Mengwei (Vivienne) Liu

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Education

Cornell University
PhD Candidate; Systems Engineering — *July 2018 - May 2023*
Master of Science; Systems Engineering — *July 2018 - Dec 2021*
Advisor: C. Lindsay Anderson

Stanford University
Master of Science; Electrical Engineering — *Sept 2016 - Apr 2018*

Tianjin University
Bachelor of Engineering with honor; Electrical Engineering — *Sept 2012 - Jun 2016*

Research Interests

- Climate change impacts on energy and power systems
- Clean energy transition
- Decision-making under uncertainties
- Multi-objective optimization

Publications

Manuscripts in Preparation

- **Liu, M. V.**, Reed, P., Quist, G., Gold, D., & Anderson, C. L. (In Preparation). Implementing a Multi-objective Adaptive Energy Management Strategy for Microgrids: A Real-World Case Study with Cornell Campus Microgrid.
- Gupta, A.*, **Liu, M. V.***, Gold, D., Reed, P., & Anderson, C. L. (In Preparation). Exploring a Multi-Objective Robust Decision-Making Framework for Microgrid Energy Management (* indicates co-corresponding authors).
- **Liu, M. V.**, Liu, J., Guo, G., Wang, Z., & Anderson, C. L. (In Preparation). A Co-optimization Framework for the Operation of Interdependent Energy Sectors under Uncertainty from Renewable Generation.
- Kabir, E., **Liu, M. V.**, Anderson, C. L., Srikrishnan, V., & Steinschneider, S. (In Preparation). Quantifying the Impacts of CLCPA and Renewable Energy Expansion Policies on NYS Power Grid with Long-term Climate Change Scenarios.

Manuscripts under Review

- Wang, Z., Younesi, A., **Liu, M. V.**, Guo, G. C., & Anderson, C. L. (Submitted). AC Optimal Power Flow in Power Systems with Renewable Energy Integration: A Review of formulations, Controls, and Case Studies.

Peer-reviewed Journals

- **Liu, M. V.**, Yuan, B., Wang, Z., Sward, J. A., Zhang, K. M., & Anderson, C. L. (2022). An Open Source Representation for the NYS Electric Grid to Support Power Grid and Market Transition Studies. *IEEE Transactions on Power Systems.* (In Press)

- Nagpal, S. V., **Liu, M. V.**, & Anderson, C. L. (2021). A comparison of deterministic refinement techniques for wind farm layout optimization. *Renewable Energy, 168*, 581-592.

Peer-reviewed Conference Proceedings

- **Liu, M. V.**, Doering, K., Cupta, A., & Anderson, C. L. (In Press) A Spatiotemporal Analysis of New York State Grid Transition under the CLCPA Energy Strategy. In *Proceedings of the 56th Hawaii International Conference on System Sciences*.
- **Liu, M. V.**, Reed, P., & Anderson, C. L. (2021, January). Stochastic Synthetic Data Generation for Electric Net Load and Its Application. In *Proceedings of the 54th Hawaii International Conference on System Sciences* (p. 3147).
- Golla, A., Meinke, R. J., **Liu, M. V.**, Staudt, P., Anderson, C. L., & Weinhardt, C. (2021, January). Direct Policy Search for Multiobjective Optimization of the Sizing and Operation of Citizen Energy Communities. In *Proceedings of the 54th Hawaii International Conference on System Sciences* (p. 3263).
- Gupta, A., **Liu, M. V.**, Gold, D., Reed, P., & Anderson, C. L. (2020, January). Exploring a direct policy search framework for multiobjective optimization of a microgrid energy management system. In *Proceedings of the 53rd Hawaii International Conference on System Sciences* (p. 3137).

Presentations

Invited Talks

- **Liu, M. V.** Exploring a Direct Policy Search Framework for Multi-objective Optimization of a Microgrid Energy Management System. EWRS Seminar; March 5 2020; Cornell University, NY, USA
- **Liu, M. V.**, & Anderson, C. L. A Multi-Objective Policy Search Approach for Microgrid Energy Management. ENRE Online Scientific Event; January 27 2022 (Virtual)

Conference Talks

- **Liu, M. V.**, & Anderson, C. L. A Multi-Objective Policy Search Approach for Stakeholder Engagement in Microgrid Management. CORS 2021 Annual Conference; June 7-10 2021 (Virtual)
- **Liu, M. V.**, Gupta, A., Gold, D., Reed, M. P., & Anderson, C. L. Transitioning Power Generation to Distributed and Operationally Robust Microgrids. DMDU Annual Meeting; November 10-12 2020 (Virtual)
- **Liu, M. V.**, Liu, J., & Anderson, C. L. Optimal Coordination of High and Low Voltage Systems to Leverage DERs. SmartGridComm; Nov 11-13 2020 (Virtual)

Posters

- **Liu, M. V.**, Reed, M. P., & Anderson, C. L. Stochastic Synthetic Data Generation for Electric Net Load and Its Application. HICSS-54 Energy Systems Track Get Together; Jan 7 2021 (Virtual)
- **Liu, M. V.**, & Anderson, C. L. A Policy Search Based Multi-Objective Optimization Framework for Microgrids Energy Management. CompSust-2019: Doctoral Consortium on Computational Sustainability; October 18-20 2019; Carnegie Mellon University, Pittsburgh, PA, USA
- **Liu, M. V.**, Gupta, A., Anderson, C. L. Multi-Objective Policy Search Optimization of Microgrids Energy Management. Cornell Energy Day; April 10 2019; Ithaca, New York, USA

Teaching Interests

- Analysis of complex systems: Renewable system modeling and simulation, Environmental system analysis
- Data Science: Introduction to data science, Machine learning and its applications

- Optimization: Convex Optimization, Mathematical Programming, Decision making and uncertainties

Teaching Experience

Graduate Teaching Assistant, Cornell University *Aug - Dec 2019, 2020, 2021*
BEE 4750: Environmental Systems Analysis

- Create assignment and prelim questions
- Hold office hours and one-on-one class project tutor
- Design auto-grader for assignments to give students real-time feedback

Graduate TA Development Consultant, Cornell University *May 2020 - Apr 2021*

- Develop and co-facilitate workshops to prepare new TAs for their roles in working with students
- Research and share evidence-based teaching methods
- Collaboratively develop skills in workshop facilitation
- Conduct microteaching sessions

Graduate Teaching Assistant, Stanford University *Sept 2017 - Apr 2018*
CS 229: Machine Learning & CS 228: Probabilistic Graphical Models

- Grade assignments and exams
- Hold office hours and review sessions

Mentorship

- Arjun Malhotra, M.S. Chemical Engineering, *Aug 2021–present.*

Industry Experience

Data Science Intern, Fluency Energy *Aug 2022 - Dec 2022*

- Develop generic model to predict the location marginal emission rate for the California Independent System Operator
- Use the electricity market and generation data to improve the performance of bidding algorithms and contribute to a more efficient electricity grid

Awards And Honors

- Selected for Teaching Assistant Development Consultant *2020*
- Cornell University Fellowship *2018*
- Departmental Exceptional Student Honor (Top 2% in Department) *2015*
- Mathematical Contest in Modeling (United States): Honorable Mention *2015*
- Mathematical Contest in Modeling (China): The Second Prize in Tianjin Province *2014*
- The Public Scholarship from Yihai Kerry Group *2013-2014, 2014-2015*
- Merit Student of Tianjin University *2012-2013, 2013-2014,2014-2015*

Service

Journal Reviewer
Fuel; IEEE Transactions on Power Systems; Oxford Open Energy; Sustainable Energy Technologies and Assessments; IEEE Transactions on Sustainable Energy

Conference Session Chair *Oct 2022*
General Session entitled "Data-driven modeling and algorithmic methods for a clean energy transition", Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting

Advisory Board Member *2020-2022*
English Language Support Office Advisory Board, Cornell University

TA Development Consultant *2020-2021*
Design and deliver TA training workshops for the School of Engineering, Cornell University

PROFESSIONAL MEMBERSHIP

Canadian Operational Research Society
Institute for Operations Research and the Management Sciences