

# Zheng Shi

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## EDUCATION

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**Shandong University - School of Information Science and Engineering**, Qingdao, China 09/2021-06/2025  
Bachelor in Communication Engineering (Innovation College)

- GPA: 4.185/5.0 | Cumulative Average Grade: 91.85/100
- Relevant Courses: Signal and System (99); Linear algebra (99); Principle of Communications(97); Probability and Statistics (95); Digital Signal Processing (95), et al.
- Note: Innovation College members are Top 5% Shandong University students selected after the first year.

## RESEARCH INTERESTS

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Wireless Sensing, AIoT, Mobile Computing, Ubiquitous Computing

## PUBLICATIONS

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- **RFnoID: Protecting RFID Motion Privacy via Metasurface** [\[paper\]](#)  
Yanni Yang, **Zheng Shi**, Zhenlin An, Runyu Pan, Yanling Bu, Guoming Zhang, Pengfei Hu, Jiannong Cao  
*2025 IEEE International Conference on Computer Communications (INFOCOM)*
- **Wireless Eavesdropping on Wired Audio with Radio-frequency Retroreflector Attack** [\[paper\]](#)  
Genglin Wang, **Zheng Shi**, Yanni Yang, Zhenlin An, Guoming Zhang, Pengfei Hu, Xiuzhen Cheng, Jiannong Cao  
*IEEE Transactions on Mobile Computing (TMC)*
- **MetaRFence: Protecting Human Motion Privacy Against RFID Sensing via Metasurface** [\[page\]](#)  
**Zheng Shi**, Zhikai Ding, Yanni Yang, Zhenlin An, Guoming Zhang, Pengfei Hu, Xiuzhen Cheng, Jiannong Cao  
*Submitted to IEEE Transactions on Mobile Computing (TMC)*
- **A Sparse-Dense Based Forward-Looking Intelligent Vehicle Obstacle Avoidance Method** [\[page\]](#)  
Ming Fang, **Zheng Shi**, Wenchao Qiao, Yuxin Cui, Yuan Zhang, Liding Xu      Patent No. CN118567361A
- **A Closed-Loop Road Based Limited Resource Intelligent Vehicle Navigation Method** [\[page\]](#)  
Ming Fang, Yuxin Cui, Wenchao Qiao, **Zheng Shi**, Yuan Zhang, Liding Xu      Patent No. CN118482729A

## ACADEMIC EXPERIENCE

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**MetaRFence: Protecting Human Motion Privacy Against RFID Sensing via Metasurface** 11/2024-06/2025  
*Main Contributor|Supervisor: Yanni Yang|Research Area: Wireless Sensing, RFID, Metasurface*

- This work builds upon our previous work *RFnoID*, and has been submitted to *IEEE TMC*
- We detail our system design, improve our method and consider a wider variety of human motion eavesdropping. We add new sections to describe the threat model and our compound strategy. In addition, more experiments and simulations are conducted.

**RFnoID: Protecting RFID Motion Privacy via Metasurface** 11/2023-08/2024  
*Main Contributor|Supervisor: Yanni Yang|Research Area: Wireless Sensing, Ubiquitous Computing*

- As student first author, this work was accepted and to be published in the *IEEE INFOCOM 2025*.
- Investigate the principle and application of metasurface, simulate and reproduce the reconfigurable element, design the metasurface in UHF-RFID band. Implement sensing algorithms based on RFID, including through-wall human presence detection and through-wall respiration rate monitoring.
- Theoretically model and characterize the metasurface effect on the human-reflected RFID signal in temporal and spectral domains, and design a novel metasurface controlling strategy to strike a balance between effective temporal and spectral domain obfuscation.

**Wireless Eavesdropping on Wired Audio with Radio-frequency Retroreflector Attack** 01/2024-06/2024  
*Co-author|Supervisor: Yanni Yang|Research Area: Wireless Sensing, Ubiquitous Computing*

- As student second author, this work was published in the *IEEE Transactions on Mobile Computing*.
- Utilize CST Studuio to model and simulate the electromagnetic radiation pattern of linear audio line to guide the placement of eavesdropper TX and RX.
- Use USRP X310 to transmit wave signals of random magnitude and leverage dynamic multipath effects generated by human movement as countermeasures. Analyze the impact of these methods on eavesdropping.

**PROJECTS**

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**Design of Electronic Perpetual Calendar Based on ESP32** [\[page\]](#) 02/2023-06/2023  
*Team leader|Supervisor: Hua Li|Research Area: Embedded Development*

- Designed hardware using AD to create schematics and PCB, integrating modules such as ESP32, capacitive touchscreen, music module, temperature and humidity sensor, DC/DC regulator, etc.
- Implemented embedded development using Arduino framework and LVGL library for software development. Developed a mobile application using App Inventor and MQTT protocol.
- Achieved all basic functionalities of a perpetual calendar, along with features like email smoke alarm, work-station status monitoring, and remote monitoring via mobile app.

**High-Speed Mobile Unmanned Vehicles Based on ROS Architecture** [\[page\]](#) 05/2023-12/2023  
*Team leader|Supervisor: Ming Fang|Research Area: Robotics, Autonomous Driving*

- This project won the **national first prize** in the Undergraduate Intelligent Vehicle Competition
- Employed Karto for SLAM in high-speed motion, coupled with EKF for positioning and Teb for path planning. Utilized OpenCV for image processing tasks like edge detection, template matching
- Proposed a sparse-dense based forward-looking obstacle avoidance method for intelligent vehicles, employing filtering, clustering, and iterative classification of 2D LiDAR point clouds

**Course Project : Labyrinth Smart Car** [\[page\]](#) 09/2022-12/2022  
*Team leader|Supervisor: Ming Fang|Research Area: Robotics, Autonomous Driving*

- Designed and implemented an intelligent vehicle system on Python 3.6 platform
- Conducted system simulation using models and algorithms, incorporating signals and systems for stable driving and collision avoidance
- Utilized amplifiers and photosensitive resistors to steer the intelligent vehicle toward light sources

**AWARDS**

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**National Awards**

- First Prize of Undergraduate Intelligent Vehicle Competition (Top 1%) 2023
- Second Prize of the "Shanshu Cup" Mathematical Modeling 2023

**Provincial Awards**

- First Prize of Undergraduate Mathematical Contest in Modeling (Top 5%) 2023
- Third Prize of Undergraduate Intelligent Vehicle Competition 2023
- First Prize of Shandong Robotics Competition 2023

**School Awards**

- First Prize of Shandong University Academic Award Scholarship (Top 5%) 2022
- First Prize of Shandong University Research and Innovation Scholarship 2024
- Third Prize of Shandong University Academic Award Scholarship 2023

**SKILLS**

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- Programming Language: Python, MATLAB, C/C++
- Software: Latex, CST, HFSS, Altium Designer, EDA, Multisim, ADS, Keil, ROS
- Language: Mandarin, English (IELTS Overall: 7.0; GRE: 307+3.0)