Ming Yi Ph.D.

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Professional Experience

Data Science Institute, Columbia University New York, NY
Postdoctoral Research Scientist July. 2023-Dec. 2025 *(expected)*
- Advisor: Prof. Bolun Xu and Prof. Gil Zussman
- Also collaborating with Prof. James Anderson

School for Environment and Sustainability, University of Michigan, Ann Arbor Ann Arbor, MI
Postdoctoral Fellow Apr., 2023 - June 2023
- Advisor: Prof. Parth Vaishnav and Prof. Michael Craig

Education

Rensselaer Polytechnic Institute Troy, NY
Ph.D. in Electrical Engineering Sept. 2018 - Dec. 2022
- Advisor: Prof. Meng Wang
- Thesis Committee: Prof. Joe H. Chow, Prof. Ali Tajer, and Prof. Yangyang Xu
- GPA: 3.93/4.00

Harbin Institute of Technology Harbin, China
M.Sc in Control Science and Engineering Sept. 2016 - July 2018
- GPA: 88.95/100, Rank: 1/37.

Harbin Engineering University Harbin, China
B.E. in Automation Sept. 2012 - July 2016
- GPA: 92.03/100, Rank: 3/209

Internship

Argonne National Laboratory | Lemont, IL Jan. 2022 - May 2022
- Research Aide
- Mentor: Dr. Dongbo Zhao and Dr. Tianqi Hong
- Project: Developed data-driven solar disaggregation algorithms based on deep neural networks.

Research Interests

- Machine Learning; Electricity Market; High-Dimensional Energy Data Analytics; Power System Monitoring; Smart Energy Systems
- I am broadly interested in (1) designing data-driven algorithms to enhance intelligence, sustainability, and resilience in energy systems, (2) integrating renewable energy, energy storage, and emerging decarbonization technologies, and (3) modeling the impacts of climate change on energy systems.

Selected Awards and Honors

- **DSI Postdoctoral Fellowship**, Columbia University. Feb. 2023
  support the next generation of leaders in data science and artificial intelligence, with only 6 fellows selected from 142 applicants globally.
- **Charles M. Close '62 Doctoral Prize**, Rensselaer Polytechnic Institute. Apr. 2023
  awarded to an ECSE doctoral candidate who has done outstanding work as a researcher and a teacher and who shows promise of a distinguished academic or research career.
- **Founders Award of Excellence** (top 1%), Rensselaer Polytechnic Institute. Oct. 2022
  highest honor in RPI, honor students who embody the qualities of creativity, discovery, and leadership, and the values of pride and responsibility at Rensselaer.
- **Outstanding Master's Thesis Award**, Harbin Institute of Technology. July 2018
- **Graduation with Honors** (M.S.), Harbin Institute of Technology. July 2018
- **National Scholarship** (top 1%), Ministry of Education of China. Oct. 2017

PUBLICATIONS

Working Paper

1. **Ming Yi**, Yiqian Wu, James Anderson, and Gil Zussman, "Stealthy Cyber-Attack for Strategic Behind-the-Meter Energy Storage," under preparation, 2024.
2. **Ming Yi** and Bolun Xu, "A Dual-Based PID Controller for Job Scheduling in Data Centers with Uncertain Demand," under preparation, 2024.
3. Yiqian Wu, **Ming Yi**, Bolun Xu, and James Anderson, "Risk-Averse Energy Storage Arbitrage," *under preparation*, 2024.

Journal

1. **Ming Yi**, Yiqian Wu, Saud Alghumayjan, James Anderson, and Bolun Xu, "Decision-Focused Bidding for Strategic Energy Storage," *submitted to IEEE Transactions on Smart Grid*, (under review), 2025.
2. **Ming Yi**, Shuhaib Nawawi, and Parth Vaishnav "Efficient electrification and a warming climate could act together to keep energy burdens in check," *submitted to Nature Communication* (under review), 2025, Poster presentation delivered at the American Geophysical Union (AGU) Fall Meeting 2024.
3. **Ming Yi**, Saud Alghumayjan, and Bolun Xu, "Perturbed Decision-Focused Learning for Strategic Energy Storage," *IEEE Transactions on Smart Grid*, 2025.
4. Saud Alghumayjan‡, Jiajun Han, Ningkun Zheng, **Ming Yi** and Bolun Xu, "Energy Storage Arbitrage in Two-settlement Markets: A Transformer-Based Approach," *Electric Power Systems Research*, 2024. ‡ Student under my mentorship
5. Meixuan Li, K. Tse Chi, and **Ming Yi**. "The Impact of Inverter-Based Resources (IBRs) on Cascading Failures in Power Systems," *IEEE Transactions on Power Systems*, 2023.
6. Meixuan Li, K. Tse Chi, and **Ming Yi**. "Steady-State Cascading Failure Model With Voltage Instability Event Detection," *IEEE Transactions on Circuits and Systems I: Regular Papers*, 2023.
7. Meixuan Li, K. Tse Chi, and **Ming Yi**. "Interdependence Among Voltage-Unstable Buses During Cascading Failure in Power Systems," *IEEE Transactions on Circuits and Systems I: Regular Papers*, 2023.
8. Anne Stratman, Tianqi Hong, **Ming Yi**, and Dongbo Zhao, "Novel Net Load Forecasting with Disaggregated PV Generation and Error Compensation," *IEEE Transactions on Industry Applications*, 2023.
9. **Ming Yi**, Meng Wang, Tianqi Hong, and Dongbo Zhao, "Bayesian High-Rank Hankel Matrix Completion for Nonlinear Synchrophasor Data Recovery," *IEEE Transactions on Power Systems*, 2023.
10. **Ming Yi**, Meng Wang, Evangelos, Farantatos, and Tapas Barik, "Bayesian Robust Hankel Matrix Completion with Uncertainty Modeling for Synchrophasor Data Recovery," *ACM SIGENERGY Energy Informatics Review*, (invited paper), 2022.
11. **Ming Yi** and Meng Wang, "Bayesian Energy Disaggregation at Substations with Uncertainty Modeling," *IEEE Transactions on Power Systems*, 2021.
12. Wenting Li*, **Ming Yi*** and Meng Wang, Yishen Wang, Di Shi, and Zhiwei Wang, "Real-time Energy Disaggregation at Substations with Behind-the-Meter Solar Generation," *IEEE Transactions on Power Systems*, 2020. (* equal contributors and listed in alphabetical order)

13. Huijun Gao, **Ming Yi***, Jinyong Yu, Junbao Li, and Xinghu Yu, "Character Segmentation-Based Coarse-Fine Approach for Automobile Dashboard Detection," *IEEE Transactions on Industrial Informatics*, 2019. ($*$ Student 1^{st} author)

Conference

1. Saud Alghumayjan[‡], **Ming Yi**, and Bolun Xu, "Risk-Averse Uncertainty Quantification in Electricity Price Forecasting with Conformal Prediction," *IEEE PES General Meeting*, 2025. ‡ Student under my mentorship
2. **Ming Yi** and Meng Wang, "Recent Results of Energy Disaggregation with Behind-the-Meter Solar Generation," *Proc. 11th Bulk Power Systems Dynamic and Control Symposium*, 2022.
3. Anne Stratman, Tianqi Hong, **Ming Yi**, and Dongbo Zhao, "Net Load Forecasting with Disaggregated Behind-the-Meter PV Generation," *Proc. of IEEE Industry Applications Society Annual Meeting*, 2022.
4. **Ming Yi**, Zhenhua Yang, Fengyu Guo, and Jialin Liu, "A clustering-based algorithm for automatic detection of automobile dashboard," *Proc. of the* 43^{rd} *Annual Conference of the IEEE Industrial Electronics Society (IECON)* 2017.

Patents

1. Huijun, Gao, **Ming Yi**, Jinyong Yu, and Fengyu Guo, "Adaptive Auto Meter Detection Method based on Character Segmentation and Cascade Classifier," U.S. Patent Application 16/144,845, granted Dec. 2020.
2. Huijun, Gao, **Ming Yi**, Jinyong Yu, and Fengyu Guo, "Self-adaptive automobile instrument detection method based on character segmentation cascade two classifiers," Chinese Patent CN201710891277, granted Sept. 2020.

Tools and Software

1. **Real-Time Electricity Price Forecasting Platform in ERCORT** *with Concord Energy*

   • Processed over 100 GB of ERCOT data, developing a foundational physical-learning hybrid model to predict system lambda and shadow price.
   • Achieved 80% profit in energy storage arbitrage compared to perfect forecasting.

   July. 2023- Present

2. **Streaming Synchrophasor Data Quality (SSDQ) Software** *with EPRI*

   • Integrated my data recovery algorithms into SSDQ to enhance the quality of streaming synchrophasor data by correcting erroneous measurements and filling in missing data.

   2020-2022

3. **Open Energy Data Initiative (OEDI) Solar Systems Integration Data and Analytics** *with ANL*

   • Integrated my developed solar disaggregation algorithms into OEDI-SI platform to enhance the system visibility by processing aggregated measurements with Behind-the-Meter solar generations.

   2022

Teaching and Mentoring

Teaching Assistant at RPI for: *ECSE-2500 Engineering Probability*, Fall 2018
ENGR-2350 Embedded Control, Fall 2018, Spring 2019
ECSE-4510 Digital Control Systems. Spring 2019

Student Mentoring: *Seven undergraduates at RPI, one Ph.D. student at the University of Michigan, and two graduate students and two Ph.D. students at Columbia University.*

Invited Talks And Presentations

1. **Decision-Focused Learning for Energy Storage Management**
   Brookhaven National Laboratory, Dr. Meng Yue's Group 2025
   The University of Hong Kong-Columbia University Energy Seminar 2025
2. **Perturbed Decision-Focused Learning for Modeling Strategic Energy Storage**
   ACM SIGEnergy Graduate Student Seminar 2024
3. **Energy Data Recovery in Power Systems via Low-Rank Models**
   The Chinese University of Hong Kong, Department of Mathematics 2024
4. **Bayesian Hankel Matrix Completion for Synchrophasor Data Recovery**
   NREL Sixth Workshop on Autonomous Energy Systems 2023
5. **High-Fidelity Information Extraction in Future Power Grids**
   PEESE Lab, Cornell University 2022
   Prof. Johanna Mathieu's Group, University of Michigan, Ann Arbor 2022
6. **Bayesian Energy Disaggregation at Substations with Uncertainty Modeling**
   IEEE PES General Meeting 2022
7. **Real-time Energy Disaggregation at Substations with Behind-the-Meter Solar Generation**
   IEEE PES General Meeting 2020

Grant Preparation and Award

Columbia University DSI Postdoctoral Fellowship 2023
Award amount: $150,000.

Data-driven Energy Resource Disaggregation in Sustainable Buildings 2023
2023 EPRI University Global Research Award: Supporting a Clean Energy Future.
Role: drafted and developed research proposal.

Academic Services and Activities

Vice President, ECSE Graduate Student Council, RPI 2021

Reviewer for: *IEEE Transactions on Power System*
IEEE Transactions on Smart Grid
IEEE Transactions on Energy Markets, Policy and Regulation
IEEE Transactions on Power Delivery
IEEE Transactions on Industrial Informatics
IEEE Transactions on Industrial Electronics
IEEE Transactions on Vehicular Technology
IEEE Power Engineering Letters
Journal of Modern Power Systems and Clean Energy
Measurement
Scientific Report