Haizhou Liu (1997.09)

Ph.D. Student, Tsinghua University

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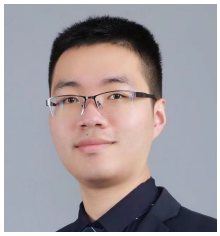

Education

Year	Degree	Institution	Major	Supervisor	GPA
2019 – Now	Ph.D.	Tsinghua University	Data Science and Info Tech*	Xuan Zhang/Hongbin Sun	**3.9/4.0**
2015 – 2019	B.Sc.	Nanjing University	Physics	Lin Zhou/Jia Zhu	**4.7/5.0**

* Expected to be switched to *Electrical Engineering* before graduation.

Overseas Experience

Year	Identity	Institution	Major	Supervisor	GPA
2023 – Now	Visiting Scholar	University of California, Berkeley	Computer Science	Somayeh Sojoudi	—
2019 – 2021	Online Master	University of Michigan, Ann Arbor	Applied Data Science	——	**3.9/4.0**
2017 – 2017	Exchange Student	Duke Universtiy	Physics	Sara Haravifard	**3.9/4.0**

Awards

Awarded during Ph.D. study at Tsinghua University:

- 2022.12 National Scholarship for Graduates.
- 2021.12 Comprehensive Scholarship Award (First Prize, University Level).
- 2020.11 Comprehensive Scholarship Award (First Prize, Department Level).

Awarded during undergraduate study at Nanjing University:

- 2019.08 Outstanding Graduating Student; Outstanding Graduation Thesis.
- 2016.11 National Scholarship for Undergraduates.

Awarded during internship at Huawei Technologies:

- 2019.08 Outstanding Graduating Student; Outstanding Graduation Thesis.

Research Experience

1. Improvements on Federated Learning and Its Application in the Smart Grid **Feb 2021 - Now**

Supervisor: Prof. Xuan Zhang *Tsinghua University*

- Demonstrated the applicability and potentials of *federated learning in Smart City load prediction problems*.
- Proposed *a hybrid federated learning framework based on XGBoost*, in order to incentivize homogeneous and heterogeneous data holders to simultaneously join in the collaborative training.
- Designed *a multi-task federated learning framework for district load forecasting*, with dynamic and simultaneous district dropout mechanisms, respectively.

2. Model-Driven and Data-Driven Scheduling of Integrated Energy Systems **Jul 2019 - Jan 2021**

Supervisor: Prof. Hongbin Sun *Tsinghua University*

- Improved the *heuristic Progressive Hedging algorithm*, in order to accelerate convergence in stochastic electricity-gas coupled scheduling problems.
- Applied *artificial neural networks to achieve fast and accurate economic dispatch* in an electricity-gas coupled system.
- Proposed *a data-driven warm start algorithm for optimal economic dispatch* in integrated energy systems.

3. Solar-Thermal Conversion based on Nanomaterials **Mar 2017 - Jun 2019**

Supervisor: Prof. Lin Zhou/Prof. Jia Zhu *Nanjing University*

- Designed a highly efficient *solar thermal photovoltaic absorber* based on the *Optical TAMM State*.
- Conducted studies and reviews on *nano-scale solar water evaporation*.

Internships

1. Huawei Technologies Ltd. **May 2021 - Sept 2021**

2012 Laboratories –Central Research Institute – Service Lab

- Developed *an XGBoost-based federated learning framework with dynamic task allocation*.
- Construct an XGBoost learning model to *predict the energy consumption patterns of Huawei's 5G base stations*.

Technical Skills

- English skills: CET-6 626, TOEFL 110, GRE 329+3.5. Especially fluent in listening and speaking.
- Programming Languages: Python, MATLAB, C++.
- Coding Expertise: Data Analysis (Pandas, Scikit-learn), Deep Learning (TensorFlow), Git Version Control.

Publications

- 2023.12 S. Tao*, **H. Liu*** et al., "Collaborative retired battery sorting for efficient and profitable recycling via federated machine learning," *Nat. Commun.*, vol. 14, Art. No. 8032 (***Equal Contribution**).
- 2023.04 **H. Liu**, X. Zhang, H. Sun, and M. Shahidehpour, "Boosted multi-task learning for inter-district collaborative load forecasting," Accepted in *IEEE Trans. Smart Grid*.
- 2022.10 **H. Liu**, X. Zhang, X. Shen, H. Sun, and M. Shahidehpour, "A hybrid federated learning framework with dynamic task allocation for multi-party distributed load prediction," *IEEE Trans. Smart Grid*, vol. 14, no. 3, pp. 2460-2472.
- 2022.08 **H. Liu**, X. Zhang, X. Shen, and H. Sun, "Privacy-preserving power consumption prediction based on federated learning with cross-entity data," in *Chinese Control Decis. Conf. (CCDC)*, pp. 181-186.
- 2022.05 Z. Lin*, **H. Liu*** *et al.*, "Tamm plasmon enabled narrowband thermal emitter for solar thermophotovoltaics," *Sol. Energy Mater. Sol. Cells*, vol. 238, Art. No. 111589 (***Equal Contribution**).
- 2021.11 **H. Liu**, L. Yang, X. Shen, Q. Guo, H. Sun, and M. Shahidehpour, "A data-driven warm start approach for convex relaxation in optimal gas flow," *IEEE Trans. Power Syst.*, vol. 36, no. 6, pp. 5948-5951.
- 2021.07 **H. Liu** *et al.*, "Application of modified progressive hedging for stochastic unit commitment in electricity-gas coupled systems," *CSEE J. Power Energy Syst.*, vol. 7, no. 4, pp. 840-849.
- 2020.12 **H. Liu**, X. Shen, Q. Guo, and H. Sun, "A data-driven approach towards fast economic dispatch in electricity-gas coupled systems based on artificial neural network," *Appl. Energy*, vol. 286, Art. No. 116480.
- 2020.07 **H. Liu**, X. Shen, H. Sun, and W. Zhao, "Stochastic day-ahead scheduling of electricity-gas coupled systems via progressive hedging," in *IEEE Ind. Commer. Power Syst. Asia Tech. Conf.*, pp. 64-69.
- 2020.06 W. Zhao, J. Zheng, Z. Han, and **H. Liu**, "Large-disturbance stability analysis method based on mixed potential function for AC/DC hybrid distribution network with PET," *IET Gener. Transm. Distrib.*, vol. 14, no. 18, pp. 3802-3813.
- 2019.09 X. Liu*, **H. Liu***, X. Yu, L. Zhou, and J. Zhu, "Solar thermal utilizations revived by advanced solar evaporation," *Curr. Opin. Chem. Eng.*, vol. 25, pp. 26-34 (***Equal Contribution**).
- 2019.08 Y. Wang, **H. Liu**, and J. Zhu, "Solar thermophotovoltaics: progress, challenges and opportunities," *APL Mater.*, vol. 7, no. 8, Art. No. 080906.
- 2019.07 **H. Liu**, X. Yu, J. Li, N, Xu, L. Zhou, and J. Zhu, "Plasmonic nanostructures for advanced interfacial solar vapor generation," *Sci. Sin.-Phys. Mech. Astron.*, vol. 49, Art. No. 124203.
- 2019.04 J. Liang, **H. Liu**, J. Yu, L. Zhou, and J. Zhu, "Plasmon enhanced solar vapor generation," *Nanophotonics*, vol. 8, no. 5, pp. 771-786.