Liya MA

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EDUCATION EXPERIENCE

University of California, San Diego California, U.S.A
Visiting scholar of Center for Energy Research *Oct. 2025 – Mar. 2026*
Supervisor: Prof. Jan Kleissl, Director of the Center for Energy Research

Peking University Beijing, China
Graduate Summer School *July. 2025*
Tutorials on Data and Operational Intelligence

University of Macau Macau, China
Ph.D. Candidate, Electrical and Computer Engineering *Aug. 2022 – now*
Supervisor: Prof. Yonghua Song, Fellow of Royal Academy of Engineering (UK), IEEE Fellow

North China Electric Power University Beijing, China
Master in Electrical Engineering *Sep. 2019 – June 2022*
Graduating with honors

North China Electric Power University Beijing, China
Bachelor in Electrical Engineering and its Automation *Sep. 2015 – June 2019*
Graduating with honors (Top 6%)

RESEARCH INTERESTS

Power System Operation: Coordinated model, planning, and operation on power-communication coupling networks, especially focusing on dispatching large-scale flexible resources.
Power System Resilience: Enhancement and implementation strategies from a communications perspective.
Power Internet of Things: Hybrid IoT technologies application in power systems, as well as ICTs.

TEACHING AND PEDAGOGICAL EXPERIENCE

Teaching Assistant, Advanced Mathematics: Assisted with student Q&A, led one tutorial session on midterm exam solutions to the class.
Supervision of Master's theses:
 • Mr. Jiabao Li, Value-Based Data Governance and Security for Demand-Side Flexible Load Resources (graduated).
 • Mr. Yuhao Chen, SDN-Enabled Heterogeneous Communication Services in Distributed Energy Resource Coordinated-Control System (in progress).
Pedagogical training: Completed a teaching assistant training workshop at the University of Macau and gained basic experience using UMMoodle for managing course materials and assignments.

PUBLICATIONS

[1] H. Hui, **L. Ma**, Y. Ding, and Y. Song, *Planning, Operation, and Security of Communication Networks for Regulating Large-scale Flexible Resources in Modern Power Systems.* Springer Nature, 2026.

[2] **L. Ma**, H. Hui, L. Peng, and Y. Song, "Communication Accessibility Oriented Deployment Strategy of Hybrid IoT Terminals for Dispatching Large-scale Flexible Loads in Power Systems," *IEEE Transactions on Smart Grid*, vol. 16, no. 5, pp. 3857–3872, 2025.

[3] **L. Ma**, H. Hui, and Y. Song, "Data Valuation-Aware Coordinated Optimization of Power-Communication Coupled Networks Considering Hybrid Ancillary Services," *IEEE Transactions on Smart Grid*, vol. 16, no. 1, pp. 568–581, 2024.

[4] **L. Ma**, H. Hui, S. Wang, and Y. Song, "Coordinated Optimization of Power-Communication Coupling Networks for Dispatching Large-Scale Flexible Loads to Provide Operating Reserve," *Applied Energy*, vol. 359, p. 122705, 2024.

[5] **L. Ma**, N. Liu, H. Sun, C. Li, and W. Liu, "Bi-Level Frequency Regulation Resource Trading for Electricity Consumers: A Data-Driven Contract Approach," *International Journal of Electrical Power & Energy Systems*, vol. 135, p. 107543, 2022.

[6] J. Shi, **L. Ma**, C. Li, N. Liu, and J. Zhang, "A Comprehensive Review of Standards for Distributed Energy Resource Grid-Integration and Microgrid," *Renewable and Sustainable Energy Reviews*, vol. 170, p. 112957, 2022.

[7] **L. Ma**, H. Hui, and Y. Song, "Incentive Mechanism Design for Electricity Data Trading With Data Valuation-Aware Contract," in *2024 IEEE Power & Energy Society General Meeting (PESGM)*, 2024.

[8] J. Shi, N. Liu, Y. Huang, and **L. Ma**, "An Edge Computing-oriented Net Power Forecasting for PV-assisted Charging Station: Model Complexity and Forecasting Accuracy Trade-off," *Applied Energy*, vol. 310, p. 118456, 2022.

[9] **L. Ma**, W. Liu, H. Sun, N. Liu, and J. Shi, "Contract Theory Based Transaction Strategy for Prosumer to Participate in the Frequency Modulation Ancillary Service Market," *Power System Technology*, vol. 45, no. 4, pp. 1347–1355, 2021.

[10] J. Shi, **L. Ma**, C. Li, N. Liu, and J. Zhang, "Daily Peak Load Forecasting based on Sequential-Parallel Ensemble Learning," *Proceedings of CSEE*, vol. 40, no. 14, pp. 4463–4472, 2020.

[11] C. Li, J. Shi, N. Liu, **L. Ma**, and C. Li, "Analysis Model of Power User Group Evolution Based on Complex Network," *Proceedings of CSEE*, vol. 42, no. 16, p. 13, 2022.

PROJECT EXPERIENCE

Data Valuation and Secure High-efficiency Communication for the Regulation of Large-scale Flexible Resources in Digital Power Systems (2024 − 2026)

Supported by Natural Science Foundation of Guangdong Province of China, Major Research investigator.
Contributions: Unlock diverse flexible resource data value into 3 aspects with lifecycle governance and granular security to enable efficient transmission and enhanced large-scale control.

Regulation Technologies of Flexible Resources in Power-Communication Deep Coupling Network (2023 − 2026)

Supported by Science and Technology Development Fund, Macao, China, Major Research investigator.
Contributions: Design 3 types of IoT terminal deployments for power data communication demands and propose power-communication co-optimization considering spatiotemporal diversity, decreasing around 7% operational costs for power systems within large-scale flexible loads.

Dual Carbon Target based Urban Grids: IoT-Enabled Flexibility Evaluation and Dynamic Coordination Mechanisms (2022 − 2024)

Supported by China Southern Power Grid, Research investigator.
Contributions: Develop an information interaction architecture and extended model to enable real-time monitoring and control of urban grid flexible resources.

The Key Technologies Research for the Intelligent Joint Centralized Control and Operation of Grid-friendly Wind/PV/Storage Hybrid Power Station Group (2021 − 2023)

Supported by China Three Gorges Corporation, Research investigator.
Contributions: Establish a coordinated active power dispatch model for wind-solar-storage clusters with multi-timescale scheduling and SOC-response analysis.

Research on the Applicability and Business Model of Integrated Energy Technology in Park Based on Dynamic Portrait Analysis (2019 – 2020)

Supported by State Grid Corporation of China, Research investigator.
Contributions: Developed a multidimensional user profiling system for parks, enabling dynamic assessment of energy demand and responsiveness with temporal and event triggers.

JOURNAL REVIEWER

IEEE Transactions on Smart Grid	IEEE Transactions on Sustainable Energy
Journal of Modern Power Systems and Clean Energy	IEEE Transactions on Industry Applications
Protection and Control of Modern Power Systems	

HONORS & AWARDS

- The Guangdong-Hong Kong-Macao Greater Bay Area (University of Macau) Taihu Scholarship, 2024.
- Excellent Postgraduate Student Award from North China Electric Power University, 2020.
- Interdisciplinary Contest in Modeling Honorable Mention, MCM/ICM, the Consortium for Mathematics and Its Applications (COMAP), 2017.
- National Third Prize in China, Enactus Competition, Enactus Worldwide, 2017.
- Second Prize in Beijing Division, Contemporary Undergraduate Mathematical Contest in Modeling, China Society for Industrial and Applied Mathematics and Beijing Municipal Education Commission, 2017.
- Excellent Student Awards from North China Electric Power University, 2016 – 2019.

WORK EXPERIENCE

IEEE Student Branch Industrial Application Society Chapter, Macao   *May. 2024 – Dec. 2024*
Co-chair of the 2024 IEEE 7th Student Conference on Electric Machines and Systems.
Contributions: Expanding the influence of University of Macau IEEE Student Branch Industrial Application Society Chapter and enhancing the impact of the internation forum by warmly inviting students, youth researchers, scientists, and engineers.

Siemens Ltd., China, Beijing   *Nov. 2018 – Apr. 2019*
Product intern in Digital Factory.
Contributions: Apply and maintain the product material information in SAP system, ensuring 100% accuracy and supporting seamless operational workflows. Assist in preparing the monthly commercial report, contributing to data-driven decision-making for the manager and team members.