Daniel K. Molzahn

Assistant Professor
Georgia Institute of Technology
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Education

University of Michigan

2013 – 2015 Dow Sustainability Fellow, Department of Electrical Engineering and Computer Science

University of Wisconsin–Madison

2013 Ph.D. Electrical Engineering (Electric Power Systems)
- Dissertation: *Application of Semidefinite Optimization Techniques to Problems in Electric Power Systems*
- 2014 Harold A. Peterson Best Dissertation Award, Second Place

2012 M.P.A. La Follette School of Public Affairs

2010 M.S. Electrical Engineering
- Thesis: *Power System Models Formulated as Eigenvalue Problems and Properties of Their Solutions*
- Certificate in Energy Analysis and Policy
- Grainger Power Engineering Award

2008 B.S. Electrical Engineering, Mathematics
- Graduated with Highest Distinction Honors
- Grainger Power Engineering Award

Employment

2019 – Assistant Professor, Georgia Institute of Technology, School of Electrical and Computer Engineering

2019 – Argonne Associate, Argonne National Laboratory, Energy Systems Division

2015 – 2019 Computational Engineer, Argonne National Laboratory, Energy Systems Division

Awards

2024 Georgia Institute of Technology Class of 1940 W. Roane Beard Outstanding Teacher Award

2024 Georgia Institute of Technology Center for Teaching and Learning Junior Faculty Teaching Excellence Award

2024 Georgia Institute of Technology College of Engineering Outstanding Teacher Award (Early Career)

2023 Georgia Institute of Technology Roger P. Webb ECE Junior Faculty Award

2022 National Science Foundation CAREER Award

2021 IEEE Power and Energy Society Outstanding Young Engineer Award

2020, 2021 Department of Energy ARPA-E Grid Optimization Competition Challenge 1: second place out of 27 teams, resulting in a $400k prize. Challenge 2: six/seventh place out of 16 teams, resulting in a $30k prize.

2020 PSCC 2020 Highlights Award, top 3% of papers at the 21st Power Systems Computation Conference

2020 Working Group Award for Technical Report from the IEEE Power and Energy Society (PES) Power System Operation, Planning and Economics (PSOPE) Committee

2019, 2021, 2023 Thank a Teacher Certificate, Georgia Institute of Technology

2017 Best Reviewer 2017, IEEE Transactions on Smart Grid

2017 High-quality paper award, IEEE Manchester PowerTech Conference

2016 Best presentation in session award, American Control Conference

2013 Harold A. Peterson Best Dissertation Award, Second Place, Department of Electrical and Computer Engineering, University of Wisconsin—Madison

2009 National Science Foundation Graduate Research Fellowship

2008, 2010 Grainger Power Engineering Award

2008 Distinguished Fellowship, Department of Electrical and Computer Engineering, University of Wisconsin—Madison

Publications (Google Scholar Link)

In Review (Journal Articles)

1. R. Piansky, R.K. Gupta, and **D.K. Molzahn**, "Optimizing Battery and Line Undergrounding Investments for Transmission Systems under Wildfire Risk Scenarios: A Benders Decomposition Approach," submitted.
2. A. Rangarajan, R.K. Gupta, **D.K. Molzahn**, and L.A. Roald, "Forecast-Aided State Estimation in Unbalanced Distribution Networks Using Smart Meter Data under Limited Communication Bandwidth," submitted.
3. B. Taheri and **D.K. Molzahn**, "AC-Informed DC Optimal Transmission Switching Problems via Parameter Optimization," submitted, arXiv:2411.10528.
4. B. Taheri and **D.K. Molzahn**, "Improving the Accuracy of DC Optimal Power Flow Formulations via Parameter Optimization," submitted, arXiv:2410.11725.
5. D. Turizo, D. Cifuentes, A. Leykin, and **D.K. Molzahn**, "Discrete Shortest Paths in Optimal Power Flow Feasible Regions," submitted, arXiv:2408.02172.
6. B. Taheri, R. Gupta, and **D.K. Molzahn**, "Optimizing Parameters of the LinDistFlow Power Flow Approximation for Distribution Systems," submitted, arXiv:2404.05125.
7. R. Gupta and **D.K. Molzahn**, "Improving Fairness in Photovoltaic Curtailments via Daily Topology Reconfiguration for Voltage Control in Power Distribution Networks," submitted, arXiv:2403.07853.
8. M. Alkhraijah and **D.K. Molzahn**, "A Fault-Tolerant Distributed Termination Method for Distributed Optimization Algorithms," submitted, arXiv:2401.16595.
9. M. Alkhraijah, R. Harris, S. Litchfield, D. Huggins, and **D.K. Molzahn**, "Detecting Shared Data Manipulation in Distributed Optimization Algorithms," submitted, arXiv:2310.13252.

In Review (Conference Proceedings)

1. R. Harris, C.-Y. Chang, and **D.K. Molzahn**, "Integrated Transmission-Distribution Multi-Period Switching for Wildfire Risk Mitigation: Improving Speed and Scalability with Distributed Optimization," submitted.
2. P. Buason, S. Misra, and **D.K. Molzahn**, "Sample-Based Piecewise Linear Power Flow Approximations Using Second-Order Sensitivities," submitted.
3. R. Piansky, **D.K. Molzahn**, N.D. Jackson, and J.K. Skolfield, "Evaluating Undergrounding Decisions for Wildfire Ignition Risk Mitigation across Multiple Hazards," submitted.

4. R. Asiamah, T. Manoj, K.K. Ji, R.H. Williams, and **D.K. Molzahn**, "Developing a Synthetic Electricity Grid in Africa: A Case Study in Ghana," submitted.
5. A. Jadhav, S. Taylor, R. Piansky, **D.K. Molzahn**, and L.A. Roald, "Data-Driven Power Shutoff Decision-Making for Wildfire Resilience," submitted.
6. K. Xiang and **D.K. Molzahn**, "Initializing PV-PQ Switching in Power Flow Problems Using Neural Networks," submitted.
7. R. Gupta and **D.K. Molzahn**, "Optimizing Phase Allocation in Unbalanced Power Distribution Networks using a Linearized DistFlow Formulation," submitted.
8. R. Gupta and **D.K. Molzahn**, "Analysis of Fairness-promoting Optimization Schemes of Photovoltaic Curtailments for Voltage Regulation in Power Distribution Networks," submitted, arXiv:2404.00394.

Monographs

2019 1. **D.K. Molzahn** and I.A. Hiskens, "A Survey of Relaxations and Approximations of the Power Flow Equations," *Foundations and Trends in Electric Energy Systems*, vol. 4, no. 1-2, pp. 1-221, February 2019.

Journal Articles

2025 1. M. Pollack, R. Piansky, S. Gupta, and **D.K. Molzahn**, "Equitably Allocating Wildfire Resilience Investments for Power Grids – The Curse of Aggregation and Vulnerability Indices," to appear in *Applied Energy*.
2. R. Harris, M. Alkhraijah, and **D.K. Molzahn**, "Optimally Managing the Impacts of Convergence Tolerance for Distributed Optimal Power Flow," to appear in *IEEE Transactions on Smart Grid*.
3. P. Buason, S. Misra, J.P. Watson, and **D.K. Molzahn**, "Adaptive Power Flow Approximations with Second-Order Sensitivity Insights," to appear in *IEEE Transactions on Power Systems*.
4. S. Gupta, C. Hettle, and **D.K. Molzahn**, "Fair and Reliable Reconnections for Temporary Disruptions in Electric Distribution Networks using Submodularity," to appear in *INFORMS Journal on Computing*.
5. M.R. Narimani, **D.K. Molzahn**, K.R. Davis, and M.L. Crow, "Tightening QC Relaxations of AC Optimal Power Flow through Improved Linear Convex Envelopes," to appear in *IEEE Transactions on Power Systems*.
6. A. Jalilian, B. Taheri, and **D.K. Molzahn**, "Co-Optimization of Damage Assessment and Restoration: A Resilience-Driven Dynamic Crew Allocation for Power Distribution Systems," *IEEE Transactions on Power Systems*, vol. 40, no. 1, pp. 676-688, January 2025.

2024 7. B. Taheri and **D.K. Molzahn**, "Optimizing Parameters of the DC Power Flow," *Electric Power Systems Research*, vol. 235, no. 110719, October 2024, presented at the *23rd Power Systems Computation Conference (PSCC)*, June 4-7, 2024.
8. B. Taheri and **D.K. Molzahn**, "AC Power Flow Feasibility Restoration via a State Estimation-Based Post-Processing Algorithm," *Electric Power Systems Research*, vol. 235, no. 110642, October 2024, presented at the *23rd Power Systems Computation Conference (PSCC)*, June 4-7, 2024.

9. R. Piansky, G. Stinchfield, A. Kody, **D.K. Molzahn**, and J.P. Watson, "Long Duration Battery Sizing, Siting, and Operation Under Wildfire Risk Using Progressive Hedging," *Electric Power Systems Research*, vol. 235, no. 110785, October 2024, presented at the *23rd Power Systems Computation Conference (PSCC)*, June 4-7, 2024.
10. P. Buason, S. Misra, and **D.K. Molzahn**, "A Data-Driven Sensor Placement Approach for Detecting Voltage Violations in Distribution Systems," *Electric Power Systems Research*, vol. 232, no. 110387, July 2024.
11. G. Nilsson, A.D. Owen Aquino, S. Coogan, and **D.K. Molzahn**, "GreenEVT: Greensboro Electric Vehicle Testbed," *IEEE Systems Journal*, vol. 18, no. 1, pp. 600-611, March 2024.
12. M. Alkhraijah, R. Harris, C. Coffrin, and **D.K. Molzahn**, "PowerModelsADA: A Framework for Solving Optimal Power Flow using Distributed Algorithms," *IEEE Transactions on Power Systems (Letters)*, vol. 39, no. 1, pp. 2357-2360, January 2024.
13. S. Talkington, D. Turizo, S. Grijalva, J. Fernandez, and **D.K. Molzahn**, "Conditions for Estimation of Sensitivities of Voltage Magnitudes to Complex Power Injections," *IEEE Transactions on Power Systems*, vol. 39, no. 1, pp. 478-491, January 2024.

2023 14. O. Kuryatnikova, B. Ghaddar, and **D.K. Molzahn**, "Two-Stage Robust Quadratic Optimization with Equalities and Its Application to Optimal Power Flow," *SIAM Journal on Optimization*, vol. 33, no. 4, pp. 2830-2857, December 2023.

15. I. Aravena, **D.K. Molzahn**, S. Zhang, F.E. Curtis, S. Tu, A. Wächter, E. Wei, E. Wong, A. Gholami, K. Sun, X.A. Sun, S.T. Elbert, J.T. Holzer, and A. Veeramany, "Recent Developments in Security-Constrained AC Optimal Power Flow: Overview of Challenge 1 in the ARPA-E Grid Optimization Competition," *Operations Research*, special issue on *Computational Advances in Short-Term Power System Operations*, vol. 71, no. 6, pp. 1997-2014, November-December 2023.
16. F.E. Curtis, **D.K. Molzahn**, S. Tu, A. Wächter, E. Wei, and E. Wong, "A Decomposition Algorithm with Fast Identification of Critical Contingencies for Large-Scale Security-Constrained AC OPF," *Operations Research*, special issue on *Computational Advances in Short-Term Power System Operations*, vol. 71, no. 6, pp. 2031-2044, November-December 2023.
17. D. Turizo and **D.K. Molzahn**, "Invertibility Conditions for the Admittance Matrices of Balanced Power Systems," *IEEE Transactions on Power Systems*, vol. 38, no. 4, pp. 3841-3853, July 2023.
18. F. Milano and **D.K. Molzahn**, "Forward to the EPSR Special Issue for PSCC 2022," *Electric Power Systems Research*, vol. 217, no. 109148, April 2023.
19. L.A. Roald, D. Pozo, A. Papavasiliou, **D.K. Molzahn**, J. Kazempour, and A. Conejo, "Power Systems Optimization under Uncertainty: A Review of Methods and Applications," *Electric Power Systems Research*, vol. 214, Part A, no. 108725, January 2023. Presented at *22nd Power Systems Computation Conference (PSCC)*.
20. B. Taheri, **D.K. Molzahn**, and S. Grijalva, "Improving Distribution System Resilience by Undergrounding Lines and Deploying Mobile Generators," *Electric Power Systems Research*, vol. 214, Part A, no. 108804, January 2023.

2022 21. A. Kody, S. Chevalier, S. Chatzivasileiadis, and **D.K. Molzahn**, "Modeling the AC Power Flow Equations with Optimally Compact Neural Networks: Application to Unit Commitment," *Electric Power Systems Research*, vol. 212, no. 108282, November 2022. Presented at *22nd Power Systems Computation Conference (PSCC)*, June 27 - July 1, 2022.

22. S. Zeng, A. Kody, Y. Kim, K. Kim, and **D.K. Molzahn**, "A Reinforcement Learning Approach to Parameter Selection for Distributed Optimization in Power Systems," *Electric Power Systems Research*, vol. 212, no. 108546, November 2022. Presented at *22nd Power Systems Computation Conference (PSCC)*, June 27 - July 1, 2022.
23. P. Buason, S. Misra, and **D.K. Molzahn**, "A Sample-Based Approach for Computing Conservative Linear Power Flow Approximations," *Electric Power Systems Research*, vol. 212, no. 108579, November 2022. Presented at *22nd Power Systems Computation Conference (PSCC)*, June 27 - July 1, 2022.
24. M. Alkhraijah, C. Menendez, and **D.K. Molzahn**, "Assessing the Impacts of Nonideal Communications on Distributed Optimal Power Flow Algorithms," *Electric Power Systems Research*, vol. 212, no. 108297, November 2022. Presented at *22nd Power Systems Computation Conference (PSCC)*, June 27 - July 1, 2022.
25. N. Patari, V. Venkataramanan, A.K. Srivastava, **D.K. Molzahn**, N. Li, and A. Annaswamy, "Distributed Optimization in Distribution Systems: Use Cases, Limitations, and Research Needs," *IEEE Transactions on Power Systems*, vol. 37, no. 5, pp. 3469-3481, September 2022.
26. J. Liu, B. Cui, **D.K. Molzahn**, C. Chen, and X. Lu, "Optimal Power Flow for DC Networks with Robust Feasibility and Stability Guarantees," *IEEE Transactions on Control of Network Systems*, vol. 9, no. 2, pp. 904-916, June 2022.

2021 27. D. Lee, K. Turitsyn, **D.K. Molzahn**, and L.A. Roald, "Robust AC Optimal Power Flow with Robust Convex Restriction," *IEEE Transactions on Power Systems*, vol. 36, no. 6, pp. 4953-4966, November 2021.

28. M. Alkhraijah, M. Alowaifeer, M. Alsaleh, A. Alfaris, **D.K. Molzahn**, "The Effects of Social Distancing on the Temperature-Demand Relationship," *Energies*, vol. 14, no. 2, 2021.
29. M.R. Narimani, **D.K. Molzahn**, and M.L. Crow, "Tightening QC Relaxations of AC Optimal Power Flow Problems via Complex Per Unit Normalization," *IEEE Transactions on Power Systems*, vol. 36, no. 1, pp. 281-291, January 2021.
30. A. Peña Ordieres, **D.K. Molzahn**, L.A. Roald, and A. Wächter, "DC Optimal Power Flow with Joint Chance Constraints," *IEEE Transactions on Power Systems*, vol. 36, no. 1, pp. 147-158, January 2021.
31. **D.K. Molzahn** and C. Rehtanz, "Forward to the EPSR Special Issue for PSCC 2020," *Electric Power Systems Research*, vol. 190, January 2021.
32. A. Venzke, **D.K. Molzahn**, and S. Chatzivasileiadis, "Efficient Creation of Datasets for Data-Driven Power System Applications," *Electric Power Systems Research*, vol. 190, January 2021. Presented at *21st Power Systems Computation Conference (PSCC)*, June 29 – July 3, 2020.
33. B. Li, B. Cui, F. Qiu, and **D.K. Molzahn**, "Balancibility: Existence and Uniqueness of Power Flow Solutions under Voltage Balance Requirements," *Electric Power Systems Research*, vol. 190, January 2021. Presented at *21st Power Systems Computation Conference (PSCC)*, June 29 – July 3, 2020. **PSCC 2020 Highlights Award, top 3% of papers at the 21st Power Systems Computation Conference.**

2020 34. A. Venzke, S. Chatzivasileiadis, and **D.K. Molzahn**, "Inexact Convex Relaxations of AC Optimal Power Flow Problems: Towards AC Feasibility," *Electric Power Systems Research*, vol. 187, October 2020.

35. D. Lee, K. Turitsyn, **D.K. Molzahn**, and L.A. Roald, "Feasible Path Identification in Optimal Power Flow with Sequential Convex Restriction," *IEEE Transactions on Power Systems*, vol. 35, no. 5, pp. 3648-3659, September 2020.

2019 36. A. Barzegar, **D.K. Molzahn**, and R. Su, "A Method for Quickly Bounding the Optimal Objective Value of an OPF Problem using a Semidefinite Relaxation and a Local Solution," *Electric Power Systems Research*, vol. 177, December 2019.

37. M. Yao, **D.K. Molzahn**, and J.L. Mathieu, "An Optimal Power-Flow Approach to Improve Power System Voltage Stability Using Demand Response," *IEEE Transactions on Control of Network Systems*, special issue on *Analysis, Control, and Optimization of Energy System Networks*, vol. 6, no. 3, pp. 1015-1025, September 2019.

38. **D.K. Molzahn** and J. Wang, "Detection and Characterization of Intrusions to Network Parameter Data in Electric Power System Operations," *IEEE Transactions on Smart Grid*, vol. 10, no. 4, pp. 3919-3928, July 2019.

2018 39. **D.K. Molzahn**, "Identifying and Characterizing Non-Convexities in Feasible Spaces of Optimal Power Flow Problems," *IEEE Transactions on Circuits and Systems II: Express Briefs*, vol. 65, no. 5, pp. 672-676, May 2018. Presented at *IEEE International Symposium on Circuits and Systems (ISCAS), special session on On-line Identification, Control, & Optimization of Electric Power Systems*, 27-30 May 2018.

40. C. Josz and **D.K. Molzahn**, "Lasserre Hierarchy for Large Scale Polynomial Optimization in Real and Complex Variables," *SIAM Journal on Optimization*, vol. 28, no. 2, pp. 1017-1048, 2018.

41. **D.K. Molzahn**, "Identifying Redundant Flow Limits on Parallel Lines," *IEEE Transactions on Power Systems (Letters)*, vol. 33, no. 3, pp. 1-3, May 2018.

42. O. Coss, J.D. Hauenstein, H. Hong, and **D.K. Molzahn**, "Locating and Counting Equilibria of the Kuramoto Model with Rank One Coupling," *SIAM Journal on Applied Algebra and Geometry*, vol. 2, no. 1, pp. 45-71, 2018.

43. D. Wu, **D.K. Molzahn**, B.C. Lesieutre, and K. Dvijotham, "A Deterministic Method to Identify Multiple Local Extrema for the AC Optimal Power Flow Problem," *IEEE Transactions on Power Systems*, vol. 33, no. 1, pp. 654-668, January 2018.

2017 44. J. Lavaei, S.H. Low, R. Baldick, B. Zhang, **D.K. Molzahn**, F. Dörfler, and H. Sandberg, "Guest Editorial: Distributed Control and Efficient Optimization Methods for Smart Grid," *IEEE Transactions on Smart Grid, Special issue on Distributed Control and Efficient Optimization Methods for Smart Grid*, vol. 8, no. 6, pp. 2939-2940, November 2017.

45. **D.K. Molzahn**, F. Dörfler, H. Sandberg, S.H. Low, S. Chakrabarti, R. Baldick, and J. Lavaei, "A Survey of Distributed Optimization and Control Algorithms for Electric Power Systems," *IEEE Transactions on Smart Grid, Special issue on Distributed Control and Efficient Optimization Methods for Smart Grid*, vol. 8, no. 6, pp. 2941-2962, November 2017.

46. **D.K. Molzahn**, "Computing the Feasible Spaces of OPF Problems," *IEEE Transactions on Power Systems*, vol. 32, no. 6, pp. 4752-4763, November 2017.

47. **D.K. Molzahn**, "Incorporating Squirrel-Cage Induction Machine Models in Convex Relaxations of OPF Problems," *IEEE Transactions on Power Systems (Letters)*, vol. 32, no. 6, pp. 4972-4974, November 2017.

48. J.F. Marley, **D.K. Molzahn**, and I.A. Hiskens, "Solving Multiperiod OPF Problems using an AC-QP Algorithm Initialized with an SOCP Relaxation," *IEEE Transactions on Power Systems*, vol. 32, no. 5, pp. 3538-3548, September 2017.
49. **D.K. Molzahn**, C. Josz, I.A. Hiskens, and P. Panciatici, "A Laplacian-Based Approach for Finding Near Globally Optimal Solutions to OPF Problems," *IEEE Transactions on Power Systems*, vol. 32, no. 1, pp. 305-315, January 2017.

2016 50. **D.K. Molzahn** and I.A. Hiskens, "Convex Relaxations of Optimal Power Flow Problems: An Illustrative Example," *IEEE Transactions on Circuits and Systems I: Regular Papers*, vol. 63, no. 5, pp. 650-660, May 2016.

2015 51. **D.K. Molzahn** and I.A. Hiskens, "Sparsity-Exploiting Moment-Based Relaxations of the Optimal Power Flow Problem," *IEEE Transactions on Power Systems*, vol. 30, no. 6, pp. 3168-3180, November 2015.

2014 52. **D.K. Molzahn**, B.C. Lesieutre, and C.L. DeMarco, "Approximate Representation of ZIP Loads in a Semidefinite Relaxation of the OPF Problem," *IEEE Transactions on Power Systems (Letters)*, vol. 29, no. 4, pp. 1864-1865, July 2014.
53. **D.K. Molzahn**, B.C. Lesieutre, and C.L. DeMarco, "A Sufficient Condition for Global Optimality of Solutions to the Optimal Power Flow Problem," *IEEE Transactions on Power Systems (Letters)*, vol. 29, no. 2, pp. 978-979, March 2014.

2013 54. **D.K. Molzahn**, J.T. Holzer, B.C. Lesieutre, and C.L. DeMarco, "Implementation of a Large-Scale Optimal Power Flow Solver Based on Semidefinite Programming," *IEEE Transactions on Power Systems*, vol. 28, no. 4, pp. 3987-3998, November 2013.
55. **D.K. Molzahn**, B.C. Lesieutre, and C.L. DeMarco, "A Sufficient Condition for Power Flow Insolvability with Applications to Voltage Stability Margins," *IEEE Transactions on Power Systems*, vol. 28, no. 3, pp. 2592-2601, August 2013.
56. **D.K. Molzahn** and B.C. Lesieutre, "Initializing Dynamic Power System Simulations Using Eigenvalue Formulations of the Induction Machine and Power Flow Models," *IEEE Transactions on Circuits and Systems I: Regular Papers*, vol. 60, no. 3, pp. 690–702, March 2013.
57. **D.K. Molzahn**, B.C. Lesieutre, and H. Chen, "Counterexample to a Continuation-Based Algorithm for Finding All Power Flow Solutions," *IEEE Transactions on Power Systems (Letters)*, vol. 28, no. 1, pp. 564–565, February 2013.

2011 58. **D.K. Molzahn** and C. Singletary, "An Empirical Investigation of Speculation in the MISO Financial Transmission Rights Auction Market," *The Electricity Journal*, vol. 24, issue 5, pp. 57–68, June 2011.

Conference Proceedings

2025 1. R. Piansky, S. Taylor, N. Rhodes, **D.K. Molzahn**, L.A. Roald, and J.P. Watson, "Quantifying Metrics for Wildfire Ignition Risk from Geographic Data in Power Shutoff Decision-Making," *58th Hawaii International Conference on System Sciences (HICSS)*, January 7-10, 2025.

2024 2. S. Talkington, R. Gupta, R. Asiamah, P. Buason, and **D.K. Molzahn**, "Strategic Electric Distribution Network Sensing via Spectral Bandits," *63rd IEEE Conference on Decision and Control (CDC)*, December 16-19, 2024.
3. R. Asiamah, R. Gupta, R. Haider, and **D.K. Molzahn**, "Performance Assessment of Data Sampling Strategies for Neural Network-based Voltage Approximations," *56th North American*

Power Symposium (NAPS), October 13-15, 2024.
First runner-up for the Best Graduate Presentation award.

4. L. Thomas, V. Thomas, and **D. K. Molzahn**, "Designing a Peer-to-Peer Energy Trading Market to Improve Prosumer Participation in a Community using Evolutionary Algorithms," *56th North American Power Symposium (NAPS)*, October 13-15, 2024.
5. P. Buason, S. Misra, and **D.K. Molzahn**, "Sample-Based Conservative Bias Linear Power Flow Approximations," *IEEE IAS Industrial and Commercial Power System Asia (IEEE I&CPS Asia)*, July 9-12, 2024.
6. R. Gupta, P. Buason, and **D.K. Molzahn**, "Fairness-aware Photovoltaic Generation Limits for Voltage Regulation in Power Distribution Networks using Conservative Linear Approximations," *8th Texas Power and Energy Conference (TPEC)*, February 12-13, 2024.
7. A.D. Owen Aquino, S. Talkington, and **D.K. Molzahn**, "Managing Vehicle Charging during Emergencies via Conservative Distribution System Modeling," *8th Texas Power and Energy Conference (TPEC)*, February 12-13, 2024.
8. B. Taheri and **D.K. Molzahn**, "AC Power Flow Informed Parameter Learning for DC Power Flow Network Equivalents," *8th Texas Power and Energy Conference (TPEC)*, February 12-13, 2024.
9. R. Harris and **D.K. Molzahn**, "Detecting and Mitigating Data Integrity Attacks on Distributed Algorithms for Optimal Power Flow using Machine Learning," *57th Hawaii International Conference on System Sciences (HICSS)*, January 3-6, 2024.

2023 10. R. Harris, A. Banerjee, and **D.K. Molzahn**, "Synthetic Test Case for Ukraine's Power Grid," *55th North American Power Symposium (NAPS)*, October 15-17, 2023.
11. B. Taheri and **D.K. Molzahn**, "Restoring AC Power Flow Feasibility for Solutions to Relaxed and Approximated Optimal Power Flow Problems," *American Control Conference (ACC)*, May 31 – June 2, 2023.
12. A.D. Owen Aqunio, R. Harris, A. Kody, and **D.K. Molzahn**, "Comparing Machine Learning and Optimization Approaches for the $N-k$ Interdiction Problem Considering Load Variability," *56th Hawaii International Conference on System Sciences (HICSS)*, January 3-6, 2023.

2022 13. A. Kody, A. West, and **D.K. Molzahn**, "Sharing the Load: Considering Fairness in De-energization Scheduling to Mitigate Wildfire Ignition Risk using Rolling Optimization," *61st IEEE Conference on Decision and Control (CDC)*, December 6-9, 2022.
14. M. Alkhraijah, R. Harris, S. Litchfield, D. Huggins, and **D.K. Molzahn**, "Analyzing Malicious Data Injection Attacks on Distributed Optimal Power Flow Algorithms," *54th North American Power Symposium*, October 9-11, 2022.
15. A. Kody, R. Piansky, and **D.K. Molzahn**, "Optimizing Transmission Infrastructure Investments to Support Line De-energization for Mitigating Wildfire Ignition Risk," *11th IREP Symposium on Bulk Power Systems Dynamics and Control*, July 25-30, 2022.
16. R. Harris, M. Alkhraijah, D. Huggins, and **D.K. Molzahn**, "On the Impacts of Different Consistency Constraint Formulations for Distributed Optimal Power Flow," *Texas Power and Energy Conference (TPEC)*, February 28 - March 1, 2022.

2021 17. S. Xu, R. Ma, **D.K. Molzahn**, H.L. Hijazi, and C. Josz, "Verifying Global Optimality of Candidate Solutions to Polynomial Optimization Problems using a Determinant Relaxation Hierarchy," *60th IEEE Conference on Decision and Control (CDC)*, December 13-15, 2021.

18. A.D. Owen Aquino, L.A. Roald, and **D.K. Molzahn**, "Identifying Redundant Constraints for AC OPF: The Challenges of Local Solutions, Relaxation Tightness, and Approximation Inaccuracy," *53rd North American Power Symposium (NAPS)*, November 14-16, 2021.
19. P. Buason and **D.K. Molzahn**, "Analysis of Fast Decoupled Power Flow via Multiple Axis Rotations," *52nd North American Power Symposium (NAPS)*, April 11-13, 2021.
20. A. Ivemeyer, M. Bossart, R.W. Kenyon, A. Sajadi, B.-M. Hodge, and **D.K. Molzahn**, "Assessing the Accuracy of Balanced Power System Models in the Presence of Voltage Unbalance," *Power and Energy Conference at Illinois (PECI)*, April 1-2, 2021.
21. M. Alkhraijah, M. Alowaifeer, X. Li, M.J. Till, and **D.K. Molzahn**, "Reactive Power Planning using Security-Constrained AC Optimal Power Flow and Sensitivity Analyses," *Power and Energy Conference at Illinois (PECI)*, April 1-2, 2021.
22. S. Tandon, S. Grijalva, and **D.K. Molzahn**, "Motivating the Use of Dynamic Line Ratings to Mitigate the Risk of Wildfire Ignition," *Power and Energy Conference at Illinois (PECI)*, April 1-2, 2021.
23. M. Alkhraijah, M. Alowaifeer, S. Grijalva, and **D.K. Molzahn**, "Distributed Multi-Period DCOPF via an Auxiliary Principle Problem Algorithm," *5th Texas Power and Energy Conference (TPEC)*, February 2-5, 2021.

2020 24. Z.J. Zhang, P.T. Mana, D. Yan, Y. Sun, and **D.K. Molzahn**, "Study of Active Line Flow Constraints in DC Optimal Power Flow Problems," *IEEE SoutheastCon*, March 12-15, 2020.

2019 25. K. Girigoudar, **D.K. Molzahn**, and L.A. Roald, "On The Relationships Among Different Voltage Unbalance Definitions," *51st North American Power Symposium (NAPS)*, October 13-15, 2019.
26. L.A. Roald and **D.K. Molzahn**, "Implied Constraint Satisfaction in Power System Optimization: The Impacts of Load Variations," *57th Annual Allerton Conference on Communication, Control, and Computing*, September 25-27, 2019.
27. T. Mühlpfordt, **D.K. Molzahn**, V. Hagenmeyer, and S. Misra, "Optimal Adaptive Power Flow Linearizations: Expected Error Minimization using Polynomial Chaos Expansion," *IEEE Milan PowerTech*, June 23-27, 2019.
28. C. Josz, **D.K. Molzahn**, M. Tacchi, and S. Sojoudi, "Transient Stability Analysis of Power Systems via Occupation Measures," *Innovative Smart Grid Technologies (ISGT)*, February 17-20, 2019.
29. **D.K. Molzahn** and L.A. Roald, "Grid-Aware versus Grid-Agnostic Distribution System Control: A Method for Certifying Engineering Constraint Satisfaction," *52nd Hawaii International Conference on System Sciences (HICSS)*, January 8-11, 2019.

2018 30. M.R. Narimani, **D.K. Molzahn**, H. Nagarajan, and M.L. Crow "Comparison of Various Trilinear Monomial Envelopes for Convex Relaxations of Optimal Power Flow Problems," *IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, November 26-28, 2018.
31. M.R. Narimani, **D.K. Molzahn**, D. Wu, and M.L. Crow, "Empirical Investigation of Non-Convexities in Optimal Power Flow Problems," *American Control Conference (ACC)*, June 27-29, 2018.
32. **D.K. Molzahn** and L.A. Roald, "Towards an AC Optimal Power Flow Algorithm with Robust Feasibility Guarantees," *20th Power Systems Computation Conference (PSCC)*, June 11-15, 2018.

33. M.R. Narimani, **D.K. Molzahn**, and M.L. Crow, "Improving QC Relaxations of OPF Problems via Voltage Magnitude Difference Constraints and Envelopes for Trilinear Monomials," *20th Power Systems Computation Conference (PSCC)*, June 11-15, 2018.
34. S. Misra, **D.K. Molzahn**, and K. Dvijotham, "Optimal Adaptive Approximations of the AC Power Flow Equations," *20th Power Systems Computation Conference (PSCC)*, June 11-15, 2018.
35. J.A. Kersulis, I.A. Hiskens, C. Coffrin, and **D.K. Molzahn**, "Topological Graph Metrics for Detecting Grid Anomalies and Improving Algorithms," *20th Power Systems Computation Conference (PSCC)*, June 11-15, 2018.

2017
36. M. Yao, **D.K. Molzahn**, and J.L. Mathieu, "The Impact of Load Models in an Algorithm for Improving Power System Voltage Stability via Demand Response," *55th Annual Allerton Conference on Communication, Control, and Computing*, October 4-6, 2017.
37. L.A. Roald, **D.K. Molzahn**, and A.F. Tobler, "Power System Optimization with Uncertainty and AC Power Flow: Analysis of an Iterative Algorithm," *10th IREP Symposium on Bulk Power System Dynamics and Control*, August 27–September 1, 2017.
38. M. Yao, J.L. Mathieu, and **D.K. Molzahn**, "Using Demand Response to Improve Power System Voltage Stability Margins," *IEEE PowerTech Manchester*, June 18-22, 2017.
High-quality paper award.

2016
39. K. Dvijotham and **D.K. Molzahn**, "Error Bounds on the DC Power Flow Approximation: A Convex Relaxation Approach," *55th IEEE Conference on Decision and Control (CDC)*, December 12-14, 2016.
40. **D.K. Molzahn**, C. Josz, and I.A. Hiskens, "Moment Relaxations of Optimal Power Flow Problems: Beyond the Convex Hull," *IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, December 7-9, 2016.
41. **D.K. Molzahn**, D. Mehta, and M. Niemerg, "Toward Topologically Based Upper Bounds on the Number of Power Flow Solutions," *American Control Conference (ACC)*, July 6-8, 2016. **Best presentation in session award.**
42. D. Mehta, **D.K. Molzahn**, K. Turitsyn, "Recent Advances in Computational Methods for the Power Flow Equations," *American Control Conference (ACC)*, July 6-8, 2016.
43. **D.K. Molzahn**, C. Josz, I.A. Hiskens, and P. Panciatici, "Computational Advances for Sparsity-Exploiting Moment Relaxations of the OPF Problem," *19th Power Systems Computation Conference (PSCC)*, June 20-24, 2016.
44. **D.K. Molzahn**, I.A. Hiskens, and B.C. Lesieutre, "Calculation of Voltage Stability Margins and Certification of Power Flow Insolvability using Second-Order Cone Programming," *49th Hawaii International Conference on System Sciences (HICSS)*, January 5-8, 2016.

2015
45. **D.K. Molzahn**, C. Josz, I.A. Hiskens, and P. Panciatici, "Solution of Optimal Power Flow Problems using Moment Relaxations Augmented with Objective Function Penalization," *54th IEEE Conference on Decision and Control (CDC)*, December 15-18, 2015.
46. **D.K. Molzahn**, Z.B. Friedman, B.C. Lesieutre, C.L. DeMarco, and M.C. Ferris, "Estimation of Constraint Parameters in Optimal Power Flow Data Sets," *47th North American Power Symposium (NAPS)*, October 4-6, 2015.
47. **D.K. Molzahn** and I.A. Hiskens, "Mixed SDP/SOCP Moment Relaxations of the Optimal Power Flow Problem," *IEEE PowerTech Eindhoven*, June 29–July 2, 2015.

48. **D.K. Molzahn**, S.S. Baghsorkhi, and I.A. Hiskens, "Semidefinite Relaxations of Equivalent Optimal Power Flow Problems: An Illustrative Example," *IEEE International Symposium on Circuits and Systems (ISCAS)*, May 24-27, 2015.

2014 49. P. Panciatici, M.C. Campi, S. Garatti, S.H. Low, **D.K. Molzahn**, A.X. Sun, L. Wehenkel, "Advanced Optimization Methods for Power Systems," *18th Power Systems Computation Conference (PSCC)*, August 18-22, 2014.

50. **D.K. Molzahn** and I.A. Hiskens, "Moment-Based Relaxation of the Optimal Power Flow Problem," *18th Power Systems Computation Conference (PSCC)*, August 18-22, 2014.

51. **D.K. Molzahn**, B.C. Lesieutre, and C.L. DeMarco, "Investigation of Non-Zero Duality Gap Solutions to a Semidefinite Relaxation of the Optimal Power Flow Problem," *47th Hawaii International Conference on System Sciences (HICSS), 2014*, January 6-9, 2014.

2013 52. A.R. Borden, **D.K. Molzahn**, B.C. Lesieutre, and P. Ramanathan, "Power System Structure and Confidentiality Preserving Transformation of Optimal Power Flow Problem," *51st Annual Allerton Conference on Communication, Control, and Computing, 2013*, October 2-4, 2013.

53. **D.K. Molzahn**, V. Dawar, B.C. Lesieutre, and C.L. DeMarco, "Sufficient Conditions for Power Flow Insolvability Considering Reactive Power Limited Generators with Applications to Voltage Stability Margins," *9th IREP Symposium on Bulk Power System Dynamics and Control*, August 25-30, 2013.

2012 54. A.R. Borden, **D.K. Molzahn**, P. Ramanathan, and B.C. Lesieutre, "Confidentiality-Preserving Optimal Power Flow for Cloud Computing," *50th Annual Allerton Conference on Communication, Control, and Computing*, pp. 1300-1307, October 1-5, 2012.

2011 55. B.C. Lesieutre, **D.K. Molzahn**, A.R. Borden, and C.L. DeMarco, "Examining the Limits of the Application of Semidefinite Programming to Power Flow Problems," in *49th Annual Allerton Conference on Communication, Control, and Computing*, pp. 1492-1499, September 28-30, 2011.

56. D.R. Schwarting, **D.K. Molzahn**, C.L. DeMarco, and B.C. Lesieutre, "Topological and Impedance Element Ranking (TIER) of the Bulk-Power System," *44th Hawaii International Conference on System Sciences (HICSS), 2011*, pp. 1-10, January 4-7, 2011.

2010 57. **D.K. Molzahn** and B.C. Lesieutre, "An Eigenvalue Formulation for Determining Initial Conditions of Induction Machines in Dynamic Power System Simulations," *2010 IEEE International Symposium on Circuits and Systems (ISCAS)*, pp. 2311-2313, May 30–June 2, 2010.

Plenary Lectures

2022 1. **D.K. Molzahn**, "A Review of Recent Developments in Nonlinear Optimization of Electric Power Systems," plenary lecture at *IFAC Conference on Networked Systems (NecSys 22)*, July 5, 2022.

Other Conference and Workshop Presentations

2024 1. J. Cohn, **D.K. Molzahn**, S. Dhople, and M.A. Goldberg, "Algorithms and Interviews: Using Historical Methods to Enhance Power Grid Engineering," panel presentation at *International Network for Engineering Studies (INES)* Workshop on *Engineering Interventions: Interdisciplinary Engagements with Engineers*, November 13, 2024.

2. J. Cohn, **D.K. Molzahn**, S. Dhople, and M.A. Goldberg, "Contemplating the future of the Power Grid by Tracing its History," panel presentation at *IEEE Power and Energy Society General Meeting (PESGM)*, July 24, 2024.

2023 3. R. Piansky, M. Pollack, A. Kody, S. Gupta, and **D.K. Molzahn**, "Optimizing Equitable Infrastructure Investment Decisions Under High Wildfire Risk Scenarios," *INFORMS Annual Meeting*, Phoenix, Arizona, October 16, 2023.

4. **D.K. Molzahn**, "Overcoming Nonlinearities, Uncertainties, and Discreteness to Mitigate the Impacts of Extreme Events on Electric Power Systems," *IEEE Power and Energy Society General Meeting*, Orlando, FL, July 19, 2023.

5. C. Hettle, S. Gupta, and **D.K. Molzahn**, "Fair and Reliable Reconnections for Temporary Disruptions in Electric Distribution Networks Using Submodularity," Poster presentation at *Los Alamos National Laboratory Grid Science Winter School and Conference*, January 9-13, 2023.

6. R. Piansky, A. Kody, and **D.K. Molzahn**, "Siting and Sizing Batteries for Cost Optimization in a Wildfire Setting," Poster presentation at *Los Alamos National Laboratory Grid Science Winter School and Conference*, January 9-13, 2023.

2022 7. R. Harris, M. Alkhraijah, S. Litchfield, N. Foster, D. Huggins, and **D.K. Molzahn**, "Distributed Optimal Power Flow Robust to False Data Injection Attack," *AI4OPT TechFest Poster Session*, Atlanta, GA, November 16, 2022.

8. **D.K. Molzahn**, A. Kody, A. West, M.A.N. Lopes, A. Ivemeyer, and S. Gupta, "Assessing and Improving Fairness in the Operation of Resilient Electric Power Grids," *INFORMS Annual Meeting*, Indianapolis, IN, October 17, 2022.

9. C. Hettle, S. Gupta, and **D.K. Molzahn**, "Fair and Reliable Reconnections for Temporary Disruptions in Electric Distribution Networks Using Submodularity," *INFORMS Annual Meeting*, Indianapolis, IN, October 17, 2022.

10. A. Kody and **D.K. Molzahn**, "Computational Methods for Optimizing the Mitigation of Wildfire Ignition Risk for Electric Power Networks," *INFORMS Annual Meeting*, Indianapolis, IN, October 17, 2022.

11. **D.K. Molzahn**, "Computing and Applying Tailored Power Flow Approximations and Relaxations in Power System Optimization Problems," *INFORMS Annual Meeting*, Indianapolis, IN, October 16, 2022.

12. P. Buason, S. Misra, and **D.K. Molzahn**, "A Data-Driven Method to Identify Critical Location in Distribution Grids," *Los Alamos National Laboratory Student Symposium*, Los Alamos, NM, August 1, 2022.

13. **D.K. Molzahn**, "Evaluating the Performance of Distributed Optimal Power Flow Algorithms with Nonideal Communications," panel on *Distributed Optimization in the Power System: Advancement, Challenges, and Applications* during *IEEE Power and Energy Society General Meeting*, Denver, CO, July 12, 2022.

14. **D.K. Molzahn**, "Evaluating the Performance of Distributed Optimal Power Flow Algorithms with Nonideal Communications," tutorial on *Distributed Optimization for Electric Power Systems: Needs, Algorithmic Developments, and Use Cases* during *IEEE Power and Energy Society General Meeting*, Denver, CO, July 17, 2022.

15. M. Alkhraijah, R. Harris, S. Litchfield, N. Foster, C. Raslawski, D. Huggins, and **D.K. Molzahn**, "Analyzing Malicious Data Injection Attacks on Distributed Optimal Power Flow Algorithms," poster presentation at *5th Workshop on Autonomous Energy Systems at NREL*, Golden, CO, July 14, 2022.

16. **D.K. Molzahn**, "Overview of Research on Electric Power Systems," *AI4All Summer Program at the Georgia Institute of Technology*, Atlanta, GA, June 16, 2022.
17. **D.K. Molzahn**, "Overview of Research on Electric Power Systems," *AI4OPT Summer Sessions*, Atlanta, GA, June 7, 2022.
18. **D.K. Molzahn** and M. Alkhraijah, "Evaluating the Performance of Distributed Optimal Power Flow Algorithms with Nonideal Communications," tutorial on *Distributed Optimization for Electric Power Systems: Needs, Algorithmic Developments, and Use Cases* during *13th Innovative Smart Grid Technologies (ISGT 2022)*, March 1-2, 2022.

2021 19. A. Kody, Y. Kim, K. Kim, and **D.K. Molzahn**, "Parameter Learning in Alternating Direction Method of Multipliers," *INFORMS Annual Meeting 2021*, October 27, 2021.

20. M. Alkhraijah and **D.K. Molzahn**, "Evaluating the Performance of Distributed Optimization Algorithms with Nonideal Data Sharing," *INFORMS Annual Meeting 2021*, October 27, 2021.
21. **D.K. Molzahn** and P. Buason, "A Bilevel Optimization Approach to Sensor Placement in Electric Distribution Systems," *INFORMS Annual Meeting 2021*, October 26, 2021.
22. **D.K. Molzahn**, D. Lee, K. Turitsyn, and L.A. Roald, "Robust AC Optimal Power Flow with Robust Convex Restriction," *NREL Workshop on Resilient Autonomous Energy Systems*, September 8, 2021.
23. P. Buason, S. Misra, and **D.K. Molzahn**, "Locating Sensors to Identify Violations of Critical Limits in Distribution Systems," *IEEE Power and Energy Society General Meeting*, July 27, 2021.
24. **D.K. Molzahn**, M. Alkhrajiah, and C. Menendez, "Distributed Optimal Power Flow Algorithms with Nonideal Communications," *SIAM Conference on Optimization*, July 20, 2021.
25. **D.K. Molzahn**, A. Kody, S. Tandon, A.S. Xavier, and F. Qiu, "Mitigating the Risk of Fault-Induced Wildfires using Transmission Switching," *IISE Annual Conference*, May 25, 2021.
26. **D.K. Molzahn**, D. Lee, K. Turitsyn, and L.A. Roald, "Applications of Convex Restriction Techniques to Electric Power System Optimization Problems," *Los Alamos National Laboratory Grid Science Winter School and Conference*, January 15, 2021.
27. S. Tandon, A. Kody, and **D.K. Molzahn**, "Operation and Planning of FACTS Devices for Wildfire Risk Reduction," Poster presentation at *Los Alamos National Laboratory Grid Science Winter School and Conference*, January 12, 2021.
28. P. Buason and **D.K. Molzahn**, "Analysis of Fast Decoupled Power Flow via Multiple Axis Rotations," Poster presentation at *Los Alamos National Laboratory Grid Science Winter School and Conference*, January 12, 2021.
29. M. Alkhrajiah and **D.K. Molzahn**, "The Impacts of Communication Errors on Distributed Algorithms for Optimal Power Flow Problems," Poster presentation at *Los Alamos National Laboratory Grid Science Winter School and Conference*, January 12, 2021.
30. A.D. Owen Aquino, J.A. Huertas, G. Nilsson, K. Iles, S. Coogan, P. Van Hentenryck, and **D.K. Molzahn**, "How High Penetrations of Electric Vehicles Impacts the Way We Evacuate Cities," Poster presentation at *Los Alamos National Laboratory Grid Science Winter School and Conference*, January 12, 2021.

2020 31. **D.K. Molzahn** and L.A. Roald, "Applications of Constraint Screening Methods to Electric Power Systems," *INFORMS Annual Meeting 2020*, November 11, 2020.

32. **D.K. Molzahn**, A. Wächter, E. Wei, R. Tushen, F.E. Curtis, E. Wong, "Security-Constrained AC Optimal Power Flow: Team GO-SNIP," *IEEE Power and Energy Society General Meeting*, August 4, 2020.

2019 33. **D.K. Molzahn**, "Convex Relaxations of the Power Flow Equations: Recent Advances and Emerging Applications," *Georgia Tech Workshop on Electric Energy Systems and Operations Research*, Atlanta, GA, November 14-15, 2019.

34. **D.K. Molzahn**, S. Misra, K. Dvijotham, T. Mühlpfordt, and B. Li, "Optimal Adaptive Linearizations of the AC Power Flow Equations," *INFORMS Annual Meeting 2019*, Seattle, WA, October 20-23, 2019.

35. **D.K. Molzahn**, M.R. Narimani, H. Nagarajan, and M.L. Crow, "Using Coordinate Transformations to Strengthen QC Relaxations of Optimal Power Flow Problems," *INFORMS Annual Meeting 2019*, Seattle, WA, October 20-23, 2019.

36. **D.K. Molzahn** and L.A. Roald, "Applications of Constraint Screening Methods to Electric Power Systems," *INFORMS Annual Meeting 2019*, Seattle, WA, October 20-23, 2019.

37. **D.K. Molzahn** and L.A. Roald, "Applications of Constraint Screening Methods to Electric Power Systems," *Modeling and Optimization: Theory and Applications (MOPTA)*, Bethlehem, PA, August 14-16, 2019.

38. **D.K. Molzahn** and L.A. Roald, "An Overview of Robust AC Optimal Power Flow Problems," *IEEE Power and Energy Society General Meeting*, Atlanta, GA, August 8, 2019.

39. M.R. Narimani, **D.K. Molzahn**, and M.L. Crow, "Tightening QC Relaxations of AC Optimal Power Flow Problems via Coordinate Transformations," *IEEE Power and Energy Society General Meeting, Student Poster Session*, Atlanta, GA, August 4, 2019.

40. **D.K. Molzahn**, "Convex Relaxations of the Power Flow Equations: Overview and Selected Applications," *ChrisFest: A Symposium in Honor of Christopher DeMarco*, Madison, WI, May 15, 2019.

41. **D.K. Molzahn**, S. Misra, and T. Mühlpfordt "Controlling Electric Power Grids: Computing Optimal Adaptive Approximations of the Power Flow Equations," Poster presentation at *18th German-American Frontiers of Engineering Symposium organized by the Alexander von Humboldt Foundation (AvH) and the National Academy of Engineering (NAE)*, Hamburg, Germany, March 20-23, 2019.

2018 42. **D.K. Molzahn** and S. Misra, "Optimal Adaptive Approximations of the Power Flow Equations," *Georgia Tech Workshop on Electric Energy Systems and Operations Research*, Atlanta, GA, November 15-16, 2018.

43. A. Venzke, S. Chatzivasileiadis, and **D.K. Molzahn**, "Recovery of Locally Optimal Solutions from Convex Relaxations of the AC Optimal Power Flow," *INFORMS Annual Meeting 2018*, Phoenix, AZ, November 4-7, 2018.

44. **D.K. Molzahn** and L.A. Roald, "AC Optimal Power Flow with Robust Feasibility Guarantees," *Modeling and Optimization: Theory and Applications (MOPTA)*, Bethlehem, PA, August 15-17, 2018.

45. **D.K. Molzahn**, H. Hijazi, and C. Josz, "Quickly Certifying Global Optimality of a Candidate Optimal Power Flow Solution using a Moment Relaxation Hierarchy," *Power Systems: Semi-Algebraic Techniques for Optimal Power Flow and Stability Assessment*, Paris, France, January 16-17, 2018.

2017 46. **D.K. Molzahn** and L.A. Roald, "AC Optimal Power Flow with Robust Feasibility Guarantees," *Georgia Tech Workshop on Electric Energy Systems and Operations Research*, Atlanta, GA, November 9-10, 2017.

47. **D.K. Molzahn** and K. Dvijotham, "Error Bounds on Power Flow Linearizations: A Convex Relaxation Approach," *INFORMS Annual Meeting 2017*, Houston, TX, October 22-25, 2017.

48. **D.K. Molzahn**, M. Yao, and J.L. Mathieu, "A Multi-Period OPF Approach to Improve Voltage Stability using Demand Response," *INFORMS Annual Meeting 2017*, Houston, TX, October 22-25, 2017.

49. **D.K. Molzahn**, "Characterizing Non-Convexities in the Feasible Spaces of AC OPF Problems," *INFORMS Annual Meeting 2017*, Houston, TX, October 22-25, 2017.

50. O. Coss, J.D. Hauenstein, H. Hong, and **D.K. Molzahn**, "Finding & Counting Equilibria of the Kuramoto Model for Coupled Oscillators," *SIAM Conference on Applied Algebraic Geometry*, Atlanta, GA, July 31–August 4, 2017.

51. **D.K. Molzahn**, C. Josz, I.A. Hiskens, and P. Panciatici, "A Laplacian-Based Approach for Finding Near Globally Optimal Solutions to OPF Problems," *IEEE Power and Energy Society General Meeting, Transactions Paper Session*, Chicago, IL, July 19, 2017.

52. **D.K. Molzahn**, J.L. Mathieu, and M. Yao, "Power System Voltage Stability using Demand Response," *Staff Technical Conference on Increasing Real-Time and Day-Ahead Market Efficiency through Improved Software (Docket No. AD10-12-008)*, Federal Energy Regulatory Commission, Washington, DC, June 26-28, 2017.

53. **D.K. Molzahn** and K. Dvijotham, "Error Bounds on Power Flow Linearizations: A Convex Relaxation Approach," *Staff Technical Conference on Increasing Real-Time and Day-Ahead Market Efficiency through Improved Software (Docket No. AD10-12-007)*, Federal Energy Regulatory Commission, Washington, DC, June 26-28, 2017.

54. **D.K. Molzahn**, "A Tutorial on Convex Relaxations of the Power Flow Equations," *Modern Challenges in Power System Operation and Electricity Market: An Optimization Perspective*, DTU Summer School, Copenhagen, Denmark, June 12-16, 2017.

55. **D.K. Molzahn** and K. Dvijotham, "Error Bounds on Power Flow Linearizations: A Convex Relaxation Approach," *Banff International Research Station, Workshop on Optimization and Inference for Physical Flows on Networks (17w5165)*, March 7, 2017.

56. **D.K. Molzahn**, D. Wu, B.C. Lesieutre, and K. Dvijotham, "Computing Multiple Local Optima for OPF Problems using an Elliptical Tracing Algorithm," *INFORMS Computing Society Conference (ICS)*, Austin, TX, January 15-17, 2017.

57. **D.K. Molzahn** and K. Dvijotham, "Error Bounds on Power Flow Linearizations: A Convex Relaxation Approach," *Los Alamos National Laboratory, Center for Nonlinear Studies, Grid Science Winter School and Conference*, Santa Fe, NM, January 12-13, 2017.

2016 58. **D.K. Molzahn**, "Visualizing The Feasible Spaces of Optimal Power Flow Problems and Their Convex Relaxations," *INFORMS Annual Meeting 2016*, Nashville, TN, November 13-16, 2016.

59. J.-C. Gilbert, C. Josz, and **D.K. Molzahn**, "Plea for a Semidefinite Optimization Solver in Complex Numbers," *14th EUROPT Workshop on Advances in Continuous Optimization*, Warsaw, Poland, July 1-2, 2016.

60. **D.K. Molzahn**, "Visualizing the Feasible Spaces of Challenging OPF Problems," *Staff Technical Conference on Increasing Real-Time and Day-Ahead Market Efficiency through Improved*

Software (Docket No. AD10-12-007), Federal Energy Regulatory Commission, Washington, DC, June 27-29, 2016.

61. C. Josz and **D.K. Molzahn**, "Moment/Sum-of-Squares Hierarchy for Complex Polynomial Optimization," *INFORMS International*, Waikoloa Village, HI, June 12-15, 2016.
62. **D.K. Molzahn**, F. Qiu, and J. Wang, "Optimization of Electric Power Systems: Considering Uncertainty and Non-Convexity," Poster presentation at *Argonne National Laboratory Grid Day*, Lemont, IL, April 18, 2016.

2015 63. **D.K. Molzahn** and I.A. Hiskens, "Computational Advances for Moment Relaxations of Optimal Power Flow Problems," *INFORMS Annual Meeting 2015*, Philadelphia, PA, November 1-4, 2015.

64. **D.K. Molzahn**, I.A. Hiskens, and B.C. Lesieutre, "Calculation of Voltage Stability Margins and Certification of Power Flow Insolvability using Convex Relaxations," *INFORMS Annual Meeting 2015*, Philadelphia, PA, November 1-4, 2015.
65. **D.K. Molzahn** and I.A. Hiskens, "Sparsity-Exploiting Moment Relaxations of Optimal Power Flow Problems," *22nd International Symposium on Mathematical Programming*, Pittsburgh, PA, July 12-17, 2015.
66. **D.K. Molzahn** and I.A. Hiskens, "Moment-Based Relaxations of the Optimal Power Flow Problem," *SIAM Conference on Computational Science and Engineering*, Salt Lake City, UT, March 14-18, 2015.

2014 67. **D.K. Molzahn** and I.A. Hiskens, "Convex Optimization of Electric Power Systems," *Dow Sustainability Fellows Symposium*, poster session, Ann Arbor, MI, November 15, 2014.

68. **D.K. Molzahn** and I.A. Hiskens, "Moment-Based Relaxations of Optimal Power Flow Problems," *INFORMS Annual Meeting 2014*, San Francisco, CA, November 9-12, 2014.
69. **D.K. Molzahn** and I.A. Hiskens, "Moment-Based Relaxations of Optimal Power Flow Problems," *Staff Technical Conference on Increasing Real-Time and Day-Ahead Market Efficiency through Improved Software (Docket No. AD10-12-005)*, Federal Energy Regulatory Commission, Washington, DC, June 23-25, 2014.
70. **D.K. Molzahn** and I.A. Hiskens, "Moment-Based Relaxation of the Optimal Power Flow Problem," *IBM and RTE Workshop on Convexification of the AC Optimal Power Flow Problem*, Dublin, Ireland, April 23, 2014.

2013 71. **D.K. Molzahn**, B.C. Lesieutre, C.L. DeMarco, and M.C. Ferris, "Application of Semidefinite Programming to Large-Scale Optimal Power Flow Problems," *Staff Technical Conference on Increasing Real-Time and Day-Ahead Market Efficiency through Improved Software (Docket No. AD10-12-004)*, Federal Energy Regulatory Commission, Washington, DC, June 24-26, 2013.

72. M.C. Ferris, Z.B. Friedman, **D.K. Molzahn**, C.L. DeMarco, and B.C. Lesieutre, "ACOPF Models: Extending Data, Formulations, and Solution Methodology," *Staff Technical Conference on Increasing Real-Time and Day-Ahead Market Efficiency through Improved Software (Docket No. AD10-12-004)*, Federal Energy Regulatory Commission, Washington, DC, June 24-26, 2013.
73. B.C. Lesieutre, **D.K. Molzahn**, and C.L. DeMarco, "Advanced Optimization Tools for OPF Formulations in Power Markets," *Power Systems Engineering Research Center (PSERC) Industry-University Meeting, 2013*, Madison, WI, May 29-31, 2013.

2019 1. S. Babaeinejadsarookolaee, A. Birchfield, R.D. Christie, C. Coffrin, C.L. DeMarco, R. Diao, M. Ferris, S. Fliscounakis, S. Greene, R. Huang, C. Josz, R. Korab, B.C. Lesieutre, J. Maeght, **D.K. Molzahn**, T.J. Overbye, P. Panciatici, B. Park, J. Snodgrass, and R.D. Zimmerman, "The Power Grid Library for Benchmarking AC Optimal Power Flow Algorithms," technical report by the IEEE PES PGLib Task Force, arXiv:1908.02788, August 2019.
2020 Working Group Award for Technical Report from the IEEE Power and Energy Society (PES) Power System Operation, Planning and Economics (PSOPE) Committee.

2016 2. S. Backhaus, K. Kalsi, S. Misra, **D.K. Molzahn**, J. Lian, E. Dall'Anese, M. Vuffray, S. Kundu, and K. Baker, "Grid Modernization Initiative Project 1.4.10 Control Theory Project Road Map," October 2016.

3. **D.K. Molzahn**, M. Niemerg, D. Mehta, and J.D. Hauenstein, "Investigating the Maximum Number of Real Solutions to the Power Flow Equations: Analysis of Lossless Four-Bus Systems," arXiv:1603.05908, March 2016.

2012 4. B.C. Lesieutre, C.L. DeMarco, and **D.K. Molzahn**, "Power System Deliverability Ranking of Critical Elements to Support Select Facilities," *Report to the Federal Energy Regulatory Commission (not publicly available)*, January 2012.

5. B.C. Lesieutre, C.L. DeMarco, and **D.K. Molzahn**, "Power System Ranking of Nodal Locations," *Report to the Federal Energy Regulatory Commission (not publicly available)*, January 2012.

2010 6. **D.K. Molzahn**, S.P. Williams, and R. Srinivasan, "Plug-In Vehicles in Madison, WI: Consumer Preferences, Charging Stations, and Distribution System Impacts," *Energy Analysis and Policy Capstone Project Report to Madison Gas and Electric (not publicly available)*, 2010.

Invited Seminars

2024 1. **D.K. Molzahn**, T. Ziegler, O. Mason, D. Abalde, P. Yadav, R. O'Meara, and M. Yuan, "Vertically Integrated Projects Team: Gaming for Electric Power Grids," *Georgia Tech Advisory Board Spring Meeting*, March 15, 2024.

2023 2. **D.K. Molzahn** and J.A. Cohn, "From Edison's Bulbs to Chevy Bolts: A Historical Look at Power Grids and the Road Ahead," *GM Geek Program*, November 16, 2023.

3. **D.K. Molzahn**, "Cybersecurity of Distributed Optimization for Electric Power Systems," *FERC OEIS Visit*, November 16, 2023.

4. **D.K. Molzahn**, "A Review of Optimization Methods for Electric Power Systems," *MathWorks Seminar*, July 12, 2023.

2022 5. **D.K. Molzahn**, "An Overview of Distributed Optimization in Electric Power Systems," *Argonne National Laboratory CEEESA Seminar*, April 22, 2022.

6. **D.K. Molzahn**, "Recent Developments in Nonlinear Optimization of Electric Power Systems," *West Virginia University ECE Department Seminar*, March 28, 2022.

7. A.K. Srivastava and **D.K. Molzahn**, "Distributed Optimization and Control for Enabling Power Grid Resiliency," *IEEE Power and Energy Society Computing and Analytic Methods Subcommittee (CAMS) Webinar*, January 17, 2022.

2021 8. **D.K. Molzahn**, "A Review of Recent Developments in Nonlinear Optimization of Electric Power Systems," *IEEE Power and Energy Society, University of California, Berkeley Student Chapter Seminar*, April 7, 2021.

9. **D.K. Molzahn**, "An Overview of Distributed Optimization in Electric Power Systems," *IEEE Power and Energy Society, Atlanta Chapter Seminar*, February 16, 2021.
10. **D.K. Molzahn**, "An Overview of Distributed Optimization in Electric Power Systems," *Georgia Tech Research Institute (GTRI) CIPHER Lab*, January 19, 2021.

2020 11. **D.K. Molzahn**, "Applications of Convex Restriction Techniques to Electric Power System Optimization Problems," *Université catholique de Louvain, Mathematical Engineering Departmental Seminar*, December 1, 2020.

12. **D.K. Molzahn**, "Applications of Polynomial Optimization in Electric Power Systems," *Georgia Institute of Technology, Algorithms and Randomness Center ThinkTankTalk*, October 5, 2020.
13. **D.K. Molzahn**, "A Review of Recent Developments in Nonlinear Optimization of Electric Power Systems," *IEEE Power and Energy Society, Boston Chapter Seminar*, June 23, 2020.
14. **D.K. Molzahn**, "A Review of Recent Developments in Nonlinear Optimization of Electric Power Systems," *Power Systems Engineering Research Center (PSERC) Webinar*, March 10, 2020.

2019 15. **D.K. Molzahn**, "Convex Relaxations of the Power Flow Equations: Overview and Selected Applications," *Georgia Institute of Technology, ISyE Departmental Seminar*, August 28, 2019.

2018 16. **D.K. Molzahn**, "Achieving Robust Power System Operations using Convex Relaxations of the Power Flow Equations," *ETH Zürich*, November 12, 2018.

17. **D.K. Molzahn**, "Convex Relaxations of the Power Flow Equations: Overview and Selected Applications," *University of Colorado Boulder*, September 25, 2018.
18. **D.K. Molzahn**, "Recent Research in Power System Optimization: Approximation Error Quantification and Feasible Space Computation," *ETH Zürich*, May 31, 2018.
19. **D.K. Molzahn**, "Optimal Power Flow with Robust Feasibility Guarantees," *Argonne National Laboratory, Laboratory Directed Research and Development (LDRD) Seminar*, April 17, 2018.
20. **D.K. Molzahn**, "Characterizing Non-Convexities in the Feasible Spaces of OPF Problems and an Algorithm for Finding Multiple Local Optima," *Los Alamos National Laboratory, Center for Nonlinear Studies*, March 26, 2018.
21. **D.K. Molzahn**, "Recent Research in Power System Optimization: Feasible Space Computation and Approximation Error Quantification," *Boston University, Center for Information and Systems Engineering*, February 23, 2018.
22. **D.K. Molzahn**, "Recent Research in Power System Optimization: Feasible Space Computation and Approximation Error Quantification," *Massachusetts Institute of Technology*, February 22, 2018.

2017 23. **D.K. Molzahn**, "Recent Research in Power System Optimization: Approximation Error Quantification, Feasible Space Computation, and Convex Relaxations," *Northwestern University*, November 30, 2017.

24. **D.K. Molzahn** and L.A. Roald, "Recent Progress in Optimal Power Flow: A Survey of Convex Relaxations and an Algorithm for Robust Feasibility," *Argonne National Laboratory, Mathematics and Computer Science Division*, November 16, 2017.
25. **D.K. Molzahn**, "Recent Research in Power System Optimization: Approximation Error Quantification, Feasible Space Computation, and Convex Relaxations," *Purdue University*, October 19, 2017.

26. **D.K. Molzahn**, "Recent Research in Power System Optimization: Approximation Error Quantification, Feasible Space Computation, and Convex Relaxations," *University of Aalborg*, June 16, 2017.
27. **D.K. Molzahn**, "Recent Research in Power System Optimization: Approximation Error Quantification, Feasible Space Computation, and Convex Relaxations," *University of California, Berkeley*, May 3, 2017.
28. **D.K. Molzahn**, "Recent Research in Optimization of Electric Power Systems and Implications for Electricity Markets," *Energy Policy Institute at the University of Chicago (EPIC)*, February 21, 2017.

2016
29. **D.K. Molzahn**, "Moment Relaxations of Optimal Power Flow Problems," *Missouri University of Science and Technology*, October 4, 2016.
30. **D.K. Molzahn**, "Recent Developments in Moment Relaxations of Optimal Power Flow Problems," *Columbia University*, May 9, 2016.
31. **D.K. Molzahn**, "Moment Relaxations of Optimal Power Flow Problems," *Argonne National Laboratory*, January 22, 2016.

2015
32. **D.K. Molzahn**, "Computational Advances for Moment Relaxations of Optimal Power Flow Problems," *University of Wisconsin–Madison*, September 18, 2015.
33. **D.K. Molzahn** and I.A. Hiskens, "Computational Advances for Moment Relaxations of Optimal Power Flow Problems," *Réseau de transport d'électricité (RTE)*, June 23, 2015.
34. **D.K. Molzahn** and I.A. Hiskens, "Moment-Based Relaxations of the Optimal Power Flow Problem," *ETH Zürich*, June 8, 2015.
35. **D.K. Molzahn** and I.A. Hiskens, "Moment-Based Relaxations of the Optimal Power Flow Problem," *University of Notre Dame*, April 16, 2015.
36. **D.K. Molzahn** and I.A. Hiskens, "Optimization of Electric Power Systems," *University of Michigan Dow Sustainability Seminar*, February 26, 2015.
37. **D.K. Molzahn** and I.A. Hiskens, "Moment-Based Relaxations of the Optimal Power Flow Problem," *University of Illinois at Urbana-Champaign*, February 2, 2015.

2014
38. **D.K. Molzahn** and I.A. Hiskens, "Moment-Based Relaxations of the Optimal Power Flow Problem," *University of California, Berkeley*, November 6, 2014.
39. **D.K. Molzahn** and I.A. Hiskens, "Moment-Based Relaxation of the Optimal Power Flow Problem," *Argonne National Laboratory*, May 12, 2014.
40. **D.K. Molzahn** and I.A. Hiskens, "Moment-Based Relaxation of the Optimal Power Flow Problem," *University of Wisconsin–Madison*, April 10, 2014.
41. **D.K. Molzahn**, I.A. Hiskens, B.C. Lesieutre, and C.L. DeMarco, "Optimization and Other Research Topics in Electric Power Systems," *University of Michigan Dow Sustainability Seminar*, February 17, 2014.
42. **D.K. Molzahn**, I.A. Hiskens, B.C. Lesieutre, and C.L. DeMarco, "Application of Semidefinite Optimization Techniques to the Optimal Power Flow Problem," *Texas A&M University*, January 20, 2014.

2013
43. **D.K. Molzahn**, I.A. Hiskens, B.C. Lesieutre, and C.L. DeMarco, "Application of Semidefinite Optimization Techniques to the Optimal Power Flow Problem," *Los Alamos National Laboratory, Center for Nonlinear Studies*, October 30, 2013.

44. B.C. Lesieutre and **D.K. Molzahn**, "A New Method for Estimating Maximum Power Transfer and Voltage Stability Margins to Mitigate the Risk of Voltage Collapse," *PSERC Webinar*, October 15, 2013.
45. **D.K. Molzahn**, "Research Topics in Electric Power Systems Engineering," *University of Michigan Undergraduate Research Opportunity Program (UROP) Seminar*, October 8, 2013.
46. **D.K. Molzahn**, B.C. Lesieutre, and C.L. DeMarco, "Training on the TIER Methods for Ranking Transmission System Facilities," *Federal Energy Regulatory Commission Training Session*, June 18-20, 2013.

Software Packages

2023 1. M. Alkhraijah, R. Harris, C. Coffrin, and **D.K. Molzahn**, "PowerModelsADA: A Framework for Solving Optimal Power Flow using Distributed Algorithms," `https://github.com/mkhraijah/PowerModelsADA.jl`, 2023.

2018 2. IEEE PES PGLib-OPF Task Force, "Power Grid Lib: Benchmarks for Validating Power System Algorithms," `https://power-grid-lib.github.io` Power grid datasets under continuous curation by the IEEE PGLib-OPF Task Force, which I have co-chaired since September 2018.

2013 3. **D.K. Molzahn**, "`SDP_PF`: Implementation of Applications for a Semidefinite Programming Relaxation of the Power Flow Equations."

A package of MATLAB code integrated with MATPOWER that implements the semidefinite programming relaxation of the optimal power flow problem for large-scale systems, a sufficient condition for global optimality of an optimal power flow solution, a power flow insolvability condition (including the possibility of generator reactive power limits), and voltage stability margins. *Available in the current version of the* MATPOWER *distribution:* `https://matpower.org`

Funded Research Projects

2025 1. Stochastic Temperature-Dependent Models for Evaluating Flexible Load Dispatch
Agency/Company: Power Systems Engineering Research Center (PSERC)
Total Dollar Amount: $220k Role: Co-PI
Collaborators: Constance Crozier, Georgia Tech ISyE (PI), Anna Stuhlmacher, Michigan Tech ECE (Co-PI)
Period of Contract: 7/1/2025 – 8/31/2027
Share: 32% ($70k)

2. Synthetic-But-Realistic Power Grid Development Leveraging Open Source Data
Agency/Company: Lawrence Livermore National Laboratory LDRD
Role: PI (Georgia Tech lead), overall PI is J.P. Watson (Lawrence Livermore National Laboratory)
Collaborators: J.P. Watson, Lawrence Livermore National Laboratory (overall project PI)
Period of Contract: 1/1/2025 – 9/30/2027
Share: $265.7k

3. Resilient Critical Infrastructures via Provably Secure Control Algorithms
Agency/Company: Georgia Tech Strategic Energy Institute
Total Dollar Amount: $160k
Role: PI

Collaborators: Saman Zonouz, Georgia Tech ECE/SCP (Co-PI), Vladimir Kolesnikov, Georgia Tech SCP (Co-PI), Samuel Litchfield, GTRI CIPHER (Co-PI)
Period of Contract: 1/1/2025 – 6/30/2026
Share: 25% ($40k)

2024 4. Multi-hazard, Multi-objective, Multi-investment Optimal Transmission Infrastructure Expansion Planning for Natural Disaster Resilience (3M)
Agency/Company: Sandia National Laboratory Academic Alliance Program
Total Dollar Amount: $2.08M, including GT cost share
Role: PI (Georgia Tech lead), overall PI is Kyle Skolfield (Sandia National Laboratory)
Collaborators: Kyle Skolfield, Sandia National Laboratory (overall project PI), William Hart at Sandia National Laboratory (Co-PI), among other collaborators
Period of Contract: 10/1/2024 – 9/30/2027
Share: 25.5% ($531k)

5. Physics-Aware and AI-Enabled Automated Vulnerability Discovery and Patching in Heterogeneous Distributed Energy Resources against Cyber Attacks
Agency/Company: Department of Energy Office of Cybersecurity, Energy Security, and Emergency Response (CESER)
Total Dollar Amount: $4.2M
Role: Co-PI
Collaborators: Saman Zonouz, Georgia Tech SCP (PI), Wenke Lee, Georgia Tech SCP (Co-PI), David Nicol, University of Illinois at Urbana-Champaign ECE (Co-PI), David Emmerich, University of Illinois at Urbana-Champaign (Co-PI), Carter Manucy, National Rural Electric Cooperative Association (Co-PI), David Formby, Fortiphyd Logic (Co-PI), Richard Macwan, National Renewable Energy Laboratory (Co-PI), Sriharsha Etigowni, National Renewable Energy Laboratory (Co-PI)
Period of Contract: 8/1/2024 – 12/31/2026
Share: 10.9% ($457k)

2023 6. Global Centers Track 2: US-Africa Research Center for Clean Energy
Agency/Company: National Science Foundation
Total Dollar Amount: $250k
Role: Co-PI
Collaborators: Valerie Thomas, Georgia Tech ISyE (PI), Anthony Giarrusso, Georgia Tech College of Design (Co-PI), Allison Bridges, Georgia Tech Scheller College of Business (Co-PI), Ellen Bassett, Georgia Tech College of Design (Co-PI), Michael Oxman, Georgia Tech Scheller College of Business (Co-PI).
Period of Contract: 10/1/2023 – 10/1/2025
Share: 5.4% ($13.6k)

7. Assessing Inequality in health benefits from EV adoption, charging, and air pollution
Agency/Company: Georgia Tech Sustainability Next Call for Seed Grant Proposals
Total Dollar Amount: $17.9k
Role: Co-PI
Collaborators: Dylan Brewer, Georgia Tech Economics (PI), Jennifer Kaiser, Georgia Tech CEE/EAS (Co-PI). Period of Contract: 10/1/2023 – 6/30/2024
Share: 0% ($0k, unfunded collaborator supplement)

8. Assessing the Impacts of Electric Vehicle Adoption and Charging on Air Pollution and Health

Agency/Company: Georgia Tech Strategic Energy Institute
Total Dollar Amount: $293.1k
Role: PI
Collaborators: Jennifer Kaiser, Georgia Tech CEE/EAS (PI).
Period of Contract: 8/1/2023 – 7/31/2025
Share: 50% ($146.9k)

9. Computing Worst-Case Scenarios of Multiple Failures in Electric Power Grids using Machine Learning Techniques Inspired by Large Language Models
Agency/Company: Sandia National Laboratory Academic Alliance Program
Total Dollar Amount: $87.3k
Role: PI (Georgia Tech lead, overall project PI is William Hart at Sandia National Laboratory)
Collaborators: Emma Johnson, Sandia National Laboratory (Co-PI), William Hart at Sandia National Laboratory (overall project PI).
Period of Contract: 10/1/2023 – 9/30/2024
Share: 100% ($87.3k)

10. Project T-67: Smart Meter-Driven Distribution Grid Visibility and Control
Agency/Company: Power Systems Engineering Research Center (PSERC)
Total Dollar Amount: $220k
Role: PI
Collaborators: Line Roald, University of Wisconsin–Madison (Co-PI), Dan Fuhrmann, Michigan Technological University (Co-PI)
Period of Contract: 7/1/2023 – 8/31/2025
Share: 36% ($80k)

2022 11. Algorithms and Power Systems Architecture: Using Historical Analysis to Envision a Sustainable Future
Agency/Company: Sloan Foundation
Total Dollar Amount: $250k
Role: PI
Collaborators: Julie Cohn, University of Houston (Co-PI), Monica Perales, University of Houston (Co-PI), Sairaj Dhople, University of Minnesota (Co-PI)
Period of Contract: 12/1/2022 – 11/30/2024
Share: 21.6% ($54k)

12. CAREER: Overcoming Nonlinearities, Uncertainties, and Discreteness to Mitigate the Impacts of Extreme Events on Electric Power Systems
Agency/Company: National Science Foundation
Total Dollar Amount: $500k
Role: PI
Period of Contract: 2/1/2022 – 1/31/2027
Share: 100% ($500k)

13. Artificial Intelligence Institute for Advances in Optimization (AI4OPT)
Agency/Company: National Science Foundation
Total Dollar Amount: $20M
Role: Co-lead of the Energy Systems End Use Case and the Ethical AI Thrust
Collaborators: Pascal Van Hentenryck, Georgia Tech (PI), Justin Romberg, Georgia Tech (Co-PI), many other team members

Period of Contract: 2/1/2022 – 1/31/2027
Share: 2.5% ($500k), estimated

2021 14. A MATLAB-Based Extreme Event Simulation Tool for Power Engineering Education
Agency/Company: MathWorks Microgrants
Total Dollar Amount: $20k
Role: PI
Collaborators: N/A
Period of Contract: 9/1/2021 – 6/30/2022
Share: 100% ($20k)

15. Securing Distributed Agents in the Smart Grid
Agency/Company: Georgia Tech Research Institute (IRAD)
Total Dollar Amount: $112k
Role: PI
Collaborators: David Huggins, GTRI CIPHER Lab (PI), Samuel Litchfield, GTRI CIPHER Lab (SP), Nicolas Foster, GTRI CIPHER Lab (SP)
Period of Contract: 1/1/2021 – 6/30/2022
Share: 45% ($51k)

2020 16. Collaborative research: Polynomial Optimization and its Application to Power Systems
Agency/Company: National Science Foundation
Total Dollar Amount: $694k
Role: PI
Collaborators: Cedric Josz, Columbia University (PI)
Period of Contract: 9/1/2020 - 8/31/2023
Share: 46% ($317k)

17. Resiliency of Electric Power Grids During Pandemics
Agency/Company: Georgia Tech Research Institute (HIVES)
Total Dollar Amount: $25k
Role: PI
Period of Contract: 8/15/2020 – 6/30/2021
Share: (100%) $25k

18. Project T-64: Who Controls the DERs? Increasing DER Hosting Capacity through Targeted Modeling, Sensing, and Control
Agency/Company: Power Systems Engineering Research Center (PSERC)
Total Dollar Amount: $220k
Role: Co-PI
Collaborators: Line Roald, University of Wisconsin–Madison (PI), Mojdeh Hedman, Arizona State University (Co-PI)
Period of Contract: 7/1/2020 – 8/31/2022
Share: 32% ($70k)

19. Evacuating Urban Areas with Electrified Transportation Systems
Agency/Company: Georgia Tech Strategic Energy Institute
Total Dollar Amount: $80k
Role: PI
Collaborators: Sam Coogan, Georgia Tech ECE/CEE (Co-PI), Pascal Van Hentenryck, Georgia Tech ISyE (Co-PI)

Period of Contract: 4/1/2020 – 6/30/2023
Share: 50% ($40k)

2018 20. Mitigating Phase Unbalance for Distribution Systems with High Penetrations of Solar PV
Agency/Company: Department of Energy Solar Energy Technologies Office Lab Call
Total Dollar Amount: $750k
Role: PI
Collaborators: Line Roald, University of Wisconsin–Madison (Co-PI), Johanna Mathieu, University of Michigan (Co-PI), Ian Hiskens, University of Michigan (Co-PI), David Pinney, National Rural Electric Cooperative Association (Co-PI)
Period of Contract: 10/1/2018 – 12/31/2019
Share: 32.4% ($243k)

21. Hybrid Interior-Point/Active-Set SCOPF Algorithms Exploiting Power System Characteristics
Agency/Company: Department of Energy ARPA-E GO Competition, Seed and Prize Funding
Total Dollar Amount: $650k
Role: Co-PI
Collaborators: Frank Curtis, Lehigh University (PI), Andreas Waechter, Northwestern University (Co-PI), Ermin Wei, Northwestern University (Co-PI), Elizabeth Wong, University of California, San Diego (Co-PI)
Period of Contract: 10/1/2018 – 7/31/2022
Share: 12.0% ($78k)

2016 22. Enhancing Computational Tools for Polynomial Optimization Problems Relevant to Networked Systems
Agency/Company: Laboratory Directed Research and Development (LDRD) SEED Project, Argonne National Laboratory
Total Dollar Amount: $25k
Role: PI
Period of Contract: 10/1/2016 – 9/31/2017
Share: 100% ($25k)

23. EPIGRIDS: Electric Power Infrastructure & Grid Representation in Interoperable Data Sets
Agency/Company: Department of Energy ARPA-E GRID DATA
Total Dollar Amount: $1.867M
Role: Co-PI
Collaborators: Christopher DeMarco, University of Wisconsin–Madison (PI), Bernard Lesieutre, University of Wisconsin–Madison (Co-PI), Michael Ferris, University of Wisconsin–Madison (co-I), Qunying Huang, University of Wisconsin–Madison (co-I)
Period of Contract: 9/1/2016 – 8/31/2018
Share: 17.4% ($325k)

24. Control Theory Enabling the Deployment of Huge Numbers of Distributed Energy Resources
Agency/Company: Department of Energy Grid Modernization Laboratory Consortium (GMLC)
Total Dollar Amount: $6.47M
Role: Co-PI
Collaborators: Scott Backhaus, Los Alamos National Laboratory (PI), Karan Kalsi, Pacific Northwest National Laboratory (Co-PI), Sidhant Misra, Los Alamos National Laboratory (Co-PI), Emiliano Dall'Anese, National Renewable Energy Laboratory (Co-PI), Andrey Bernstein, National Renewable Energy Laboratory (Co-PI)

Period of Contract: 4/1/2016 – 9/31/2019
Share: 10.1% ($655k)

Courses Taught and Student Evaluation Scores

Semester	Course	Class Size	Score	GT Median	CoE Median
Fall 2024	Vertically Integrated Project	37	**4.89**	—	—
Spring 2024	Vertically Integrated Project	31	**4.96**	4.71	4.70
Fall 2023	ECE 4320	28	**5.00**	4.67	4.67
Fall 2023	Vertically Integrated Project	30	**4.94**	4.67	4.67
Spring 2023	ECE 4321	36	**5.00**	4.61	4.59
Spring 2023	Vertically Integrated Project	24	**5.00**	4.73	4.70
Fall 2022	ECE 4320	33	**5.00**	4.70	4.67
Fall 2022	Vertically Integrated Project	18	**5.00**	4.70	4.67
Spring 2022	Vertically Integrated Project	16	**4.75**	4.72	4.56
Fall 2021	ECE 4320	27	**5.00**	4.75	4.67
Spring 2021	ECE 4321	29	**5.00**	4.73	4.60
Fall 2020	ECE 4320	21	**4.97**	4.53	4.42
Spring 2020	ECE 4321	15	—	—	—
Fall 2019	ECE 6320 (in person)	29	**4.95**	4.70	4.70
Fall 2019	ECE 6320 (online)	8	**4.80**	4.80	4.80
Spring 2019	ECE 4321	16	**5.00**	4.60	4.50

Instructor Effectiveness Score ("Considering everything, the instructor was an effective teacher") on a five-point scale. This score (in bold) is the primary student-provided metric by which Georgia Tech assesses teaching. Normative data provided for Georgia Tech (GT) as a whole and the GT College of Engineering (CoE) in particular for comparably sized courses.

Vertically Integrated Project refers to the "Gaming for Electric Power Grids" student team.
ECE 4320: Power System Analysis and Control
ECE 4321: Power System Engineering
ECE 6320: Power Systems Control and Operation

Graduated PhD Advisees

2024
1. Babak Taheri, Georgia Institute of Technology ECE
   Dissertation: *Improving Power System Approximations Through Machine Learning-Inspired Optimization Methods*
   Passed the qualifying exam in Spring 2022, passed the PhD proposal exam in Spring 2024, and received the MS degree in Electrical Engineering in Spring 2024.
   Dr. Taheri will be starting a research scientist position at Hitachi Energy.
2. Alejandro Owen Aquino, Georgia Institute of Technology ECE
   Dissertation: *Offline Simplification and Reduction Strategies for Online Solution of Power System Optimization Problems*
   Passed the qualifying exam in Fall 2020, passed the PhD proposal exam in January 2023, and received the MS degree in Electrical Engineering (thesis) in Spring 2024.
   Dr. Owen Aquino is a member of the research staff at Sandia National Laboratories.
3. Mohannad Alkhraijah, Georgia Institute of Technology ECE
   Dissertation: *Cybersecurity-Aware Distributed Optimization for Optimal Power Flow*

Passed the qualifying exam in Fall 2020, received the MS degree in Operations Research in Fall 2023, and passed the PhD proposal exam in Spring 2023.
Dr. Alkhraijah will be a postdoc at the National Renewable Energy Laboratory.

2023 4. Paprapee Buason, Georgia Institute of Technology ECE
Dissertation: *Sample-Based Power Flow Approximations: Computational Methods, Analysis, and Applications*
Passed the qualifying exam in Fall 2020 and proposal exam in Fall 2022.
Dr. Buason is a postdoc with the Advanced Network Science Initiative at Los Alamos National Laboratory.

2020 5. Mohammad Rasoul Narimani, Missouri University of Science & Technology ECE
Dissertation: *Strengthening QC Relaxations of Optimal Power Flow Problems by Exploiting Various Coordinate Changes and Extending Polynomial Optimization Hierarchies*
Co-advised with Dr. Mariesa Crow. During his PhD studies, Dr. Mariesa Crow provided research funding. I was the sole advisor on technical aspects of the student's thesis research. I advised Rasoul Narimani since the Fall 2016 semester through his graduation in December 2019. As part of this role, I was an adjunct professor at the Missouri University of Science & Technology. After graduating, Dr. Narimani was a postdoc at Texas A&M University with Dr. Katherine Davis until August 2021 when he started a position as an assistant professor in ECE at Arkansas State University. In August 2022, he started a position as an assistant professor in ECE at California State University Northridge (CSUN).

Current PhD Advisees

1. Betelihem Ashebo, Georgia Institute of Technology ECE
PhD student in my group since Fall 2024.
2. Michael Boateng, Georgia Institute of Technology ECE
PhD student in my group since Fall 2024.
3. Samuel Talkington, Georgia Institute of Technology ECE
PhD student in my group since Fall 2023.
Passed the qualifying exam in Fall 2022. Proposal exam planned for Spring 2025.
Awards: NSF Graduate Research Fellowship, 2021 Spark Award.
4. Sergio Dorado Rojas, Georgia Institute of Technology ECE
PhD student in my group since Summer 2023.
5. Richard Asiamah, Georgia Institute of Technology ECE
PhD student in my group since Summer 2023.
Passed the qualifying exam in Spring 2023 and received the MS degree in Electrical Engineering in Spring 2024.
Awards: Selected to participate in Eaton's inaugural emPOWER U Leadership Summit. Selected as one of the top six GEM interns from NREL to present at the national GEM conference in September 2023. Participated in the NextProf Pathfinder Workshop in October 2023. Chosen for the RCE Atlanta SDG Fellows program. Elected as president of the ECE Graduate Student Organization in January 2024. 2024 Spark Award. First runner-up for the Best Graduate Presentation award at the 56th North American Power Symposium.
6. Ryan Piansky, Georgia Institute of Technology ECE
PhD student in my group since Spring 2023.
Passed the qualifying exam in Fall 2022 and received the MS degree in Electrical Engineering in Spring 2023.

7. Rachel Harris, Georgia Institute of Technology ECE
   PhD student in my group since Fall 2021.
   Passed the qualifying exam in Spring 2022 and the PhD proposal exam in Fall 2024.
   Thesis Topic: Computational Methods for Fast and Secure Distributed Optimal Power Flow
   Awards: 2022 Spark Award, NSF Graduate Research Fellowship Program (Honorable Mention).
8. La'Darius Thomas, Georgia Institute of Technology ECE
   PhD student in my group since Fall 2021. Co-advised with Dr. Valerie Thomas (ISyE).
   Passed the qualifying exam in Fall 2021 and the PhD proposal exam in Fall 2024.
   Thesis Topic: Improvements to Peer-to-Peer Energy Trading Markets Under Network Constraints in Electrical Distribution Systems
   Awards: 2022-23 Scheller College Graduate Sustainability Fellow.
9. Daniel Turizo Arteaga, Georgia Institute of Technology ECE
   PhD student in my group since Fall 2020.
   Passed the qualifying exam in Summer 2022 and the PhD proposal exam in Fall 2024.
   Thesis Topic: Advancements in Interior Point Methods for Electric Power Systems
   Awards: Fulbright Fellowship, 2023 ECE INSPIRE Fellowship.

Competed Postdoctoral Advisees

1. Rahul Gupta, Georgia Institute of Technology ECE (2023 – 2024)
   Awards: Swiss Postdoc.Mobility Fellow
   Dr. Gupta started an assistant professor in Electrical Engineering at Washington State University in January 2025.
2. Alyssa Kody, Argonne National Laboratory Energy Systems Division (2019–2023)
   Co-advisor with Dr. Feng Qiu at Argonne National Laboratory
   Awards: Maria Goeppert Mayer Fellowship which funds three years of her postdoctoral research.
   In Spring 2024, Dr. Kody started an assistant professor position in the Department of Electrical and Computer Engineering at NC State University. In Fall 2024, Dr. Kody started a research staff position at the National Renewable Energy Laboratory.
3. Bowen Li, Argonne National Laboratory Energy Systems Division (2019)
   Dr. Li is currently a research associate at Imperial College London.

Current Masters Advisees

1. Xuhang (Peter) Cao, Georgia Institute of Technology CS
   Project: Developing Generative Adversarial Neural Networks for Cyberattack Detection
   Advised since Spring 2024 via a special topics course.

Graduated Masters Advisees

2024 1. Yuhao Chen, Georgia Institute of Technology ECE
   Project: A Machine Learning Approach to Synthetic Power Grid Modeling
   Advised during Spring 2024 and Summer 2024 via a special topics course.
2. Bradley Sisk, Georgia Institute of Technology ECE
   Project: Air Pollution and Human Health Impacts of Vehicle Electrification
   Advised from Fall 2023 to Spring 2024 via a special topics course.

2022 3. Abigail Ivemeyer, Georgia Institute of Technology ECE
   Project: Exploring and Analyzing Resiliency and Fairness Metrics for Infrastructure Hardening
   Advised from Fall 2021 to Spring 2022 via special topics course.

2021 4. Shubham Tandon, Georgia Institute of Technology ECE
Project: Exploring the Use of FACTS Devices and Dynamic Line Ratings to Mitigate the Risk of Wildfire Ignitions from Electric Transmission Systems Advised from Fall 2020 to Summer 2021 via special topics course.

2020 5. Carlos Menendez, Georgia Institute of Technology ECE
Project: Analysis of Distributed Optimization Algorithms for DC Optimal Power Flow Problems.
Advised from Spring 2020 to Summer 2020 via special topics course.

6. Nathan Grice, Georgia Institute of Technology ECE
Project: Development and Comparison of Linear Approximations of the Power Flow Equations
Advised from Spring 2020 to Summer 2020 via special topics course.

2016 7. Aldo Tobler, ETH Zürich Department of Information Technology and Electrical Engineering
Co-advised with Dr. Gabriela Hug and Dr. Line Roald (then a PhD student)
Thesis: Nonlinear Optimization in Electric Power Systems with Uncertainty: Understanding the Impact of Uncertainty on the Feasible Space

Undergraduate Student Researchers

2024 1. Susannah Gordon, Georgia Institute of Technology ECE
Independent research project during the Fall 2022 and Spring 2024 semesters.
Topic: Generating Synthetic Distribution System Models using Machine Learning

2. Ayush Banerjee, Georgia Institute of Technology ECE
Independent research project since summer of 2022 (as a high school student until Fall 2023).
Topic: Creating a Synthetic Test Case of the Ukrainian Power Grid

2022 3. Madeleine Pollack, Georgia Institute of Technology ISyE
Research intern during Summer 2022, co-advised with Dr. Swati Gupta.
Topic: Incorporating Fairness Considerations in Wildfire Mitigation Problems

2021 4. Mario Lopes, Georgia Institute of Technology ECE
Independent research project during the Fall 2021 semester.
Topic: Augmenting Power System Test Cases with Resiliency and Equity Data

5. Ravi Kodali, Georgia Institute of Technology ISyE
Independent research project during the Fall 2021 semester.
Topic: Analyzing Evacuation Plans with High Penetrations of Electric Vehicles

6. Michelle Paquette, Georgia Institute of Technology ECE
Independent research project during the Spring 2021 semester.
Topic: A Repository of Power System Test Cases for Distributed Optimization Algorithms

7. Abigail Ivemeyer, Georgia Institute of Technology ECE
Independent research project during the Fall 2020 and Spring 2021 semesters.
Topic: Analysis of Phase Unbalance in Co-Simulations of Electric Transmission and Distribution Systems
Awards: Recipient of the 2021 Roger P. Webb ECE Undergraduate Research Award and the 2022 IEEE Power and Energy Society (PES) Outstanding Student Scholarship. Profiled as one of 11 women highlighted in a Georgia Tech news article "Celebrating 70 Years of Women at Tech".

8. Dilip Paruchuri, Georgia Institute of Technology ECE
   Independent research project through the Opportunity Research Scholars (ORS) program during the Fall 2020 and Spring 2021 semesters.
   Topic: Analysis of Angle Rotations in an Extended Fast Decoupled Power Flow Algorithm
9. Emerald White, Georgia Institute of Technology ECE
   Independent research project through the Opportunity Research Scholars (ORS) program during the Fall 2020 and Spring 2021 semesters.
   Topic: Analysis of Angle Rotations in the Fast Decoupled Power Flow Algorithm Highlighted via an article in the Georgia Tech daily digest.

2020 10. Sebastian Tapias, Georgia Institute of Technology ECE
   Independent research project during the Fall 2020 semester.
   Topic: Development and Comparison of Linear Approximations of the Power Flow Equations
11. Maile Wobb, Georgia Institute of Technology ECE
   Independent research project during the Fall 2019 and Fall 2020 semesters.
   Topic: Application of Energy Storage to Mitigate the Risk of Wildfire Ignition from Electric Transmission Systems
12. Javier Moreno, Georgia Institute of Technology ECE
   Independent research project during the Spring 2020 semester.
   Topic: Analysis and Characterization of Binding Constraints in DC Optimal Power Flow Problems
13. Wesley Chan, Northwestern University ECE
   Summer research aide at Argonne National Laboratory during 2017.
   Topic: Application of Machine Learning to Power System Optimization Problems: Leveraging DC Optimal Power Flow Solutions in AC Optimal Power Flow Algorithms

Additionally, the Vertically Integrated Project team "Gaming for Electric Power Grids" has had over 150 enrollments of undergraduate and masters students since starting in Spring 2022.

PhD Committees

2024 1. Decheng Yan, Georgia Institute of Technology ECE, "GridFormer – A New Approach to Stabilize and Manage a High IBR Penetration Grid"
2. Siyao Cai, Georgia Institute of Technology ECE, "Modeling and Simulation of Power System with High Penetration of Inverter Based Resources"
3. Zhengrong Chen, Georgia Institute of Technology ECE, "Advancing Distribution Automation through Model-Based and Machine Learning Approaches"
4. Kartik Sastry, Georgia Institute of Technology ECE, "Smart Charging of Electric Vehicles: Algorithms, Ramifications, and Hardware Development"
5. Zhi Jin Zhang, Georgia Institute of Technology ECE, "Cyber-Physical Security and Protection of Multi-Terminal DC Grids"
6. Sanghun Choi, Georgia Institute of Technology ECE, "Binary Capacitor Voltage Control Multilevel Converters and Quadratic Integration-Exploited Model Predictive Current Control"
7. Shiyuan Yin, Georgia Institute of Technology ECE, "Modeling, Control, and Fault-tolerant Operation of the Isolated Modular Multilevel DC-DC Converter for MVDC Applications"

8. Hannah Moring, University of Michigan EECS, "Mathematical Methods for Managing Distributed Energy Resources"
9. Wenbo Chen, Georgia Institute of Technology ISyE, "Synergizing Machine Learning and Optimization: Scalable Real-time Risk Assessment in Power Systems"
10. Jiaqi Chen, University of Wisconsin–Madison ECE, "Data-Driven Approaches for Distribution Grid Analysis"
11. Amanda West, Georgia Institute of Technology ECE, "Equitable Energy Sharing for Electricity Microgrids"

2023 12. Zachary Kilwein, Georgia Institute of Technology CBE, "Merging First Principle Models with Machine Learning for the Optimization of Process and Energy Systems"

13. Osamuyi Obadolagbonyi, Georgia Institute of Technology ECE, "Modeling and Dynamic Analysis of PV Plant on Grid Performance"
14. Minas Chatzos, Georgia Institute of Technology ISyE, "Advances in Large-Scale Power System Operations: Reconstruction, Reliability, Learning"
15. Nishant Bilakanti, Georgia Institute of Technology ECE, "Grid Interfaces for Flexible and Resilient Distribution Systems"
16. Sihan Zeng, Georgia Institute of Technology ECE, "Designing Policy Optimization Algorithms for Multi-Agent Reinforcement Learning"
17. Filipe Cabral, Georgia Institute of Technology ISyE, "Optimal Planning for Electrification of Public Transit Systems and Infinite-Dimensional Linear Programming"

2022 18. Rahul Gupta, Swiss Federal Institute of Technology Lausanne (EPFL) Electrical and Electronic Engineering, "Methods for Grid-Aware Operation and Planning of Active Distribution Networks"

19. Kshitij Girigoudar, University of Wisconsin–Madison ECE, "Optimization of Unbalanced Distribution Grid Operations using Distributed Energy Resources"
20. Shixuan Zhang, Georgia Institute of Technology ISyE, "On Multistage Stochastic and Distributionally Robust Optimization: New Algorithms, Complexity Analysis, and Performance Comparison"
21. Löic Van Hoorebeeck, Université catholique de Louvain Applied Mathematics, "Nonconvex and Nonsmooth Economic Dispatch"
22. Julia Lindberg, University of Wisconsin–Madison ECE, "Convex Algebraic Geometry with Applications to Power Systems, Statistics and Optimization"
23. Yu-Cheng Chen, Georgia Institute of Technology ECE, "Cyber Threat Propagation Modeling in Cyber Physical Systems"
24. Siavash Sadeghi, Georgia Institute of Technology ECE, "Advanced Electric Motor Drive Systems for Ultra-Fast Electric Trains"
25. Cesar Guillermo Santoyo, Georgia Institute of Technology ECE, "Probabilistic Analysis Methods for Electric Vehicle Charging"
26. Emma Johnson, Georgia Institute of Technology ISyE, "Solution Techniques for Scaling Various Large-Scale Optimization Problems on the Transmission Grid"
27. Kaiyu Liu, Georgia Institute of Technology ECE, "Dynamic State Estimation Based Protection of Power Electronic Systems"

28. Amin Gholami, Georgia Institute of Technology ISyE, "Structure-Aware Methods in Optimization and Control with Applications in Electric Power Systems"

2021 29. Christy Green, Georgia Institute of Technology ME, "Advanced Metering Infrastructure Data for Load Disaggregation and Demand-Side Management Analysis"

30. Shenyinying (Ruby) Tushen, Northwestern University ECE/IEMS, "Two-Stage Decomposition Algorithms and Their Application to Optimal Power Flow Problems"

31. Laurine Duchesne, University of Liège, Montefiore Institute, "Machine Learning of Proxies for Power Systems Reliability Management in Operation Planning"

32. Maad Alowaifeer, Georgia Institute of Technology ECE, "Microgrid Energy Management System with Ancillary Services to the Grid"

33. Gad Ilunga, Georgia Institute of Technology ECE, "Autonomous Quadratized Optimal Power Flow via Convex Solution – Sequential Linear Programming (CS-SLP)"

34. Emeka Obikwelu, Georgia Institute of Technology ECE, "Electrical Power System Current and Voltage Instrumentation Channel Error Correction Using Unconstrained Weighted-Least-Squares (WLS) Dynamic State Estimation"

2020 35. Nawaf Nazir, University of Vermont EBE, "Optimization of Energy-Constrained Resources in Radial Distribution Networks with Solar PV"

36. Genyi Luo, Georgia Institute of Technology ECE, "Stray Flux Monitoring and Multi-Sensor Fusion Condition Monitoring for Squirrel Cage Induction Machines"

37. Evgeniya Tsybina, Georgia Institute of Technology ECE, "Residential Demand Response using a House as a Battery"

38. Xiangyu Han, Georgia Institute of Technology ECE, "Soft-Switching Solid-State Transformer for Traction Applications"

39. Boqi Xie, Georgia Institute of Technology ECE, "An Object-Oriented Distribution System Distributed Quasi-Dynamic State Estimator"

40. Alejandra Peña Ordieres, Northwestern University IEMS, "Nonlinear Programming Approximations of Chance Constraints"

41. Omer Lateef, Georgia Institute of Technology ECE, "Measurement-Based Parameter Estimation and Analysis of Power Systems"

42. Jiahao Xie, Georgia Institute of Technology ECE, "Time Domain Analysis of the Impact of Geomagnetically Induced Current on Power System"

43. Abdullah Alamri, Georgia Institute of Technology ECE, "Reliability Analysis Methods for Power Systems with Substantial Penetration of Renewable Generating Resources"

2019 44. Seyyed Mohammad Sadegh Vejdan, Georgia Institute of Technology ECE, "Service Revenue Evaluation Methodologies to Maximize the Benefits of Energy Storage"

45. Chiyang Zhong, Georgia Institute of Technology, ECE, "Autonomous Multi-Stage Flexible Optimal Power Flow"

46. Rohit Jinsiwale, Georgia Institute of Technology ECE, "Decentralized Operation and Control of Integrated Transactive Grids"

47. Hang Shao, Georgia Institute of Technology ECE, "Electromagnetic Modeling and Design Optimization of Synchronous Reluctance Machines and Single-Phase Induction Motors"

48. Shen Zhang, Georgia Institute of Technology ECE, "Multi-Objective Design, Optimization, and Condition Monitoring of High-Performance Electric Machines for Electric Propulsion"
49. Cheng Gong, Georgia Institute of Technology ECE, "Design and Control of Ultra-High Speed Switched Reluctance Machines Over 1 Million RPM"
50. Mengqi Yao, University of Michigan EECS, "Using Distributed Energy Resources to Improve Power System Stability and Voltage Unbalance"

2018 51. Dmitry Shchetinin, ETH Zürich ECE, "Optimization of Power System Operation: Approximations, Relaxations, and Decomposition"

Fellowships

2013 1. University of Michigan, Dow Sustainability Fellows Program, "Optimization of Electric Power Systems"

2009 2. National Science Foundation, Graduate Research Fellowship Program, "Electricity Pricing Using Power Flow Tracing and Bilateral Contracts"

2008 3. Electrical and Computer Engineering Distinguished Fellowship, UW–Madison

Joint Appointments

1. Argonne Associate, Argonne National Laboratory, Energy Systems Division
2. Adjunct Professor, Missouri University of Science and Technology, Electrical and Computer Engineering Department

Professional Service

1. Member of the Executive Board for the *Power Systems Computation Conference*. Chair (2022) and Vice-chair (2020) of the Technical Program Committee, a member of the technical program committee (2016, 2018, 2024), reviewer, and session chair for this conference.
2. Faculty advisor for the Energy Club at the Georgia Institute of Technology (2019 – present)
3. Faculty advisor for the Georgia Tech Solar District Cup team (2021 – present), which won second place in their division in 2021 and honorable mention in 2022.
4. Member of the Georgia Tech *ECE Graduate Admissions Committee* (2022 – present)
5. Member of the Georgia Tech *ECE Student/Faculty Committee* (2020 – 2023)
6. Panel member for review of National Science Foundation grant proposals
7. Co-chair of *IEEE Task Force on Benchmarks for Emerging Power System Algorithms*
8. Co-chair of *IEEE Working Group on Computational Challenges and Solutions for Implementing Distributed Optimization in the Power System*
9. Vice-Chair (2023 – 2024) and Secretary (2021–2023) of *IEEE Power and Energy Society Intelligent Grid and Emerging Technologies Coordinating Committee (IGETCC)*
10. Co-lead of the Energy Systems Use Case and the Ethical AI Thrust in the NSF AI Institute for Advances in Optimization (AI4OPT)
11. Guest associate editor (special issue on distributed control and optimization) and reviewer for *IEEE Transactions on Smart Grid*. Included on list of "Best Reviewers" in 2017.
12. Guest associate editor (special issue on modeling, topology and control of grid-forming inverters) for *IEEE Journal of Emerging and Selected Topics in Power Electronics*.

13. Technical Program Committee member for *IEEE Global Conference on Signal and Information Processing*
14. Technical Program Committee member for *Intelligent System Applications to Power Systems*
15. Planning committee member for the *Energy Equity Symposium* during the *12th Annual RCE Americas Regional Meeting (2023)*
16. Session co-organizer for *Hawaii International Conference on System Sciences (HICSS)* (2024, 2025)
17. Moderator for panels on "Smart Grid Technologies" and "Energy Economics" at the *Southeastern Energy Conference* (2023)
18. Organizer of a session titled "Improving the Reliability and Resiliency of Electric Power Grids" for the National Academy of Engineering's *2021 EU-US Frontiers of Engineering Symposium*
19. Session co-organizer for *INFORMS Annual Meeting* (2021)
20. Session co-organizer for *SIAM Conference on Optimization* (2021)
21. Session organizer for *Modeling and Optimization: Theory and Applications (MOPTA) (2018, 2019)*
22. Tutorial session co-organizer and reviewer for *American Control Conference* (2016)
23. Session chair and reviewer for *IEEE PowerTech Conference*
24. Session chair and reviewer for *North American Power Symposium*
25. Poster judge for *Postdoctoral Research and Career Symposium, Argonne National Laboratory*
26. Journal reviewer for *Proceedings of the IEEE*
27. Journal reviewer for *IEEE Transactions on Power Systems*
28. Journal reviewer for *IEEE Transactions on Automatic Control*
29. Journal reviewer for *IEEE Transactions on Control of Network Systems*
30. Journal reviewer for *IEEE Transactions on Network Science and Engineering*
31. Journal reviewer for *IEEE Transactions on Industrial Informatics*
32. Journal reviewer for *International Journal of Electrical Power and Energy Systems*
33. Journal reviewer for *IET Generation, Transmission & Distribution*
34. Journal reviewer for *Journal of Modern Power Systems and Clean Energy*
35. Journal reviewer for *Sustainable Energy, Grids and Networks*
36. Journal reviewer for *Electric Power Systems Research*
37. Journal reviewer for *Mathematical Programming*
38. Journal reviewer for *Optimization Methods and Software*
39. Journal reviewer for *Automatica*
40. Journal reviewer for *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*
41. Reviewer for *IEEE Conference on Decision and Control*
42. Reviewer for *IEEE Power and Energy Society General Meeting*
43. Reviewer for *IEEE International Symposium on Circuits and Systems*

Memberships in Professional Organizations

1. Member of the Executive Board and the Council for the *Power Systems Computation Conference*

2. NSF AI Institute for Advances in Optimization (Co-lead of the Energy Systems Use Case, Co-lead of the Ethical AI Research Thrust)
3. Strategic Energy Institute, Georgia Institute of Technology (Fellow)
4. EpiCenter Energy Faculty Affiliate, Georgia Institute of Technology
5. Institute of Electrical and Electronics Engineers, Senior Member (Power and Energy Society, Circuits and Systems Society, Control Systems Society)
6. INFORMS (Optimization Society)
7. Tau Beta Pi Engineering Honor Society
8. Eta Kappa Nu Electrical and Computer Engineering Honor Society