# Ke Xu

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## Education

**Nanjing University of Posts and Telecommunications** Nanjing, China
*M.Eng. (Academic Master) in Communication & Information System,*
*National Engineering Research Center of Communications & Networking* *Sep 2022 – Jun 2025*

- GPA: 3.62/4.00, ranking: 3/60
- **Research Interests: Wireless communications, MAC protocol, deep reinforcement learning, reconfigurable intelligent surface, random access procedure, cell-free network, mMTC**

**Nantong University** Nantong, China
*B.Eng. in Electronics & Information Engineering, School of Information Science & Technology* *Sep 2018 – Jun 2022*

- GPA: 3.51/4.00, Comprehensive GPA: 89.7/100, ranking: 1/28
- Relevant Coursework: Communication Principles (94), Information Theory & Coding (92)

**Nagasaki Wesleyan University, Nagasaki Institute of Applied Science** Jul 2019
*Summer program of Telecommunications* *Nagasaki, Japan*

## Publications

[1] **K. Xu**, Y. Xu, and Xiaoming Wang, "Learning-Based Random Access Protocol With RIS-Aided Cell-Free Networks," in *IEEE Communications Letters*, under review.
[2] **K. Xu**, Y. Xu, and Xiaoming Wang, Xianbin Wang "A Hybrid Collaborative Learning for Age of Information Minimization in Massive Access," *IEEE Transactions on Vehicular Technology*, doi: 10.1109/TVT.2024.3467255.
[3] **K. Xu**, Y. Xu, and X. Wang, "Research On Massive Random Access Method for Space-Air-Ground Integrated Network," *Mobile Communications*, vol. 47, no. 7, pp. 58–63, Jul. 2023, doi: 10.3969/j.issn.1006-1010.20230514-0001.

## Research Experience

**Learning-Based Random Access Protocol With RIS-Aided Cell-Free Networks**
*Author: Ke Xu* *Mar 2024 - Jul 2024*

- Conducted analysis of the channel model for random access in RIS-aided cell-free networks, optimizing preamble collision and access performance using a deep reinforcement learning algorithm.
- Utilized practical channel and preamble properties from 3GPP and ETSI to achieve robust simulation results for throughput and age of information.
- Developed a collision resolution algorithm based on varying energy levels among cell-free clusters to address the issue of multiple users accessing the same preamble.

**Hybrid Collaborative Learning for Age of Information Minimization in Massive Access**
*Author: Ke Xu* *Aug 2023 - Jul 2024*

- Analyzed the random access procedure using age-critical frameless ALOHA, formulated the optimization problem, and proposed a hybrid collaborative learning algorithm to optimize the age of information.
- Designed reward functions for devices and base stations (BS) to address the trade-off between the age of information and normalized throughput, ensuring cooperative operation.

**Research On Massive Random Access for Space-Air-Ground Integrated Network**
*Author: Ke Xu* *Jan 2023 - Jul 2023*

- Analyzed the optimization problem of massive access in space-air-ground integrated networks, and proposed a reinforcement learning-based random access method that outperforms the traditional access class barring (ACB) method.

**National Natural Science Foundation of China** Jan 2023 – Present
*Supervisor: Youyun Xu* *Nanjing*
*Project: Multi-RIS-assisted V2X Communication Enhancement Technology in Urban Environments* *No.62371246*

- Optimizing beam and access efficiency under uncertain and complex link blockage, realizing the seamless coverage of multi-mobile vehicle communication.

**Research on Service Customized Network Architecture and Key Technologies** Jan 2023 – Jan 2024
*National Innovation Center par Excellence, Jiangsu Industrial Technology Research Institute* *Nanjing*
*Project: Key Technologies and Application Scenarios of Deterministic Networks*

- Analyzed the application scenarios and requirements of deterministic networking technologies in the industrial Internet, vehicle networks (V2X), and mobile communication networks, and wrote a related report.

**The National Key Research and Development Program of China (International)** Sep 2021 – Sep 2022
*Supervisor: Youyun Xu* *Nanjing*
*Project: A New Generation Wireless Mobile Communication System for Intelligent Railway* *No. 2016YFE0200200*

- Proposed a new generation integrated architecture for railway wireless mobile communication ground-air integration

## Scientific Competitions

**The Challenge Cup College Student Entrepreneurship Plan Competition** May 2023
*Leader: Ke Xu* *Nanjing*
*Project: Construction Project of Smart Power IoT platform based on 5G* *Bronze Award*

- Built a smart energy IoT platform based on 5G. The platform could collect status information from various terminal devices, use edge computing technology to intelligently identify the status information, and upload sensitive status information to the cloud platform via 5G communication technology.

**China College Students' Innovational Competition** Jul 2020
*Keynote Speaker: Ke Xu* *Nantong*
*Project: Sea Area Communication* *Gold Award*

- Built a shipborne base station network, designed a mobile shipborne antenna, and used a Customer Premises Equipment (CPE) platform to convert LTE and 5G signals into WiFi signals.

## Honors & Awards

**Outstanding Graduate Student** Sep 2024
**The First Prize Scholarship** Sep 2024
**The Third Prize Scholarship** Sep 2023
**Bronze Award of 2023 "The Challenge Cup" in NJUPT** May 2023
**The First Prize Scholarship(top 10%)** Sep 2022
**Recommendation:** Formally recommended for further studies in MPhil at NJUPT**(top 3%, 1/28)** Sep 2021
**The First Prize Scholarship** Sep 2021
**Jiangsu Computer Rank Examination Certificate, level 3:**
Achieved the highest level with a focus on Microcomputer Principle and Interface Technology May 2021
**The Second Prize Scholarship** Sep 2020
**Gold Award of 2020 China College Students' Innovational Competition in Nantong University** Jul 2020
**The First Prize Scholarship** Sep 2019

## Working Experience

**NJUPT Research Academy of Communication & Networking Industry** Aug 2022 – Aug 2023

- Intelligent and Digital Transformation of Manufacturing Industry with Jiangsu Province Government
  - Conducted factory field research, generated diagnostic reports about the level of their intelligent transformation and the places need improving.
- Communication Network and Intelligent Terminal Research with Sheng Xun Co., Ltd
  - Conducted researches on standards and patents of wearable electronic devices, involving in 3GPP reports and Chinese patents, a patent disclosure is accomplished.

**China Mobile Communications Corporation, Siyang Branch** Jun 2022 – Jul 2022

- Checked the connected functionality of Base Station in 3G, LTE, and 5G regularly
- Negotiation of construction of central communication processing room

## Skills

**Languages**: Mandarin (Native), English (IELTS: 7.0 with L:7.5;R:8.0;W:7.0;S:6.0, CET4: 548, CET6: 531)
**Technical**: Matlab, Python, LaTeX, Arduino, Unity, C++
**Artistic**: Silver Award of the 6th National College Student Art Exhibition in Jiangsu Province(vocal), as Tenor, 2020; Champion of the College-level Singing Competition in Nantong University, 2018
**Volunteer**: Advanced Individual Award of Summer Social Practice, 2019; Volunteer as sports player assistant of Sports Day in Nantong University, 2019