Shicong LIU

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Education

City University of Hong Kong — **09 2023 ∼ 06 2027 (Est.)**
Doctor of Philosophy — Hong Kong SAR, China
Electrical Engineering — 3.92/4.0

Beijing Institute of Technology — **09 2020 ∼ 06 2023**
Master of Engineering — Beijing, China
Information and Communication Engineering — Outstanding Graduate, Beijing

Beijing Institute of Technology — **09 2016 ∼ 06 2020**
Bachelor of Science — Beijing, China
Electronics and Information Engineering — 7-th/94

Awards

- **1st place** in National Undergraduate Algorithmic Game Theory Championship. 08 2018
- **Meritorious Winner** (7%) in Mathematical Contest in Modeling (MCM). 04 2019
- 2020 **National Scholarship** (2.5%) for Graduate Students 09 2020
- 2021 **National Scholarship** (2.5%) for Graduate Students 09 2021
- 2021 Outstanding Student 09 2021
- **Hong Kong Ph.D. Fellowship Scheme (HKPFS) Awardee** 04 2023
- Beijing Municipal Outstanding Master Graduate 06 2023
- Entrance Fellowship of CityU Graduate School 09 2023
- CityU Academic Excellence and QE Award 09 2024

Research

Sensing Assisted Channel Estimation for Near-Field XL-MIMO

Localization and Channel Estimation in the Near Field. Supervisor: Prof. Xianghao YU 09 2024

- Propose to adopt **back-projection** based algorithm for near-field localization with significantly **reduced complexity** [J1].
- Further utilize the estimated location coordinates for channel estimation/beamfocusing [C1].

Master's Thesis

XL-MIMO Signal Processing Techniques. Supervisor: Prof. Zhen Gao ∼ 06 2023

- Channel estimation and beamforming techniques for XL-MIMO antenna arrays.
- Learning-based signal processing, e.g., CSI feedback and semantic communications [J2-3], [C2-3].

Beijing Municipal Natural Science Foundation

Reconfigurable Intelligent Surfaces (RISs) related research. Supervisor: Prof. Zhen Gao 09 2019

- Architecture and algorithm design for RIS-assisted wireless systems. Utilizing the hybrid passive/ active RIS structure and proposed an uplink greedy iterative channel estimation method to reconstruct the **sparse channel matrix** with limited overhead for MIMO-OFDM systems [J2].
- Survey on LEO satellites [A1].

Technical Skills

- **Coding**: Skilled in **MATLAB** and **Python** for communication system algorithm simulations and AI-related algorithms.
- **Language**: **IELTS: 7.5 (L/R/W/S: 8.5/8/6.5/6.5)**.

Services

- **Academic**
  - **Session Chair**, *Antenna and Smart Antenna*, GLOBECOM'24, Cape Town. 2024 Dec.
  - **Session Chair**, *Mobile and Wireless Networks*, ICCC'23, Dalian, China. 2023 Aug.
  - **Peer Reviewer**, IEEE ComSoc Journals and Conferences.
- **Teaching**
  - **Research Assistant** at Dept. EE, City University of Hong Kong. 2024 Aug.
  - **Teaching Assistant**:
    - EE3008 Principles of Communications, City University of Hong Kong 2024 Fall
    - EE3008 Principles of Communications, City University of Hong Kong 2024 Spring
    - EE3008 Principles of Communications, City University of Hong Kong 2023 Fall
    - Innovation and Entrepreneurship Projects, Beijing Institute of Technology 2023 Spring
    - Frontiers of Communication Technology, Beijing Institute of Technology 2022 Spring

Internship

Cambricon Technology *(Campus Compulsory)* **Beijing, China**
Hardware Developer 08 2019 - 09 2019

- Application Specific Integrated Chips (ASIPs) for neural network calculation acceleration.
- Software development for deploying Inception V3 model on Cambricon ASIPs by C++.

ByteDance Ltd. *(Research Related)* **Beijing, China**
Researcher and Developer 06 2022 - 09 2022

- Implementation research on multi-path UDP transmission schemes under real-time communication (RTC) scenario.
- Optimization of RTC transmission protocols on packet scheduling and buffering strategies.

Publications

Journals

[J1] **S. Liu**, *X. Yu**, Z. Gao, J. Xu, D. W. K. Ng, and S. Cui, "Sensing-Enhanced Channel Estimation for Near-Field XL-MIMO Systems," *arXiv*. [Online] Available: https://arxiv.org/abs/2403.11809.

[J2] **S. Liu**, *Z. Gao**, J. Zhang, M. D. Renzo and M.-S. Alouini, "Deep Denoising Neural Network Assisted Compressive Channel Estimation for mmWave Intelligent Reflecting Surfaces," *IEEE Trans. Veh. Technol.*, vol. 69, no. 8, pp. 9223-9228, Aug. 2020. **(ESI Highly Cited)**

[J3] Z Gao, **S. Liu**, Y. Su, Z. Li, and D. Zheng, "Hybrid Knowledge-Data Driven Channel Semantic Acquisition and Beamforming for Cell-Free Massive MIMO", *IEEE J. Sel. Top. Signal Process.*, vol. 17, no. 5, pp. 964-979, Sept. 2023.

[J4] X. Zhou, K. Ying, **S. Liu**, M. Ke, Z. Gao and M. -S. Alouini, "Reconfigurable intelligent surface assisted grant-free massive access," *Intell. Converg. Netw.*, vol. 3, no. 1, pp. 134-143, March 2022.

[J5] L. Bian, X. Chang, S. Jiang, L. Yang, X. Zhan, **S. Liu**, D. Li, R. Yan, Z. Gao, and J. Zhang, "Large-scale scattering-augmented optical encryption", *Nat. Commun.*, *to appear*.

Article

[A1] **S. Liu**, *Z. Gao**, Y. Wu, D. W. K. Ng, X. Gao, K.-K Wong, S. Chatzinotas, B. Ottersten, "LEO Satellite Constellations for 5G and Beyond: How Will They Reshape Vertical Domains?," *IEEE Commun. Mag.*, vol. 59, no. 7, pp. 30-36, July 2021.

Conferences

[C1] **S. Liu**, *X. Yu**, "Low-Complexity Near-Field Localization with XL-MIMO Sectored Uniform Circular Arrays" *in Proc. IEEE GLOBECOM'24*, Cape Town, South Africa.

[C2] **S. Liu**, *X. Yu**, Z. Gao, and D. W. K. Ng, "DPSS-based Codebook Design for Near-Field XL-MIMO Channel Estimation" *in Proc. IEEE ICC'24*, Denver, CO, USA.

[C3] **S. Liu**, *Z. Gao**, G. Chen, Y. Su, L. Peng, "Transformer-based Joint Source Channel Coding for Textual Semantic Communication", Accepted by IEEE/CIC International Conference on Communications in China (ICCC), Dalian, China, 2023.

[C4] **S. Liu**, *et al.*, "Model-Driven Deep Learning Based Precoding for FDD Cell-Free Massive MIMO with Imperfect CSI", *IWCMC 2022* June, 2022.

[C5] M. Wu, Z. Wan, Y. Wang, **S. Liu**, *Z. Gao,* "Deep Learning-Based Rate-Splitting Multiple Access for Massive MIMO-OFDM Systems With Imperfect CSIT", 2022 International Symposium on Wireless Communication Systems (ISWCS), Hangzhou, China, 2022.

[C6] C. Zhang, H. Huang, Z. Zhang and **S. Liu**, "Optimization of VCDTS algorithm in Connect6 game," *Chinese Control And Decision Conference (CCDC)*, 2018, pp. 6643-6646.