

Haifeng Xu

Forth-year Ph.D. Student
Teamcore Group and Theory Group
Department of Computer Science
University of Southern California

Salvatori CS Center (SAL) 246
Phone: 213-880-0250
Email: haifengx@usc.edu
Homepage: [link here](#)

RESEARCH INTERESTS

Artificial Intelligence, Strategic Reasoning, Algorithmic Game Theory, Design and Analysis of Algorithms.

EDUCATION

- **University of Southern California**, Los Angeles, US. 08/2013 – present.
Ph.D. Student in Computer Science.
Advisor: Prof. Shaddin Dughmi and Prof. Milind Tambe.
- **University of Waterloo**, Waterloo, Canada. 08/2012 – 08/2013.
MMath, Computational Mathematics.
Thesis Title: Fast Multi-Level Co-Clustering.
Advisor: Prof. Hans De Sterck.
- **University of Science & Technology of China**, Hefei, China. 08/2008 – 07/2012.
B.Sc. (honours) in Mathematics, School of Gifted Young.
I am a member of HUA Loo-Keng Elite Program of Mathematics and rank 3/26.

SELECTED HONORS & AWARDS

- **2017 Google PhD Fellowship.** 2017
* one of the 3 recipients worldwide in the category of *Algorithms, Optimizations and Markets*.
- **The Prize for Excellence in Research by USC Center for Applied Mathematics.** 2017
* awarded to two PhD students each year across the university.
- **Best Research Assistant Award, Computer Science Department, USC.** 2017
- **Best Paper Award , AAMAS-16 Workshop on Security and Multi-agent Systems.** 2016
* Paper: The mysteries of security games: Equilibrium computation becomes combinatorial algorithm design.
* Single Author: **Haifeng Xu**.
- **Best Student Paper Award, AAMAS 16.** 2016
* Paper: Using social networks to aid homeless shelters: Dynamic influence maximization under uncertainty.
* Authors: Amulya Yadav, Hau Chan, Albert Jiang, **Haifeng Xu**, Eric Rice, Milind Tambe.
- **Best Master Thesis Presentation Award, Computational Math Program, UWaterloo.** 2013
- **Prize for Academic Excellence (for rank 1 in the [Computational Math Program](#)), UWaterloo.** 2013
- **Shing-Tung Yau College Student Mathematics Contests¹ [[link](#)], China.** 2011
 1. Silver Medal in Applied Mathematics (**Top 4 in the country**).
 2. Bronze Team Medal (**Top 4 teams in the country**).
- **Microsoft Young Fellowship [[link](#)].** 2011
- **Meritorious Winner in Mathematical Contest of Modeling (MCM), US.** 2011

¹A prestigious national contest organized by the famous mathematician Shing-Tung Yau (a winner of Fields Medal and Wolf Prize).

PUBLICATIONS

Journal Articles

2. (α - β) Shaddin Dughmi, **Haifeng Xu**. Algorithmic Bayesian Persuasion. *SIAM Journal on Computing* (minor revision).
1. Amulya Yadav, Hau Chan, Albert Jiang, **Haifeng Xu**, Eric Rice, Milind Tambe. Using Social Networks to Raise HIV Awareness Among Homeless Youth. *IBM Journal of Research and Development*, 2017.

Rigorously Reviewed Conference Papers

Note: in computer science, conferences are the primary publication venues. Top conferences in AI include AAAI, IJCAI, AAMAS, etc. and top conferences in CS theory and algorithmic game theory include STOC, FOCS, EC, etc.

16. (α - β) Shaddin Dughmi, **Haifeng Xu**. Algorithmic Persuasion with No Externalities. *Proceedings of the 18th ACM Conference on Economics and Computation (EC'17)*.
15. **Haifeng Xu**^{*}, Benjamin Ford^{*}, Fei Fang, Bistra Dilkina, Andrew Plumtre, 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)
14. 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)*. **Selected for the press release opening the IJCAI'17 conference.**
13. (α - β) Shaddin Dughmi, **Haifeng Xu**. Algorithmic Bayesian Persuasion. *Proceedings of the 48th ACM Symposium on Theory of Computing (STOC'16)*.
12. **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)*.
11. **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)*.
10. **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)
9. 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.**
8. **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)*.
7. 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)*.
6. 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)*.
5. **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)*

4. **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)*
3. 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)*
2. **Haifeng Xu**, Kate Larson. Improving the Efficiency of Crowdsourcing Contests. *Proceedings of the 13th International Conference on Autonomous Agents and Multiagent Systems (AAMAS'14)*.
1. **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)*.

Book Chapters

2. Leandro S. Marcolino, **Haifeng Xu**, David Gerber, Boian Kolev, Samori Price, Evangelos Pantazis, and Milind Tambe. Multi-agent Team Formation for Design Problems. In *Coordination, Organizations, Institutions and Norms in Agent Systems XI. Springer-Verlag Lecture Notes in AI, 2016*.
1. L. S. Marcolino, **Haifeng Xu**, A. X. Jiang, M. Tambe, and E. Bowring. The Power of Teams that Disagree: Team Formation in Large Action Spaces. In *Coordination, Organizations, Institutions and Norms in Agent Systems X. Springer-Verlag Lecture Notes in AI, 2015*.

Workshop and Symposium Papers

8. A. Schlenker, **H. Xu**, C. Kiekintveld, A. Sinha, M. Tambe, M. Guirguis, S. Sonya, D. Balderas, N. Dunstatter. Don't Bury your Head in Warnings: A Game-Theoretic Approach for Intelligent Allocation of Cyber-security Alerts. In *the Algorithmic Game Theory Workshop (AGT) with IJCAI-2017*.
7. **Haifeng Xu**. The Mysteries of Security Games: Equilibrium Computation Becomes Combinatorial Algorithm Design. In *the Workshop on Security and Multi-agent Systems (SecMAS) with AAMAS 2016. Best Paper Award*.
6. **Haifeng Xu**, Albert X. Jiang, Arunesh, Sinha, Zinovi Rabinovich, Shaddin Dughmi, Milind Tambe. Security Games with Information Leakage: Modeling and Computation. In *the Algorithmic Game Theory Workshop with IJCAI-2015*.
5. **Haifeng Xu**, Zinovi Rabinovich, Shaddin Dughmi, Milind Tambe. Exploring Information Asymmetry in Two-Stage Security Games. *AAAI Spring Symposium 2015 on Applied Computational Game Theory*.
4. Leandro S. Marcolino, **Haifeng Xu**, David Gerber, Boian Kolev, Samori Price, Evangelos Pantazis, and Milind Tambe. Agent Teams for Design Problems. In *the 19th International Workshop on Coordination, Organisations, Institutions and Norms (COIN 2015), May 2015*.
3. **Haifeng Xu**, Hans De Sterck, Geoff Sanders. Fast Multilevel Co-Clustering: Unraveling the Multilevel Overlapping Cluster Structure of Social Network Data. In *the Workshop of Scalable Data Analytics: Theory & Application, with the Eighth ACM International Conference on Web Search and Data Mining (WSDM), 2015*.
2. **Haifeng Xu**, Fei Fang, Albert X. Jiang, Vincent Conitzer, Shaddin Dughmi, Milind Tambe. Computing Minimax Strategy for Discretized Spatio-Temporal Zero-Sum Security Games. In *the Joint Workshop on Optimization in Multi-Agent Systems and Distributed Constraint Reasoning (OPTMAS-DCR) at AAMAS 2014*.
1. Leandro Marcolino, **Haifeng Xu**, Albert X. Jiang, Milind Tambe, Emma Bowring. Diverse Teams in Large Action Spaces. *The 17th International Workshop on Coordination, Organisations, Institutions and Norms (COIN 2014) with AAMAS 2014*.

Patents

- Algorithmic Bayesian Persuasion (with Shaddin Dughmi), 2015.
US Provisional Application No. 62/137,613.

Proposals Helped In

- Security Games on Uncharted Social Networks: Addressing Challenges of Simultaneous Learning and Game-Play, ARO, \$ 500,000 (funded).
- Towards OPTimized SECurity at Ports of Entry (TOP-SEC), NSF.

INVITED TALKS

- [China Theory Week](#), Shanghai, China, July 2017, *Persuasion Through the Computational Lens*.
- Multiagent Systems Professional Group (MSPG) Online Seminar Series, May 2017, *Algorithmic Persuasion: Theory and Applications*.
- [Econ-CS Young Researcher Workshop](#), Tel Aviv, Israel, Jan 2017, *Algorithmic Bayesian Persuasion*.
- [Caltech, Linde Institute](#), SISL Seminar Series, October 2016, *Persuasion Through the Computational Lens*.
- Google Research, Mountain View, July 2016, *Algorithmic Bayesian Persuasion*.

ACADEMIC SERVICE

(Co-)Chair:

- [Workshop on Adversarial Reasoning in Multi-Agent Systems](#) with AAMAS 2017.

Conference Program Committee:

- The 8th Conference on Decision and Game Theory for Security (GameSec 2017).
- The 32nd AAAI Conference on Artificial Intelligence (AAAI 2018).
- The 26th International Joint Conference on Artificial Intelligence (IJCAI 2017).
- The 25th International Joint Conference on Artificial Intelligence (IJCAI 2016).
- The 24th International Joint Conference on Artificial Intelligence (IJCAI 2015).

Journal Reviewer:

- Journal of Artificial Intelligence Research (JAIR) 2017

External Reviewer:

- ACM-SIAM Symposium on Discrete Algorithms (SODA 2018)
- The 49th ACM Symposium on Theory of Computing (STOC 2017)
- The 44th International Colloquium on Automata, Languages, and Programming (ICALP 2017)
- The 57th Annual IEEE Symposium on Foundations of Computer Science (FOCS 2016)
- International Conference on Autonomous Agents and Multiagent Systems (AAMAS) 2016
- SIAM: ACM-SIAM Symposium on Discrete Algorithms (SODA 2015)
- The 29th Conference on Artificial Intelligence (AAAI 2015)

Mentoring:

- **Pawel Furtek**, B.S., University of Southern California. Fall 2016, Spring 2017.
- **Venil Loyd Noronha**, M.S., University of Southern California. Fall 2016, Spring 2017.

RESEARCH EXPERIENCE

- University of Southern California**, Department of Computer Science. 08/2013 – present.
* research assistant in CS [theory group](#) and [Teamcore](#) group
- Algorithmic game theory and strategic information.
 - The effects of information asymmetry in security domains.
- Google Research**, Mountain View. 06/2016 – 08/2016.
* intern in Market Algorithm Group; Mentors: [Ashwinkumar Badanidiyuru](#) and [Kshipra Bhawalkar](#)
- Information structure design in ad auctions with re-targeting.
 - Paper “*Targeting and Signaling in Ad Auctions*” in submission.
- Simons Institute for the Theory of Computing**, Berkeley 10/2015 – 12/2015.
* student visitor of the [Economics and Computation](#) program
- Yahoo! Lab**, New York Office. 06/2015 – 08/2015.
* research intern in Electronic Marketplace Group; Mentor: [Ruggiero Cavallo](#)
- Analyze Ad auctions with asymmetrically informed bidders.
 - Analyze revenue and efficiency trade-off for bundling decisions in auctions.
- University of Waterloo**, Department of Mathematics. 01/2013 – 08/2013.
* research assistant supervised by Prof. [Hans De Sterck](#)
- Develop novel hierarchical co-clustering algorithms, with application on real data like LinkedIn and gene expression data.
- University of Waterloo**, School of Computer Science. 01/2013 – 04/2013.
* class member of the advanced AI course by Prof. Kate Larson
- Seminar discussions on Crowdsourcing.
 - [Course project](#) on improving the efficiency of Crowdsourcing was accepted by AAMAS’ 14.
- Microsoft Research Asia**, Beijing, China. 07/2011 – 06/2012.
* research intern in Internet Economics & Computational Advertising ([IECA](#)) group
- Model and predict advertisers’ bidding behaviors using game-theoretic models [[WWW 2013](#)].
 - Study auction theory and lecture for weekly group learning seminar.

TEACHING EXPERIENCE

Teaching Assistant for

4. [CSCI 675](#), Convex and Combinatorial Optimization, USC. Fall’ 16.
3. [CSCI 270](#), Introduction to Algorithms and the Theory of Computing, USC. Spring’ 16.
* I served as the **head TA** of a team with 6 teaching assistants.
2. [MATH 138](#), Calculus II For Honours Mathematics, UWaterloo. Winter’ 13.
1. [MATH 116](#), Calculus I For Engineering, UWaterloo. Fall’ 12.

Guest Lecture for

2. [ISE 599](#), Security and Game Theory, USC. Spring’ 16.
– Lecture 1: *Security Games and Combinatorial Algorithm Design*.
– Lecture 2: *Information Leakage in Security Games*.
1. [CSCI 270](#), Introduction to Algorithms and the Theory of Computing, USC. Spring’ 16.
– Lecture 1: *Reductions among NP-Complete Problems*.

CONFERENCE/WORKSHOP TALKS

- Google Research, Mountain View, August 2016. *Re-targeting and Signaling in Ad Auctions*.

- STOC 2016, Boston, June 2016. *Algorithmic Bayesian Persuasion*.
- Southern California Symposium on Network Economics and Game Theory, October 2015. *Algorithmic Bayesian Persuasion*.
- ACM EC 2016, Maastricht, Netherlands, July 2016. *The Mysterious of Security Games: Equilibrium Computation Becomes Combinatorial Algorithm Design*.
- MURI Annual Meeting: Scalable, Stochastic and Spatio-temporal Game Theory for Real-World Human Adversarial Behavior, Los Angeles, CA, USA, September 2016. *The Mysterious of Security Games: Equilibrium Computation Becomes Combinatorial Algorithm Design*.
- AAMAS workshop on Security and Multi-agent Systems (SecMAS), Singapore, May 2016. *The Mysterious of Security Games: Equilibrium Computation Becomes Combinatorial Algorithm Design*.
- AAMAS 2016, Singapore, May 2016. *Playing Security Games With No Prior Knowledge*.
- AAMAS 2016, Singapore, May 2016. *Signaling in Bayesian Stackelberg Games*.
- MURI Annual Meeting: Scalable, Stochastic and Spatio-temporal Game Theory for Real-World Human Adversarial Behavior, Los Angeles, CA, USA, September 2015. *Signaling in Bayesian Stackelberg Games*.
- Yahoo! Lab Science Week, San Francisco, July, 2015. *On Information Asymmetry in Second Price Auctions*.
- The 24th International Joint Conference on Artificial Intelligence (IJCAI), Argentina, 2015. *Security Games with Information Leakage: Modeling and Computation*.
- Algorithmic Game Theory workshop with IJCAI 2015. *Security Games with Information Leakage: Modeling and Computation*.
- The 29th AAAI Conference on Artificial Intelligence (AAAI), Austin, USA, 2015. *Exploring Information Asymmetry in Two-Stage Security Games*.
- AAAI 2015 Spring Symposium, Stanford, March, 2015. *Exploring Information Asymmetry in Two-Stage Security Games*.
- MURI Annual Meeting: Scalable, Stochastic and Spatio-temporal Game Theory for Real-World Human Adversarial Behavior, Los Angeles, CA, USA, December 2014. *Solving Zero-Sum Security Games in Spatio-Temporal Domains*.
- The 13th International Conference on Autonomous Agents and Multiagent System (AAMAS), Paris, France, 2014. *Improving the Efficiency of Crowdsourcing Contests*.
- International Joint Workshop on Optimization in Multi-Agent Systems and Distributed Constraint Reasoning (OPTMAS-DCR), at AAMAS 2014. *Computing Minimax Strategy for Discretized Spatio-Temporal Zero-Sum Security Games*.