

Junyan Lü

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(Electrical Engineering)

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Power system optimization · Shared energy storage · Multi-
microgrid coordination



EDUCATION

Changzhou University | Master of Energy and Power 2023.09 - 2026.06

Advisor: Prof. Xiaohua Zhang | Research area: Power system optimization
Thesis: Hybrid Game-Based Energy Interaction among Multiple Microgrids with Shared Energy Storage

Changzhou University | Bachelor's in Electrical Engineering and Automation 2018.09 - 2022.06

Selected courses: Power System Analysis, Power Electronics, Electrical Machines, Automatic Control Theory.

RESEARCH PROFILE

Shared storage and multi-microgrid coordination; low-carbon dispatch of integrated energy systems; renewable energy uncertainty.

Second author of 2 published SCI journal papers; 2 additional submitted manuscripts; 6 published invention patent applications.

PUBLICATIONS & PATENTS

Journal papers and manuscripts | Second author on all entries

- 01

Low carbon regional energy management system with conditional value at risk
Journal of Building Engineering, 107 (2025), 112572 | **Published**
DOI: 10.1016/j.jobe.2025.112572
- 02

Degradation-aware optimization for shared energy storage in solar integrated microgrids
Solar Energy, 315 (2026), 114760 | **Published**
DOI: 10.1016/j.solener.2026.114760
- 03

Demand response portraits based on multidimensional big data of electric power
Electrical Engineering | **Submitted / under review**
- 04

A Cooperative Game-based Optimal Dispatch Strategy for Multi-microgrids Integrating Renewable Uncertainty and Dual-Contribution Profit Allocation
Under review

Patents: 6 published invention patent applications; listed second among inventors on 1 and third on 2.
Selected application: A Multi-Microgrid Coordinated Optimal Dispatch Method Based on Improved ADMM
Application No. 202511018647.1 | Publication No. CN120879557A

MASTER'S THESIS RESEARCH

Hybrid Game-Based Energy Interaction among Multiple Microgrids with Shared Energy Storage

Master's thesis / core research 2024.09 - 2026.06

- Modeling:** Built a two-level Stackelberg game between a shared storage operator and an alliance of residential, commercial and industrial microgrids; used asymmetric Nash bargaining to coordinate rental pricing, P2P trading and benefit allocation.
- Optimization and evaluation:** Developed a Wasserstein-based distributionally robust model incorporating calendar and cycle degradation into storage pricing. Applied GA-PSO and BB-ADMM in a hierarchical solution scheme to analyze operating costs, capacity degradation and carbon emissions.

RESEARCH PROJECTS

Integrated Energy System Modeling and Low-Carbon Economic Operation

Project Lead | SIETP-funded project | Completed 2024 - 2025

- Built a coupled multi-energy dispatch model integrating carbon allowances, carbon trading costs and integrated demand response, considering operating economics, emissions, user comfort and energy efficiency.
- Applied an improved multi-objective evolutionary algorithm and the Shannon method to select a compromise solution from the Pareto set; completed simulations and result analysis.

Game-Based Optimal Dispatch Using Electric Vehicle User Profiles in Changzhou

Contributor | Changzhou Science & Technology Program (Soft Science) 2025

- **Project CR20250058 (completed):** Constructed multidimensional profiles of electricity use and demand-response capabilities. Used SOM to identify cluster centers and an improved K-means algorithm to classify users.
- Developed integrated demand-response indicators to quantify response potential across user groups and support differentiated response and dispatch strategies.

Community Energy Management and Low-Carbon Operation in Changzhou

Contributor 2024.05 - 2024.09

- Modeled community energy use and carbon trading mechanisms using a leader-follower game between an aggregator and residents. Applied an improved particle swarm algorithm to analyze peak-valley differences, user benefits and grid load regulation.

PROFESSIONAL EXPERIENCE

Design & Research Institute, China Energy Engineering Gezhouba Group Electric Power Co., Ltd.

Design Assistant | Transmission Line Electrical Design 2026.07 - Present

- **Engineering practice:** Participate in ongoing projects under mentor supervision, learning electrical design requirements for feasibility studies, preliminary design and construction drawings through project examples and feedback.
- **Tools and standards:** Edit drawings in AutoCAD; learn Daoheng SLCAD for pole/tower spotting, SmartLoad for load calculations and Ovi Maps for project information. Study design standards and previous project documents.

SKILLS & HONORS

- **Research programming:** Proficient in MATLAB for energy system modeling, optimization algorithm implementation, data processing and simulation-based validation.
- **Methods:** Stackelberg games; asymmetric Nash bargaining; Wasserstein distributionally robust optimization; ADMM / BB-ADMM; GA-PSO; multi-objective optimization.
- **Engineering software:** AutoCAD drawing editing; continued practical learning of Daoheng SLCAD, SmartLoad and Ovi Maps.
- **AI-assisted work:** Use AI tools and Codex for information organization, coding and debugging, data processing and document layout; verify outputs using domain knowledge.
- **Languages and certificates:** CET-6; English academic reading and writing. China National Computer Rank Examination: Level 2 MS Office, Level 3 Network Technology, Level 4 Network Engineer.
- **Honors:** University First-Class and Third-Class Scholarships during master’s studies.