Zhoubin Kou

University of Virginia
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Research Interests

My primary research interests lie in **Transformer/LLM-driven NextG wireless communication systems**, and I also work on the optimization of distributed machine learning systems.

Education

University of Virginia, Charlottesville, VA, USA 2025.01 - Present
Ph.D. in Electrical Engineering
Advisor: Cong Shen

Tsinghua University, Shenzhen, Guangdong, China 2021.09 - 2024.06
M.Eng. in Electronic and Communication Engineering

Southeast University, Nanjing, Jiangsu, China 2017.09 - 2021.06
B.Eng. in Information Engineering

Selected Research Projects

Research Assistant @ ECE, University of Virginia 2025.01 - Present

Topic 1: Unified Transformer Models for NextG Communication System Design

- ICL-enhanced Transformer Receiver for Modular and Multi-Function Communication Tasks
- Transformer Model for Joint Signal Detection and Modulation Classification

Topic 2: Efficient Deployment of Transformer/LLM Models for Practical Communication Systems

Topic 3: Distributed Optimization over Resource-Constrained Networks

- Hybrid Zeroth– and First–Order Optimizer Design for Resource-Constrained Clients

Research Assistant @ EE, Tsinghua University 2021.09 - 2024.06

Topic: Wireless Communication Challenges in Federated Learning (FL)

- Efficiency-boost Federated Learning in Wireless Networks
- Asynchronous Design for Heterogeneous Federated Edge Learning

Research Assistant @ Purple Mountain Laboratory, Southeast University 2019.12 - 2021.06

Topic: Intelligent Reflective Surface (IRS)–Assisted Wireless Communication

- Multi-User IRS-based Transmission Scheme using Deep Reinforcement Learning.

Publications

[8] **Multi-Task Transformer Receiver for OFDM Channel Estimation and Symbol Detection** [Link]
Zhoubin Kou, Renpu Liu, Jing Yang, Cong Shen
NeurIPS'25@AI4NextG Workshop

[7] **Lean Clients, Full Accuracy: Hybrid Zeroth- and First-Order Split Federated Learning**
Zhoubin Kou, Zihan Chen, Jing Yang, Cong Shen
In Submission

[6] **Semi-asynchronous over-the-air federated learning over heterogeneous edge devices** [Link]
Zhoubin Kou, Yun Ji, Danni Yang, Sheng Zhang, Xiaoxiong Zhong

IEEE Transactions on Vehicular Technology, 2025

[5] **Semi-Asynchronous Federated Edge Learning for Over-the-Air Computation** [Link]

Zhoubin Kou, Yun Ji, Xiaoxiong Zhong, Sheng Zhang

IEEE GLOBECOM 2023

[4] **Asynchronous Federated Learning with Incentive Mechanism Based on Contract Theory** [Link]

Danni Yang, Yun Ji, **Zhoubin Kou**, Xiaoxiong Zhong, Sheng Zhang

IEEE WCNC 2024

[3] **Efficiency-boosting federated learning in wireless networks: A long-term perspective** [Link]

Yun Ji, Xiaoxiong Zhong, **Zhoubin Kou**, Sheng Zhang, Hangfan Li, Yuanyuan Yang

IEEE Transactions on Vehicular Technology, 2023

[2] **Client selection and bandwidth allocation for federated learning: An online optimization perspective** [Link]

Yun Ji, **Zhoubin Kou**, Xiaoxiong Zhong, Hangfan Li, Fan Yang, Sheng Zhang

IEEE GLOBECOM 2022

[1] **Long-term CSI-based design for RIS-aided multiuser MISO systems exploiting deep reinforcement learning** [Link]

Hong Ren, Cunhua Pan, Liang Wang, Wang Liu, **Zhoubin Kou**, Kezhi Wang

IEEE Communications Letters

Honors and Awards

AraFest' 25 Travel Grant 2025

First Grade Scholarship, Tsinghua University 2023

Services

Reviewer for IEEE Transactions on Vehicular Technology

Reviewer for IEEE Internet of Things Journal

Reviewer for IEEE Transactions on Machine Learning in Communications and Networking

Mentorship

Lisa Berlizova → Undergraduate student in EE @ University of Virginia 2025 Fall-present

- Working on Transformer for Spectrum Sensing (joint signal detection and modulation classification)

Teaching

Teaching Assistant of *Artificial Internet of Things* (AIoT), Tsinghua University 2023 Fall

Skills

- Programming Skills: Python, PyTorch, MATLAB, C/C++, bash, HTML/CSS, LaTeX
- Language Skills: Mandarin (native), English (IELTS 7)