Xiang Ma

(435)915-1716 \diamond xiang.ma@usu.edu \diamond Expected graduate time: May 2024

Education

Utah State University (USU)	08/2019 - Present
Ph.D. student, Department of Electrical and Computer Engineering	
Advisor: Prof. Rose Qingyang Hu	
Southern University of Science and Technology (SUSTech), China	08/2013 - 06/2017
B.Eng. in Communications Engineering, Department of Electrical and Electronic Engineering	
Advisor: Prof. Jin Zhang	

Research Interests

Wireless Communication, Machine Learning, Internet of Things, Cyber Security, Signal Processing

Skills & Expertise

Computer Languages	Python, Java, $C/C++$
Software	MATLAB, Pytorch, LabView, Latex, GNURadio, Wireshark

Teaching Experience

ECE 5600: Introduction to Computer Networks, Fall 2020, Fall 2021, Fall 2022, Fall 2023. Lead TA, teaching lab classes, helping students to debug their code, and grading.

ECE 6600: Wireless and Mobile Networking, Spring 2021, Spring 2022, Spring 2023. Holding office hours and grading.

Industry Work Experience

Sangfor Technologies, Shenzhen, China (07/2017 - 07/2019).

Software Engineer

- \cdot Worked in the Virtual Technology (VT) department, participating in a data backup project; helped the team build an automatic GUI test framework.
- \cdot Designed a bug-finding tool, which led to discovering many critical issues and ultimately contributed to winning the Excellent New Employee Award.

Publications

Journal Publications:

 H. Sun, X. Ma, and R. Q. Hu, "Adaptive Federated Learning With Gradient Compression in Uplink NOMA," *IEEE Trans. Veh. Technol.*, vol. 69, no. 12, pp. 16325-16329, 2020.

Conference Publications:

- 1. X. Ma, H. Sun, R. Q. Hu and Y. Qian, "Approximate Wireless Communication for Federated Learning," in *Proc. ACM WiseML 2023*, Surrey, United Kingdom, June. 2023.
- Y. Zhou, H. Sun, X. Ma, and R. Q. Hu, "Energy-Efficient Secure Offloading for NOMA-Enabled Machine-type Mobile-Edge Computing," *IEEE International Conference on Industrial Technology* (*ICIT*), pp. 1-6. IEEE, 2023.

- 3. X. Ma, H. Sun, R. Q. Hu and Y. Qian, "A New Implementation of Federated Learning for Privacy and Security Enhancement," in *Proc. IEEE GLOBECOM*, Rio de Janeiro, Brazil, Dec. 2022.
- 4. X. Ma, H. Sun, Q. Wang and R. Q. Hu, "User Scheduling for Federated Learning Through Over-the-Air Computation," in *IEEE VTC 2021 Fall*
- 5. X. Ma, H. Sun, and R. Q. Hu, "Scheduling policy and power allocation for federated learning in NOMA based MEC," in *Proc. IEEE GLOBECOM*, Taipei, Taiwan, Dec. 2020.
- H. Sun, Q. Wang, X Ma, Y. Xu, R. Q. Hu, "Towards Green Mobile Edge Computing Offloading Systems with Security Enhancement,", 2020 Intermountain Engineering, Technology and Computing (IETC), Orem, UT, USA, 2020, pp. 1-6.

Preprints

- 1. X. Ma, Q. Wang, H. Sun, R. Q. Hu and Y. Qian, "CSMAAFL: Client Scheduling and Model Aggregation in Asynchronous Federated Learning," in submission.
- 2. X. Ma, H. Sun, R. Q. Hu and Y. Qian, "Approximate Wireless Communication for Federated Learning," (Journal version), in submission

Major Projects

Reducing Communication Costs in Federated Learning

- Advanced communication schemes such as NOMA, over-the-air computation (AirCom), and approximate communication are employed to reduce communication costs.
- Propose gradient compression, client scheduling, and power allocation to enhance the system performance.

Asynchronous Federated Learning

- Provide a comparison of synchronous and asynchronous federated learning frameworks.
- Propose an asynchronous federated learning framework to solve system heterogeneity problems.

Addressing Security and Privacy Issues in Federate Learning

- Propose model update-based aggregation to defend against Byzantine attacks.
- Model update-based aggregation, combined with individual client model initialization, protects client privacy.

Graduate Course Completed

Computer Networks, Wireless and Mobile Networks, Stochastic Processes, Mathematical Methods for Signals and Systems, Digital Signal and Image Processing, Advanced Digital Signal and Image Processing, Coding Theory, Deep learning Theory and Application, Big Data

Honors and Awards

- IEEE ICC NSF travel award, 2022.
- Excellent New Employee in Sangfor Technologies, 2017
- Newly-Established Scholarship from SUSTech, 2013-2016

Service

• Graduate Student Council, USU, 2022-2023

- President of Chinese Student Association, USU, 2020-2021
- Freshman Mentor, SUSTech, 2015-2016

Academic Service

- Invited TPC Member:
 - 2023 International Conference on Wireless Communications and Signal Processing (WCSP)
- Invited Reviewer for Conferences:
 - IEEE Conference on Vehicular Technology (VTC) (2021 Fall, 2023 Fall)
 - IEEE International Conference on Communications in China (ICCC) (2021)
- Invited Reviewer for Journals:
 - IEEE Transactions on Vehicular Technology
 - IEEE Wireless Communications Magazine
 - IEEE Vehicular Technology Magazine
 - IEEE Transactions on Network Science and Engineering
 - IEEE Transactions on Emerging Telecommunications Technologies

Professional Reference List

Rose Hu, Professor, IEEE Fellow, Utah State University, rose.hu@usu.edu Yi Qian, Professor, IEEE Fellow, University of Nebraska-Lincoln, yi.qian@unl.edu Ziqi Song, Associate Professor, University at Buffalo, zqsong@buffalo.edu