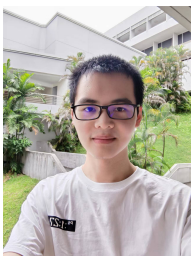
Zonghang Li, PhD



Age: 28 **Country:** China **Supervisor:** Prof. Hongfang Yu
Research Interests: AI, ML Systems, LLM Systems, Federated Learning, Network AI.

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https://scholar.google.com/citations?user=1IA-XokAAAAJ&hl=en

Biography: Zonghang Li obtained his Bachelor and PhD degrees from the University of Electronic Science and Technology of China (UESTC). He has visited the University of Oxford, the Peng Cheng Laboratory, and the Nanyang Technological University. His research interests are mainly in Distributed AI Systems, including geo-distributed machine learning, federated learning, and large model systems. He is also interested in Network AI and Edge AI. He has published in top-tier journals including IEEE TSC, IEEE TMC, IEEE JSAC, IEEE COMST, IEEE Wire. Comm., IEEE TCC, IEEE TNSM, IEEE Network, IEEE IoT-J, with total citations of 568, and one paper during the second review process in ACM/IEEE TON with positive comments. He obtained 6 CN Patents and authored 1 book. His work won the Future Network Leading Innovative Scientific and Technological Award of China Institute of Communications (CIC) and the Best Paper Award in Guangdong Computer Society. He now serves as an assistant area editor in IEEE IoT-J, an assistant editor in IEEE COMST, IEEE Network, and an assistant guest editor in IEEE VTM. He was a roundtable speaker in the 8th China Open Source Conference (COSCon '23) and a lecturer in National University AI Education Summit.

Education and Work Experience

Sept.2021 - Sept.2022	School of Computer Science and Engineering, **Nanyang Technological University (NTU).** Visiting Scholar, advised by Prof. Dusit Niyato and Prof. Han Yu.
Aug.2019 - Jan.2020	**Peng Cheng Laboratory, Shenzhen, China.** Intern, advised by Prof. Zenglin Xu.
Aug.2018 - Sep.2018	Lady Margaret Hall, **University of Oxford.** Visiting Scholar.
Sept.2014 - July.2024	School of Information and Communication Engineering, **University of Electronic Science and Technology of China (UESTC).** Bachelor and PhD, advised by Prof. Hongfang Yu and Prof. Gang Sun.

Selected Publications

Journal and Conference Papers (by year)

1. Du, H., **Li**, **Z.**, Niyato, D., Kang, J., Xiong, Z., Huang, H., & Mao, S. (2024). Diffusion-based reinforcement learning for edge-enabled ai-generated content services. *IEEE Transactions on Mobile Computing*. **Co-first author and corresponding author**. doi:10.1109/TMC.2024.3356178
2. Du, H., **Li**, **Z.**, Niyato, D., Kang, J., Xiong, Z., Shen, X. S., & Kim, D. I. (2024). Enabling ai-generated content services in wireless edge networks. *IEEE Wireless Communications*. **Co-first author**. doi:10.1109/MWC.004.2300015
3. **Li**, **Z.**, Feng, W., Cai, W., Yu, H., Luo, L., Sun, G., … Niyato, D. (2024). Accelerating geo-distributed machine learning with network-aware adaptive tree and auxiliary route. *arXiv preprint arXiv:2404.11352*. Under 2nd review in IEEE/ACM TON with positive comments. doi:10.48550/arXiv.2404.11352
4. Kang, J., Du, H., **Li**, **Z.**, Xiong, Z., Ma, S., Niyato, D., & Li, Y. (2023). Personalized saliency in task-oriented semantic communications: Image transmission and performance analysis. *IEEE Journal on Selected Areas in Communications*, *41*(1), 186–201. **Best Paper Award**. doi:10.1109/JSAC.2022.3221990

5. Zeng, S., **Li**, **Z.**, Yu, H., Zhang, Z., Luo, L., Li, B., & Niyato, D. (2023). Hfedms: Heterogeneous federated learning with memorable data semantics in industrial metaverse. *IEEE Transactions on Cloud Computing*, *11*(3), 3055–3069. **Co-first author**. doi:10.1109/TCC.2023.3254587

6. Zhou, H., **Li**, **Z.**, Yu, H., Luo, L., & Sun, G. (2023). Nbsync: Parallelism of local computing and global synchronization for fast distributed machine learning in wans. *IEEE Transactions on Services Computing*, *16*(6), 4115–4127. doi:10.1109/TSC.2023.3304312

7. **Li**, **Z.**, He, Y., Yu, H., Kang, J., Li, X., Xu, Z., & Niyato, D. (2022). Data heterogeneity-robust federated learning via group client selection in industrial iot. *IEEE Internet of Things Journal*, *9*(18), 17844–17857. doi:10.1109/JIOT.2022.3161943

8. **Li**, **Z.**, Zhou, H., Zhou, T., Yu, H., Xu, Z., & Sun, G. (2022). Esync: Accelerating intra-domain federated learning in heterogeneous data centers. *IEEE Transactions on Services Computing*, *15*(4), 2261–2274. doi:10.1109/TSC.2020.3044043

9. Zeng, S., **Li**, **Z.**, Yu, H., He, Y., Xu, Z., Niyato, D., & Yu, H. (2022). Heterogeneous federated learning via grouped sequential-to-parallel training. *International Conference on Database Systems for Advanced Applications*, 455–471. **Co-first author**. doi:https://arxiv.org/pdf/2201.12976

10. **Li**, **Z.**, Yu, H., Zhou, T., Luo, L., Fan, M., Xu, Z., & Sun, G. (2021). Byzantine resistant secure blockchained federated learning at the edge. *IEEE Network*, *35*(4), 295–301. doi:10.1109/MNET.011.2000604

Book

1. Yu, H., **Li**, **Z.**, Sun, G., & Luo, L. (2023). *Geo-distributed machine learning: Enabling integration of intelligence on multiple clouds*. **Only-student author**. Publishing House of Electronics Industry.

Selected Awards and Scholarships (by year)

2024
- **Excellent PhD Graduates Award** of University of Electronic Science and Technology of China (UESTC).

2023
- **Best Oral Award** of China Doctoral Forum on Information and Communication Engineering.
- **Academic Rising Star Award** of University of Electronic Science and Technology of China.
- **CETC-UESTC Scholarship** of China Electronics Technology Group Corporation (CETC)
- **Best Paper Award** of Guangdong Computer Society.

2022
- **Talent Student Scholarship** of Nanjing Pukou Economic Development Zone.

2021
- **Doctoral First-Class Scholarship** of University of Electronic Science and Technology of China (UESTC).
- **Doctoral Academic Visiting Scholar Funding** of University of Electronic Science and Technology of China (UESTC).
- **Future Network Leading Innovative Scientific and Technological Award** of China Institute of Communications (CIC).

2020
- **Outstanding Achievement Award** of Intelligent Network and Application Research Center.

2019
- **Excellent Solution Award** of China Institute of Communications (CIC).

Skills and Interests

Language	Chinese and English.
Coding	Python; C++; MXNET; PyTorch; Llama-Factory; Megatron; DeepSpeed; Transformers etc.
Interests	Net for AI; AI for Net; Distributed AI System; Geo-distributed AI System; Efficient LM Training, Fine-Tuning and Inference; Advanced Network for Distributed AI; Federated Learning; LLM Agent; Reinforcement Learning; Generative AI; Edge AI; AIoT etc.

Selected Projects (by year)

2023 - Present

KlonetAI - An intelligent virtual network management and orchestration agent adopted by Klonet, which was presented on NSDI '24
Github: `https://github.com/Lizonghang/KlonetAI`
Description: Klonet is designed to support the deployment and testing of new network protocols and applications in a realistic environment, such as distributed machine learning and federated learning, and KlonetAI provides an AI agent for intelligent interaction with the Klonet platform.

2022 - Present

NetStorm - To appear on IEEE/ACM TON
Github: `https://github.com/Lizonghang/netstorm`
Description: NetStorm is an topology-adaptive and communication-efficient system designed for geo-distributed machine learning training, which achieves a speedup of 7.5∼9.2 times over the standard GeoMX system.

2019 - 2021

NBSync - An asynchronous pipelining scheduler accepted by IEEE TSC
Description: NBSync is a novel training algorithm for distributed ML over WANs, which greatly speeds up the model training by the parallelism of local computing and global synchronization. NBSync employs a well-designed pipelining scheme, which relaxes the sequential dependency of local computing and global synchronization and process them in parallel so as to overlap their operating overhead in the time dimension. NBSync also realizes flexible, differentiated and dynamical local computing for workers to maximize the overlap ratio in dynamically heterogeneous training environments.

2018 - Present

GeoMX - Accepted and adopted by ZTE Co., Ltd.
Github: `https://github.com/INET-RC/GeoMX`
Description: GeoMX is a fast and unified distributed system for training ML models over geographical data centers, which offers 20× speedup under identical network conditions.

2018 - 2019

ESync - An efficient DML synchronization algorithm accepted by IEEE TSC
Github: `https://github.com/Lizonghang/ESync`
Description: ESync is an efficient synchronization algorithm designed for distributed ML tasks in heterogeneous clusters, which consists of computing devices with different computing capabilities.

Talk and Teaching

Talk — **Large Model Applications in Industry: Dilemma and Open Source Solutions**
The 8-th China Open Source Conference (COSCon '23), Roundtable Speaker of the Main Forum

Teaching — **ChatGPT and Large Model Training Technologies Behind National Computing Power Networks**
National University AI Education Summit, Invited Lecturer

Professional Services

2024 - Present — Assistant Editor in IEEE Communications Surveys & Tutorials.

Assistant Guest Editor in IEEE Vehicular Technology Magazine.

2023 - Present — Assistant Editor in IEEE Network.

2022 - Present — Assistant Area Editor in IEEE Internet of Things Journal.