

Wenhao Li

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 0009-0004-7752-6737 |  Wenhao-Li-66 |  PhD in Electronic Engineering



Ph.D. candidate of the Department of Electronic Engineering at Tsinghua University, Class of 2023, majoring in Information and Communication Engineering, focusing on positioning algorithm research. Possesses solid algorithm development and engineering practice capabilities, with multiple internship experiences in embedded development, data science, and embodied intelligence. Optimistic and proactive, good at research and innovation, conscientious and responsible, has good organizational coordination abilities and teamwork spirit, emphasizing deep integration of theory and practice.

Education

 **Ph.D. in Information and Communication Engineering** 2023 - Present
Tsinghua University Beijing, China

• Courses: Functional Analysis | Matrix Analysis and Applications | Pattern Recognition | Introduction to Artificial Intelligence

 **Bachelor of Engineering in Electronic Science and Technology** 2019 - 2023
Tsinghua University Beijing, China

• Thesis: Research and Implementation of GNSS Data Compression Technology for Power Estimation Applications
• Courses: Database | Computer Networks | Principles of Communications | Data and Algorithms | Signals and Systems
• GPA: 3.78/4.0

Professional Experience

 **Embodied Intelligence Algorithm Intern** 2025.06 - 2025.08
SERES GROUP Chongqing, China

• Conducted research on Vision-Language Navigation (VLN) applications for robotics/quadruped robot dogs, designed and implemented navigation algorithms based on multi-modal perception
• Responsible for positioning error analysis and performance optimization of the Automatic Parking Assist (APA) system, improving parking accuracy and system robustness through data-driven methods

Vision Language Navigation Automated Parking Assist

 **Algorithm R&D Intern** 2024.06 - 2024.08
NAVITECH Beijing, China

• Completed embedded development on Xilinx FPGA platform using C language, implemented and optimized hardware-software communication, improving system response efficiency
• Designed multi-peak signal capture module, completed robustness testing and performance evaluation, ensuring algorithm stability in complex scenarios

Embedded Development Baseband Signal Processing

 **Software R&D Intern** 2023.03 - 2023.09
PEERUP Beijing, China

• Conducted large-scale dataset analysis and mining using SQL and Python, designed and validated regression prediction metrics to support business decision-making
• Evaluated software functionality and practicality, optimized core performance indicators, improved overall system operation efficiency

Statistics Data Processing

Projects

Vision-Language Navigation Application Research 2025.06 - 2025.08
SERES GROUP Chongqing, China

• Researched embodied intelligence navigation technology based on VLM, constructed SKG to improve path planning capabilities in complex environments
• Designed and implemented multi-modal feature fusion strategy, combining visual perception and language understanding to achieve autonomous navigation and task execution for robots/agents in unknown environments

VLN VLM CV Embodied AI SKG

APA Positioning Error Propagation Research for Automated Parking System 2025.06 - 2025.08
SERES GROUP Chongqing, China

• Analyzed the sources of positioning errors in the perception module of APA and their propagation mechanism in the control system

- Adopted ESKF for multi-sensor fusion positioning, combined with graph optimization to improve pose estimation accuracy, providing a more reliable positioning foundation for parking path planning
- CV ESKF Graph Optimization Autonomous Driving

FPGA-based Streaming Data Compression Platform

PERSONAL PROJECT

2023.06 - 2024.04

Beijing, China

- Implemented efficient streaming data compression architecture on FPGA platform using Verilog
 - Designed pipeline-style data processing module to achieve low-latency, high-throughput compression for real-time data streams
- Compression Verilog FPGA DEFLATE Zstandard

Subspace-based Face Recognition Technology

COURSE PROJECT

2024.05 - 2024.06

Beijing, China

- Researched face representation and recognition technology based on subspace methods, implemented dimensionality reduction algorithms such as SRC and Laplacian Eigenmaps
 - By constructing subspace models of face images, explored robust feature extraction and classification strategies under different lighting, expressions, and occlusion conditions
- Subspace SRC Face Identification Laplacian

Audio-Video Joint Text Transcription Problem

COURSE PROJECT

2023.12 - 2024.01

Beijing, China

- Explored joint recognition and transcription methods for audio-video bimodal signals, implemented multi-modal information fusion
 - Extracted visual features based on ResNet, combined with BPE for text sequence modeling, improving speech recognition accuracy in complex scenarios
- BPE DL Python ResNet

Cocktail Party Effect Speaker Recognition Technology

COURSE PROJECT

2021.01 - 2021.02

Beijing, China

- Researched speaker recognition in complex acoustic environments, simulated target speech separation and identification scenarios in cocktail party effect
 - Utilized facial visual information to assist speech recognition, achieving accurate identity recognition in multi-speaker scenarios
- CV DL Python Speaker Recognition Face Identification

Campus Experience

Deputy Secretary of the General Branch

DEPARTMENT OF ELECTRONIC ENGINEERING, TSINGHUA UNIVERSITY

2023.09 - 2024.06

Beijing, China

- Planned and coordinated external exchange activities for the Graduate Student League Committee, organized multiple department-level events to enhance the committee's influence and cohesion

Branch Leader of Doctoral Lecturers Group

TSINGHUA UNIVERSITY DOCTORAL LECTURERS GROUP

2023.09 - 2024.06

Beijing, China

- Comprehensively managed the certification, graduation, and presentation activities of the Electronic Engineering Doctoral Lecturers Group, ensuring efficient and orderly operations
- Coordinated with multiple departments within the university and external universities and enterprises to expand presentation collaboration channels and enhance the group's social impact

Excellent Practice Team Leader

DEPARTMENT OF ELECTRONIC ENGINEERING, TSINGHUA UNIVERSITY

2023.09 - 2024.06

Beijing, China

- Organized and planned the practice team to Wuhan, leading the team in in-depth research and practical activities
- Awarded the only gold award team in the department, ranking in the top 4% (6/150) across the university, and received the "Excellent Team Leader" title

Teaching Assistant - Modern Signal Processing

DEPARTMENT OF ELECTRONIC ENGINEERING, TSINGHUA UNIVERSITY

2024.09 - 2025.01

Beijing, China

- Responsible for grading assignments and experiment reports, conducting regular Q&A sessions, assisting the main instructor in optimizing teaching content and methods
- Compiled problem-solving approaches and implementation methods for typical algorithms such as Unscented Kalman Filter and Particle Filter, helping students understand nonlinear non-Gaussian signal processing techniques

Teaching Assistant - Statistical Signal Processing

DEPARTMENT OF ELECTRONIC ENGINEERING, TSINGHUA UNIVERSITY

2025.03 - 2025.07

Beijing, China

- Responsible for assignment grading and after-class tutoring, assisting in explaining core algorithm principles to improve students' understanding and application of statistical inference methods
- Participated in compiling exercises and case studies for key topics such as EM Algorithm, Kalman Filter, and Generalized Likelihood Ratio Test (GLRT), strengthening the integration of theory and practice

Certificates & Awards

- 2025Tsinghua University Outstanding Teaching Assistant Award
- 2024Tsinghua University Graduate Comprehensive Excellence Award
- 2024Tsinghua University Outstanding Communist Youth League Member
- 2022Tsinghua University Undergraduate Academic Excellence Award
- 2018National High School Biology League Competition First Prize
- 2017National High School Biology League Competition First Prize

Publications

[1] W. Li, M. Zhong, M. Lu, and H. Li, "Full-channel asynchronous spoofing technique for GNSS time synchronization attack," *IEEE Trans. Smart Grid*, vol. 17, no. 2, pp. 1492–1502, Mar. 2026, doi: 10.1109/TSG.2025.3622566.

[2] M. Zhong, W. Li, M. Lu, and H. Li, "Feedback node aided distributed spoofing system for global navigation satellite system time synchronisation attack," *IET Radar Sonar Navig.*, vol. 19, no. 1, p. e70088, 2025, doi: 10.1049/rsn2.70088.

[3] W. Li, M. Zhong, M. Lu, and H. Li, "Sequential separate clock drift anomaly detection method for GNSS time synchronization attack," in *Proceedings of the 39th International Technical Meeting of the Satellite Division of the Institute of Navigation (ION GNSS+ 2026)*, Orlando, Florida, Oct. 2026.

[4] W. Li, L. Wang, M. Zhong, M. Lu, and H. Li, "An FD-DEFLATE data compression scheme for C/N0 estimation in GNSS interference monitoring," in *Proceedings of the 37th International Technical Meeting of the Satellite Division of the Institute of Navigation (ION GNSS+ 2024)*, Baltimore, Maryland, Oct. 2024, pp. 818–829. doi: 10.33012/2024.19871.

[5] Y. Ma, H. Li, Z. Zhou, Z. Wu, W. Li, and M. Lu, "A fast C/N0 estimation method based on the ratio of acquisition correlation value," in *China Satellite Navigation Conference (CSNC 2024) Proceedings*, C. Yang and J. Xie, Eds., Singapore: Springer Nature, 2024, pp. 567–577. doi: 10.1007/978-981-99-6932-6_47.

Skills

Languages	Chinese English Japanese
Operating Systems	Linux Windows MacOS
Programming	MATLAB Python Verilog C# Java Rust
Tech Stack	SLAM RTK VLN CV SKG