

Zheng Shi

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EDUCATION

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

Wireless Sensing, AIoT, Mobile Computing, Ubiquitous Computing

PUBLICATIONS

- **MetaRFence: Protecting Human Motion Privacy Against RFID Sensing via Metasurface** [\[paper\]](#)
Zheng Shi,Zhikai Ding,Yanni Yang,Zhenlin An,Guoming Zhang,Pengfei Hu,Xiuzhen Cheng, Jiannong Cao
IEEE Transactions on Mobile Computing (TMC)
- **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)
- **A Sparse-Dense Based Forward-Looking Intelligent Vehicle Obstacle Avoidance Method** [\[patent\]](#)
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** [\[patent\]](#)
Ming Fang,Yuxin Cui,Wenchao Qiao,Zheng Shi,Yuan Zhang,Liding Xu Patent No. CN118482729A

RESEARCH EXPERIENCE

Wireless Communication with Rydberg Atomic Receiver 09/2025-Present
Main Contributor | Supervisor: Fusang Zhang, Jie Xiong | Research Area: Quantum Sensing, Communication

- Developing a wideband and multi-band quantum receiver compatible with existing communication transmitters to receive, demodulate, and decode commercial signals, e.g., LoRa and WiFi OFDM.

MetaRFence: Protecting Human Motion Privacy Against RFID Sensing via Metasurface 11/2024-09/2025
Main Contributor | Supervisor: Yanni Yang | Research Area: Wireless Sensing, RFID, Metasurface

- This work builds upon our previous work *RFnoID*; published in *IEEE TMC*. [\[demo\]](#)
- Detailed the system design, improved method and considered a wider variety of human motion eavesdropping; strengthened the threat model, and proposed a compound metasurface-based defense strategy; conducted extensive experiments and simulations to validate robustness across diverse environments and adversary settings.

RFnoID: Protecting RFID Motion Privacy via Metasurface 11/2023-09/2024
Main Contributor | Supervisor: Yanni Yang | Research Area: Wireless Sensing, Ubiquitous Computing

- Student first author; published in *IEEE INFOCOM 2025*.
- Investigated the principle and application of metasurface; designed and prototyped the UHF-RFID metasurface, including reconfigurable unit modeling, CST-based simulation, and hardware implementation.

- Implemented RFID-based sensing algorithms for through-wall presence detection and respiration estimation.
- Theoretically model and characterize the metasurface effect on the human-reflected RFID signal in both temporal and spectral domains; proposed a novel metasurface controlling strategy to balance efficient signal obfuscation across both domains, thus protect human motion privacy in various environments.

Wireless Eavesdropping on Wired Audio with Radio-frequency Retroreflector Attack 01/2024-06/2024

Co-author | Supervisor: Yanni Yang | Research Area: Wireless Sensing, Audio Eavesdropping

- Student second author; published in *IEEE TMC*. [\[demo\]](#)
- Modeled and simulated radiation patterns of audio lines using CST to guide the TX/RX antenna deployment.
- Designed RF-based countermeasures using USRP X310 by injecting randomized waveforms and exploiting human-induced dynamic multipath effects; investigated their impact on eavesdropping performance.

PROJECTS

Design of Electronic Perpetual Calendar Based on ESP32 [\[demo\]](#)

02/2023-06/2023

Team Leader | Supervisor: Hua Li | Research Area: Embedded Development

- Designed and fabricated the prototype by using AD to create schematics and PCB, integrating ESP32 micro-controller, touchscreen, audio module, temperature sensor, etc.
- Implemented the embedded software stack using the Arduino framework and LVGL for UI development, and developed a mobile application via App Inventor with MQTT-based communication.
- Delivered a fully functional system supporting perpetual calendar operations, email-based smoke alarms, workstation status monitoring, and remote monitoring via mobile app.

High-Speed Mobile Unmanned Vehicles Based on ROS Architecture [\[demo\]](#)

05/2023-12/2023

Team Leader | Supervisor: Ming Fang | Research Area: Robotics, Autonomous Driving

- Awarded National First Prize in the Undergraduate Intelligent Vehicle Competition.
- Designed and integrated a ROS-based autonomous car enabling high-speed navigation, incorporating OpenCV image processing, Karto SLAM, EKF-based localization, and TEB path planning.
- Proposed sparse-dense based forward-looking obstacle avoidance method for high-speed mobile robots by jointly leveraging filtering, clustering, and iterative classification of LiDAR point clouds.

Course Project : Labyrinth Smart Car [\[demo\]](#)

09/2022-12/2022

Team Leader | Supervisor: Ming Fang | Research Area: Robotics, Autonomous Driving

- Designed and implemented an intelligent vehicle system using Python 3.6.
- Conducted simulations to evaluate collision-avoidance performance and stability under varying noise intensities based on signal processing and system modeling.
- Employed amplifiers and photoresistors to guide the vehicle toward light sources.

AWARDS

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| • National First Prize (Top 1%), Undergraduate Intelligent Vehicle Competition | 2023 |
| • National Second Prize, “Shanshu Cup” Mathematical Modeling | 2023 |
| • Provincial First Prize (Top 5%), Undergraduate Mathematical Contest in Modeling | 2023 |
| • Provincial First Prize, Shandong Robotics Competition | 2023 |
| • School First Prize, SDU Academic Award Scholarship (Top 5%) | 2022 |
| • School First Prize, SDU Research Innovation Scholarship | 2024 |

SKILLS

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