

# Ryan Shi

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CONTACT	ISR - TCS Hall 430, 4665 Forbes Avenue Pittsburgh, PA 15213, USA	<a href="mailto:ryanshi@cmu.edu">ryanshi@cmu.edu</a> <a href="https://ryanzshi.github.io">https://ryanzshi.github.io</a>
EDUCATION	<b>School of Computer Science, Carnegie Mellon University, USA</b> Ph.D. Candidate, Societal Computing. Advisor: Fei Fang Committee: Rayid Ghani, Jason Hong, Milind Tambe	Aug 2018 - Present
	<b>Swarthmore College, USA</b> B.A. Mathematics and Computer Science with Honors, 4.00/4.00	Aug 2014 - May 2018
	<b>Massachusetts Institute of Technology, USA</b> Visiting Student, EECS, 5.00/5.00	Aug 2016 - May 2017
EMPLOYMENT	<b>Microsoft Research</b> , Research Intern Office of Applied Research. Recommender system's effect on user behavior.	May 2022 - Aug 2022
	<b>Facebook</b> , Software Engineering Intern Causal modeling for large-scale feed subjective quality user experiments, meta-analyses of aggregated A/B testings.	May 2021 - Aug 2021
	<b>Credit Suisse</b> , Summer Analyst Credit and equity derivative structuring, quantitative modeling group.	Jun 2017 - Aug 2017
RESEARCH AREAS	Machine learning, online learning, reinforcement learning, game theory. AI for nonprofits, as related to sustainability, food security, and public health. Deployment and evaluation of AI with nonprofits.	
TECHNICAL SKILLS	Python (PyTorch, Scikit-learn, Pandas, Matplotlib, etc.), CPLEX, Gurobi, SQL, Matlab.	
HONORS AND AWARDS	<b>Siebel Scholar, the Siebel Scholars Foundation, 2021.</b> Awarded annually for academic excellence and demonstrated leadership to about 90 top students from the world's leading graduate schools.	
	<b>Carnegie Mellon Presidential Fellowship, 2021.</b> Awarded annually to the top Ph.D. students across all academic departments at CMU.	
	<b>Upsilon Pi Epsilon Honor Society Scholarship, IEEE Computer Society, 2018.</b> Up to four awards are given each year to outstanding students worldwide based on academic achievement and extracurricular activities related to the discipline of computing.	
	<b>Best Paper Award, AAMAS-17 Workshop on Teams in Multiagent Systems, 2017.</b>	
	<b>Honorable Mention, CRA Outstanding Undergraduate Researcher Award, 2017.</b>	
DEPLOYED RESEARCH	<b>Data-driven Optimization of Volunteer-based Community Services</b> Mobile app notification scheme adopted by 412 Food Rescue, since January 2020.	
	<b>NewsPanda: Smart Media Monitoring for Conservation</b> Field test with WWF worldwide offices, since February 2022.	

## CyberTWEAK: Personalized Solution for Watering Hole Attacks

Chrome extension, hosted on AWS, publicly available at [bit.ly/CyberTWEAK](https://bit.ly/CyberTWEAK).

WORKING  
PAPERS

**Zheyuan Ryan Shi**, Claire Wang, Fei Fang. Artificial Intelligence for Social Good: A Survey. 2020. Available on arXiv.

RIGOROUSLY  
REFEREED  
CONFERENCE  
PUBLICATIONS

**Zheyuan Ryan Shi**, Zhiwei Steven Wu, Rayid Ghani, Fei Fang. Bandit Data-Driven Optimization. In Proceedings of the Thirty-Sixth AAAI Conference on Artificial Intelligence (AAAI-22).

Alison Hau, Fei Fang, **Zheyuan Ryan Shi**. Pallet Estimation for Food Bank Logistics Management. In Proceedings of the 4th ACM SIGCAS Conference on Computing and Sustainable Societies, Poster (COMPASS-21).

**Zheyuan Ryan Shi**, Leah Lizarondo, Fei Fang. A Recommender System for Crowdsourcing Food Rescue Platforms. In Proceedings of the Thirtieth The Web Conference (WWW-21).

**Zheyuan Ryan Shi**. AI for Social Good: Between My Research and the Real World. In Proceedings of the Thirty-Fifth AAAI Conference on Artificial Intelligence, Doctoral Consortium (AAAI-21).

**Zheyuan Ryan Shi**, Ariel D. Procaccia, Kevin S. Chan, Sridhar Venkatesan, Noam Ben-Asher, Nandi O. Leslie, Charles Kamhoua, Fei Fang. Learning and Planning in the Feature Deception Problem. In Proceedings of the Eleventh Conference on Decision and Game Theory for Security (GameSec-20).

**Zheyuan Ryan Shi\***, Yiwen Yuan\*, Kimberly Lo, Leah Lizarondo, Fei Fang. Improving Efficiency of Volunteer-Based Food Rescue Operations. In Proceedings of the Thirty-Second Annual Conference on Innovative Applications of Artificial Intelligence (IAAI-20).

**Zheyuan Ryan Shi**, Aaron Schlenker, Brian Hay, Daniel Bittleston, Siyu Gao, Emily Peterson, John Trezza, Fei Fang. Draining the Water-hole: Mitigating Social Engineering Attacks with CyberTWEAK. In Proceedings of the Thirty-Second Annual Conference on Innovative Applications of Artificial Intelligence (IAAI-20).

Yufei Wang, **Zheyuan Ryan Shi**, Lantao Yu, Yi Wu, Rohit Singh, Lucas Joppa, Fei Fang. Deep Reinforcement Learning for Green Security Games with Real-Time Information. In Proceedings of the Thirty-Third AAAI Conference on Artificial Intelligence (AAAI-19). Selected for oral.

**Zheyuan Ryan Shi\***, Ziye Tang\*, Long Tran-Thanh, Rohit Singh, Fei Fang. Designing the Game to Play: Optimizing Payoff Structure in Security Games. In Proceedings of the 27th International Joint Conference on Artificial Intelligence and the 23rd European Conference on Artificial Intelligence (IJCAI-ECAI-18).

REFEREED  
WORKSHOP  
PUBLICATIONS

**Zheyuan Ryan Shi**, Zhiwei Steven Wu, Rayid Ghani, Fei Fang. Bandit Data-driven Optimization: AI for Social Good and Beyond. At the Machine Learning for Economic Policy Workshop at NeurIPS-20.

**Zheyuan Ryan Shi**, Zhiwei Steven Wu, Rayid Ghani, Fei Fang. Bandit Data-driven Optimization: AI for Social Good and Beyond. At the Consequential Decisions in Dynamic Environments Workshop at NeurIPS-20.

**Zheyuan Ryan Shi**, Zhiwei Steven Wu, Rayid Ghani, Fei Fang. Bandit Data-driven Optimization: AI for Social Good and Beyond. At the Machine Learning for the Developing World Workshop at NeurIPS-20.

Zihan Zhou, **Zheyuan Ryan Shi**, Fei Fang, Yi Wu. Approximated Temporal-Induced Neural Self-Play for Finitely Repeated Bayesian Games. At the Workshop on Reinforcement Learning in Games at AAAI-20.

Yiwen Yuan, Kimberly Lo, **Zheyuan Ryan Shi**, Leah Lizarondo, Fei Fang. Efficiency and Fairness of Food Rescue Platforms: An Initial Study. At the AI for Social Good Workshop at IJCAI-19.

**Zheyuan Ryan Shi**, Ariel D. Procaccia, Kevin S. Chan, Sridhar Venkatesan, Noam Ben-Asher, Nandi O. Leslie, Charles Kamhoua, Fei Fang. Feature Deception Games. At the Strategic Reasoning Workshop at IJCAI-19.

**Zheyuan Ryan Shi**, Ariel D. Procaccia, Kevin S. Chan, Sridhar Venkatesan, Noam Ben-Asher, Nandi O. Leslie, Charles Kamhoua, Fei Fang. Learning and Planning in Feature Deception Games. At the Machine Learning in the Presence of Strategic Behavior Workshop at EC-19.

**Zheyuan Ryan Shi**, Aaron Schlenker, Brian Hay, Fei Fang. Draining the Water-hole: Mitigating Social Engineering Attacks. At the Artificial Intelligence for Cyber Security (AICS) Workshop at AAAI-19.

Yufei Wang, **Zheyuan Ryan Shi**, Lantao Yu, Yi Wu, Rohit Singh, Lucas Joppa, Fei Fang. Deep Reinforcement Learning for Green Security Games with Real-Time Information. At the Reinforcement Learning in Games Workshop at AAAI-19.

Lantao Yu, Yi Wu, **Zheyuan Ryan Shi**, Rohit Singh, Lucas Joppa, Fei Fang. Deep Reinforcement Learning for Green Security Games with Real-Time Information. At the AI for Wildlife Conservation (AIWC) Workshop at IJCAI-18.

**Zheyuan Ryan Shi**<sup>\*</sup>, Ziyue Tang<sup>\*</sup>, Long Tran-Thanh, Rohit Singh, Fei Fang. Designing the Game to Play: Optimizing Payoff Structure in Security Games. At the AI for Wildlife Conservation (AIWC) Workshop at IJCAI-18.

**Zheyuan Ryan Shi**<sup>\*</sup>, Ziyue Tang<sup>\*</sup>, Long Tran-Thanh, Rohit Singh, Fei Fang. Designing the Game to Play: Optimizing Payoff Structure in Security Games. At the International Workshop on Optimization in Multiagent Systems (OptMAS-18) at AAMAS-18.

Dhaval Adjodah, Yan Leng, Shi Kai Chong, **Zheyuan Ryan Shi**, Peter Krafft, Alejandro Noriega, Sandy Pentland. Social Bayesian Decision Making. At the 52nd Conference on Information Sciences and Systems (CISS-18).

**Zheyuan Ryan Shi**, Fei Fang. Optimizing Peer Teaching to Enhance Team Performance. In Autonomous Agents and Multiagent Systems: AAMAS'17 Workshops Best Papers, Volume 10642 of Lecture Notes in Artificial Intelligence, Springer, 2017. Winner of Best Paper at TEAMAS-17.

OTHER  
REFEREED  
PUBLICATIONS

**Zheyuan Ryan Shi**, Sindhu Kutty. Strategic Reporting in Exponential Family Prediction Markets. In Proceedings of the 2016 MIT IEEE Undergraduate Research Technology Conference (IEEE URTC 2016).

INVITED  
TALKS

**From a Bag of Bagels to Bandit-Data Driven Optimization.**  
Young Achievers Symposium, Penn State, March 2022.  
Pasteur's Quadrant Seminar Series, November 2021.  
Google, October 2021.

**Learning and Planning in Feature Deception Games.**

Perspecta Labs, August 2019.

## SERVICES

### Conference Organizer

CMU Symposia on AI for Social Good: 2020, 2021, 2022.

### Program Committee

EAAMO: 2022.

AAAI: 2020, 2021, 2022.

ACM COMPASS: 2021, 2022.

AI for Social Good Workshops @ IJCAI-19, NeurIPS-19, IJCAI-20, AAMAS-22.

AI for Social Good Workshop @ Harvard CRCS 2020.

Try AI Outreach event @ AAAI-20.

## TEACHING

### Teaching Assistant

CMU 17-737: Artificial Intelligence Methods for Social Good, Spring 2021.

CMU 17-737: Artificial Intelligence Methods for Social Good, Spring 2020.

Swarthmore College ECON 031: Introduction to Econometrics, Spring 2016.

### Guest Lecturer

*Building a Recommender System for Crowdsourcing Food Rescue Platforms.*

CMU 17-737: Artificial Intelligence Methods for Social Good, January 2022.

CMU Executive Education: Artificial Intelligence Methods for Social Good, January 2022.

CMU 17-737: Artificial Intelligence Methods for Social Good, February 2021.

### Other teaching positions

Math Clinician for all undergraduate math courses, Swarthmore College, Spring 2016.

## RESEARCH EXPERIENCE

### School of Computer Science, Carnegie Mellon University

Sept 2018 - Present

Working towards AI for immediate and measurable social good. Learning in games in cybersecurity and sustainability domains. Formulated and analyzed two-layer optimization in Stackelberg security games. Applied deep reinforcement learning to solve security games with online information.

*Supervisor: Fei Fang*

### Department of Mathematics, Swarthmore College

Sept 2017 - May 2018

Proposed homological symmetry and analyzed its use in topological data analysis. Experimented with planar curves and handwritten digits.

*Supervisor: Noah Giansiracusa*

### CRCS, Harvard University

Sept 2016 - May 2017

Formulated the peer teaching problem and devised algorithms to boost team performance. Published and chosen as Best Paper in TEAMAS'17. Designed and experimented with doodle polling mechanisms.

*Supervisor: Fei Fang*

### Human Dynamics Group, Media Lab, MIT

Sept 2016 - May 2017

Studied network structure in evolution strategies for deep reinforcement learning. Investigated influence patterns in SciCast prediction markets. Built DRL testing module on Amazon EC2, and Python package for the Influence Model.

*Supervisor: Dhaval Adjodah*

### Department of Computer Science, Swarthmore College

Jan 2016 - Aug 2016

Investigated incentive compatibility in exponential family prediction markets. Published at IEEE URTC'16. Designed and analyzed cryptogenography protocols.

*Supervisors: Sindhu Kutty, Joshua Brody*

OTHER  
EXPERIENCE

**The Cornell, Maryland, Max Planck Pre-doctoral Research School**  
Selected as one of the 80 attendees worldwide with scholarship.

Aug 2018