Yizhou Ding

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IELTS: 7.5 (Listen:8; Reading:7.5; Writing:6.5; Speaking:7.5)

Education

- **Université Paris Sciences & Lettres** — Paris, France
  Master of Energy; GPA: 3.80/4.00; — *Sep. 2021 – Jun. 2024*
- **Huazhong University of Science and Technology (985 Program)** — Wuhan, China
  Master of New Energy Science and Engineering; GPA: 3.80/4.00; — *Sep. 2021 – Jun. 2024*
- **Wuhan University of Technology (211 Program)** — Wuhan, China
  Bachelor of Communication Engineering; GPA: 3.98/5.00; — *Sep. 2017 – Jun. 2021*

Research Interest

† Renewable Energy Forecast; Artificial Intelligence; Semi-supervised Representation Learning for Renewable Energy; Federated Learning-based Power Market Management; Graph Representation Learning; Smart Grid Analysis; Power System Operation;

Publications

1. Li, Y. (Advisor), **Ding, Y.**, Liu, Y., Yang, T., Wang, P., Wang, J., and Yao, W, "Dense skip attention based deep learning for day-ahead electricity price forecasting", in *IEEE Transactions on Power Systems*, 2022, doi: 10.1109/TPWRS.2022.3217579. [PDF]

2. Zhou, Y., Liang, H., Zou, X., **Ding, Y.*** (Corresponding Author), "Topology Identification of Distribution Networks Based on Physics-Informed Latent Graph Attention Network", *2023 3rd International Joint Conference on Energy, Electrical and Power Engineering (COEEPE)*, 2023 (Accepted).

3. Li, Y. (Advisor), Long, X., Li, Y*, **Ding, Y.**, Yang, T., Zeng, Z.,"A Demand-Supply Cooperative Responding Strategy in Power System with High Renewable Energy Penetration", in *IEEE Transactions on Control Systems Technology*, 2023, under review.

4. Li, Y. (Advisor), **Ding, Y**, He, S., Li, Y., Gao, L., Zeng, Z., Chung, C., "Privacy-Preserving Graph Inference Network for Multi-Entity Wind Power Forecast: A Federated Learning Approach", in *IEEE Transactions on Sustainable Energy*, 2023, under review.

5. **Ding, Y.**, Li, Y. (Advisor), "Elicit Compact Representation Learning on Renewable Energy Forecast based on Closed-loop Self-Supervision", 2023, (in. prep).

Research Experience

- **Elicit Compact Representation in Renewable Energy (RE) Forecasting** — Wuhan, China
  Independent research — *Jan. 2023 - Present*
  - **Objectives**: Explored informative representation of stochastic RE generation datasets; Exploited the RE representation to effectively generate multi-horizon forecast both in determinstic and interval way.
  - **Contribution**: Designed a unified representation learning scheme for RE forecasting; Developed a contrastive& contractive encoder to elicit intricate RE characteristics; Proposed a complementary downstream regressor to distill the representation to predictions; Established an effective interval forecast sheme based on the generated representation.

- **Topology Identification for Distribution Network (DN) with PV Integration** Wuhan, China
  Independent research *Jan. 2023 - July. 2023*
  - **Objectives**: Abstracted topological identification into a multi-classification problem; Estimated the topology of the DN precisely with only voltages given in each node; Designed effective method to exploit the physical information underlies the topology of DN.
  - **Contribution**: Constructed concrete graph representation based on real topology of IEEE 33 bus system; Developed a graph-learning framework to identify the topology of DN in different time slot; Combined sub-graphs into a sparsified graph representation to enable multiple mini-batch training scheme.
- **Privacy-Preserving Multi-entity Wind Power Forecast (MWPF)** Wuhan, China
  Advisor: *Prof. Yuanzheng Li* *May. 2022 - Present*
  - **Objectives**: Accomplished multi-entity wind power forecasting without breaching the privacy across clients; Developed a cooperative privacy-preserving MWPF method to solve the data silo dilemma; Elicited *spatial-temporal dependencies* in the wind-related meteorological features to reduce the uncertainties in wind power prediction.
  - **Contribution**: Proposed a collaborative privacy-preserving framework for MWPF based on federated learning; Built a high-capacity graph learning model named Graph Inference Network (GIN) for local model pruning; Created a structure-independent dynamic graph inference block to efficiently elicit the *spatial interdependencies*. Designed a customized federated learning protocal to address the *heterogeneous temporal depedencies*
- **Attention-Based Day-Ahead Electricity Price (DAEP) Prediction** Wuhan, China
  Key Scientific and Technological Research Project of State Grid Corporation; ***Advisor:*** *Prof. Yuanzheng Li* *Jan. 2021 - July. 2022*
  - **Objectives**: Explored the internal *temporal* and *feature-wise variability* of the electricity price in the liberalized power markets; Addressed these two challenges in the DAEP forecasting by developing effective deep learning models.
  - **Contribution**: Designed an end-to-end framework to automatically read the price data files and to predict the DAEP using historical price-related data; Constructed an advanced deep learning block to extract the *temporal variability*; Developed a dense skip attention block which enables the model to automatically distinguish and emphasize the critical features in an effort to deal with *feature-wise variability*.

Project & Teamwork Experience

- **AI-Enabled Computational Methods for Smart Grid Forecast and Dispatch** Wuhan, China
  Participated in Book Manuscript Writting *Aug. 2022 - Oct. 2022*
  - **Objectives**: Reported novel breakthroughs in intelligent decision-making approaches for optimization of smart grid dispatch; Presents recent development of deep learning and machine learning in smart grid forecast problems.
  - **Contribution**: Wrote the Chapter IV and VI in the book titled "*Artificial Intelligence Enabled Computational Methods for Smart Grid Forecast and Dispatch*". [PDF]

- **Distributed Harmonics Monitor & Mitigation in Large-scale Public Buildings** Wuhan, China
  National First Prize (Top 2.2%) Project *Oct. 2019 - Aug. 2020*
  - **Objectives**: Designed a distributed smart harmonics monitor & mitigation system for the electrical system in large-scale public buildings to improve energy efficiency.
  - **Contribution**: Adopted distributed method to replace the centralized harmonic mitigation; Conducted an active power filter sub-system simulation using Simulink; Designed a smart grid harmonic mitigation mechanism based on edge computing; Developed a hardware device based on STM32 and MSP to achieve grid data acquisition, data transmission, and command reception; [Github Link]

Honors & Awards

Interdisciplinary Contest In Modeling (ICM) May. 2023
Honorable Mention (**Global Top 30**%) Team member

Asia and Pacific Mathematical Contest in Modeling (APMCM) Jan. 2023
Third Price in Asia Pacific region Team leader

"Double Carbon" Innovation and Creativity Competition for Postgraduate Jan. 2023
Third Prize in China region Team member

First Class Academic Scholarship for Postgraduate (two times) Nov. 2021 & Nov. 2022
Huazhong University of Science and Technology

Merit Students Sep. 2022
Huazhong University of Science and Technology

Outstanding Graduates Jun. 2021
Wuhan University of Technology

Postgraduate Candidates Exempt from Admission Exam Sep. 2020
Ranked **6/57 (10.5%)** in all exemplary candidates

National University Student Social Practice and Science Contest on ESER Aug. 2020
National First Prize (**Top 2.2%**); **ESER**: Energy Saving and Emission Reduction Team member

National College Student Innovation and Entrepreneurship Training Program Aug. 2020
Completed the national project with excellence Team leader

Third Prize of National Undergraduate FPGA Innovation Design Competition Nov. 2019
Third Prize in China region Team leader

National Undergraduate Electronics Design Contest Aug. 2019
Third Prize in Hubei Province Team leader

Merit Students (two times) Sep. 2018 & Sep. 2019
Wuhan University of Technology

First Class Scholarship for Undergraduate Jun. 2018
Wuhan University of Technology

Extracurricular Experience

- **Point-Corp Future Entrepreneur School** Wuhan, China
  Advisor: *Prof. Yu Liu, CEO of Dian Organization* *Mar. 2023 - Jun. 2023*
- **Global Youth Leadership Academy (GYLA)** Turin, Italy & Wuhan, China
  Advisor: *Dr.Liangrong Zu, Founder of GYLA, Senior Official of United Nations* *Jan. 2021 - Feb. 2021*