BO ZHOU

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EMPLOYMENT

University of Michigan, Ann Arbor, United States *September 2022 - Present*
Research Fellow, Department of Industrial and Operations Engineering
Mentor: Siqian Shen, Ruiwei Jiang

EDUCATION

Huazhong University of Science and Technology, Wuhan, China *September 2017 - June 2022*
Ph.D. in Electrical Engineering
Supervisor: Jinyu Wen, Xiaomeng Ai

Huazhong University of Science and Technology, Wuhan, China *September 2013 - June 2017*
B.S. in Electrical Engineering and Automation

RESEARCH AREAS

Theories: Continuous-time optimization, robust optimization, bilevel optimization, machine learning

Applications: Flexibility & resilience, power/energy system, energy storage, power market, energy bank

HONORS AND AWARDS

- Frontrunner 5000 top article, Institute of Scientific and Technical Information of China, 2023

- UMPDA Conference Award, University of Michigan, 2023

Awards recieved as a PhD student:

- Outstanding Graduate, Huazhong University of Science and Technology, 2022

- National Scholarship for Postgraduate, Ministry of Education, China, 2020

- Excellent Oral Presentation, China Electrotechnical Society, 2020

- Excellent Paper Award, iSPEC 2019, IEEE Power & Energy Society, 2019

PUBLICATIONS

Papers under Review/Revision

[R3] Yanru Guo, **Bo Zhou**, Ruiwei Jiang, Siqian Shen, Xi (Jessie) Yang, "Distributionally Robust Resource Allocation with Trust-aided Parametric Information Fusion," submitted, 2024.

[R2] Wenjia Shen, **Bo Zhou**, Ruiwei Jiang, Siqian Shen, "Sequential Charging Station Location Optimization under Uncertain Charging Behavior and User Growth," submitted, 2024.

[R1] Xiaomeng Ai, Huang Zhou, Jun Zhou, **Bo Zhou**, Shichang Cui, Jiakun Fang, Jinyu Wen, "Multi-Week Continuous-Time Scheduling of Integrated Electricity and Natural Gas System Against Long-Lasting Stressful Weather," submitted, 2024.

Refereed Journal Papers

[J17] **Bo Zhou**, Ruiwei Jiang, Siqian Shen, "Frequency-Secured Unit Commitment: Tight Approximation using Bernstein Polynomials," *IEEE Transactions on Power Systems*, early access. [[Link](#)]

[J16] **Bo Zhou**, Xiaomeng Ai, Jiakun Fang, Kun Li, Wei Yao, Zhe Chen, Jinyu Wen, "Function-space optimization to coordinate multi-energy storage across the integrated electricity and natural gas system," *International Journal of Electrical Power & Energy System*, 2023(151), 109181, 2023. [Link]

[J15] **Bo Zhou**, Jiakun Fang, Xiaomeng Ai, Yipu Zhang, Wei Yao, Zhe Chen, Jinyu Wen, "Partial-dimensional correlation-aided convex-hull uncertainty set for robust unit commitment," *IEEE Transactions on Power Systems*, 38(03), 2434-2446, 2023. [Link]

[J14] **Bo Zhou**, Jiakun Fang, Xiaomeng Ai, Shichang Cui, Wei Yao, Zhe Chen, Jinyu Wen, "Storage right-based hybrid discrete-time and continuous-time flexibility trading between energy storage station and renewable power plants," *IEEE Transactions on Sustainable Energy*, 14(01), 465-481, 2023. [Link]

[J13] Kun Li, Jiakun Fang, Xiaomeng Ai, **Bo Zhou**, Wei Yao, Jinyu Wen, "Energy management model of large-scale 5G macro base stations network considering the coordinated optimization of communication equipment and standard equipment," *Proceedings of the CSEE (in Chinese)*, 43(14), 5391-5403, 2023. [Link]

[J12] Jinyu Wen, **Bo Zhou**, Lishen Wei, "Preliminary study on an energy storage grid for future power system in China," *Power System Protection and Control (in Chinese)*, 50(07), 1-10, 2022. (**F5000** top article) [Link]

[J11] Menglin Zhang, Qiuwei Wu, Jinyu Wen, **Bo Zhou**, Qingyue Guan, Jin Tan, Zhongwei Lin, Fang Fang, "Day-ahead stochastic scheduling of integrated electricity and heat system considering reserve provision by large-scale heat pumps," *Applied Energy*, 307, 118143, 2022. [Link]

[J10] Sui Peng, Xianfu Gong, Xinmiao Liu, Xun Lu, Yunyun Wu, Xizhen Xue, **Bo Zhou**, Xiaomeng Ai, "Optimized energy storage configuration of wind power integrated power system considering DC regulation capacity," *Electric Power (in Chinese)*, 55(01), 37-45, 2022. [Link]

[J9] **Bo Zhou**, Jiakun Fang, Xiaomeng Ai, Wei Yao, Jinyu Wen, "Flexibility-enhanced continuous-time scheduling of power system under wind uncertainties," *IEEE Transactions on Sustainable Energy*, 12(04), 2306-2320, 2021. [Link]

[J8] **Bo Zhou**, Jiakun Fang, Xiaomeng Ai, Chengxiang Yang, Wei Yao, Jinyu Wen, "Dynamic Var reserve-constrained coordinated scheduling of LCC-HVDC receiving-end system considering contingencies and wind uncertainties," *IEEE Transactions on Sustainable Energy*, 12(01), 469-481, 2021. [Link]

[J7] **Bo Zhou**, Xiaomeng Ai, Jiakun Fang, Wei Yao, Jinyu Wen, "Continuous-time modeling based robust unit commitment considering beyond-the-resolution wind power uncertainty," *Transactions of China Electrotechnical Society (in Chinese)*, 36(07), 1456-1467, 2021. [Link]

[J6] Kun Li, Xiaomeng Ai, Jiakun Fang, **Bo Zhou**, Lingling Le, Jinyu Wen, "Coordination of macro base stations for 5G network with user clustering," *Sensors*, 21(16), 5501, 2021. [Link]

[J5] **Bo Zhou**, Jiakun Fang, Xiaomeng Ai, Menglin Zhang, Wei Yao, Zhe Chen, Jinyu Wen, "Linear network model for integrated power and gas distribution systems with bidirectional energy conversion," *IET Renewable Power Generation*, 14(17), 3284-3291, 2020. [Link]

[J4] **Bo Zhou**, Jiakun Fang, Xiaomeng Ai, Wei Yao, Zhe Chen, Jinyu Wen, "Pyramidal approximation for power flow and optimal power flow," *IET Generation, Transmission & Distribution*, 14(18), 3774-3782, 2020. [Link]

[J3] Menglin Zhang, Jiakun Fang, Xiaomeng Ai, **Bo Zhou**, Wei Yao, Qiuwei Wu, Jinyu Wen, "Partition-combine uncertainty set for robust unit commitment," *IEEE Transactions on Power Systems*, 35(04), 3266-3269, 2020. [Link]

[J2] **Bo Zhou**, Xiaomeng Ai, Jiakun Fang, Wei Yao, Wenping Zuo, Zhe Chen, Jinyu Wen, "Data-adaptive robust unit commitment in the hybrid AC-DC power system," *Applied Energy*, 254, 113784, 2019. [Link]

[J1] **Bo Zhou**, Minggang Song, Jiawei Huang, Xiaomeng Ai, Wei Yao, Jinyu Wen, "Configuration optimization method of multifunctional hybrid energy storage for regional power line fault," *Automation of Electric Power System (in Chinese)*, 43(08), 25-34, 2019. [Link]

Refereed Conference Proceedings

[C5] **Bo Zhou**, Ruiwei Jiang, Siqian Shen, "Learning to Solve Bilevel Programs with Binary Tender," in *Proceedings of the 12th International Conference on Learning Representation (ICLR 2024)*, Vienna, Austria, May, 2024. [Link]

[C4] **Bo Zhou**, Ruiwei Jiang, Siqian Shen, "Differential-Algebraic Equation-Constrained Frequency-Secured Stochastic Unit Commitment," in *Proceedings of 2023 IEEE Power & Energy Society General Meeting (PESGM 2023)*, Orlando, United States, July 2023. [Link]

[C3] **Bo Zhou**, Xiaomeng Ai, Jiakun Fang, Wei Yao, Jinyu Wen, "Continuous-trajectory robust unit commitment considering beyond-the-resolution uncertainty," in *Proceedings of the 2020 IEEE Power & Energy Society General Meeting (PESGM 2020)*, Montreal, Canada, August 2020. [Link]

[C2] **Bo Zhou**, Xiaomeng Ai, Jiakun Fang, Chengxiang Yang, Ruitong Liu, Yingxuan Yang, Fangwei Duan, "Steady state security region considering post contingency cascaded DC commutation failure," in *Proceedings of the 2019 IEEE Sustainable Power and Energy Conference (iSPEC 2019)*, Beijing, China, November 2019 (Excellent Paper). [Link]

[C1] **Bo Zhou**, Xiaomeng Ai, Jiakun Fang, Jinyu Wen, Jianhua Yang, "Mixed-integer second-order cone programming taking appropriate approximation for the unit commitment in hybrid ACDC grid," in *Proceedings of the 6th International Conference on Renewable Power Generation (IET RPG 2017)*, Wuhan, China, October 2017. [Link]

RESEARCH EXPERIENCE

Theories and Computational Algorithms for Optimizing Bilevel Mixed-Integer Nonlinear Programs
Funded by U.S. Air Force Office of Scientific Research   *Sep. 2023 - present*

Extreme-Scale Stochastic Optimization via Learning-enhanced Decomposition and Parallelization
Funded by U.S. Department of Energy   *Sep. 2022 - Aug. 2023*

Adaptive Extreme Scenario Method for Unit Commitment with Wind Power Ramp Event
Funded by National Natural Science Foundation of China   *Jan. 2018 - Dec. 2020*

Robust Coordinated Planning of Energy Storage in Integrated Electricity and Natural Gas System
Funded by National Natural Science Foundation of China   *Jan. 2018 - Dec. 2020*

Configuration Optimization and Control Strategy of Energy Storage Stations for the Power System
Funded by State Grid Corporation of China   *Jan. 2018 - Dec. 2019*

Key Technologies in Characteristic Analysis and Security Defense for HVDC Receiving-End Power Grid
Funded by State Grid Henan Electric Power Company   *Aug. 2016 - Dec. 2017*

PRESENTATIONS

Invited Talks

[T3] "Risk-Averse Reinforcement Learning for Real-Time Economic Dispatch," 2023 INFORMS Annual Meeting, Phoenix, United States, October 2023.

[T2] "Frequency Stability-Constrained Unit Commitment: Tight Approximation using Bernstein Polynomials," 2023 INFORMS Annual Meeting, Phoenix, United States, October 2023.

[T1] "Differential algebraic equation-constrained frequency-secured stochastic unit commitment," SIAM Conference on Optimization (OP23), Seattle, U.S., June 2023.

Conference Presentations

[P5] "Differential Algebraic Equation-constrained Frequency-secured Stochastic Unit Commitment," 2023 IEEE Power & Energy Society General Meeting, Orlando, United States, July 2023.

[P4] "Continuous-time modeling based robust unit commitment considering beyond-the-resolution wind power uncertainty," the 9th Frontier Academic Forum of Electrical Engineering, Xi'an, China, August 2020 (Excellent Oral Presentation).

[P3] "Continuous-trajectory robust unit commitment considering beyond-the-resolution uncertainty," 2020 IEEE Power & Energy Society General Meeting, Montreal, Canada, August 2020.

[P2] "Steady state security region considering post contingency cascaded DC commutation failure," 2019 IEEE Sustainable Power and Energy Conference, Beijing, China, November 2019.

[P1] "Mixed-integer second-order cone programming taking appropriate approximation for the unit commitment in hybrid ACDC grid," the 6th International Conference on Renewable Power Generation, Wuhan, China, October 2017.

MEMBERSHIP AND SERVICES

Professional Membership

- Society for Industrial and Applied Mathematics (SIAM), Member, 2023 - present
- Institute for Operations Research and the Management Sciences (INFORMS), Member, 2022 - present
- Institute of Electrical and Electronics Engineers (IEEE), Member, 2019 - present

Reviewer Experience

- Reviewer:
  INFORMS Journal on Computing
  IISE Transactions
  IEEE Transactions on Energy Markets, Policy and Regulation
  IEEE Transactions on Smart Grid
  IEEE Transactions on Power Systems
  Applied Energy
  CSEE Journal of Power and Energy Systems
  IET Generation, Transmission & Distribution
  International Journal of Electrical and Computer Engineering Systems
  IEEE Power & Energy Society General Meeting 2020, 2023