

# He (Iris) WANG

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## EDUCATION

University of Chinese Academy of Sciences | ShanghaiTech University

Shanghai, China

M.S. Candidate in Communication and Information Systems

Sep. 2019 - June 2022 (expected)

Overall GPA: 3.88/4.00; Major GPA: 4.00/4.00

Supervisor: Prof. Jie LU

ShanghaiTech University

Shanghai, China

B.Eng in Computer Science and Technology, as **Outstanding Graduate**

Sep. 2015 - June 2019

Overall GPA: 3.65/4.00 (last 60 units: 3.90/4.00); Major GPA: 3.72/4.00

University of California, Berkeley

Berkeley, CA

Summer Sessions Student

June 2017 - Aug. 2017

Peace and Conflict Studies course, GPA: 4.00/4.00

## RESEARCH INTERESTS

My research interests lie in **distributed optimization**, **distributed and federated machine learning**, **multi-agent reinforcement learning** and **algorithmic game theory**.

## RESEARCH EXPERIENCE

Summer Research Internship

University of California, San Diego

Supervised by Prof. Yuanyuan SHI, on Multi-Agent Reinforcement Learning

June 2021 - Present

- Incorporating **cooperative game theory techniques** to improve **multi-agent reinforcement learning** performance with respect to stability and maximizing social welfare.
- Applied our designed reward reallocation mechanism to connected and autonomous vehicles [2].

Lab of Decision, Optimization, and Control for Intelligent Agent

ShanghaiTech University

Supervised by Prof. Jie LU, on Distributed Optimization

Aug. 2018 - Present

- Proposing a communication-efficient distributed optimization algorithm [1] by **coordinate descent methods**.
- Employed **data-driven approaches** for distributed optimization algorithms via **graph neural networks** [5], which reduced the communication rounds of base algorithms by approximately 80%.
- Investigated primal-dual algorithms [3][6] to solve distributed optimization problems **with coupled constraints**, and established an  $O(1/k)$  rate of convergence for proposed algorithms.
- Approximated **distributed Fenchel dual gradient methods** to alleviate computational costs [7], which accelerated 100× compared with the original algorithm in terms of running time.

FinTech Project Group

ShanghaiTech University

Supervised by Prof. Haipeng ZHANG, on Data Mining

Oct. 2019 - June 2020

- Proposed a framework [4] for inferencing reasons behind politicians' tweets by finding critical components in tweets and news articles, and establishing causal links between them via **attention-based neural networks**.

ShanghaiTech Multi-Agent Systems Research Team (SMART Lab)

ShanghaiTech University

Supervised by Prof. Dengji ZHAO, on Algorithmic Game Theory

Oct. 2017 - June 2018

- Proposed a novel model [8] that mimics the real-world dynamics of the repeated prisoner's dilemma games and designed an online game to collect real data by interacting between 315 human players and AIs.

## TEACHING EXPERIENCE

Teaching Assistant

ShanghaiTech University

Delivering tutorials, correcting homework and exams, providing Q & A in office hours

- MATH1112 Linear Algebra (with 100 students). Sep. 2019 - Jan. 2020
- SI100B Introduction to Science and Technology (with 201 students). Feb. 2019 - June 2019
- CS100 Introduction to Programming (with 349 students). Sep. 2018 - Jan. 2019

## ACADEMIC ACTIVITIES

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### Conference Talk

*IEEE International Conference on Control & Automation (ICCA)*

Online

*Oct.10, 2020*

### Conference Attendee

*Annual Learning for Dynamics and Control Conference (L4DC)*

*IEEE Conference on Decision and Control (CDC)*

Online

*June 7 – 8, 2021*

*Dec.14 - 18, 2020*

## PUBLICATIONS

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### Preprints/Under Review

- [1] **H. Wang**, C. Shi, J. Liu and J. Lu, “A Stochastic Block-Wise Gradient-Tracking-Based Algorithm for Distributed Optimization”, under preparation to *IEEE Transactions on Control of Network Systems (TCNS)*.
- [2] S. Han, **H. Wang**, S. Su, Y. Shi and F. Miao, “Stable and Efficient Reward Reallocation for Cooperative Policy Learning of Connected Autonomous Vehicles”, submitted to *IEEE International Conference on Robotics and Automation (ICRA)*, 2022.
- [3] X. Wu, **H. Wang** and J. Lu, “Distributed Algorithms for Convex Optimization Problems with Coupling Constraints”, under the 1st round review in *IEEE Transactions on Automatica Control (TAC)*.
- [4] Z. Li, H. Hu, **H. Wang**, L. Cai, K. Zhang and H. Zhang, “Why Politicians Tweet: Discovering Causal Backgrounds for Politicians’ Tweets from News Articles”, under the 1st round review in *Information Processing and Management*.

### Conference Publications

- [5] **H. Wang**, Y. Shen, Z. Wang, D. Li, J. Zhang, K. Letaief and J. Lu, “Decentralized Statistical Inference with Unrolled Graph Neural Networks”, accepted to *IEEE Conference on Decision and Control (CDC)*, 2021.
- [6] X. Wu, **H. Wang** and J. Lu, “A Distributed Proximal Primal-Dual Algorithm for Nonsmooth Optimization with Coupling Constraints”, in *IEEE Conference on Decision and Control (CDC)*, 2020.
- [7] **H. Wang** and J. Lu, “An Inexact Fenchel Dual Gradient Algorithm for Distributed Optimization”, in *IEEE International Conference on Control & Automation (ICCA)*, 2020.
- [8] Y. Zhang, **H. Wang**, J. Huang and D. Zhao, “Simulations vs. Human Playing in Repeated Prisoner’s Dilemma”, in *International Conference on Principles and Practice of Multi-Agent Systems (PRIMA)*, 2018.

## AWARDS

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**China National Scholarship** (Top 0.2% Nationwide), Ministry of Education in China, 2021.

**Outstanding Student** (Top 5%), ShanghaiTech University, 2020 & 2018 & 2016.

**Outstanding Graduate**, ShanghaiTech University, 2019.

**Academic Excellence Scholarship**, ShanghaiTech University, 2018.

**Merit Student** (Top 10%), ShanghaiTech University, 2017.

**Advanced Individual for Social Engagement** (Top 1%), Shanghai Municipal Education Commission, 2016.

## SERVICE

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### Conference Volunteer

Online

- 2017 *Chinese Multi-Agent System Seminar*, 2018 *ShanghaiTech Workshop on Information, Learning and Decision (SWILD)*, 2018 *ShanghaiTech Symposium on Information Science and Technology (SSIST)*.

### Social Practice Program

*Group Leader*

Huishui, Guizhou, China

*June 2016 - Sep. 2016*

- Researched the relationship between education and poverty in remote areas of China, interviewed many local students, and recorded their lives to figure out the underlying problems in such areas.
- Won the third prize in the social practice competition of undergraduates in Shanghai.

## SKILLS

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### Technical Skills

### Programming Language

### Standardized Tests

CVX, CVXPY, PyTorch, Git, Linux, Office, L<sup>A</sup>T<sub>E</sub>X

Python, C, MATLAB

TOEFL: 102 (Speaking: 22/Writing: 25), GRE: 328 (V: 160/Q: 168/A: 4.0)