

Zonghang Li, PhD

Age: 28

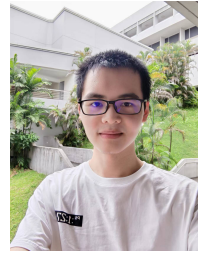
Country: China

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. He is now a postdoc researcher at MBZUAI. 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

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| Jun.2024 - Present | ■ MBZUAI. Postdoc Researcher, advised by Prof. Mohsen Guizani. |
| 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](https://doi.org/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](https://doi.org/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](https://doi.org/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)

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| 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	<div>📖 KlonetAI - An intelligent virtual network management and orchestration agent adopted by Klonet, which was presented on NSDI '24</div> <div>Github: https://github.com/Lizonghang/KlonetAI</div> <div>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.</div>
2022 - Present	<div>📖 NetStorm - To appear on IEEE/ACM TON</div> <div>Github: https://github.com/Lizonghang/netstorm</div> <div>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.</div>
2019 - 2021	<div>📖 NBSync - An asynchronous pipelining scheduler accepted by IEEE TSC</div> <div>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.</div>
2018 - Present	<div>📖 GeoMX - Accepted and adopted by ZTE Co., Ltd.</div> <div>Github: https://github.com/INET-RC/GeoMX</div> <div>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.</div>
2018 - 2019	<div>📖 ESync - An efficient DML synchronization algorithm accepted by IEEE TSC</div> <div>Github: https://github.com/Lizonghang/ESync</div> <div>Description: ESync is an efficient synchronization algorithm designed for distributed ML tasks in heterogeneous clusters, which consists of computing devices with different computing capabilities.</div>

Talk and Teaching

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| 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

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| 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. |