

# Shun Zhuge

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Leeghwaterstraat 306, 2628 LX, Delft, Netherlands

## EDUCATION

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**Delft University of Technology** Sep. 2024 – Present  
*Doctoral of Philosophy* Delft, Netherlands

- Supervisor: **Prof. Qing Wang**

**Nanyang Technological University** Aug. 2022 – Jun. 2024  
*Master of Science (Communication Engineering)* Singapore

- CGPA: **4.44/5.00**

**Australian National University** Jul. 2018 – Jul. 2022  
*Bachelor of Engineering (Honours), major in Electronic and Communication Systems, minor in Finance* Canberra, Australia

- GPA: **6.07/7.00.**
- Honours Grade: **2<sup>nd</sup> class honours division awarded A**

## SKILLS

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- **Programming:** MATLAB, Python, Simulink, Verilog, C
- **Software:** GitLab, Linux, Visual Studio Code, Windows, SolidWorks, Figma, ANASY, LTspice, Vivado
- **Languages:** Mandarin (native), English (fluent)

## RESEARCH PROJECTS

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**Master's Dissertation: Integrated Sensing and Communication (ISAC)** Aug. 2022 – Jun. 2024

- Supervisor: Assoc. Prof. Zhiping Lin
- Investigate target localization within the ISAC system, leveraging radar parameters obtained from the communication receiver.
- Develop a novel localization algorithm focusing on multistatic sensing, utilizing bistatic range, bistatic range rate, and degree of arrival for the moving target tracking.
- The proposed algorithm demonstrates superior performance compared to the existing well-known two-step weighted least square (2WLS) method, achieving lower root-mean-square error in both position and velocity estimation.
- Extend the research to address realistic scenarios, including moving transmitters, unknown transmitters, and tracking of multiple targets.

**Machine Learning Project: Dimensionality Reduction for Classification** Apr. – May. 2023

- Investigated two dimensionality reduction techniques called Linear Discriminant Analysis (LCA) and Principal Component Analysis (PCA).
- Applied both techniques to the high dimensional 'Iris' dataset and the minimum Mahalanobis distance (MMD) classifier was used to distinguish groups of data after dimensionality reduction.
- Concluded that LDA outperforms PCA in terms of classification accuracy.

**Antennas for Wireless Systems: Antennas Design** Mar. – Apr. 2023

- Designed a Yagi-Uda dipole antenna achieving specifications of 600MHz operating frequency and 10 dB gain, utilizing the CocoaNEC simulation tool.
- Designed a circularly polarized patch antenna meeting criteria of 3GHz operating frequency, 6.97 dB gain, and exhibiting a boresight radiation pattern, utilizing MATLAB with Antenna Toolbox.

- Designed a radio frequency identification (RFID) reader antenna featuring 9 circular patches, meeting specifications including a 2.5GHz center frequency, 150 MHz bandwidth, 12.43 dB gain, and unidirectional radiation in the boresight direction, utilizing the PCADE 5.0 simulation tool.

**Honours Project: Ultra-Reliable and Low Latency Communication (URLLC)** Jul. 2021 – Jun. 2022

- Thesis supervisor: Assoc. Prof. Nan Yang
- Investigated short-packet communication (SPC) in the context of Multiple-Input Multiple-Output (MIMO) Non-Orthogonal Multiple Access (NOMA).
- Conducted an extensive literature review, analyzing over 50 journal articles to build a comprehensive understanding of the field.
- Successfully reproduced two selected technical papers, building their system models, and deriving approximate and asymptotic closed-form expressions of the average block error rate (BLER) at different users.
- Presented findings through an oral presentation to the supervisor and examiners.

**Signal Processing: Noise cancellation of a recorded speech** Feb. – May. 2021

- Analyzed a given recorded speech clip with noise and applied modulation to it.
- Designed an appropriate low pass filter to eliminate the noise of a recorded speech.

**FPGA: Smart Home Controller using Basys3** Feb. – May. 2020

- Created a digital design to turn the FPGA development board into a ‘smart home’ controller.
- Coded in Vivado and used the available switches, push buttons, and LEDs to mimic the sensors and outputs.
- Programmed the FPGA development board with three functions (Garage Door Opener, Automated Home Lights, and Climate Control) in a hierarchical design.

**WORK EXPERIENCES**

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**Ph.D. Candidate** Sep. 2024 – Present  
*Delft University of Technology (TU Delft)* Delft, Netherlands

- Daily supervisor: Dr. Prof. Qing Wang

**Student Attachment** Aug. 2022 – Jun. 2024  
*Institute for Infocomm Research (I<sup>2</sup>R), A\*STAR* Singapore

- Principle Investigators: Dr. Yonghong Zeng (IEEE Fellow), Dr. Yugang Ma
- Present literature reviews on assigned topics and update research findings in bi-weekly ISAC team meetings.
- Organize occasional events such as seminars, workshops, and invited talks by external researchers.
- Authored a conference paper summarizing a novel localization algorithm in the ISAC system.

**Product Engineering Assistant (Internship)** Dec. 2020 – Jan. 2021  
*Department of Technology, Huake 3D* Wuhan, China

- Designed and modified more than 40 CAD models with specifications for performance testing of the new 3D printing platform.
- Contributed to a 40-page technical report.

**Assistant Teacher (Internship)** Dec. 2019 – Feb. 2020  
*U-CAN Secondary School, New Oriental* Wuhan, China

- Prepared teaching materials for lessons, exams, and homework.

**PUBLICATIONS**

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- **S. Zhuge**, Y. Ma, Z. Lin, and Y. Zeng, “A Novel Geometric Solution for Moving Target Localization through Multistatic Sensing in the ISAC System”, *IEEE VTC-Spring*, Singapore, June 2024.
- (Under review) **S. Zhuge**, Z. Lin, Y. Ma, and Y. Zeng, “Multistatic Sensing for Target Localization in ISAC systems with Dynamic and Unknown-location Transmitters”.