




Ning Qi, Ph.D.

🏠 Mudd Building, 500 West 120th Street, New York, NY 10027  Ning Qi
✉️ nq2716@columbia.edu 📞 (332)-261-9737 🌐 <https://bolunxu.github.io/group/>








Positions

- 2024.03 – Present  **Postdoctoral Research Scientist**
Department of Earth and Environmental Engineering, **Columbia University**
Program: Grid Integration and Market Design of Energy Storage (Mentor: Prof. Bolun Xu)
- 2023.07 – 2024.02  **Postdoctoral Fellow**
Department of Electrical Engineering, **Tsinghua University**
Program: Long-term Risk Management for Renewables-Dominated Energy Systems with Generic Energy Storage (Mentor: Prof. Feng Liu)
- 2021.11 – 2022.11  **Visiting Scholar**
Department of Management, **Technical University of Denmark**
Program: Generic Energy Storage Optimization under Decision-Dependent Uncertainties (Mentor: Prof. Pierre Pinson & Prof. Mads. R. Almassalkhi)


Education

- 2018.09 – 2023.06  **Ph.D. in Electrical Engineering, Tsinghua University**
GPA: 3.85/4.0 (93.2/100), Top 20%
Thesis Title: *Risk Management and Optimal Allocation of Power Distribution System under Decision-Dependent Uncertainties*. (Mentor: Prof. Lin Cheng)
- 2014.09 – 2018.07  **B.S. in Electrical Engineering, Tianjin University**
GPA: 3.83/4.0 (92.6/100), Top 3%
Thesis Title: *Active Distribution System Planning Considering Optimal Operation of Flexible Resources*. (Mentor: Prof. Yanxia Zhang)

Service

- 2024 – 2025  **Guest Editor**, Frontier in Energy Research–Special Issue: Advancing Demand Response in Renewable Smart Grid for a Sustainable Future.
 **Guest Editor**, Processes–Special Issue: Recent Technologies on CO₂ Capture and (Photo) Electrochemical Utilization.
- 2024 – Present  **Youth Editorial Board Member**, Power System Protection and Control(Chinese).
- 2023 – Present  **Editorial Board Member**, American Journal of Modern Energy.
 **Book Reviewer**, Theory and Applications of Engineering Research.
- 2019 – 2021  **University Contact**, Automation of Electric Power Systems(Chinese).
- 2019 – Present  **Paper Reviewer**, IEEE Transactions on Power Systems, IEEE Transactions on Smart Grid, IEEE Transactions on Industrial Application, Applied Energy, Energy Reports, Journal of Energy Storage, International Journal of Electrical Power and Energy Systems, IET Renewable Power Generation, IET Smart Grid, IEEE PES General Meeting, Journal of Modern Power Systems and Clean Energy, Protection and Control of Modern Power Systems, Frontiers in Energy Research.

Service (continued)

2017 – Present  **Membership**, IEEE Member, IEEE PES Member, IEEE Young Professionals, IEEE PES SBLC Technical Committee Member, IEEE P762 Working Group Member, IEEE P3434 Working Group Member, IET Member, CSEE Member.

Publications

Journal Articles

- 1 K. Kang, Y. Su, P. Yang, Z. Wang, Y. Zhang, **N. Qi**, and F. Liu, “Understanding cross-market strategic behaviors of prosumers: An equilibrium-driven evolutionary game approach,” *Applied Energy (under review)*, 2024.
- 2 **N. Qi**, K. Huang, Z. Fan, and B. Xu, “Long-term energy management for microgrid with hybrid hydrogen-battery energy storage: A prediction-free coordinated optimization framework,” *Applied Energy (under review)*, 2024.
- 3 **N. Qi**, A. Hussain, A. Mujeeb, Z. Javid, S. Zeb, and S. Wu, “Mitigation of overvoltage in lvdC distribution system with constant power load using generic energy storage system,” *Journal of Energy Storage*, vol. 95, no. 1, p. 112 554, 2024.
- 4 **N. Qi**, P. Pinson, M. R. Almassalkhi, Y. Zhuang, Y. Su, and F. Liu, “Capacity credit evaluation of generalized energy storage considering endogenous uncertainty,” *IEEE Transactions on Power Systems (under review)*, 2024.
- 5 **N. Qi**, N. Zheng, and B. Xu, “Chance-constrained energy storage pricing for social welfare maximization,” *IEEE Transactions on Energy Markets, Policy and Regulation (under review)*, 2024.
- 6 Y. Su, P. Yang, K. Kang, Z. Wang, **N. Qi**, T. Liu, and F. Liu, “Sharing energy in wide area: A two-layer energy sharing scheme for massive prosumers,” *Applied Energy (under review)*, 2024.
- 7 Y. Zhuang, L. Cheng, **N. Qi**, M. R. Almassalkhi, and F. Liu, “Problem-driven scenario reduction framework for power system stochastic operation,” *IEEE Transactions on Power Systems (under review)*, 2024.
- 8 **N. Qi**, L. Cheng, H. Li, Y. Zhao, and H. Tian, “Portfolio optimization of generic energy storage-based virtual power plant under decision-dependent uncertainties,” *Journal of Energy Storage*, vol. 63, p. 107 000, 2023.
- 9 **N. Qi**, L. Cheng, and F. Liu, “Capacity credit evaluation of generic energy storage under decision-dependent uncertainty,” *Power Grid Technology(Chinese)*, vol. 47, no. 12, pp. 4916–4925, 2023.
- 10 **N. Qi**, P. Li, L. Cheng, Z. Zhang, W. Huang, and W. Yang, “Methodology for capacity credit evaluation of physical and virtual energy storage in decarbonized power system,” *arXiv preprint arXiv:2303.09560*, 2023.
- 11 **N. Qi**, P. Pinson, M. R. Almassalkhi, L. Cheng, and Y. Zhuang, “Chance-constrained generic energy storage operations under decision-dependent uncertainty,” *IEEE Transactions on Sustainable Energy*, vol. 14, no. 4, pp. 2234–2248, 2023.
- 12 Y. Zhuang, L. Cheng, **N. Qi**, W. Chen, X. Wu, and Z. Yao, “Typical scenario generation algorithm for microgrid based on deep temporal clustering,” *Automation of Electric Power Systems(Chinese)*, vol. 47, no. 20, pp. 95–103, 2023.
- 13 L. Cheng, Y. Wan, **N. Qi**, and Y. Zhou, “Coordinated operation strategy of distribution network with the multi-station integrated system considering the risk of controllable resources,” *International Journal of Electrical Power & Energy Systems*, vol. 137, p. 107 793, 2022.

- 14 S. Ma, T. Xiang, K. Hou, Z. Liu, P. Tang, and N. Qi, "Spatial-temporal optimal dispatch of mobile energy storage for emergency power supply," *Energy Reports*, vol. 8, pp. 322–329, 2022.
- 15 N. Qi, L. Cheng, Y. Zhuang, Y. Zhou, Y. Zhang, and C. Zhu, "Reliability assessment and improvement of distribution system with virtual energy storage under exogenous and endogenous uncertainty," *Journal of Energy Storage*, vol. 56, p. 105 993, 2022.
- 16 Q. Yun, L. Tian, N. Qi, F. Zhang, and L. Cheng, "Optimization method of resource combination for virtual power plant based on modern portfolio theory," *Automation of Electric Power Systems(Chinese)*, vol. 46, no. 01, pp. 146–154, 2022.
- 17 L. Cheng, Y. Wan, N. Qi, and L. Tian, "Review and prospect of research on operation reliability of power distribution and consumption system considering various distributed energy resources," *Automation of Electric Power Systems(Chinese)*, vol. 45, no. 22, pp. 191–207, 2021.
- 18 N. Qi, L. Cheng, L. Tian, J. Guo, R. Huang, and C. Wang, "Review and prospect of distribution network planning research considering access of flexible load," *Automation of Electric Power Systems(Chinese)*, vol. 44, no. 10, pp. 193–207, 2020.
- 19 N. Qi, L. Cheng, H. Xu, Z. Wang, and X. Zhou, "Practical demand response potential evaluation of air-conditioning loads for aggregated customers," *Energy Reports*, vol. 6, pp. 71–81, 2020.
- 20 N. Qi, L. Cheng, H. Xu, K. Wu, X. Li, Y. Wang, and R. Liu, "Smart meter data-driven evaluation of operational demand response potential of residential air conditioning loads," *Applied Energy*, vol. 279, p. 115 708, 2020.
- 21 H. Xu, L. Cheng, N. Qi, and X. Zhou, "Peak shaving potential analysis of distributed load virtual power plants," *Energy Reports*, vol. 6, pp. 515–525, 2020.
- 22 L. Cheng, N. Qi, and L. Tian, "Joint planning of generalized energy storage resource and distributed generator considering operation control strategy," *Automation of Electric Power Systems(Chinese)*, no. 10, pp. 27–40, 2019.
- 23 B. Yuan, L. Cheng, L. Chen, N. Qi, L. Qin, and Y. Wang, "Evaluation method for power grid vulnerability considering operation reliability of components," *Proceedings of the CSU-EPSA(Chinese)*, vol. 8, 2019.
- 24 N. Qi, Z. Xu, and Q. Zhang, "The application of integral transform method to solve the boundary value problem of electrostatic field," *Journal of EEE(Chinese)*, vol. 39, no. 2, pp. 79–82, 2017.

Conference Papers

- 1 K. Huang, L. Cheng, N. Qi, Q. Ji, and W. G. David, "Security-aware coordinated dispatch of microgrid: An adaptive online optimization approach," in *2024 IEEE Power & Energy Society General Meeting (PESGM)*, IEEE, 2024, pp. 1–5.
- 2 K. Kang, Y. Su, N. Qi, T. Liu, and F. Liu, "Enforcing nonanticipativity via controlled evolution: A two-layer framework for chance-constrained dispatch of power systems with high-share renewable generation," in *2024 IEEE Power & Energy Society General Meeting (PESGM)*, IEEE, 2024, pp. 1–5.
- 3 A. Mujeeb, Z. Hu, R. Diao, N. Qi, and Z. Bao, "Ramp-reference track algorithm for the provision of agc dispatch through vpp in frequency regulation market," in *2024 IEEE Power & Energy Society General Meeting (PESGM)*, IEEE, 2024, pp. 1–5.
- 4 N. Qi, L. Cheng, K. Huang, A. Mujeeb, F. Liu, and P. Pinson, "Reliability-aware probabilistic reserve procurement under decision-dependent uncertainty," in *2024 IEEE Power & Energy Society General Meeting (PESGM)*, IEEE, 2024, pp. 1–5.
- 5 K. Huang, L. Cheng, N. Qi, H. Xu, and E. Zhao, "An online convex optimization method for optimal dispatch of microgrid," in *2023 IEEE International Conference on Energy Technologies for Future Grids (ETFG)*, IEEE, 2023, pp. 1–6.

- 6 N. Qi, L. Cheng, H. Li, Y. Zhuang, L. Hao, and F. Liu, "Capacity credit evaluation of generic energy storage under decision-dependent uncertainty," in *2023 IEEE PES Innovative Smart Grid Technologies Europe (ISGT EUROPE)*, IEEE, 2023, pp. 1–5.
- 7 Y. Zhuang, L. Cheng, N. Qi, H. Li, Z. Li, and C. Wang, "Optimal energy management for multi-microgrid system based on stackelberg game," in *2023 IEEE PES Innovative Smart Grid Technologies Europe (ISGT EUROPE)*, IEEE, 2023, pp. 1–5.
- 8 N. Qi, L. Cheng, Y. Wan, Y. Zhuang, and Z. Liu, "Risk assessment with generic energy storage under exogenous and endogenous uncertainty," in *2022 IEEE Power & Energy Society General Meeting (PESGM)*, IEEE, 2022, pp. 1–5.
- 9 Y. Wan, L. Cheng, H. Xu, N. Qi, and L. Tian, "Photovoltaic generation scenario analysis considering irradiation uncertainty and output derating probability," in *2021 IEEE 5th Conference on Energy Internet and Energy System Integration (EI2)*, IEEE, 2021, pp. 997–1003.
- 10 N. Qi, L. Cheng, F. Liu, X. Zhou, and F. You, "Optimal mechanism design for incentive-based demand response based on stackelberg game," in *2020 IEEE Sustainable Power and Energy Conference (iSPEC)*, IEEE, 2020, pp. 2089–2096.
- 11 X. Zhou, L. Cheng, Y. Wan, N. Qi, L. Tian, and F. You, "Research on lithium-ion battery safety risk assessment based on measured information," in *2020 IEEE Sustainable Power and Energy Conference (iSPEC)*, IEEE, 2020, pp. 2047–2052.
- 12 L. Cheng, N. Qi, Y. Guo, N. Liu, and W. Wei, "Potential evaluation of distributed energy resources with affine arithmetic," in *2019 IEEE Innovative Smart Grid Technologies-Asia (ISGT Asia)*, IEEE, 2019, pp. 4334–4339.
- 13 N. Qi, L. Cheng, Y. Jiang, J. Luo, K. Sun, D. Wang, L. Cheng, and Q. Wang, "Reliability assessment of generation and transmission systems considering multi-form access of" source-network-load-storage," in *2019 IEEE Sustainable Power and Energy Conference (iSPEC)*, IEEE, 2019, pp. 213–218.
- 14 N. Qi, L. Cheng, Y. Jiang, J. Luo, K. Sun, D. Wang, W. Wang, and W. Sun, "Vulnerability assessment based on operational reliability weighted and preventive planning," in *2019 IEEE Sustainable Power and Energy Conference (iSPEC)*, IEEE, 2019, pp. 1749–1754.
- 15 L. Cheng, N. Qi, L. Tian, R. Li, and S. Sun, "Exploration on the value innovation of energy internet demonstration park," in *2018 2nd IEEE Conference on Energy Internet and Energy System Integration (EI2)*, IEEE, 2018, pp. 1–6.
- 16 L. Cheng, N. Qi, L. Wei, S. Xu, and Q. Liu, "Power and energy balance of active distribution network considering operation-control strategy," in *2018 2nd IEEE Conference on Energy Internet and Energy System Integration (EI2)*, IEEE, 2018, pp. 1–5.
- 17 L. Cheng, X. Wang, N. Qi, L. Tian, and H. Liu, "Joint planning of distribution networks with demand side response and distributed generation considering operation-control strategy," in *2018 International Conference on Power System Technology (POWERCON)*, IEEE, 2018, pp. 1638–1645.
- 18 H. Kong, Y. Luo, X. Huang, L. Cheng, L. Tian, and N. Qi, "Operation strategy selection of a district multi-energy system based on environmental impact," in *2018 2nd IEEE Conference on Energy Internet and Energy System Integration (EI2)*, IEEE, 2018, pp. 1–5.
- 19 W. Yang, L. Cheng, N. Qi, Y. Liu, and X. Wang, "Review on distribution network planning methods considering large-scale access of flexible load," in *2018 2nd IEEE Conference on Energy Internet and Energy System Integration (EI2)*, IEEE, 2018, pp. 1–6.
- 20 L. Cheng, N. Qi, F. Zhang, H. Kong, and X. Huang, "Energy internet: Concept and practice exploration," in *2017 IEEE conference on energy internet and energy system integration (EI2)*, IEEE, 2017, pp. 1–5.

Patents

- 1 F. Liu, K. Kang, Y. Su, Y. Zhang, and N. Qi, "Dispatch method, apparatus, and electronic device for power system," Patent Number: CN117154839A, 2023.
- 2 F. Liu, K. Kang, Y. Su, Y. Zhang, and N. Qi, "Method and components for unit combination in power systems," Patent Number: CN117154841A, 2023.
- 3 X. Song, L. Han, L. Cheng, Y. Cai, Z. Xiao, J. Zhang, S. Gu, D. Yang, M. Liu, Y. Jiang, J. Li, T. Xia, C. Wu, W. Liu, T. Feng, P. Yan, X. Zhang, and N. Qi, "Integrated isolation circuit breaker and its reliability optimization method," Patent Number: CN109521309B, 2023.
- 4 Y. Zhang, L. Cheng, C. Zhu, K. Suo, K. Zhang, N. Qi, and Y. Liu, "Method and system for assessment and enhancement of state-of-health throughout the lifecycle of energy storage," Patent Number: CN115663936A, 2023.
- 5 Y. Zhang, L. Cheng, C. Zhu, K. Suo, K. Zhang, N. Qi, and Y. Liu, "Method, system, and device for hybrid energy storage scheduling with retired batteries in wind farms," Patent Number: CN115879596A, 2023.
- 6 L. Cheng, L. Tian, N. Qi, K. Wu, X. Li, Y. Wang, and R. Liu, "Multi-level optimization method for integrated energy systems considering carbon emissions," Patent Number: CN112116131B, 2022.
- 7 L. Cheng, X. Tian, N. Qi, F. Peng, Y. Jiang, X. Gao, Z. Wang, J. Zhang, and Y. Zhang, "Reliability assessment method and system for transmission system with wind-solar-energy storage," Patent Number: CN110661250B, 2022.
- 8 E. Lin, L. Cheng, Y. Li, K. Suo, Y. Zhou, and N. Qi, "Method and device for price adjustment of battery energy storage systems," Patent Number: CN115063185A, 2022.
- 9 Y. Liu, L. Cheng, H. Li, H. Tian, Z. Zhou, N. Qi, T. Zhang, M. Qi, L. Tian, Y. Li, L. Chen, S. Bai, and Y. Li, "Method, system, electronic device, and storage medium for risk perception in distribution networks," Patent Number: CN114282762A, 2022.
- 10 Y. Zhang, L. Cheng, C. Zhu, Y. Zhuang, L. Zhao, N. Qi, Y. Liu, Y. Wan, and S. Xiao, "Method, medium, and system for photovoltaic power probability prediction," Patent Number: CN109685379B, 2022.
- 11 L. Cheng, X. Gao, Y. Wan, X. Tian, Y. Jiang, Z. Wang, N. Qi, F. Peng, and Y. Zhang, "Method and evaluation device for reliability assessment of air conditioning load supply," Patent Number: CN110223005B, 2021.
- 12 L. Cheng, L. Tian, Y. Jiang, Y. Wan, N. Qi, Q. Huang, X. Yuan, and C. Zhang, "Optimization method for hybrid ac/dc power systems," Patent Number: CN110086195B, 2021.
- 13 L. Cheng, Y. Wan, Y. Shen, H. Xu, N. Qi, and L. Tian, "Method and apparatus for photovoltaic output scenario generation based on catboost algorithm," Patent Number: CN113283492B, 2021.
- 14 F. Liu, K. Kang, Y. Zhang, Y. Su, and N. Qi, "Bi-level robust unit combination method and components for power systems," Patent Number: CN113283492A, 2021.
- 15 Y. Liu, L. Cheng, H. Li, H. Tian, Z. Zhou, N. Qi, T. Zhang, M. Qi, L. Tian, Y. Li, L. Chen, S. Bai, and Y. Li, "Method, system, device, and storage medium for source-load characteristics prediction in pv-storage microgrid systems," Patent Number: CN113837485B, 2021.
- 16 L. Cheng, J. Luo, M. Liu, K. Sun, D. Wang, N. Qi, S. Xin, X. Han, L. Cheng, W. Wang, Z. Xie, and W. Sun, "Method for power grid vulnerability assessment considering operational reliability," Patent Number: CN111160675A, 2020.
- 17 L. Cheng, L. Tian, Y. Jiang, Y. Wan, N. Qi, Q. Huang, X. Yuan, and C. Zhang, "Decoupling method for power flow determination in hybrid ac/dc distribution grid," Patent Number: CN109861233B, 2020.
- 18 L. Cheng, L. Tian, X. Yuan, X. Ge, Q. Li, N. Qi, and Y. Wan, "Power supply partition method, system, device, and medium for ac/dc equipment," Patent Number: CN109685379B, 2020.

- 19 K. Sun, L. Cheng, D. Wang, J. Luo, **N. Qi**, X. Zhang, Z. Liu, X. Han, and X. Zhang, “Method for vulnerability assessment of large power grids based on power flow betweenness centrality,” Patent Number: CN111160716A, 2020.
- 20 H. Zhan, M. Li, Z. Lai, Y. Cao, H. Jia, Z. Xu, C. Xu, Z. Wang, and **N. Qi**, “Device for cleaning photovoltaic array and automatic positioning cleaning robot for photovoltaic arrays,” Patent Number: CN209982425U, 2020.
- 21 L. Cheng, L. Tian, C. Shi, Y. Wan, **N. Qi**, S. Sun, Y. Cheng, and D. Wei, “Method and device for energy efficiency evaluation of integrated energy systems,” Patent Number: CN110147568A8, 2019.
- 22 X. Song, L. Han, L. Cheng, Y. Cai, Z. Xiao, J. Zhang, S. Gu, D. Yang, M. Liu, Y. Jiang, J. Li, T. Xia, C. Wu, W. Liu, T. Feng, P. Yan, X. Zhang, and **N. Qi**, “Integrated isolation circuit breaker,” Patent Number: CN209169078U, 2019.
- 23 X. Song, L. Han, L. Cheng, Z. Xiao, Y. Cai, S. Gu, J. Zhan, M. Liu, D. Yang, J. Li, T. Xia, Y. Jiang, C. Wu, W. Liu, R. Zhang, H. Shen, and **N. Qi**, “Reliability assessment and optimization method for novel power equipment connection to the grid and system,” Patent Number: CN209169078U, 2019.
- 24 W. Yang, Z. Wu, L. Cheng, Y. Liu, X. Wang, Y. Wang, S. Jiang, L. Tian, **N. Qi**, Z. Leng, L. Zhang, and H. Huang, “Method and system for site selection of grid-connected thermal storage boilers,” Patent Number: CN109255558B, 2019.
- 25 H. Zhan, M. Li, Z. Lai, Y. Cao, H. Jia, Z. Xu, C. Xu, Z. Wang, and **N. Qi**, “Cleaning device for photovoltaic array and automatic positioning cleaning robot,” Patent Number: CN109981043A, 2019.

Fundings

- 2023.07 – Present ■ **Grant Recipient**, China Postdoctoral Science Foundation Special Funded Project (2023TQ0169): Research on Trusted Response of Virtual Power Plant with Scalable Flexible Resources (¥180,000).
- 2022.01 – 2024.12 ■ **Participant**, National Key Research and Development Program (2021YFB2400700): Grid Proactive Supporting Capability Assessment of Energy Storage Clustering (¥3,500,000).
- 2021.07 – 2024.06 ■ **Participant**, Government-to-Government International Science and Technology Innovation Cooperation Project under the National Key Research and Development Program (2021YFE0191000): Artificial Intelligence Assessment and Optimization of Operation Reliability in High-Proportion Renewable Energy Power Systems (¥11,170,000).
- 2021.01 – 2025.12 ■ **Participant**, Key Program of National Nature Science Foundation of China (52037006): Research on Operational Reliability Evaluation and Improvement Technology of Large-scale Battery Energy Storage System (¥3,000,000).
- 2020.09 – 2023.02 ■ **Student Leader**, Science and Technology Major Project of Inner Mongolia Autonomous Region of China (2020ZD0018): Key Technology of Large-scale Application of Cascading Utilization of Power Batteries (¥3,008,400).
- 2020.09 – 2021.09 ■ **Major Participant**, Huawei Technologies Co., Ltd. Technology Collaboration Project: AI-based PV-Storage (¥2,987,000).
- 2020.01 – 2023.12 ■ **Participant**, National Natural Science Foundation of China (Joint Research Fund in Smart Grid under cooperative agreement between NSFC and State Grid Corporation of China): Supply-Demand Balance Mechanism and Methodologies Enabling Renewable Energy Dominated Power Systems (¥3,400,000).
- 2019.12 – 2021.05 ■ **Participant**, Science and Technology Project of State Grid Corporation of China North China Branch: Key Influencing Factors Research on Load Characteristics in North China Region (¥1,500,000).

Fundings (continued)

- 2019.01 – 2021.12 **Major Participant**, Science and Technology Project of State Grid Corporation of China: Research and Demonstration Application of Multi-agent and Multi-energy Virtual Power Plant under the Energy Internet Environment (¥3,000,000).
- 2018.01 – 2022.12 **Major Participant**, National Nature Science Foundation of China (51777105). Research on Distribution System Planning Based on Data Mining, Risk Hedging and Economic Incentives (¥602,000).
- 2018.01 – 2019.12 **Major Participant**, Science and Technology Project of State Grid Corporation of China: Coordinated Development Mode of Generation-Network-Load-Storage and Reliability Assessment of Power Systems Considering Inherent Safety Requirements (¥1,000,000).
- Major Participant**, Science and Technology Project of State Grid Corporation of China: Research on Topological Structure Characteristics Analysis and Preventive Planning Technology for Bulk Power Grids (¥1,000,000).
- 2016.05 – 2017.05 **Grant Recipient**, National-level College Student Innovation and Entrepreneurship Project: Energy Dispatching System of Buildings Considering Architectural Thermal Inertia (¥10,000).
- Major Participant**, Provincial-level College Student Innovation and Entrepreneurship Project: Development of an Independent Energy Simulator based on FPGA (¥5,000).
- 2015.05 – 2016.05 **Major Participant**, National-level College Student Innovation and Entrepreneurship Project: Intelligent Cleaning Robot for Photovoltaic Cells (¥10,000).

Awards and Honors

Honors

- 2024 **2024 IEEE PES General Meeting Best Paper**: “Reliability-Aware Probabilistic Reserve Procurement under Decision-Dependent Uncertainty”, Awarded by IEEE PES.
- 2023 **High PCSI Paper, Highly Cited Paper**: “Optimization Method of Resource Combination for Virtual Power Plant Based on Modern Portfolio Theory”, Awarded by China Research Center for Science Evaluation and Bibliometrics.
- Outstanding Reviewer**, Awarded by Renewable Energy(Chinese).
- High PCSI Paper, Highly Cited Paper, Highly Downloaded Paper**: “Joint Planning of Generalized Energy Storage Resource and Distributed Generator Considering Operation Control Strategy”, Awarded by China Research Center for Science Evaluation and Bibliometrics.
- Outstanding Individual Contributor Award** for Science and Technology Major Project of Inner Mongolia Autonomous Region of China, Awarded by China Huadian Inner Mongolia Energy Co., Ltd.
- 2021 **Third Prize for Outstanding Paper**: “Review and prospect of distribution network planning research considering access of flexible load”, Awarded by Automation of Electric Power Systems(Chinese).
- Grade A Youth League Branchr**, Awarded by Tsinghua University.
- 2020 **Outstanding Reviewer**, Awarded by Renewable Energy(Chinese).
- 2018 **Silver Award of the “12.9” Mass Chorus**, Awarded by Tsinghua University.
- Outstanding Undergraduate Graduate of Tianjin University**, Awarded by Tianjin University.

Awards and Honors (continued)

- 2017  **Outstanding Paper Award:** “Joint Optimal Planning and Operation of Active Distribution System with Generic Energy Storage Resources and Distributed Generations”, Awarded by Power System Automation Committee of Chinese Society for Electrical Engineering (CSEE).
- 2017  **16th Student Science Award (TOP 10)**, Awarded by Tianjin University.
- 2017  **Tianjin University Outstanding Student**, Awarded by Tianjin University.
- 2017  **Advanced Individual in Technological Innovation, Outstanding Learning Excellence and Continuous Self-Improvement**, Awarded by Tianjin University.
- 2017  **Merit Student**, Awarded by Tianjin University.
- 2016  **Founders and Vice President of the Beiyang Mathematical Research Society**, Awarded by Tianjin University.
- 2016  **Advanced Individual in Technological Innovation, Outstanding Learning Excellence and Continuous Self-Improvement**, Awarded by Tianjin University.
- 2016  **Merit Student**, Awarded by Tianjin University.
- 2015  **Advanced Individual in Technological Innovation, Outstanding Learning Excellence and Continuous Self-Improvement**, Awarded by Tianjin University.
- 2015  **Merit Student**, Awarded by Tianjin University.

Scientific Competition Awards

- 2017  **Meritorious Winner of the Mathematical Contest in Modeling (MCM) (Top 5%)**, Awarded by Consortium for Mathematics and Its Applications (COMAP).
- 2017  **Special Prize of the Undergraduate Physics Tournament**, Awarded by Tianjin University.
- 2017  **Special Prize of the “Challenge Cup” National College Student Extracurricular Academic Science and Technology Works Competition (Top 1)**, Awarded by Tianjin Government.
- 2017  **Third Prize of the “Challenge Cup” National College Student Extracurricular Academic Science and Technology Works Competition**, Awarded by National Government.
- 2017  **Third Prize of the National Undergraduate Electronics Design Contest**, Awarded by Ministry of Education and Industry and Information Technology of People’s Republic of China.
- 2017  **First Prize of the “Challenge Cup” National College Student Extracurricular Academic Science and Technology Works Competition**, Awarded by Tianjin University.
- 2016  **Special Prize of the Undergraduate Physics Tournament**, Awarded by Tianjin University.
- 2016  **First Prize of the National College Student Mathematics Competition Final (Top 20)**, Awarded by Popularization Work Committee of the Chinese Mathematical Society.
- 2016  **First Prize of the Tianjin Physics Competition (TOP5)**, Awarded by Tianjin Municipal Education Commission.
- 2016  **Honorable Winner of the Mathematical Contest in Modeling (MCM)**, Awarded by Consortium for Mathematics and Its Applications (COMAP).
- 2016  **Second Prize of China Undergraduate Mathematical Contest in Modeling (CUMCM)**, Awarded by Organizing Committee of China Undergraduate Mathematical Contest in Modeling.
- 2016  **Second Prize and Best Presentation Prize of the China Undergraduate Physics Tournament**, Awarded by Organizing Committee of the China Undergraduate Physics Tournament.
- 2016  **Third Prize of the Electrical Engineering Cup Mathematical Modeling Competition**, Awarded by Chinese Society for Electrical Engineering (CSEE).
- 2015  **First Prize of the National College Student Mathematics Competition (Top 5)**, Awarded by Popularization Work Committee of the Chinese Mathematical Society.

Awards and Honors (continued)

- **Special Prize of Tianjin Mathematics Competition (Top 10)**, Awarded by Tianjin Municipal Education Commission.

Scholarship

- 2021 ■ **Tsinghua University Sifang Scholarship (¥5,000)**, Awarded by Tsinghua University.
- 2020 ■ **Tsinghua University Comprehensive Second-Class (Xiaomi) Scholarship (¥5,000)**, Awarded by Tsinghua University.
- 2017 ■ **Baosteel Education Fund Outstanding Student Scholarship (¥10,000)**, Awarded by Baosteel Education Foundation.
- 2016 ■ **Special Prize of China Instrument & Control Society Scholarship (¥20,000)**, Awarded by China Instrument & Control Society.
- **National Scholarship (¥8,000)**, Awarded by Ministry of Education of the People's Republic of China.
- 2015 ■ **Merit Student Scholarship (¥5,000)**, Awarded by Tianjin University.

Teaching and Supervision

- 2022 – 2023 ■ **Undergraduate Assistant Supervisor** of Kaidi Huang, Thesis Title: Economic Dispatch of Microgrid based on Online Convex Optimization.
- 2021 – 2022 ■ **Undergraduate Assistant Supervisor** of Yingrui Zhuang, Thesis Title: Economic Dispatch of PV-ESS Microgrid based on Reinforcement Learning.
- 2020 – 2021 ■ **Postgraduate Assistant Supervisor** of Qiuchen Yun, Thesis Title: Modern Portfolio Optimization in Virtual Power Plant.
- 2019 – 2020 ■ **Undergraduate Assistant Supervisor** of Jingxuan Huo, Thesis Title: Planning of North China State Grid based on Big-data.
- **Undergraduate Assistant Supervisor** of Helin Xu, Thesis Title: Data-driven Demand Response Regulation Potential of Air-conditioning Loads.
- 2019 – 2022 ■ **Teaching Assistant** of Optimization Theory and Method (Doctor-level Course), Tsinghua University.
- **Teaching Assistant** of Power System Reliability Evaluation Theory (Undergraduate-level Course), Tsinghua University.
- 2019 – 2021 ■ **Teaching Assistant** of State-of-the-art Technology in Electrical Engineering (Doctor-level Course), Tsinghua University.
- 2019 – 2020 ■ **Teaching Assistant** of China-German Advanced Manufacturing Class (Doctor-level Course), Tsinghua University.

Talks and Presentations

- 2024.07 ■ **Oral Presentation:** Reliability-Aware Probabilistic Reserve Procurement under Decision-Dependent Uncertainty, 2024 IEEE PES General Meeting, Seattle, USA.
- 2024.04 ■ **Guest Lecture:** Unlocking Reliable Flexibility from Generalized Energy Storage Resources, Aalto University, Finland.
- 2023.10 ■ **Oral Presentation:** Capacity Credit Evaluation of Generic Energy Storage under Decision-dependent Uncertainty, 2023 IEEE PES ISGT EUROPE, Grenoble, France.

Talks and Presentations (continued)

- 2022.07 **Oral Presentation:** Risk Assessment with Generic Energy Storage under Exogenous and Endogenous Uncertainty, 2022 IEEE PES General Meeting, Denver, USA.
- 2020.10 **Oral Presentation:** Optimal Mechanism Design for Incentive-Based Demand Response Based on Stackelberg Game, 2020 IEEE Sustainable Power and Energy Conference (iSPEC), Chengdu, China.
- 2019.10 **Oral Presentation:** Reliability Assessment of Generation and Transmission Systems Considering Multi-Form Access of “Source-Network-Load-Storage”, 2019 IEEE Sustainable Power and Energy Conference (iSPEC), Beijing, China.
- 2019.05 **Oral Presentation:** Potential Evaluation of Distributed Energy Resources with Affine Arithmetic, 2019 IEEE PES ISGT ASIA, Chengdu, China.
- 2018.11 **Oral Presentation:** Joint Planning of Distribution Networks with Demand Side Response and Distributed Generation Considering Operation-Control Strategy, 2018 International Conference on Power System Technology (POWERCON 2018), Guangzhou, China.
- 2018.10 **Oral Presentation:** Power and Energy Balance of Active Distribution Network Considering Operation-Control Strategy, 2018 2nd IEEE Conference on Energy Internet and Energy System Integration (EI2), Beijing, China.

Skills

- Languages **■** Mandarin, English (IET 7.0), French (Little).
- Coding **■** MATLAB, C++, \LaTeX , C, Python, Verilog, ...
- Software **■** MATLAB, Mathematica, SPSS, Comsol, PSAPE, Photoshop,...
- Expertise **■** Mathematical Modeling, Data Analysis and Learning, Optimization under Uncertainty, Game Theory, Power System Simulink,...
- Hobby **■** Violin (Level 8), Painting, Swimming, Long-Distance Race, Ball Games,...