Haifeng Xu

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RESEARCH INTERESTS

AI agents, Machine Learning, Data-driven Decision Making, Computational Economics and Multi-Agent Systems

PROFESSIONAL EXPERIENCE

Assistant Professor in Computer Science and Data Science | 07/2022 – present
University of Chicago

Visiting Research Scientist in Market Algorithms | 09/2023 – present
Google Research

Alan Batson Assistant Professor in Computer Science | 08/2019 – 06/2022
University of Virginia

Postdoctoral Fellow at Harvard University | 08/2018 – 08/2019
Hosts: Yiling Chen and David C. Parkes

Intern at Google Research (2016), Yahoo! Lab (2015) and Microsoft Research (07/2011-05/2012)

EDUCATION

Ph.D. in Computer Science, USC | 08/2013 – 07/2018
Advisors: Milind Tambe and Shaddin Dughmi

MMath in Computational Mathematics, University of Waterloo | 08/2012 – 08/2013

B.Sc. (honours) in Mathematics, University of Science & Technology of China | 08/2008 – 07/2012
School of Gifted Young and HUA Loo-Keng Elite Program in Mathematics

AWARDS

○ Best Paper Award, the ACM Web Conference (WWW) | 2024
  1 out of 2008 submissions

○ AI2050 Early Career Fellow (see Schmidt Sciences' interview) | 2024

○ Early Career Spotlight at International Joint Conference on Artificial Intelligence (IJCAI) | 2023
  One of 11 recipients worldwide (most junior recipient of 2023 cohort)

○ Google Faculty Research Award | 2020

○ ACM SIGecom Dissertation Award (honorable mention) | 2019

○ IFAAMAS Victor Lesser Distinguished Dissertation Award (runner-up) | 2019

- Best Application System Demo Award, AAMAS 2019. 2019
- Google Ph.D. Fellowship 2017
- CAMS Prize for Excellence in Research, USC Center for Applied Mathematical Sciences 2017
- Best Paper Award, AAMAS Workshop on Security and Multi-agent Systems (SecMas) 2016
- Best Student Paper Award, AAMAS 2016 2016
- Shing-Tung Yau Chinese College Student Mathematics Contests 2011
    - Silver Medal in Applied Mathematics (Top 4 in the country)
    - Bronze Team Medal (Top 4 teams in the country)

AWARDS RECEIVED BY MY ADVISEES

- **Jibang Wu**, Stigler Center PhD Dissertation Award by *UChicago Booth Stigler Center* 2024
    First UChicago CS PhD to win this university-wide award
- **Fan Yao**, Copenhaver Bicentennial PhD Fellowship ($12K, merit-based) by *UVA Engineering* 2024
- **Anqi Qu**, Rhodes Scholar 2024
    to support her research of applying AI to economic research
- **Haichuan Wang**, David S. Hu Exceptional Undergrad Thesis Award by *UChicago Econ* 2024
- **Yifan Guo**, GUO Moruo Scholarship (the highest undergrad honor from USTC) 2024
    Yifan visits our group from University of Sci & Tech of China (USTC) to conduct undergrad thesis
- **Chenghan Zhou**, CRA Undergraduate Research Awards (honorable mention) 2021
    for her research on information design on congestion games, published at EC'22

RESEARCH ADVISING

PhD Students

- Jibang Wu, 2019 - 2025;
  Thesis: Towards a Theory of Strategic Alignment
  Next position: incoming tenure-track assistant professor at NYU Business School (Shanghai Campus)

- Fan Yao, 2019 - 2025 (co-advised with Prof. Hongning Wang);
  Thesis: TBD
  Next position: incoming tenure-track assistant professor at UNC Chapel Hill, Stats and Operations Research (STOR)

- Minbiao Han, 2019 - 2025;
  Thesis: Towards an Algorithmic Theory of Principal-Agency;
  Next position: incoming applied scientist at Microsoft

- Yuwei Cheng, 2023 -

- Alec Sun, 2023 -

- Aditya Prasad, 2024 -

Postdocs

- Seyed A. Esmaeili, 2024 -
- Andrzej Kaczmarczyk, 2024 -
- Ganghua Wang, 2024 -

Undergrads and Masters

- Qingchuan Yang, 2024 - 2025;
  Next position: incoming PhD at USC Computer Science (USC Viterbi Graduate School Fellowship)
- Chaplin (Yi-Chi) Huang, 2024 - 2025;
- Anqi Qu, 2023 - 2025 (named Rhodes Scholar);
  Next position: incoming graduate student at Oxford
- Lucien Liu, 2023 - 2025;
  Next position: IMC Trading
- Haichuan Wang, 2023 - 2024 (David S. Hu Exceptional Thesis Award for his research on academic publication competition);
  Next position: PhD at Harvard Computer Science
- Derek Zhu, 2023 - 2024 (leading author paper at NeurIPS'24);
  Next position: Radix Trading
- Simon Mahns, 2023 - 2024;
  Next position: Software engineer at Meta
- Chenghan Zhou, 2020 - 2022 (leading-author papers at EC'22 and UAI'22; honorable mention for 2020 CRA Outstanding Undergrad Research award);
  Next position: Grad student at Princeton CS (now PhD at Stanford CS)
- Quinlan Dawkins, 2020 - 2022 (leading-author papers at ICML'21, NeurIPS'21 and AAAI'22);
  Next position: Start-up *nod.ai*
- Nijat Khanbabayev, 2021 - 2022;
  Next position: Hudson River Trading
- Sijun Tan, 2020 - 2021 (leading-author paper at NeurIPS'21);
  Next position: PhD at EECS, UC Berkeley

Non-Degree Visiting Students (NDVS)

PhDs

- Suho Shin, 05/24 - 08/24, visiting PhD from UMD Computer Science
- Yang Yu, spring quarter of 2024, visiting PhD from UVA Economics.
  Next position: incoming tenure-track assistant professor in Economics at Monash University (after a one-year postdoc at MIT FutureTech Research Group).

Undergrads

- Yu He, 05/24 - 04/25, visiting undergrad from City University of Hong Kong;
  Next position: incoming PhD at Northwestern CS
- Eric (Zi-Hong) Xiao, summer 2024, visiting undergrad from National Taiwan University

○ Yifan Guo, 03/23 - 08/23, visiting undergrad from University of Science and Technology of China (winner of Guo Moruo Scholarship);
  Next position: PhD student at Stanford GSB

○ James Nachbar, summer 2020, visiting undergrad from Yale (first-author paper at DAI'21);
  Next position: Optiver Trading

SELECTED RECENT INVITED TALKS

Please refer to the Invited Talks Section for the full list

[10]. Keynote at 7th Games, Agents, and Incentives Workshop (GAIW) of AAMAS, *Rethinking Online Content Ecosystems through the Lens of Multi-Agent Systems*, May, 2025

[9]. Invited openning tutorial at Fifth Annual ACM SIGecom Winter Meeting, *Rethinking Online Content Ecosystems through the Lens of Computational Economics*, March, 2025

[8]. Invited talk at Brown CS Theory Seminar Series, *Rethinking Online Content Ecosystems through the Lens of Computational Economics*, February 2025

[7]. Invited talk at the Economic Theory of Human-AI Collaboration workshop of Econometric Society European Meetings (ESEM), *Human vs. Generative AI in Content Creation Competition: Symbiosis or Conflict?*, August 2024

[6]. Keynote at AAMAS 2024 SCaLA workshop on Social Choice and Learning Algorithms, *Rethinking Online Content Ecosystems in the Era of Generative AIs*, May, 2024

[5]. Keynote at AAAI Workshop on Recommendation Ecosystems, *Rethinking online content ecosystems in the era of generative AIs*, February, 2024

[4]. Invited Talk at Yale University Micro-economic Theory Seminar, *Mechanism Design for Large Language Models*, November 2023

[3]. Invited Talk at Princeton CSML Seminar and ECE Korhammer Seminar, *Algorithms and Incentives in Machine Learning*, December 2023

[2]. Invited talk at International Monetary Fund (IMF), *The Economics of Machine Learning*, June 2023

[1]. Invited Talk at Duke University Algorithms Seminar Series, *New Frontiers of Algorithmic Information Design*, November, 2023

SELECTED PROFESSIONAL SERVICE

Please refer to the Professional Service Section for the full list

[6]. Organizing co-chair for Midwest ML Symposium, 2025

[5]. Invited onsite review panelist for German Research Foundation's Cluster of Excellence program (the foundation's largest grants, with ~ 50 millions euros per award), Feb 2025
    I was the only panelist below full professorship rank

[4]. Co-organizer for Workshop on Economics of Modern ML: Markets, Incentives, and Generative AI with AAAI 2025

[3]. Local organizing committee member and Senior AC for International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2025)

[2]. Co-organizer for tutorial The Economics of Data and Learning (with James Zou and Shuran Zheng), AAAI 2023.

[1]. PC co-chair for the 13th Conference on Decision and Game Theory for Security (GameSec 2022)

PUBLICATIONS

Journal Papers

[J9]. (α-β) Yiding Feng, Wei Tang and **Haifeng Xu**. No-regret Bayesian Recommendation to Homogeneous Users. *Operations Research* (*OR*), *2025* (minor revision).

[J8]. (α-β) Yakov Babichenko, Inbal Talgam-Cohen, **Haifeng Xu** and Konstantin Zabarnyi. Information Design in the Principal-Agent Problem. *Games and Economic Behavior* (*GEB*), *2025* (minor revision).

[J7]. Weiran Shen, Minbiao Han , Weizhe Chen, Taoan Huang, Rohit Singh, **Haifeng Xu** and Fei Fang. An Extensive Study of Security Games with Strategic Informants. *Artificial Intelligence* (*AIJ*), *2024*.

[J6]. You Zu, Krishnamurthy Iyer and **Haifeng Xu**. Learning to Persuade on the Fly: Robustness Against Ignorance. *Operations Research* (*OR*), *2024*.

[J5]. (α-β) Ravi Sundaram, Anil Vullikanti, **Haifeng Xu** and Fan Yao. PAC-Learning for Strategic Classification. *Journal of Machine Learning Research* (*JMLR*), *2023*.

[J4]. (α-β) Yakov Babichenko, Inbal Talgam-Cohen, **Haifeng Xu** and Konstantin Zabarnyi. Regret-Minimizing Bayesian Persuasion. *Games and Economic Behavior* (*GEB*), *2022*.

[J3]. **Haifeng Xu**, Rasha Kashef, Hans De Sterck and Geoffrey Sanders. Efficient Algebraic Multigrid Methods for Multilevel Overlapping Co-Clustering of User-Item Relationships. *INFORMS Journal on Computing*, *2022*.

[J2]. (α-β) Shaddin Dughmi, **Haifeng Xu.** Algorithmic Bayesian Persuasion. *SIAM Journal on Computing* (*SICOMP*), *2019*.

[J1]. Amulya Yadav, Hau Chan, Albert Jiang, **Haifeng Xu**, Eric Rice and Milind Tambe. Using Social Networks to Raise HIV Awareness Among Homeless Youth. *IBM Journal of Research and Development: Volume 61, Issue 6(4), pp. 1-10, 2017*.

Refereed Conference Papers

[C89]. Fan Yao, Yuwei Cheng, Ermin Wei and **Haifeng Xu**. Single-agent Poisoning Attacks Suffice to Ruin Multi-Agent Learning, *Proceedings of the 13th International Conference on Learning Representations, 2025*, (**ICLR 2025**).

[C88]. Yuwei Cheng, Fan Yao, Xuefeng Liu and **Haifeng Xu**. Learning from Imperfect Human Feedback: A Tale from Corruption-Robust Dueling, *Proceedings of the 13th International Conference on Learning Representations, 2025*, (**ICLR 2025**).

[C87]. (α-β) Matteo Castiglioni, Junjie Chen, Minming Li, **Haifeng Xu** and Song Zuo. A Reduction from Multi-Parameter to Single-Parameter Bayesian Contract Design, *Proceedings of the 36th ACM-SIAM Symposium on Discrete Algorithms, 2025*, (**SODA 2025**).

[C86]. (α-β) Yuqi Pan, Zhiwei Steven Wu, **Haifeng Xu** and Shuran Zheng. Differentially Private Bayesian Persuasion, *Proceedings of the Web Conference, 2025*, (**WWW 2025**, oral presentation).

[C85]. (α-β) Haolin Liu, Rajmohan Rajaraman, Ravi Sundaram, Anil Vullikanti, Omer Wasim and **Haifeng Xu**. On the Sample Complexity of Opinion Convergence in Networks, *Proceedings of the 39th AAAI Conference on Artificial Intelligence, 2025*, (**AAAI 2025**, oral, 4.6%).

[C84]. (α-β) Wei Tang, **Haifeng Xu**, Ruimin Zhang and Derek Zhu. Intrinsic Robustness of Prophet Inequality to Strategic Reward Signaling, *Proceedings of the 38th Conference on Neural Information Processing Systems, 2024*, (**NeurIPS 2024**).

[C83]. Thomas Kleine Buening, Aadirupa Saha, Christos Dimitrakakis and **Haifeng Xu**. Strategic Linear Contextual Bandits, *Proceedings of the 38th Conference on Neural Information Processing Systems, 2024*, (**NeurIPS 2024**).

[C82]. Fan Yao, Yiming Liao, Jingzhou Liu, Shaoliang Nie, Qifan Wang, **Haifeng Xu** and Hongning Wang. Unveiling User Satisfaction and Creator Productivity Trade-Offs in Recommendation Platforms *Proceedings of the 38th Conference on Neural Information Processing Systems*, (**NeurIPS 2024**).

[C81]. (α-β) Yakov Babichenko, Inbal Talgam-Cohen, **Haifeng Xu** and Konstantin Zabarnyi. Algorithmic Cheap Talk. *Proceedings of the 25th ACM Conference on Economics and Computation, 2024*, (**EC 2024**).

[C80]. (α-β) Yakov Babichenko, Inbal Talgam-Cohen, **Haifeng Xu** and Konstantin Zabarnyi. Information Design in the Principal-Agent Problem. *Proceedings of the 25th ACM Conference on Economics and Computation, 2024*, (**EC 2024**).

[C79]. (α-β) Paul Duetting, Vahab Mirrokni, Renato Paes Leme, **Haifeng Xu**, and Song Zuo. Mechanism Design with Large Language Models. *Proceedings of the ACM Web Conference, 2024*, (**WWW 2024**), Best Paper Award (1 out of 2008 submissions)
Selected to be presented at the plenary session of **EC 2024** as *Highlights Beyond EC*;
Invited presentation at the Sister Conferences Track of IJCAI 2025

[C78]. (α-β) Jiarui Gan, Minbiao Han, Jibang Wu, and **Haifeng Xu**. Generalized Principal-Agency: Contracts, Information, Games and Beyond, *Proceedings of the 20th Conference on Web and Internet Economics, 2024*, (**WINE 2024**).

[C77]. Jibang Wu , Ashwinkumar Badanidiyuru and **Haifeng Xu**. Auctioning with Strategically Reticent Bidders *Proceedings of the 20th Conference on Web and Internet Economics, 2024*, (**WINE 2024**).

[C76]. Fan Yao , Chuanhao Li, Denis Nekipelov, Hongning Wang and **Haifeng Xu**. Human vs. Generative AI in Content Creation Competition: Symbiosis or Conflict? *Proceedings of the 41th International Conference on Machine Learning, 2024*, (**ICML 2024**).

[C75]. Safwan Hossain*, Tonghan Wang*, Tao Lin*, Yiling Chen, David Parkes and **Haifeng Xu**. Multi-Sender Persuasion – A Computational Perspective, *Proceedings of the 41th International Conference on Machine Learning, 2024*, (**ICML 2024**).

[C74]. Thomas Kleine Buening, Aadirupa Saha, Christos Dimitrakakis and **Haifeng Xu**. Bandits Meet Mechanism Design to Combat Clickbait in Online Recommendation *Proceedings of the 12th International Conference on Learning Representations, 2024*, (**ICLR 2024**), spotlight, 5%.

[C73]. Zhepei Wei, Chuanhao Li, **Haifeng Xu** and Hongning Wang. Incentivized Truthful Communication for Federated Bandits. *Proceedings of the 12th International Conference on Learning Representations, 2024*, (**ICLR 2024**).

[C72]. (equal contribution for first two authors) Niclas Boehmer, Minbiao Han, **Haifeng Xu** and Milind Tambe. Escape Sensing Games: Detection-vs-Evasion in Security Applications. *Proceedings of the 2024 European Conference on Artificial Intelligence*, (**ECAI 2024**).

[C71]. Fan Yao , Yiming Liao, Mingzhe Wu, Chuanhao Li, Yan Zhu, James Yang, Qifan Wang, **Haifeng Xu** and Hongning Wang. User Welfare Optimization in Recommender Systems with Competing Content Creators. *Proceedings of the 30th ACM SIGKDD Conference on Knowledge Discovery and Data Mining, 2024*, (**KDD 2024**).

[C70]. Minbiao Han, Michael Albert and **Haifeng Xu**. Learning in Online Principal-Agent Interactions: The Power of Menus. *Proceedings of the 38th AAAI Conference on Artificial Intelligence*, (**AAAI 2024**).

[C69]. (α-β) Junjie Chen, Minming Li, **Haifeng Xu** and Song Zuo. Bayesian Calibrated Click-Through Auction. *Proceedings of the 51st EATCS International Colloquium on Automata, Languages, and Programming*, (**ICALP 2024**).

[C68]. Fan Yao, Chuanhao Li, Karthik Abinav Sankararaman, Yiming Liao, Yan Zhu, Qifan Wang, Hongning Wang and **Haifeng Xu**. Rethinking Incentives in Recommender Systems: Are Monotone Rewards Always Beneficial? *Proceedings of the 37th Conference on Neural Information Processing Systems*, (**NeurIPS 2023**).

[C67]. Chaoqi Wang, Ziyu Ye, Zhe Feng, Ashwinkumar Badanidiyuru and **Haifeng Xu**. Follow-ups Also Matter: Improving Contextual Bandits via Post-serving Contexts. *Proceedings of the 37th Conference on Neural Information Processing Systems*, (**NeurIPS 2023**), spotlight, 3.6%.

[C66]. Zhepei Wei, Chuanhao Li, **Haifeng Xu** and Hongning Wang. Incentivized Communication for Federated Bandits. *Proceedings of the 37th Conference on Neural Information Processing Systems*, (**NeurIPS 2023**).

[C65]. (α-β) Krishnamurthy Iyer, **Haifeng Xu** and You Zu. Markov Persuasion Processes with Endogenous Agent Beliefs. *Proceedings of 19'th Conference On Web And Internet Economics*, (**WINE 2023**).

[C64]. **Haifeng Xu**. The Economics of Machine Learning. *Proceedings of 32nd International Joint Conference on Artificial Intelligence*, (**IJCAI 2023**), invited paper for early career spotlight track, 11 invitees worldwide.

[C63]. (α-β) Jiarui Gan, Minbiao Han, Jibang Wu, and **Haifeng Xu**. Robust Stackelberg Equilibria. *Proceedings of the 24th ACM Conference on Economics and Computation*, (**EC 2023**).

[C62]. Fan Yao, Chuanhao Li, Denis Nekipelov, Hongning Wang and **Haifeng Xu**. How Bad is Top-K Recommendation under Competing Content Creators? *Proceedings of the 40th International Conference on Machine Learning*, (**ICML 2023**), live presentation, 2.3%.

[C61]. (α-β) Bolin Ding, Yiding Feng, Chien-Ju Ho, Wei Tang and **Haifeng Xu**. Competitive Information Design for Pandora's Box. *Proceedings of the 34th ACM-SIAM Symposium on Discrete Algorithms*, (**SODA 2023**).

[C60]. Huazheng Wang, **Haifeng Xu**, Chuanhao Li, Zhiyuan Liu and Hongning Wang. Incentivizing Exploration in Linear Bandits under Information Gap. *Proceedings of 17th ACM Conference on Recommender Systems*, (**RecSys 2023**).

[C59]. Jibang Wu, Weiran Shen, Fei Fang and **Haifeng Xu**. Inverse Game Theory for Stackelberg Games: the Blessing of Bounded Rationality. *Proceedings of the 36th Conference on Neural Information Processing Systems* (**NeurIPS'22**).

[C58]. Ashwinkumar Badanidiyuru, Zhe Feng, Tianxi Li and **Haifeng Xu**. Incrementality Bidding via Reinforcement Learning under Mixed and Delayed Rewards. *Proceedings of the 36th Conference on Neural Information Processing Systems* (**NeurIPS'22**).

[C57]. Stephanie Schoch, **Haifeng Xu** and Yangfeng Ji. CS-Shapley: Class-wise Shapley Values for Data Valuation in Classification. *Proceedings of the 36th Conference on Neural Information Processing Systems* (**NeurIPS'22**).

[C56]. (α-β) Jibang Wu, Fan Yao and **Haifeng Xu**. Multi-Agent Learning for Iterative Dominance Elimination: Formal Barriers and New Algorithms. *Proceedings of the 35th Annual Conference on Learning Theory*, (**COLT 2022**).

[C55]. Jibang Wu, Zixuan Zhang, Zhe Feng, Zhaoran Wang, Zhuoran Yang, Michael I. Jordan and **Haifeng Xu**. Sequential Information Design: Markov Persuasion Process and Its Efficient Reinforcement Learning. *Proceedings of the 23th ACM Conference on Economics and Computation*, (**EC 2022**).

[C54]. Chenghan Zhou, Thanh H. Nguyen and **Haifeng Xu**. Algorithmic Information Design in Multi-Player Games: Possibility and Limits in Singleton Congestion. *Proceedings of the 23th ACM Conference on Economics and Computation*, (**EC 2022**).

[C53]. (α-β) Yiding Feng, Wei Tang and **Haifeng Xu**. Online Bayesian Recommendation with No Regret. *Proceedings of the 23th ACM Conference on Economics and Computation*, (**EC 2022**).

[C52]. Fan Yao, Chuanhao Li, Denis Nekipelov, Hongning Wang and **Haifeng Xu**. Learning from a Learning User for Optimal Recommendations. *Proceedings of the 39th International Conference on Machine Learning*, (**ICML 2022**).

Also selected for spotlight presentation(5 out of 38 accepted papers) at the ICML 2023 workshop on Interactive Learning with Implicit Human Feedback.

[C51]. (α-β) Junjie Chen, Minming Li and **Haifeng Xu**. Selling Data To a Machine Learner: Pricing via Costly Signaling. *Proceedings of the 39th International Conference on Machine Learning*, (**ICML 2022**).

[C50]. Huazheng Wang, **Haifeng Xu** and Hongning Wang. When Are Linear Stochastic Bandits Attackable? *Proceedings of the 39th International Conference on Machine Learning*, (**ICML 2022**).

[C49]. Chenghan Zhou, Andrew Spivey, **Haifeng Xu** and Thanh Hong Nguyen. Information Design for Multiple Independent and Self-Interested Defenders: Work Less, Pay Off More. *Proceedings of the 38th Conference on Uncertainty in Artificial Intelligence*, (**UAI 2022**).

[C48]. (α-β for first two authors) Anshuka Rangi, **Haifeng Xu**, Long Tran-Thanh and Massimo Franceschetti. Understanding the Limits of Poisoning Attacks in Episodic Reinforcement Learning. *Proceedings of the 31st International Joint Conference on Artificial Intelligence* (**IJCAI 2022**), long oral, 3.75%

[C47]. (α-β) Quinlan Dawkins, Minbiao Han and **Haifeng Xu**. First-order Convex Fitting and Its Application to Economics and Optimization. *Proceedings of the 36nd AAAI Conference on Artificial Intelligence* (**AAAI 2022**), long oral

[C46]. Fan Yao, Chuanhao Li, Denis Nekipelov, Hongning Wang and **Haifeng Xu**. Learning the Optimal Recommendation from Explorative Users. *Proceedings of the 36nd AAAI Conference on Artificial Intelligence* (**AAAI 2022**)

[C45]. **Haifeng Xu** and Ruggiero Cavallo. The Strange Role of Information Asymmetry in Auctions — Does More Accurate Value Estimation Benefit A Bidder? *Proceedings of the 36nd AAAI Conference on Artificial Intelligence* (**AAAI 2022**), long oral

[C44]. (α-β) Anshuka Rangi, Long Tran-Thanh, **Haifeng Xu** and Massimo Franceschetti. Saving Stochastic Bandits from Poisoning Attacks via Limited Data Verification. *Proceedings of the 36nd AAAI Conference on Artificial Intelligence* (**AAAI 2022**), long oral

[C43]. Thanh Nguyen and **Haifeng Xu**. When Can the Defender Effectively Deceive Attackers in Security Games? *Proceedings of the 36nd AAAI Conference on Artificial Intelligence* (**AAAI 2022**).

[C42]. (α-β) Yakov Babichenko, Inbal Talgam-Cohen, **Haifeng Xu** and Konstantin Zabarnyi. Multi-Channel Bayesian Persuasion. *Proceedings of the Innovations in Theoretical Computer Science* (**ITCS'22**).

[C41]. (α-β) Quinlan Dawkins, Minbiao Han and **Haifeng Xu**. The Limits of Optimal Pricing in the Dark. *Proceedings of the 35th Conference on Neural Information Processing Systems* (**NeurIPS'21**).

[C40]. Sijun Tan, Jibang Wu, Xiaohui Bei and **Haifeng Xu**. Least Square Calibration for Peer Reviews. *Proceedings of the 35th Conference on Neural Information Processing Systems* (**NeurIPS'21**).

[C39]. Chengshuai Shi, **Haifeng Xu**, Wei Xiong, Cong Shen. (Almost) Free Incentivized Exploration from Decentralized Learning Agents. *Proceedings of the 35th Conference on Neural Information Processing Systems* (**NeurIPS'21**).

[C38]. (α-β) Ravi Sundaram, Anil Vullikanti, **Haifeng Xu** and Fan Yao. PAC-Learning for Strategic Classification. *Proceedings of the 38th International Conference on Machine Learning* (**ICML 2021**), long oral, 3%.

[C37]. Quinlan Dawkins, Tianxi Li and **Haifeng Xu**. Diffusion Source Identification on Networks with Statistical Confidence. *Proceedings of the 38th International Conference on Machine Learning* (**ICML 2021**).

[C36]. Shuze Liu, Weiran Shen and **Haifeng Xu**. Optimal Pricing of Information. *Proceedings of the 22th ACM Conference on Economics and Computation* (**EC'21**).

[C35]. (α-β) Yakov Babichenko, Inbal Talgam-Cohen, **Haifeng Xu** and Konstantin Zabarnyi. Regret-Minimizing Bayesian Persuasion. *Proceedings of the 22th ACM Conference on Economics and Computation* (**EC'21**).

[C34]. You Zu, Krishnamurthy Iyer and **Haifeng Xu**. Learning to Persuade on the Fly: Robustness Against Ignorance. *Proceedings of the 22th ACM Conference on Economics and Computation* (**EC'21**).

[C33]. James Nachbar and Haifeng Xu. The Power of Signaling and its Intrinsic Connection to the Price of Anarchy. *Proceedings of the Third International Conference on Distributed Artificial Intelligence*, (**DAI'21**).

[C32]. Aditya Mate, Jackson A. Killian, **Haifeng Xu**, Andrew Perrault, Milind Tambe. Collapsing Bandits and Their Application to Public Health Interventions. *Proceedings of the 34th Conference on Neural Information Processing Systems* (**NeurIPS 2020**).

[C31]. (α-β) Zhe Feng, David Parkes, **Haifeng Xu**. The Intrinsic Robustness of Stochastic Bandits to Strategic Manipulation. *Proceedings of the 37th International Conference on Machine Learning* (**ICML 2020**).

[C30]. **Haifeng Xu**. On the Tractability of Public Persuasion with No Externalities. *Proceedings of the 31st ACM-SIAM Symposium on Discrete Algorithms* (**SODA 2020**).

[C29]. (α-β) Yiling Chen, **Haifeng Xu**, Shuran Zheng. Selling Information through Consulting. *Proceedings of the 31st ACM-SIAM Symposium on Discrete Algorithms* (**SODA 2020**).

[C28]. Sarah Keren, **Haifeng Xu**, David Parkes, Kofi Kwapong and Barbara Grosz. Information Shaping for Enhanced Goal Recognition of Partially-Informed Agents. *Proceedings of the 34nd AAAI Conference on Artificial Intelligence* (**AAAI 2020**), oral.

[C27]. Elizabeth Bondi, Hoon Oh, **Haifeng Xu**, Fei Fang, Bistra Dilkina, Milind Tambe. To Signal or Not To Signal: Exploiting Uncertain Real-Time Information in Signaling Games for Security and Sustainability. *Proceedings of the 34nd AAAI Conference on Artificial Intelligence* (**AAAI 2020**), oral.

[C26]. Chao Yan, **Haifeng Xu**, Yevgeniy Vorobeychik, Bo Li, Daniel Fabbri, Bradley Malin. To Warn or Not to Warn: Online Signaling in Audit Games. *Proceedings of the 36th IEEE International Conference on Data Engineering* (**ICDE 2020**), oral.

[C25]. Thanh Nguyen, Andrew Butler and **Haifeng Xu**. Tackling Imitative Attacker Deception in Repeated Bayesian Stackelberg Security Games. *Proceedings of the 24th European Conference on Artificial Intelligence* (**ECAI 2020**).

[C24]. Jiarui Gan, **Haifeng Xu**, Qingyu Guo, Long Tran-Thanh, Zinovi Rabinovich and Michael Wooldridge. Imitative Follower Deception in Stackelberg Games. *Proceedings of the 20th ACM Conference on Economics and Computation* (**EC'19**).

[C23]. (α-β) Thanh H. Nguyen and **Haifeng Xu**. Imitative Attacker Deception in Stackelberg Security Games. *Proceedings of the 28th International Joint Conference on Artificial Intelligence* (**IJCAI'19**).

[C22]. (α-β) Jerry Anunrojwong, Yiling Chen, Bo Waggoner and **Haifeng Xu**. Computing Equilibria of Prediction Markets via Persuasion. *Proceedings of the 15th Conference on Web and Internet Economics* (**WINE'19**).

[C21]. Omkar Thakoor, Milind Tambe, Phebe Vayanos, **Haifeng Xu**, Christopher Kiekintveld, and Fei Fang. Cyber Camouflage Games for Strategic Deception. *Proc. 10th Conference on Decision and Game Theory for Security* (**GameSec 2019**).

[C20]. **Haifeng Xu**, Kai Wang, Phebe Vayanos, Milind Tambe. Strategic Coordination of Human Patrollers and Mobile Sensors with Signaling for Security Games. *Proceedings of the 32th AAAI Conference on Artificial Intelligence* (**AAAI'18**), oral.

[C19]. (α-β) Ashwinkumar Badanidiyuru, Kshipra Bhawalkar, **Haifeng Xu**. Targeting and Signaling in Ad Auctions. *ACM-SIAM Symposium on Discrete Algorithms* (**SODA'18**).

[C18]. **Haifeng Xu**, Shaddin Dughmi, Milind Tambe, Venil Loyd Noronha. Mitigating the Curse of Correlation in Security Games by Entropy Maximization. *Proceedings of the 17th International Conference on Autonomous Agents and Multiagent Systems* (**AAMAS'18**, short paper).

[C17]. Aaron Schlenker, Omkar Thakoor, **Haifeng Xu**, Fei Fang, Milind Tambe, Long Tran-Thanh, Phebe Vayanos, Yevgeniy Vorobeychik. Deceiving Cyber Adversaries: A Game Theoretic Approach. *Proceedings of the 17th International Conference on Autonomous Agents and Multiagent Systems* (**AAMAS'18**).

[C16]. (α-β) Shaddin Dughmi, **Haifeng Xu**. Algorithmic Persuasion with No Externalities. *Proceedings of the 18th ACM Conference on Economics and Computation* (**EC'17**).

[C15]. **Haifeng Xu**∗, Benjamin Ford∗, Fei Fang, Bistra Dilkina, Andrew Plumptre, Milind Tambe, Margaret Driciru, Fred Wanyama, Aggrey Rwetsiba, Mustapha Nsubaga and Joshua Mabonga. Optimal Patrol Planning for Green Security Games with Black-Box Attackers. *Proceedings of the 8th Conference on Decision and Game Theory for Security* (**GameSec'17**). (*Equal Contributions)

[C14]. Aaron Schlenker, **Haifeng Xu**, Mina Guirguis, Christopher Kiekintveld, Arunesh Sinha, Milind Tambe, Solomon Sonya, Darryl Balderas, Noah Dunstatter. Don't Bury your Head in Warnings: A Game-Theoretic Approach for Intelligent Allocation of Cyber-security Alerts. *Proceedings of the 26th International Joint Conference on Artificial Intelligence* (**IJCAI'17**). Highlighted in the press release opening the IJCAI'17 conference.

[C13]. (α-β) Shaddin Dughmi, **Haifeng Xu.** Algorithmic Bayesian Persuasion. *Proceedings of the 48th ACM Symposium on Theory of Computing* (**STOC'16**). Invited to SICOMP Special Issue for STOC 2016.

[C12]. **Haifeng Xu.** The Mysteries of Security Games: Equilibrium Computation Becomes Combinatorial Algorithm Design. *Proceedings of the 17th ACM Conference on Economics and Computation* (**EC'16**). Best paper award at the AAMAS-16 workshop on Security and Multi-agent Systems.

[C11]. **Haifeng Xu**, Rupert Freeman, Vincent Conitzer, Shaddin Dughmi, Milind Tambe. Signaling in Bayesian Stackelberg Games. *Proceedings of the 15th International Conference on Autonomous Agents and Multiagent Systems* (**AAMAS'16**).

[C10]. **Haifeng Xu**∗, Long Tran Thanh∗, Nick Jennings. Playing Repeated Security Games with No Prior Knowledge. *Proceedings of the 15th International Conference on Autonomous Agents and Multiagent Systems* (**AAMAS'16**). (*Equal Contributions)

[C9]. Amulya Yadav, Hau Chan, Albert Jiang, **Haifeng Xu**, Eric Rice, Milind Tambe. Using Social Networks to Aid Homeless Shelters: Dynamic Influence Maximization Under Uncertainty. *Proceedings of the 15th International Conference on Autonomous Agents and Multiagent Systems* (**AAMAS'16**). Best student paper award.

[C8]. **Haifeng Xu**, Albert X. Jiang, Arunesh, Sinha, Zinovi Rabinovich, Shaddin Dughmi, Milind Tambe. Security Games with Information Leakage: Modeling and Computation. *Proceedings of the 24th International Joint Conference on Artificial Intelligence* (**IJCAI'15**).

[C7]. Yue Yin, **Haifeng Xu**, Jiarui Gan, Bo An, Albert X. Jiang. Computing Optimal Mixed Strategies for Security Games With Dynamic Payoffs. *Proceedings of the 24th International Joint Conference on Artificial Intelligence* (**IJCAI'15**).

[C6]. Zinovi Rabinovich, Albert X. Jiang, Manish Jain, **Haifeng Xu**. Information Disclosure as a Means of Security. *Proceedings of the 14th International Conference on Autonomous Agents and Multiagent Systems* (**AAMAS'15**).

[C5]. **Haifeng Xu**, Zinovi Rabinovich, Shaddin Dughmi, Milind Tambe. Exploring Information Asymmetry in Two-Stage Security Games. *Proceedings of the 29th AAAI Conference on Artificial Intelligence* (**AAAI'15**).

[C4]. **Haifeng Xu**, Fei Fang, Albert X. Jiang, Vincent Conitzer, Shaddin Dughmi, Milind Tambe. Solving Zero-Sum Security Games in Discretized Spatio-Temporal Domains. *Proceedings of the 28th AAAI Conference on Artificial Intelligence* (**AAAI'14**).

[C3]. Leandro Marcolino, **Haifeng Xu**, Albert X. Jiang, Milind Tambe, Emma Bowring. Give a Hard Problem to a Diverse Team: Exploring Large Action Spaces. *Proceedings of the 28th AAAI Conference on Artificial Intelligence* (**AAAI'14**).

[C2]. **Haifeng Xu**, Kate Larson. Improving the Efficiency of Crowdsourcing Contests. *Proceedings of the 13th International Conference on Autonomous Agents and Multiagent Systems* (**AAMAS'14**).

[C1]. **Haifeng Xu**, Bin Gao, Diyi Yang, Tieyan Liu. Predicting Advertiser Bidding Behaviors in Sponsored Search by Rationality Modeling. *Proceedings of the 22nd International Conference on World Wide Web* (**WWW'13**).

FUNDED RESEARCH

Total: ≈**2.2M;**   **My Share:** ≈**1.7M**

Years	Description	Total	My Share
2024-2026	**AI2050 Early Career Fellowship**: *Rethinking Online Content Ecosystems in the Era of Generative AIs*, sole PI;	$300K	$300K
2023-2026	**ONR Award N00014-23-1-2802**: *Towards Distributed and Online Resource-allocation Partially Observable Stochastic Camouflage Games*, co-PI: Xu; PI: Milind Tambe	$900K	$428K
2023-2026	**ARO Award W911NF2310030**: *Efficient Deception-Aware Learning of Game-Theoretic Solutions for Adversarial Domains*, sole PI	$416K	$416K
2022-2025	**NSF Award 2303372**: *AF: Algorithmic Persuasion: Re-creating the Success of Mechanism Design*, sole PI	$453K	$453K
2021-2022	**Google AI for Social Good Award**: *Combating Poaching through Community Influence*. PI: Xu, co-PI: World Wildlife Fund	$30K	$10K
2020-2021	**Google Faculty Research Award**: *Boosting Ad Auctions through Better Information Design*. sole PI.	$55K	$55K
2020-2021	**Global Infectious Diseases Institute**: *Impact of Strategic Behavior on Inequities in Health Outcomes during COVID-19*. PI: Xu, co-PI: Deborah Hellman, Achla Marathe, Anil Vullikanti.	$50K	$35K

IMPACTS ON REAL-WORLD SYSTEMS

○ **Optimizing Reward Mechanisms for Instagram to Incentivize Content Generation**

To incentivize content creators on Instagram to create desirable content distribution that better serves varied Instagram user populations, my PhD student Fan Yao and I successfully live-tested our mechanism on 3% of Instagram traffic (with about 10 millions of active users). Our new mechanism achieved 1.13% percent improvement for the standard industrial metric of user *like-through-rate* (LTR), i.e., the probability that a user will click the content's "like" button after reading it (for comparison, among launched algorithms, a 1% LTR improvement is considered top-performance). Additionally, our algorithm also consistently and robustly leads to improvement on other aspects such as consumption diversity and daily active users. More disclosable details are reported in our KDD'24 papers.

○ **Software Assistant for the US Federal Air Marshal Service (FAMS)**

To mitigate the harm due to potential insider threat or real-time surveillance, I developed a new algorithm that enhances unpredictability in FAMS scheduling. This algorithm was integrated into the software that has been successfully delivered to FAMS by Avata Intelligence.

○ **PAWS** (**Protection Assistant for Wildlife Security**)

I have developed a novel algorithm that provides optimal randomized patrol plans against poachers whose behavior is captured via complex machine learning models. My algorithm has been integrated into PAWS, an anti-poaching software system that are in use by hundreds of national parks.

PATENTS

○ Incentive Aware Aggregation of Generative Models (with Paul Duetting, Vahab Mirrokni, Renato Paes Leme, and Song Zuo), 2024
Patent No. GP-307380-00-US

TEACHING

○ UChicago CMSC 25300/35300: Mathematical Foundations of Machine Learning (undergrad)
Spring'25, Spring'24, Spring'23.

○ UChicago DATA 37200: Learning, Decisions, and Limits (graduate)
Winter'25.

○ UChicago CMSC 35401: The Interplay of Learning and Game Theory (grad)
Winter'24, Autumn'22.

○ UChicago CMSC 27200: Theory of Algorithms (undergrad), Winter'23.

○ UVA CS 4501: Introduction to Algorithmic Economics (undergrad), Spring'22.

○ UVA CS 4710: Artificial Intelligence (undergrad)
Fall'21, Spring'20

○ UVA CS 6501: Topics in Learning and Game Theory (grad)
Spring'21, Fall'19

○ UVA CS 6161: Design and Analysis of Algorithms (grad), Fall'20

○ Harvard CS 182: Artificial Intelligence (undergrad), Fall'18

INVITED TALKS

[20]. *Rethinking Online Content Ecosystems through the Lens of Computational Economics*
- Invited openning tutorial at Fifth Annual ACM SIGecom Winter Meeting, March, 2025
- Invited talk at MIT IDSS, March, 2025
- Harvard EconCS Seminar, March 2025
- Invited talk at Brown CS Theory Seminar Series, February 2025

[19]. *Rethinking Online Content Ecosystems through the Lens of Multi-agent Systems*
- Keynote at 7th Games, Agents, and Incentives Workshop (GAIW) of AAMAS, May, 2025

[18]. *Economic Designs for Large Language Models* , invited talk at the Translational AI Center (TrAC), Iowa State University.

[17]. *Large Language Models and Social Science*, invited talk at the NSF Sponsored Workshop on AI-Enabled Scientific Revolution, August 2024

[16]. *Human vs. Generative AI in Content Creation Competition: Symbiosis or Conflict?*, invited talk at the Economic Theory of Human-AI Collaboration workshop of Econometric Society European Meetings (ESEM), August 2024

[15]. *Reinforcement Learning through Incentivization: Pulling Arms with Invisible Hands*. Hungarian Machine Learning Days, August 2024

[14]. *Rethinking Online Content Ecosystems in the Era of Generative AIs*
   - Keynote at AAMAS 2024 SCaLA workshop on Social Choice and Learning Algorithms, May, 2024
   - Invited talk at 10th Annual Midwest Workshop on Control and Game Theory.
   - Keynote at AAAI Workshop on Recommendation Ecosystems, February, 2024

[13]. *Mechanism Design for Large Language Models*
   - Department seminar, Management Science and Information Systems (MSIS), Rutgers University, March 2023
   - Financial Technology Thrust, Hong Kong University of Science and Technology, March 2023
   - Micro-economic Theory Seminar, Yale University, November 2023
   - CMU Guest Lecture on Topics in Machine Learning and Game Theory, November 2023

[12]. *The Interplay of Learning and Game Theory in the Information Age*, the inaugural seminar of the *Academic Research Talk Series* at Sunrise Future, March 2023.

[11]. *The Dynamics and Economy of Recommender Systems*
   - Kuaishou Technology Research Seminar on Recommendation, September 2023
   - Google Machine Learning Research Seminar Series, June 2023

[10]. *Algorithms and Incentives in Machine Learning*
   - Second Joint Conference on Statistics and Data Science (JCSDS), July 2024
   - CSML Seminar and ECE Korhammer Seminar, Princeton University, December 2023
   - Statistics Seminar, University of Minnesota at Twin Cities, November 2023

[9]. *The Economics of Machine Learning*
   - ACMS Statistics Seminar Series, University of Notre Dame, November 2023
   - Invited Early Career Spotlight Talk, IJCAI 2023, Macau, August 2023
   - Invited Talk, Center on Frontiers of Computing Studies,Peking University, August 2023
   - Invited Talk, Department of Computer Science, HongKong University, August 2023
   - Invited Talk, Gaoling School of Artificial Intelligence, Renmin University, August 2023
   - Invited Talk, Department of Computer Science, Oxford University, July 2023
   - Invited Talk, International Monetary Fund (IMF), June 2023
   - Department of Computer Science Seminar, George Mason University (GMU), June 2023
   - Seminar talk at Toyota Technological Institute at Chicago (TTIC) , June 2023

[8]. *An Isotonic Mechanism for Overlapping Ownership*, IDEAL Workshop on Trustworthiness in the Presence of Adversaries and Strategic Agents in ML, Northwestern, October 2023

[7]. *New Frontiers of Algorithmic Information Design*
   - Algorithms Seminar Series, Duke University, November, 2023
   - Invited talk at Institute for Theoretical Computer Science, Shanghai University of Finance and Economics, September 2023

[6]. *Towards an Efficient Market for Information and Machine Learning.*

- Workshop on the Frontiers of AI in Business and Society at UIC, May 2023
- Computer Science Seminar Series, Polytech Milan, Feb 2023

[5]. *Markov Persuasion Process and its Reinforcement Learning*

- Harvard University, Sep 2022
- The Institute of Automation, Chinese Academy of Sciences, Sep 2022
- Simons Workshop on Quantifying Uncertainty, Berkeley, Sep 2022

[4]. *Optimal Pricing of Information*

- Workshop on Data Value at UChicago, June 2022
- The Workshop on Strategic Communication and Learning, Stony Brook Center for Game Theory, July, 2021

[3]. *Algorithmic Information Design: Computability, Learnability and Applicability to Societal Challenges*

- The Center for Research on Computation and Society (CRCS) at Harvard, Nov 2021
- RPI Computer Science Colloquia & Seminars, Nov 2021

[2]. *Manipulating Learning Algorithms in Strategic Environments*

- Shanghai Finance and Economics University, August 2021
- CMU Special Institute for Software Research Seminar, Feb 2020
- UVA Bio-complexity Institute Seminar, Nov 2019
- UVA Seminar on Human and Machine Intelligence, Oct 2019

[1]. *The Double-Edged Role of Information in Security Games*

- Penn State University AI for Social Impact seminar series, Nov 2020
- Invited guest lecture at CMU for advanced course *AI Methods for Social Good*, Spring 2020

PROFESSIONAL SERVICE

Conference (Co-)chair/organizer

- Organizing co-chair for Midwest ML Symposium, 2025
- Local organizing committee member for International Conference on Autonomous Agents and Multi-agent Systems (AAMAS 2025)
- PC Co-chair for the 13th Conference on Decision and Game Theory for Security (GameSec 2022)

Tutorial Organizers/Lecturers

- Rethinking Online Content Ecosystem in the Era of Generative AI: A Multiagent System Perspective, at the 23rd International Conference on Autonomous Agents and Multi-Agent Systems, AAMAS 2024.
- Information Design: Algorithmic Fundamentals and New Frontiers (with Konstantin Zabarnyi), at the 24'th ACM Conference on Economics and Computation (EC), 2023.
- The Economics of Data and Learning (with James Zou and Shuran Zheng), AAAI 2023.
- Algorithmic Bayesian Persuasion (invited), the 17th Conference on Web and Internet Economics (WINE), Dec 2021.
- A Primer on the Interplay of Game Theory and Machine Learning, Summer School on Game Theory and Social Choice, CityU Hongkong, July 2021.
- Tutorial on Information, Persuasion and Decision Making at EC 2018.

Workshop (Co-)organizers

○ Workshop on Economics of Modern ML: Markets, Incentives, and Generative AI with AAAI 2025

○ IDEAL Special Program on Trustworthy and Reliable Data Science, Autumn 2023.

○ Chicago Region High School Teacher Workshop, Spring 2023.

○ Challenges in Data Economics Workshop (with Annie Liang and Nicolas Lambert), Autumn 2022.

○ IDEAL Special Quarter on Data Economics, Autumn 2022.

○ Workshop on Learning with Strategic Agents (LSA), with AAMAS 2022.

○ Workshop on Strategic Reasoning for Societal Challenges (SRSC) with AAMAS 2019.

○ Workshop on AI for Imperfect Information Games with AAAI 2018.

○ Workshop on Adversarial Reasoning in Multi-Agent Systems with AAMAS 2017.

Senior Area Chair: IJCAI (2025), AAMAS (2025)

Area Chair or Senior PC: EC (2023, 2024, 2025), ICML (2024, 2025), AAAI (2019, 2020, 2021, 2022, 2023, 2024), IJCAI (2021, 2022, 2023, 2024)

Program Committee: EC (2019 – 2022), ICML (2022), NeurIPS (2021 – 2022), ICLR (2022, 2025), ALT (2022), AAAI (2018– 2019), IJCAI (2015 – 2020), WINE (2021), AAMAS (2019 – 2021), GameSec (2017 – 2019)

Journal Reviewing Activities: American Economic Review, Management Science, Operations Research, Mathematics of Operation Research, Games and Economic Behavior (GEB), Artificial Intelligence (AIJ), Journal of Artificial Intelligence Research (JAIR), Autonomous Agents and Multi-Agent Systems (JAAMAS), etc.