

# Shuaiqi Wang

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## Education

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### Carnegie Mellon University

Pittsburgh, PA, USA

Jan. 2021 - present

- Ph.D. Student, Dept. of Electrical and Computer Engineering
- Advisor: Giulia Fanti

### Shanghai Jiao Tong University (SJTU)

Shanghai, China

Sep. 2016 - Jun. 2020

- Bachelor of Engineering, Dept. of Computer Science
- Zhiyuan Honors Program of Engineering (Top 5%)
- GPA: 92.1/100

## Research Interests

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Theoretical foundations of machine learning, and the applications in privacy, security, federated learning and data sharing.

## Publications and Manuscripts

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- Zinan Lin\*, **Shuaiqi Wang\***, Vyas Sekar, and Giulia Fanti. “Distributional Privacy for Data Sharing”.  
\* Equal contribution.
- **Shuaiqi Wang**, Jonathan Hayase, Giulia Fanti and Sewoong Oh. “Towards a Defense against Backdoor Attacks in Continual Federated Learning”.
- **Shuaiqi Wang** and Giulia Fanti. “Group Testing with Inexact Reconstruction”.
- Benjie Miao, **Shuaiqi Wang**, Luoyi Fu and Xiaojun Lin. “De-anonymizability of Social Network: Through the Lens of Symmetry”, in *MobiHoc 2020*.
- Luoyi Fu, Jiapeng Zhang, **Shuaiqi Wang**, Xinyu Wu, Xinbing Wang and Guihai Chen. “De-anonymizing social networks with overlapping community structure”, in *IEEE/ACM Transactions on Networking*.
- Xudong Wu, Luoyi Fu, **Shuaiqi Wang**, Bo Jiang, Xinbing Wang and Guihai Chen. “Collective Influence Maximization in Mobile Social Networks” in *IEEE Transactions on Mobile Computing*.

## Research Experiences

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### Distributional Privacy for Data Sharing

Guide: Prof. Giulia Fanti, Prof. Vyas Sekar

Mar. 2022 - present

- Formalized distributional privacy concerns in data sharing applications
- Derived fundamental limits on the tradeoff between privacy and distortion
- Proposed mechanisms that achieve order-optimal privacy-distortion tradeoffs under certain types of secrets

### Towards a Defense against Backdoor Attacks in Continual Federated Learning

Guide: Prof. Giulia Fanti, Prof. Sewoong Oh

May. 2021 - May. 2022

- Proposed a federated learning algorithm that is robust to backdoor attacks under continual learning
- Provided theoretical justifications for the proposed defense algorithm
- Achieved best defense results cross a wide range of adversarial corruption ratios and time-varying attacks

### Group Testing with Inexact Reconstruction

Guide: Prof. Giulia Fanti

Sep. 2020 - Mar. 2021

- Proved the lower bound on the sample complexity of group testing with reconstruction error
- Designed an algorithm that achieves order-optimal sample complexity
- Proved the robustness of the proposed algorithm to the sparsity estimation error

## Reinforcement Learning for Safe Control

Guide: Prof. Yorie Nakahira

May. 2020 - Dec. 2020

- Designed a safe control algorithm based on learning-based Model Predictive Control and model-free RL
- Quantified the model uncertainty and derived the safety guarantee of our algorithm in nonlinear systems
- Analyzed the conversion between model-driven and data-driven methods quantitatively

## Distributed Steiner Tree Construction in Wireless Networks with Unreliable Links

Guide: Prof. Luoyi Fu, Prof. Xinbing Wang, Prof. Xiaojun Lin

Jul. 2019 - Mar. 2020

- Proposed a protocol to search and communicate in wireless networks reliably and energy-efficiently
- Designed a distributed multicast tree construction algorithm with the lowest time and message complexity
- Achieved the approximate rate of 1.061 to the Steiner tree length

## De-anonymizability of Social Network: Through the Lens of Symmetry

Guide: Prof. Luoyi Fu, Prof. Xinbing Wang, Prof. Xiaojun Lin

Mar. 2019 - Aug. 2019

- Defined the symmetry of networks by automorphism and homomorphism
- Determined the de-anonymizability of given networks based on the symmetry level
- Designed an approximate algorithm to estimate de-anonymizability via sampling techniques

## Honors and Awards

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|---|------------------|
| ○ Carnegie Institute of Technology Dean's Fellow                          | 2021             |
| ○ Zhiyuan Distinguish Scholarship (Top 1%)                                | 2020             |
| ○ Zhiyuan College Honors Scholarship (Top 5%)                             | 2017, 2018, 2019 |
| ○ Academic Excellence Scholarship   | 2017, 2018, 2019 |
| ○ First Prize in China Undergraduate Computer Design Competition (Top 5%) | 2019             |

## Teaching Assistant

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CMU 18734: Foundations of Privacy

Instructor: Steven Wu

Pittsburgh, PA, USA

Fall 2021