2021.8 - 2024.8	Multi-Agent Reinforcement Learning for Artificial General Intelligence with Cognitive Science and Theory of Mind Methods. Funded by Shenzhen Science and Technology Program (JCYJ20210324120011032). Jianwei Huang, Hongyuan Zha, Junfeng Wu, Shuang Li, **Baoxiang Wang**. CNY 2M. Distributed to Baoxiang Wang: 0.4M.
2022.4 - 2025.3	Research on Principles, Algorithms, and Standardized Platforms of AI Security. Funded by Shenzhen Science and Technology Program (RCYX20210609103057050). Baoyuan Wu, **Baoxiang Wang**, Jicong Fan, Ning Zhang, Dandan Guo. CNY 2M. Distributed to Baoxiang: 0.4M.
2022.3 - 2025.2	Privacy and Copyright Protection of Big Data. Funded by Guangdong Provincial Key Laboratory of Big Data Computing. Baoyuan Wu, Junfeng Wu, **Baoxiang Wang**, Qilin Sun. CNY 1M. Distributed to Baoxiang: 0.25M.
2021.4 - 2022.3	Theory of Mind Methods towards Artificial General Intelligence. Funded by Shenzhen Institute of Artificial Intelligence and Robotics for Society. CNY 0.4915M.
2020.8 - 2023.7	Foundations of Reinforcement Learning. Funded by CUHK Shenzhen as research startup (non-competitive). CNY 1.5M.

Teaching

	As Assistant Professor, CUHK Shenzhen
Fall 2023	CSC3001 Discrete Mathematics. Instructor. Eval: 5.76/6.
Fall 2023	DDA6105 Reinforcement Learning. Instructor. Eval: 5.75/6.
Spring 2023	CSC3001 Discrete Mathematics. Instructor. Eval: 5.92/6.
Spring 2023	DDA4230 Reinforcement Learning. Instructor. Eval: 5.93/6.
Fall 2022	CSC3001 Discrete Mathematics. Instructor. Eval: 5.95/6.
Summer 2022	CSC3001 Discrete Mathematics. Instructor. Eval: 5.91/6.
Spring 2022	DDA4230 Reinforcement Learning. Instructor. Eval: 6/6.
Fall 2021	CSC3001 Discrete Mathematics. Instructor. Eval: 5.94/6.
Spring 2021	DDA4230 Reinforcement Learning. Instructor. Eval: 5.68/6.
Fall 2020	STA2002 Probability and Statistics. Co-instructor (Primary Instructor: Michael Choi). Eval: 5.52/6.
	As PhD student, CUHK

Fall 2016	Probability. Teaching Assistant.
Spring 2016	Automata and Formal Languages. Teaching Assistant.
Fall 2015	Probability. Teaching Assistant.
Spring 2015	Software Engineering. Teaching Assistant.
Fall 2014	Algorithms and Data Structures. Teaching Assistant.

Graduate Student Advising

[1] Jing Dong, PhD student in Data Science (2021.9 –)

[2] Shanchao Yang, PhD student in Data Science (2021.9 –)

[3] Dan Qiao, PhD student in Computer Science (2022.9 –)

[4] Jiawei Xu, PhD student in Computer Science (2023.9 –)

Postdoc Advising

[1] Ruinan Jin, PhD in Mathematics, Chinese Academy of Science (2022.11 –)

Experiences

Feb 2018-Dec 2019	Research Scientist at RBC Research Institute (Borealis AI) Visiting Student at University of Alberta, Edmonton, AB, Canada Worked with Nidhi Hegde, Ruitong Huang, Matthew E. Taylor, and Richard S. Sutton on a variety of reinforcement learning problems. See [23], [25], [26], [27] in Publications;
Jun-Oct 2017	Intern at Cubist Systematic Strategies, New York, NY, USA Worked with Julie Zhu on high-frequency trading signal research and event-based time series analysis;
Jun-Sep 2016	Intern at Siemens Research, Princeton, NJ, USA Worked with Sam Zheng on vector-valued inverse reinforcement learning. We relax the assumption of IRL that players conduct optimal actions to that players conduct non-dominated actions [28].

Academic Services

Program committee (reviewers): Adaptive and Learning Agents workshop, AAAI
Reviewer: ICML, NeurIPS, ICLR, TCS, AAMAS, AISTATS, UAI, IJCAI, Pattern Recognition

Referees

Siu On Chan (CUHK)
Andrej Bogdanov (University of Ottawa)
Hongyuan Zha (CUHK)

Online Profiles

DBLP:	https://dblp.org/pid/145/9873.html
Google Scholar:	https://scholar.google.com/citations?user=cQe4OeYAAAAJ
ORCID:	https://orcid.org/0000-0002-2997-0970