

## KANGKANG SUN Ph.D.

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### EDUCATION

#### Shanghai Jiao Tong University

Shanghai, China

*Ph.D. Electronic Information*

2020 - 2024

Dissertation: *Research on resource scheduling optimization and security protection for vehicle-road-cloud collaboration in the Internet of Vehicles (IoV)*

Academic advisor: *Prof. Jianhua Li*

Focus: *Internet of Vehicle (IoV), Machine Learning (e.g. Federated Learning, Reinforcement Learning), Security and Privacy, Game Theory.*

#### Jilin University

Jilin, China

*M.D. Mechanical Engineering*

2017 - 2020

Dissertation: *Research on Path Planning and Target Recognition Technology of Unmanned Aerial Vehicles*

Academic advisor: *Prof. Guoqiang Wang*

Cumulative GPA: Top 2%

#### National Chiao Tung University

Xinzhu, Taiwan

*Exchange Student in Electronic Information*

2019.2 - 2019.6

Academic advisor: *Prof. Teng-Hu Cheng*

Lab: *Networked Controll Robotics Lab*

#### Shandong Agricultural University

Shandong, China

*B.S., Agricultural Mechanization and Automation*

2012 - 2016

Dissertation: *Design and Research of Industrial Robotic Arm*

Cumulative GPA: Top 5%

### PUBLICATIONS

#### Published

**Kangkang Sun**, et al. Large-Scale Mean-Field Federated Learning for Detection and Defense against Byzantine Attacks. *IEEE Internet of Things Journal (IoT-J)* [Accepted].

**Kangkang Sun**, et al. 2024. Personalized Privacy-Preserving Federated Learning for Digital-Twin-Driven Vehicle Road Cooperation. *IEEE Internet of Things Journal(IoT-J)*, doi: 10.1109/JIOT.2024.3389656. IF:10.6. [\[Link\]](#)

**Kangkang Sun**, et al. 2024. Joint Top-K Sparsification and Shuffle Model for Communication-Privacy-Utility Tradeoffs in Federated Learning-based IoV. *IEEE Internet of Things Journal(IoT-J)*, doi: 10.1109/JIOT.2024.3370991. IF:10.6. [\[Link\]](#)

**Kangkang Sun**, et al. 2023. Leveraging Digital Twin and DRL for Collaborative Context Offloading in C-V2X Autonomous Driving. *IEEE Transactions on Vehicular Technology (TVT)*, vol. 73, no. 4, pp. 5020-5035, April 2024, doi: 10.1109/TVT.2023.3333243. IF:6.8. [\[Link\]](#)

Tian He, Guoqiang Wang, **Kangkang Sun**, et al. 2021. Optimization and design of hammerheads and fenders on scrap metal shredders based on improved genetic algorithm. *Shock and Vibration*, 2021 (2021): 1-13. IF:1.6. [\[Link\]](#)

Da Cui, et al, & **Kangkang Sun**. 2020. Optimization and design of hammerheads and fenders on scrap metal shredders based on improved genetic algorithm. *Reliability Engineering & System Safety*, 2020, 203: 107074. IF:8.1. [\[Link\]](#)

**Kangkang Sun**, et al. 2019. Optimization method of Bevel Gear Reliability based on Genetic Algorithm and Discrete Element. *Eksploracja i Niezawodnosc - Maintenance and Reliability*, 2019, 21(2): 186. [\[Link\]](#)

Jiaqi Wu, et al, & **Kangkang Sun**. 2019. Study on electromechanical performance of steering of the electric articulated tracked vehicles. *Journal of Mechanical Science and Technology*, vol. 33, pp. 3171–3185, 2019. [\[Link\]](#)

Lin Zhou, Guoqiang Wang, **Kangkang Sun**. 2019. Trajectory tracking study of track vehicles based on model predictive control. *Strojnicki Vestnik/Journal of Mechanical Engineering*, vol. 65, no. 6, 2019. [\[Link\]](#)

### In Review

**Kangkang Sun**, et al. Secure and Personalized Cross-silo Federated Learning with Time-Polynomial Differential Privacy for Smart Microgrid Stability Prediction. *IEEE transaction on Smart Grid* [Contributed submission].

### In Preparation

**Kangkang Sun**, et al. Privacy as Commodity: Mean-Field Auction Incentive Mechanism for Federated Learning Marketing. [In prep].

## PRESENTATIONS

### Conference Presentations

**Kangkang Sun**, et al. “Reputation-Aware Incentive Mechanism of Federated Learning: A Mean Field Game Approach.”, The 9th IEEE International Conference on Smart Cloud (IEEE SmartCloud 2024), May 2024. (*EI Conference*).

**Kangkang Sun**, et al. “Dynamic Privacy Protection of Federated Learning for Vehicular Digital Twin Networks.”, International Symposium on Intelligent Computing and Networking 2024 (ISICN 2024). International Symposium on Intelligent Computing and Networking 2024 (ISICN 2024), March 2024. (*EI Conference*).

**Kangkang Sun**, et al. “*Toward the Tradeoffs between Privacy, Fairness and Utility in Federated Learning.*”, International Symposium on Emerging Information Security and Applications. Singapore: Springer Nature Singapore (*EISA 2024*), 2023: 118-132. October 2023. (*EI Conference*).

**Kangkang Sun**, et al. “Vehicular Digital Twin Context Offloading with Reinforcement Learning and Mean Field Game”. Global Information and Telecommunication Workshop 2023 (*GITW 2023*). October 2023.

**Kangkang Sun**, et al. “*The Influence of the Structure of Double-Toothed Roller Crusher on the Crushing Effect based on EDEM*” 2018 3rd International Seminar on Advances in Materials Science and Engineering, October 2018.

GRANTS AND AWARDS

Campus-level Outstanding Graduation Paper <b>Top: 5%</b>	2022
Provincial Outstanding Graduates <b>Top: 3%</b>	2021
Academic scholarships (RMB 50,000) <b>Top: 3%</b>	2017 - 2020
Postgraduate National Scholarships (RMB 20,000) <b>Top: 0.2%</b>	2020
Student Scholarship (three times) (RMB 8,000) <b>Top: 10%</b>	2017 - 2020
Outstanding Graduates <b>Top: 10%</b>	2016
Campus-level Outstanding Graduation Paper <b>Top: 5%</b>	2016
Student Scholarship (three times) (RMB 24,000) <b>Top: 5%</b>	2012 - 2016
Freshman Innovation and Entrepreneurship Mentor <b>Top: 5%</b>	2016
Shandong Province Student Electronic Design Competition, Second Prize <b>Top: 10%</b>	2015
School-level Science and Technology Innovation Single Award (RMB 5,000) <b>Top: 10%</b>	2015
Electronic Design Competition, First Prize <b>Top: 1%</b>	2014
Shandong Hengnuo Innovation Practice Advanced Individual Award <b>Top: 10%</b>	2013

RESEARCH AND WORK EXPERIENCE

**Shanghai Jiao Tong University**  
*National Natural Science Foundation of China (NSFC)*  
Intelligent Detection and Defence of Highly Covert Unknown Attacks on Critical Infrastructure Networks  
*Supervisor: Jianhua Li*

Shanghai, China  
2021.01 - Present

**Shanghai Jiao Tong University**  
*International IoT Standardization, IEEE P21451-1-5*  
Collaborating Partner: NIST (National Institute of Standards and Technology) in the United States  
[Introduction Link](#), [Github Link](#), [IEEE Link](#)  
*Advisor: Jun Wu*

Shanghai, China  
2020-Present

**Shanghai Jiao Tong University**

Shanghai, China

*National Natural Science Foundation of China (NSFC)*

2020 - Present

Research and Application of Key Technologies for the Construction of Network Security Management System and Compliance Testing in IoV.

*Advisor:* Jianhua Li

**Shanghai Jiao Tong University**

Shanghai, China

*National Natural Science Foundation of China (NSFC)*

2020.01 - 2023.12

Research on implicit knowledge construction and evolutionary analysis methods for goals under hybrid networks

*Supervisor:* Jun Wu

**Jilin University**

Jilin, China

*National Natural Science Foundation of China (NSFC)*

2017.09 - 2020.09

Electromechanical Coupled Dynamics and Adaptive Control of Multi-track Travelling Mechanisms

*Supervisor:* Guoqiang Wang