ZIXIAO MA

185 W Stevens Way NE, Seattle, WA 98195
515-686-7511 ⋄ zixiaoma@uw.edu

EDUCATION

Iowa State University — Ames, IA, USA
Ph.D., Electrical Engineering — *May 2017 - May 2023*
Advisor: Prof. Zhaoyu Wang

Northeastern University — Shenyang, Liaoning, China
M.S., Control Theory and Control Engineering — *Sep. 2014 - Jan. 2017*
Advisor: Prof. Tianyou Chai

Northeastern University — Shenyang, Liaoning, China
B.S., Automation — *Sep. 2010 - Jun. 2014*

PROFESSIONAL EMPLOYMENT

University of Washington — Seattle, WA, USA
Distinguished Postdoctoral Fellow in Clean Energy Institute — *Jun. 2023-Present*
Hosted by Prof. Baosen Zhang

PUBLICATION

Journal Paper

[J16] **Z. Ma**, Q. Zhang and Z. Wang, "Safe and Stable Secondary Voltage Control of Microgrids based on Explicit Neural Networks," IEEE Transactions on Smart Grid, vol. 14, no. 5, pp. 3375-3387, 2023.

[J15] **Z. Ma**, Z. Wang and Rui Cheng, "Analytical Large-Signal Modeling of Inverter-based Microgrids with Koopman Operator Theory for Autonomous Control," IEEE Transactions on Smart Grid, early access, 2023.

[J14] **Z. Ma**, Z. Wang, Y. Yuan and T. Hong, "Singular Perturbation-based Large-Signal Order Reduction of Microgrids for Stability and Accuracy Synthesis with Control," submitted to IEEE Transactions on Smart Grid, 2023.

[J13] L. Liu, N. Shi, D. Wang, **Z. Ma**, Z Wang, M. J. Reno, and J. A. Azzolini, "Voltage Calculations in Secondary Distribution Networks via Physics-Inspired Neural Network Using Smart Meter Data," submitted to IEEE Transactions on Smart Grid, 2023.

[J12] R. Cheng, N. Shi, Z. Wang and **Z. Ma**, "Optimal Power Flow for Integrated Primary-Secondary Distribution Networks with Service Transformers," submitted to IEEE Transactions on Power Systems, 2023.

[J11] **Z. Ma**, Y. Xiang and Z. Wang, "Robust Conservation Voltage Reduction Evaluation using Soft Constrained Gradient Analysis," IEEE Transactions on Power Systems, vol. 37, no. 6, pp. 4485-4496, 2022.

[J10] **Z. Ma**, B. Cui, Z. Wang and D. Zhao, "Parameter Reduction of Composite Load Model using Active Subspace Method," IEEE Transactions on Power Systems, vol. 36, no. 6, pp. 5441-5452, Nov. 2021.

[J9] **Z. Ma**, Z. Wang, Y. Guo, Y. Yuan and H. Chen, "Nonlinear Multiple Models Adaptive Secondary Voltage Control of Microgrids," IEEE Transactions on Smart Grid, vol. 12, no. 1, pp. 227-238, 2021.

[J8] J. Fu, **Z. Ma**, Y. Fu, T. Chai, "Hybrid Adaptive Control of Nonlinear Systems with Non-Lipschitz Nonlinearities," Systems & Control Letters, vol. 156, no. 105012, 2021.

[J7] J. Xie, **Z. Ma**, K. Dehghanpour, Z. Wang, Y. Wang, R. Diao and D. Shi, "Imitation and Transfer Q-Learning-based parameter identification for composite load modeling," IEEE Transactions on Smart Grid, vol. 12, no. 2, pp. 1674-1684, 2021.

[J6] Q. Zhang, **Z. Ma**, Y. Zhu and Z. Wang, "A Two-Level Simulation-Assisted Sequential Distribution System Restoration Model With Frequency Dynamics Constraints," IEEE Transactions on Smart Grid, vol. 12, no. 5, pp. 3835-3846, 2021.

[J5] F. Bu, **Z. Ma**, Y. Yuan and Z. Wang, "WECC Composite Load Model Parameter Identification using Evolutionary Deep Reinforcement Learning," IEEE Transactions on Smart Grid, vol. 11, no. 6, pp. 5407-5417, 2020.

[J4] **Z. Ma**, Z. Wang, D. Zhao and B. Cui, "High-Fidelity Large-signal Order Reduction Approach for Composite Load Model," IET Generation, Transmission & Distribution, vol. 14, no. 21, pp. 4888-4897, 2020.

[J3] **Z. Ma**, Z. Wang, Y. Wang, R. Diao and D. Shi, "Mathematical Representation of WECC Composite Load Model," Journal of Modern Power Systems and Clean Energy, vol. 8, no. 5, pp. 1015-1023, 2020.

[J2] J. Li, **Z. Ma** and J. Fu, "Exponential Stabilization of Switched Discrete-Time Systems with All Unstable Modes," Asian Journal of Control, vol. 20, no. 1, pp. 608-612, 2018.

[J1] T. Li, J. Fu and **Z. Ma**, "Improved Event-Triggered Control for a Class of Continuous-Time Switched Linear Systems," IET Control Theory & Application, vol. 12, no. 7, pp. 1000-1005, 2018.

Dissertation

Z. Ma, "Composite load modeling for power systems: Model reduction, identification, and application to conservation voltage reduction," Ph.D. dissertation, Iowa State University, Ames, IA, 2023.

TEACHING PLAN

Areas Prepared to Teach: Power Systems, Dynamical Systems, Control Theory, Signal and Systems, Optimization, Data Analytics, Machine Learning

AWARDS

- Distinguished Postdoctoral Fellowship, University of Washington, 2023
- Chinese Government Award for Outstanding Self-financed Students Abroad, 2023
- Research Excellent Award, Iowa State University, 2023
- Outstanding Reviewer, IEEE Transactions on Power Systems, 2021

SERVICES

Peer Reviewer

- *Journals:* IEEE Transactions on Power Systems; IEEE Transaction on Smart Grid; IEEE Transaction on Sustainable Energy; IEEE Transactions on Power Delivery; IEEE Transaction on Energy Conversion; IEEE Transactions on Circuits and Systems II: Express Briefs; IEEE Transactions on Systems, Man, and Cybernetics: Systems; Applied Energy; IET Generation, Transmission & Distribution; IEEE Journal on Emerging and Selected Topics in Circuits and Systems, Systems & Control Letters

- *Conferences:* 2023 Power & Energy Society General Meeting (PESGM), 2022 Power & Energy Society General Meeting (PESGM), 2022 IEEE Innovative Smart Grid Technology Conference, 2021 Power & Energy Society General Meeting (PESGM), 2021 IEEE Innovative Smart Grid Technology Conference, 2020 Power & Energy Society General Meeting (PESGM)

Technical Committee Officers

- Section Co-Lead of Methodologies Selection of IEEE Standard P3102, IEEE Conservation Voltage Reduction (CVR) Task Force, 2020 - present

INVITED TALKS

- Creating Ground Truth for Validation of CVR Assessment, Commonwealth Edison, May 19, 2023.
- Energy Savings via Conservation Voltage Reduction: Measurement and Verification Methodologies and Field Results, University of Washington Clean Energy Institute Seminar, February 9, 2023.
- Conservation Voltage Reduction Measurement and Verification Methodologies and Field Results, Southeast University, November 26, 2022.
- WECC Modeling and Validation Subcommittee Meeting (virtual), *Python-PSSE based tool to identify composite model parameters*, November 30, 2021.
- NERC Load Modeling Working Group Meeting (virtual), *Python-PSSE based WECC composite load identification tool*, July 27, 2021.
- Webinar to American Electric Power, *WECC Composite Load Model Identification using Python-PSSE*, May 18, 2021.
- Western Electricity Coordinating Council (Salt Lake City, Utah), *Mathematical Representation and Dynamic Order Reduction of WECC Composite Load Model*, April 3, 2019.
- GEIRI North America (San Jose, CA), *Mathematical Modeling of WECC Composite Load Models*, December 4, 2018.