Zhihao Tao

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Research Interests

- **Wireless System Designs**
  - Integrated sensing and communications, PHY layer security, massive MIMO, 5G&6G, etc.
- **Digital Signal Processing**
  - Optimum signal processing, detection and estimation theory, signal processing for wireless communications
- **ML/AI for Signal Processing and Wireless**
  - Develop efficient machine learning and deep learning algorithms for signal processing and wireless systems

Education

- **Rutgers University–New Brunswick, NJ, USA**   **September 2022–Present**

Dept. of Electrical and Computer Engineering   PhD student in Signal and Information Processing

  - Advisor: [Prof. Athina Petropulu](#)
  - GPA: 3.93/4.0
  - Core courses include Reinforcement Learning, AI in decision making, Machine Learning/Deep Learning, Stochastic Processes, Optimum Signal Processing, etc.

- **Nanjing University, Nanjing, China**   **September 2018–June 2021**

School of Electronic Science and Engineering   Master in Communication and Information Systems

  - Outstanding Graduate (Class of 2021)
  - Core courses include Matrix Theory, Advanced Digital Signal Processing, Digital Communication, etc.

- **Sichuan University, Chengdu, China**   **September 2014–June 2018**

College of Electronics and Information Engineering   Bachelor in Electronics and Information Engineering

  - GPA: 3.67/4.0   Overall Score: 88.8/100   Ranking: 4/51
  - Outstanding Graduate (Class of 2018)
  - Core courses include Modern Communication Theory, Microwave and Antenna Theory, RF Communication Circuit, Computer Communication and Networks, Digital Signal Processing, Signals and Systems, C/C++/Matlab, etc.

Employment

- **Rutgers University–New Brunswick, NJ, USA**   **September 2022–Present**
  - Job Responsibilities: Teaching/Research assistant in the ECE Department
- **AltoBeam Inc., Beijing, China**   **March 2022–August 2022**
  - Job Title: Wireless System Engineer
  - Job Responsibilities: Design and develop wireless communications and signal processing algorithms for next-generation low-energy Bluetooth systems.

Publications

[1] **Z. Tao** and A. Petropulu, "Integrated Sensing, Communication and Security via Deep Generative AI", journal work, to be submitted, 2025.

[2] **Z. Tao** and A. Petropulu, "Secure Time-Modulated Intelligent Reflecting Surface via Generative Flow Networks", May 2025.   [PDF]   [CODE]

[3] **Z. Tao** and A. Petropulu, "Antenna Selection for Enhancing Privacy in Radar-Based Vital Sign Monitoring Systems," in *Proceedings of the 2025 IEEE International Radar Conference (RADAR '25)*, Atlanta, GA, May 2025.   [PDF]

[4] **Z. Tao** and A. Petropulu, "On the Security of Directional Modulation via Time Modulated Arrays Using OFDM Waveforms," *IEEE Trans. Wireless Commun.*, minor revision, Feb. 2025.   [PDF]

[5] **Z. Tao** and A. Petropulu, "Enhancing Privacy in Radar-Based Vital Sign Monitoring via Non-linear FMCW Waveforms," in *Proceedings of the 2025 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'25)*, Hyderabad, India, Apr. 2025. [PDF]

[6] **Z. Tao**, Z. Xu, and A. Petropulu, "How Secure Is the Time-Modulated Array-Enabled OFDM Directional Modulation?" in *Proceedings of the 2024 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'24)*, Seoul, Korea, Apr. 2024. [PDF]

[7] **Z. Tao**, Z. Xu, and A. Petropulu, "Enhance Security of Time-Modulated Array-Enabled Directional Modulation by Introducing Symbol Ambiguity," *arXiv:2310.09922,* Jun. 2023. [PDF]

[8] **Z. Tao** and S. Wang, "Improved Downlink Rates for FDD Massive MIMO Systems through Bayesian Neural Networks-Based Channel Prediction," *IEEE Trans. Wireless Commun.,* vol. 21, no. 3, pp. 2122–2134, Mar. 2022 [PDF]

[9] **Z. Tao** and S. Wang, "How Often Do We Need to Estimate Wireless Channels in Massive MIMO with Channel Aging?" in *Proceedings of the IEEE Global Communications Conference 2021*, Madrid, Spain, Dec. 2021. [PDF]

[10] **Z. Tao**, T. Wang, and S. Wang, "Improve Downlink Rates of FDD Massive MIMO Systems by Exploiting CSI Feedback Waiting Phase," in *Proceedings of the IEEE Global Communications Conference 2019,* HI, USA, 2019. [PDF]

Patents

[1] A. Petropulu and **Z. Tao**, "Enhancing Privacy in Radar-Based Vital Sign Monitoring," US Patent, Under application, 2024.

[2] S. Wang and **Z. Tao**, "Channel Prediction-Aided FDD Massive MIMO Systems Based on Bayesian Neural Networks," Nanjing University, China Patent, No. 2020112065996, 2021.

Selected Honors and Awards

03/2025	Research & Conference Travel Award ($1K), awarded by the School of Graduate Studies at Rutgers
02/2025	Nokia Bell Labs Scholarship ($10K), see the news
05/2022	Excellent Master's Thesis Award at Nanjing University
11/2020	The First-Class Academic Scholarship for Postgraduate Students at Nanjing University
12/2019	The Second-Class Academic Scholarship for Postgraduate Students at Nanjing University
12/2019	The Third Prize in "HUAWEI Cup" the 16th China Post-Graduate Mathematical Contest in Modeling
12/2018	The First-Class Postgraduate Admission Scholarship at Nanjing University
06/2018	Outstanding Undergraduate Thesis (Design) Award at Sichuan University
11/2015	National Scholarship Award Issued by Ministry of Education of China
10/2015	The Second Prize in the 7th National Mathematics Competition for College Students (Non-mathematics major)

Teaching Assistant

Introduction to Deep Learning (Spring 2025, Rutgers University–New Brunswick)

Sustainable Energy (Undergrad, Fall 2023, Rutgers University–New Brunswick)

Probability and Stochastic Processes (Undergrad, Spring 2023, Rutgers University–New Brunswick)

Mobile Communications (Undergrad, Spring 2019, Nanjing University)

Reviewer

IEEE Transactions on Wireless Communications, IEEE Transactions on Communications, IEEE Wireless Communications Letters, IEEE Communications Letters, IEEE IJCNN, IEEE ICASSP, IEEE ISBI, IEEE RADAR

Skills and Languages

ML modules:	PyTorch, TensorFlow, etc.
Programming:	Matlab, Python, C/C++, etc.
Languages:	English (Fluent), Chinese (Native)