Mikhail A. Bragin

Department of Electrical and Computer Engineering, University of California, Riverside

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Education

University of Connecticut, Electrical and Computer Engineering	Storrs, CT
(Information, Communication, Decision, and Energy)	
Ph.D.	12/2016
M.S.	07/2014
Concentration: Power Systems/Optimization	
University of Nebraska-Lincoln, Physics and Astronomy	Lincoln, NE
(Atomic, Molecular, Optical and Plasma Physics), M.S.	12/2006
Concentration: Quantum Mechanics	
Voronezh State University, Mathematics	Voronezh, Russia
(Partial Differential Equations and Probability Theory)	
Specialist (U.S. equivalent of M.S. and B.S.)	07/2004
Concentration: Partial Differential Equations and Probability Theory	

Professional Experience and Affiliations

University of California, Riverside, Electrical and Computer Engineering	Riverside, CA
Assistant Project Scientist	09/2022 – Present
University of Connecticut, Electrical and Computer Engineering	Storrs, CT
Assistant Research Professor	01/2017 – 08/2022
Graduate Research Assistant	08/2010 – 12/2016
University of Connecticut, Institute for Advanced Systems Engineering	01/2020 – Present
Southern California Edison	Rosemead, CA
Graduate Intern	06/2014 – 08/2014
Graduate Intern	06/2015 – 08/2015
University of Connecticut, Operations and Information Management, School of Business	Storrs, CT
Graduate Teaching Assistant	08/2008 – 07/2010
University of Nebraska-Lincoln, Physics and Astronomy	Lincoln, NE
Graduate Teaching/Research Assistant	01/2005 – 12/2007

Summary of Publications

28 Journal publications (1 paper is 2020 Best Transactions Paper Honorable Mention, 1 paper is based on a technical report, which received 2023 PES PSOPE Technical Committee Outstanding Technical Report Award)

31 Conference proceedings (5 nominations for the Best Paper Award)

Summary of Funding: $3,701,838

$409,049, Role: PI (Funding sources: ABB, BNL, MISO, ISO-NE)

$2,192,789, Role: Co-PI (Funding souces: AFRL, ABB, BNL, MISO, Eversource, NSF, ISO-NE, UC Office of the President)

$800,000, Role: Senior Personnel (Funding sources: NSF)

$360,000, Role: GA, contributor to grant proposal (Funding sources: NSF)

Academic Collaborators

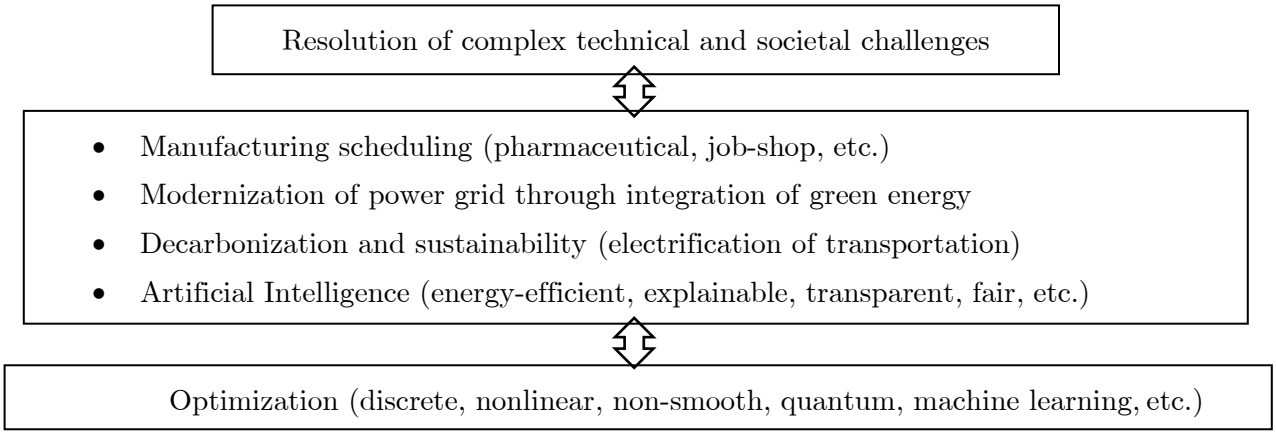
UConn, RIT, JHU, UCLA, UC Merced, Clemson

Industrial/Governmental Collaborators

Independent System Operators: Midcontinent ISO and ISO-NE

ABB, Brookhaven National Lab, CESMII, AFRL, Eversource

Research Interests



Teaching

Years of teaching experience: 5 (2.5 as an RA, 2.5 as an Assistant Research Professor)

Subjects taught: Systems Theory; Information, Control & Games; Business Information Systems; Physics

Interests: Optimization Theory, Power Systems, Neural Networks, System Theory, Manufacturing, Information Theory, Game Theory, Business Analytics, Data Mining, Database Management, Predictive and Prescriptive Analytics

Achievements: Recognition for "Excellence in Teaching," Fall 2020.

Additional Information: U.S. Permanent Resident

Publications

Journal Articles (‡ equal contribution; mentored or co-advised students are underlined):

2023:

1. J. Wu, P. B. Luh, Y. Chen, **M. A. Bragin**, and B. Yan, "Synergistic Integration of Machine Learning and Mathematical Optimization for Unit Commitment," accepted to IEEE Transactions on Power Systems.

2022:

2. **M. A. Bragin**, and E. L. Tucker, "Surrogate "Level-Based" Lagrangian Relaxation for Mixed-Integer Linear Programming," Scientific Reports, Volume 12, Issue 1, 22417. DOI: 10.1038/s41598-022-26264-1
3. W. Wan, P. Zhang, **M. A. Bragin**, and P. B. Luh, "Safety-Assured, Real-Time Neural Active Fault Management for Resilient Microgrids Integration," accepted to iEnergy. DOI: 10.23919/IEN.2022.0048
4. Y. Chen, F. Pan, F. Qiu, A. S. Xavier, T. Zheng, M. Marwali, B. Knueven, Y. Guan, P. Luh, L. Wu, B. Yan, **M. A. Bragin**, H. Zhong, A. Giacomoni, R. Baldick, B. Gisin, Q. Gu, R. Philbrick, and F. Li "Security-Constrained Unit Commitment for Electricity Market: Modeling, Solution Methods, and Future Challenges," accepted to IEEE Transactions on Power Systems. DOI: 10.1109/TPWRS.2022.3213001. (**The paper is based on a technical report, which received 2023 PES PSOPE Technical Committee Outstanding Technical Report Award**)
5. S. Zhou, X. Xu, **M. A. Bragin**, and J. Bai, "Combining Multi-view Ensemble and Surrogate Lagrangian Relaxation for Real-time 3D Biomedical Image Segmentation on the Edge," Neurocomputing, Volume 512, November 2022, pp. 466 – 481. DOI: 10.1016/j.neucom.2022.09.039
6. Y. Sun, J. Tu, **M. A. Bragin**, and L. Zhang, "A Simulation-based Integrated Virtual Testbed for Dynamic Optimization in Smart Manufacturing Systems," Journal of Advanced Manufacturing and Processing, 2022, e10141. DOI: 10.1002/amp2.10141.
7. N. Nikmehr, **M. A. Bragin**, P. B. Luh, and P. Zhang, "Computationally Distributed and Asynchronous Operational Optimization of Droop-Controlled Networked Microgrids," IEEE Open Access Journal of Power and Energy, Volume 9, July 2022, pp. 265 – 277. DOI: 10.1109/OAJPE.2022.3188733.

8. F. Feng, P. Zhang, **M. A. Bragin**, and Y. Zhou, "Novel Resolution of Unit Commitment Problems through Quantum Surrogate Lagrangian Relaxation," accepted to IEEE Transactions on Power Systems. DOI: 10.1109/TPWRS.2022.3181221.
9. W. Wan, P. Zhang, **M. A. Bragin**, and P. B. Luh, "Cooperative Fault Management for Resilient Integration of Renewable Energy," Electric Power Systems Research, Volume 211, October 2022, 108147. DOI: 10.1016/j.epsr.2022.108147.
10. **M. A. Bragin,** B. Yan, A. Kumar, N. Yu, and P. Zhang, "Efficient Operations of Micro-Grids with Meshed Topology and Under Uncertainty through Exact Satisfaction of AC-PF, Droop Control and Tap-Changer Constraints," Energies, 2022, Volume 15, Issue 10, 3662. DOI: 10.3390/en15103662.
11. N. Raghunathan, **M. A. Bragin**, B. Yan, P. B. Luh, K. Moslehi, X. Feng, Y. Yu, C.-N. Yu, and C.-C. Tsai, "Exploiting Soft Constraints within Decomposition and Coordination Methods for Sub-Hourly Unit Commitment," International Journal of Electrical Power & Energy Systems, Volume 139, July 2022, 108023. DOI: 10.1016/j.ijepes.2022.108023.
12. D. Zhdanov, S. Bhattacharjee, and **M. A. Bragin,** "Incorporating FAT and Privacy Aware AI Modeling Approaches into Business Decision Making Frameworks," Decision Support Systems, Volume 155, April 2022, 113715. DOI: 10.1016/j.dss.2021.113715.
13. **M. A. Bragin**, and Y. Dvorkin, "TSO-DSO Operational Planning Coordination through "l_1-Proximal" Surrogate Lagrangian Relaxation," IEEE Transactions on Power Systems, Volume 37, Issue 2, March 2022, pp. 1274 – 1285. DOI: 10.1109/TPWRS.2021.3101220.
14. N. Nikmehr, P. Zhang, and **M. A. Bragin**, "Quantum Distributed Unit Commitment: An Application in Microgrids," IEEE Transactions on Power Systems, Volume 37, Issue 5, September 2022, pp. 3592 – 3603. DOI: 10.1109/TPWRS.2022.3141794.

2021:

15. J. Wu, P. B. Luh, Y. Chen, **M. A. Bragin**, and B. Yan, "A Novel Optimization Approach for Sub-Hourly Unit Commitment with Large Numbers of Generators and Virtual Transactions," IEEE Transactions on Power Systems, Volume 37, Issue 5, September 2022, pp. 3716 – 3725. DOI: 10.1109/TPWRS.2021.3137842.
16. A.-B. Liu, P. B. Luh, B. Yan, and **M. A. Bragin**, "A Novel Integer Linear Formulation for Job-shop Scheduling Problems," IEEE Robotics and Automation Letters, Volume 6, Issue 3, June 2021, pp. 5937 – 5944. DOI: 10.1109/LRA.2021.3086422.

17. L. S. Thakur, and **M. A. Bragin**, "Data Interpolation by Near-Optimal Splines with Free Knots Using Linear Programming," Mathematics, Volume 9, Issue 10, 1099, May 2021. DOI: 10.3390/math9101099.
18. B. Yan, **M. A. Bragin**, and P. B. Luh, "An Innovative and Systematic Formulation Tightening Method for Job-Shop Scheduling," IEEE Transactions on Automation Science and Engineering, Volume 19, Issue 3, June 2021, pp. 2526 – 2539. DOI: 10.1109/TASE.2021.3088047.

2020:

19. A.-B. Liu, P. B. Luh, **M. A. Bragin**, and B. Yan, "Ordinal-Optimization Concept Enabled Decomposition and Coordination of Mixed-Integer Linear Programming Problems," IEEE Robotics and Automation Letters, Volume 5, Issue 4, October 2020, pp. 5051 – 5058. DOI: 10.1109/LRA.2020.3005125.
20. W. Wan, **M. A. Bragin**, B. Yan, Y. Qin, J. Philhower, P. Zhang, and P. B. Luh, "Distributed and Asynchronous Active Fault Management for Networked Microgrids," IEEE Transactions on Power Systems, Volume 35, Issue 5, Sept. 2020, pp. 3857 – 3868. DOI: 10.1109/TPWRS.2020.2976044.
21. **M. A. Bragin**, P. B. Luh, and B. Yan, "Distributed and Asynchronous Coordination of a Mixed-Integer Linear System via Surrogate Lagrangian Relaxation," IEEE Transaction on Automation Science and Engineering, Volume 18, Issue 3, June 2020, pp. 1191 – 1205. DOI: 10.1109/TASE.2020.2998048.
22. B. Yan, P. B. Luh, E. Litvinov, T. Zheng, D. Schiro, **M. A. Bragin**, F. Zhao, J. Zhao, and I. Lelic, "A Systematic Formulation Tightening Approach for Unit Commitment Problems," IEEE Transactions on Power Systems, Volume 35, Issue 1, January 2020, pp. 782 – 794. DOI: 10.1109/TPWRS.2019.2935003.

2019:

23. **M. A. Bragin**, P. B. Luh, B. Yan, and X. Sun, "A Scalable Solution Methodology for Mixed-Integer Linear Programming Problems Arising in Automation," IEEE Transaction on Automation Science and Engineering, Volume 16, Issue 2, April 2019, pp. 531 – 541. DOI: 10.1109/TASE.2018.2835298. **(2020 Best Transactions Paper Honorable Mention)**

2018:

24. B. Yan[‡], **M. A. Bragin**[‡], and P. B. Luh, "Novel Formulation and Resolution of Job-Shop Scheduling Problems," IEEE Robotics and Automation Letters, Volume 3, Issue 4, October 2018, pp. 3387 – 3393. DOI: 10.1109/LRA.2018.2850056

25. X. Sun, P. B. Luh, **M. A. Bragin**, Y. Chen, J. Wan, and F. Wang, "A Novel Decomposition and Coordination Approach for Large-Scale Security Constrained Unit Commitment Problems with Combined Cycle Units," IEEE Transactions on Power Systems, Volume 33, Issue 5, September 2018, pp. 5297 – 5308. DOI: 10.1109/PESGM.2017.8274098

2017:

26. B. Yan, H. Fan, P. B. Luh, K. Moslehi, X. Feng, C.-N. Yu, **M. A. Bragin**, and Y. Yu, "Grid Integration of Wind Generation Considering Remote Wind Farms: Hybrid Markovian and Interval Unit Commitment," IEEE/CAA Journal of Automatica Sinica, Volume 4, Issue 2, April 2017, pp. 205 – 215. DOI: 10.1109/JAS.2017.7510505

2016:

27. **M. A. Bragin**, P. B. Luh, J. H. Yan, and G. A. Stern, "An Efficient Approach for Solving Mixed-Integer Programming Problems under the Monotonic Condition," Journal of Control and Decision, Volume 3, Issue 1, January 2016, pp. 44 – 67. DOI: 10.1080/23307706.2015.1129916

2015:

28. **M. A. Bragin**, P. B. Luh, J. H. Yan, N. Yu, and G. A. Stern, "Convergence of the Surrogate Lagrangian Relaxation Method," Journal of Optimization Theory and Applications, Volume 164, Issue 1, 2015, pp. 173 – 201. DOI: 10.1007/s10957-014-0561-3.

Conference Proceedings (‡ equal contribution; mentored or co-advised students are underlined, other graduate students (at the time of submission) are double-underlined):

1. Z. Wang, B. Li, X. Xiao, T. Zhang, **M. A. Bragin**, B. Yan, C. Ding and S. Rajasekaran, "Automatic Subnetwork Search Through Dynamic Differentiable Neuron Pruning," accepted to ISQED 2023
2. N. Nikmehr, P. Zhang, and **M. A. Bragin**, "Quantum-Enabled Distributed Unit Commitment," to appear in proceedings of the IEEE PES 2022 General Meeting (**Best Paper Session**)
3. D. Gurevin‡, **M. A. Bragin**‡, C. Ding‡, S. Zhou, L. Pepin, B. Li, and F. Miao, "Enabling Retrain-Free Deep Neural Network Pruning using Surrogate Lagrangian Relaxation," Proceedings of the Thirtieth International Joint Conference on Artificial Intelligence (IJCAI-21), pp. 2497-2504. DOI: 10.24963/ijcai.2021/344 (Acceptance rate: 13.9%)
4. W. Wan, **M. A. Bragin**, P. B. Luh, and P. Zhang, "DA-AFM for Ultra PV and Wind Energy Integration," to appear in proceedings of the IEEE PES 2021 General Meeting

5. F. Hyder, B. Yan, **M. A. Bragin**, and P. B. Luh, "Impacts of UC Formulation Tightening on Computation of Convex Hull Prices," to appear in proceedings of the IEEE PES 2021 General Meeting
6. B. Yan, **M. A. Bragin**, and P. B. Luh, "Tightened Formulation and Resolution of Energy-Efficient Job-Shop Scheduling," Proceedings of the IEEE 2020 IEEE CASE.
7. J. Wu, P. B. Luh, Y. Chen, B. Yan, and **M. A. Bragin**, "A Decomposition and Coordination Approach for Large Sub-Hourly Unit Commitment," Proceedings of the IEEE PES 2020 General Meeting, Montreal, Canada, 2020 (virtual conference).
8. B. Yan, P. B. Luh, E. Litvinov, T. Zheng, D. Schiro, **M. A. Bragin**, F. Zhao, J. Zhao, and I. Lelic, "Effects of Tightening Unit-level and System-level Constraints in Unit Commitment," Proceedings of the IEEE PES 2019 General Meeting, Atlanta, GA, 2019.
9. W. Wan, Y. Li, B. Yan, **M. A. Bragin**, J. Philhower, P. Zhang, and P. B. Luh, "Active Fault Management for Networked Microgrids," Proceedings of the IEEE PES 2019 General Meeting, Atlanta, GA, 2019.
10. W. Wan, Y. Li, B. Yan, **M. A. Bragin**, J. Philhower, P. Zhang, P. B. Luh, and G. Warner, "Active Fault Management for Microgrids," the 44th Annual Conference of the IEEE Industrial Electronics Society (IECON), Washington, D.C., 2018.
11. **M. A. Bragin**, B. Yan, Y. Li, P. B. Luh, and P. Zhang, "Economic Dispatch for a Distribution Network with Intermittent Renewables and Tap Changers," Proceedings of the IEEE PES 2018 General Meeting, Portland, OR, 2018.
12. B. Yan, P. B. Luh, E. Litvinov, T. Zheng, D. Schiro, **M. A. Bragin**, F. Zhao, J. Zhao, and I. Lelic, "A Systematical Approach to Tighten Unit Commitment Formulations," Proceedings of the IEEE PES 2018 General Meeting, Portland, OR. (**Best Paper Session**)
13. **M. A. Bragin**, and Y. Dvorkin, "Toward Coordinated Transmission and Distribution Operations," Proceedings of the IEEE PES 2018 General Meeting, Portland, OR, 2018.
14. X. Sun, P. B. Luh, **M. A. Bragin**, Y. Chen, J. Wan, and F. Wang, "A Decomposition and Coordination Approach for Large-Scale Security Constrained Unit Commitment Problems with Combined Cycle Units," Proceedings of the IEEE PES 2017 General Meeting, Chicago, IL, 2017. (**Best Paper Session**)
15. B. Yan, P. B. Luh, E. Litvinov, T. Zheng, D. Schiro, **M. A. Bragin**, F. Zhao, J. Zhao, and I. Lelic "Effective Modeling and Resolution of Generation-Dependent Ramp Rates for Unit Commitment," Proceedings of the IEEE PES 2017 General Meeting, Chicago, IL, 2017.

16. **M. A. Bragin**, and P. B. Luh, "Distributed and Asynchronous Unit Commitment and Economic Dispatch," Proceedings of the IEEE PES 2017 General Meeting, Chicago, IL, 2017.
17. **M. A. Bragin**, P. B. Luh, J. H. Yan, and G. A. Stern, "An Efficient Approach for Unit Commitment and Economic Dispatch with Combined Cycle Units and AC Power Flow," Proceedings of the IEEE PES 2016 General Meeting, Boston, MA, 2016.
18. **M. A. Bragin**, P. B. Luh, J. H. Yan, and G. A. Stern, "Novel Exploitation of Convex Hull Invariance for Solving Unit Commitment by Using Surrogate Lagrangian Relaxation and Branch-and-Cut," Proceedings of the IEEE PES 2015 General Meeting, Denver, CO, 2015.
19. M. Di Somma, B. Yan, P. B. Luh, **M. A. Bragin**, N. Bianco, G. Graditi, L. Mongibello, and V. Naso, "Exergy-Efficient Management of Energy Districts." In: Proceedings of the 11th World Congress on Intelligent Control and Automation, Shenyang, China, 2014, 29 June – 4 July, p. 2675–80.
20. B. Yan, P. B. Luh, **M. A. Bragin**, C. Song, C. Dong, and Z. Gan, "Energy-Efficient Building Clusters," Proceedings of the IEEE 2014 IEEE CASE.
21. **M. A. Bragin**, P. B. Luh, J. H. Yan, and G. A. Stern, "Surrogate Lagrangian Relaxation and Branch-and-Cut for Unit Commitment with Combined Cycle Units," Proceedings of the IEEE PES 2014 General Meeting, National Harbor, MD, 2014. (**Best Paper Session**)
22. **M. A. Bragin**, P. B. Luh, J. H. Yan, N. Yu, and G. A. Stern, "Efficient Surrogate Optimization for Payment Cost Co-Optimization with Transmission Capacity Constraints," Proceedings of the IEEE PES 2013 General Meeting, Vancouver, Canada, 2013. (**Best Paper Session**)
23. **M. A. Bragin**, P. B. Luh, and J. H. Yan, "An Efficient Surrogate Optimization Method for Solving Linear Mixed-Integer Problems with Cross-Coupling Constraints," Proceedings of the 10th WCICA, Beijing, China. 2012.
24. X. Han, P. B. Luh, **M. A. Bragin**, J. H. Yan, N. Yu, and G. A. Stern, "Solving Payment Cost Co-Optimization Problems," Proceedings of the IEEE PES 2012 General Meeting, San Diego, CA, 2012.
25. **M. A. Bragin**, P. B. Luh, J. H. Yan, N. Yu, X. Han, and G. A. Stern, "An Efficient Surrogate Subgradient Method within Lagrangian Relaxation for the Payment Cost Minimization Problem," Proceedings of the IEEE PES 2012 General Meeting, San Diego, CA, 2012.
26. S. Bhattacharjee, **M. A. Bragin**, and D. Zhdanov, "A Parsimonious Methodology for Recommendation Systems on Datasets with Minimal Attributes and Large Time Span",

Statistical Challenges in Electronic Commerce Research (SCECR), 2012, Montreal, Quebec, Canada, June 28-29, 2012.

27. **M. A. Bragin**, X. Han, P. B. Luh, and J. H. Yan, "Payment Cost Minimization Using Lagrangian Relaxation and Modified Surrogate Optimization Approach," Proceedings of the IEEE PES 2011 General Meeting, Detroit, MI, 2011.
28. S. Bhattacharjee, **M. A. Bragin**, and D. Zhdanov, "Accurate Recommendations of Online Movie Ratings: Large Data Sets with Low Dimensions and Span of Multiple Years," 2010 Winter Conference on Business Intelligence, University of Utah, Salt Lake City, Utah, 2010.
29. D. Zhdanov, **M. A. Bragin**, and S. Bhattacharjee, "Accurate Predictions of Online Movie Ratings: A Challenge to Improve Personalized Recommender Systems," INFORMS Conference on Information Systems and Technology (CIST), Washington DC, October 2009.
30. S. Bhattacharjee, **M. A. Bragin**, and D. Zhdanov, "Data-Driven Prediction of Consumer Choice," 2009 CORS/INFORMS International Meeting, Toronto, Canada, June 14-17, 2009.
31. S. Bhattacharjee, **M. A. Bragin**, and D. Zhdanov, "A Million Dollar Reward: Accurate Online Prediction of Movie Ratings," Fifth Symposium on Statistical Challenges in e-Commerce Research, Carnegie Mellon University, Pittsburgh, PA, May 30-31, 2009.

Invited Newsletter Publications:

32. **M. A. Bragin**, and B. Yan, "Toward Efficient Distributed Combinatorial Optimization," IEEE TC-Cyber Physical Systems, Volume 6, Issue 2, Aug. 01, 2021

Journal Papers Under Review (mentored or co-advised students are underlined):

1. T.-H. Tsai, B. Yan, H.-C. Yang, **M. A. Bragin**, and F.-T. Cheng, "Near-Optimal Scheduling of IC Packaging Operations Considering Processing-Time Variations and Factory Practice."
2. X. Wang, P. Alpay, S. Sahoo, J. Gascon, P. Gao, F. Liu, **M. A. Bragin**, and B. Li, "Defining the Mechanism Shifts in Catalytical Pathways of CO_2 Reduction Reaction Using Structure-Process-Property Multiscale Paradigm," submitted to *Nature*
3. J. Qin, Y. Gao, **M. A. Bragin**, and N. Yu "An Optimization Method-Assisted Ensemble Deep Reinforcement Learning Algorithm to Solve Unit Commitment Problems," submitted to *IEEE Transactions on Power Systems*.
4. **M. A. Bragin,** B. Yan, P. B. Luh, T. Zheng, D. Schiro, F. Zhao, and J. Zhao, "Novel Quality Measure and Efficient Resolution of Convex Hull Pricing for Unit Commitment," submitted to *IEEE PES Letters*
5. **M. A. Bragin**, M. Wilhelm and M. Stuber, "Supply-Chain-Aware Optimization: A Case Study of Stochastic Job-Shop Scheduling," under review

6. S. Zhou, **M. A. Bragin**, L. Pepin, D. Gurevin, C. Ding, and F. Miao, "Surrogate Lagrangian Relaxation: A Path to Retrain-free Deep Neural Network Pruning," submitted to *Transactions on Pattern Analysis and Machine Intelligence*
7. **M. A. Bragin**, "Survey: Lagrangian Relaxation for Mixed-Integer Linear Programming," submitted to *European Journal of Operational Research*
8. **M. A. Bragin**, and N. Yu, "Toward Efficient Transportation Electrification of Heavy-Duty Trucks: Joint Scheduling of Truck Routing and Charging."

Technical Reports:

1. M. Yue, T. Zhao, N. Raghunathan, P. B. Luh, B. Yan, and **M. A. Bragin**, "Stochastic Sizing and Operation of Grid-Level Energy Storage Systems under Intermittent Renewable Generation and Increasing Load Forecasting Uncertainties," https://www.bnl.gov/isd/docs/ESS-Final-Report-Jul-31-2021.pdf
2. Y. Chen, F. Pan, F. Qiu, T. Zheng, M. Marwali, H. Zhong, B. Knueven, Y. Guan, P. Luh, B. Yan, **M. A. Bragin**, L. Wu, R. Baldick, A. Giacomoni, B. Gisin, Q. Gu, A. S. Xavier, R. Philbrick, F. Li, and Q. Zhai, "Security Constrained Unit Commitment for Electricity Market: Modeling, Solution Methodology and Future Challenges," https://resourcecenter.ieee-pes.org/publications/technical-reports/PES_TP_TR96_PSOPE_041522.html

Abstract Submissions:

1. J. Wu, P. B. Luh, Y. Chen, B. Yan, and **M. A. Bragin**, "Synergistic Integration of Machine Learning and Mathematical Optimization for Unit Commitment," Federal Energy Regulatory Commission, 2022.
2. J. Wu, B. Yan, **M. A. Bragin**, Y. Chen, and P. B. Luh, "A Novel Optimization Approach for Sub-hourly Unit Commitment with Large Numbers of Generators and Virtuals," Federal Energy Regulatory Commission, 2020.
3. N. Raghunathan, **M. A. Bragin**, B. Yan, P. B. Luh, K. Moslehi, Y. Yu, X. Feng, C.-N. Yu, and C.-C. Tsai, "Scalable Corrective Security-Constrained Economic Dispatch (SCED) Considering Conflicting Contingencies," Federal Energy Regulatory Commission, 2019.
4. Y. Yu, P. B. Luh, and **M. A. Bragin**, "Scalable Corrective Security-Constrained Economic Dispatch (SCED) Considering Conflicting Contingencies," Federal Energy Regulatory Commission, 2018.

5. P. B. Luh, H. Fan, K. Moslehi, X. Feng, **M. A. Bragin**, Y. Yu, C.-N. Yu, and A. Mousavi, "An Extended Hybrid Markovian and Interval Unit Commitment Considering Renewable Generation Uncertainties," Federal Energy Regulatory Commission, 2015.
6. P. B. Luh, **M. A. Bragin**, Y. Yu, J. H. Yan, G. A. Stern, and N. Yu, "A Synergistic Combination of Surrogate Lagrangian Relaxation and Branch-and-Cut for MIP Problems in Power Systems," Federal Energy Regulatory Commission, 2013.
7. Y. Yu, P. B. Luh, **M. A. Bragin**, E. Litvinov, T. Zheng, F. Zhao, and J. Zhao, "Stochastic Unit Commitment with Intermittent Distributed Wind Generation via Markovian Analysis and Optimization," Federal Energy Regulatory Commission, 2013.

Presentations

Panel:

1. "Learning to Operate an Electric Vehicle Charging Station Considering Vehicle-Grid Integration," IEEE Power and Energy Society General Meeting 2023 (forthcoming)
2. "An Uncertainty-Aware Approach for the TSO-DSO Coordination," IEEE Power and Energy Society General Meeting 2018.

Contributed:

3. "Toward Efficient Resolution of MINLP Problems: An Example from Power Systems Unit Commitment with AC Power Flow," 2022 IISE Annual Conference & Expo, Seattle, WA, May 2022
4. "Enhancing the Small-Signal Stability of Islanded Microgrids under Droop Control," 2022 INFORMS Optimization Society Conference, Greenville, SC, March 2022
5. "Toward Linear Convergence for Non-Smooth Optimization: Implications for Discrete Optimization Problems," 2022 INFORMS Optimization Society Conference, Greenville, SC, March 2022
6. "Stochastic Job-Shop Scheduling: Implications on Supply-Chain Operations under Uncertainty," 2022 INFORMS Optimization Society Conference, Greenville, SC, March 2022
7. "Toward Hyper-Parameter-Free Resolution of ILP Problems," 17th INFORMS Computing Society Conference, Tampa, FL, January 2022.
8. "Enabling Retrain-Free Deep Neural Network Pruning Using Surrogate Lagrangian Relaxation," 17th INFORMS Computing Society Conference, Tampa, FL, January 2022.
9. "Surrogate "Level-Based" Lagrangian Relaxation for MILP Problems," INFORMS Annual Meeting, Anaheim, CA, October 2021.

Invited:

10. "Synergistic Integration of Machine Learning and Mathematical Optimization for Unit Commitment," INFORMS Annual Meeting, Indianapolis, IN, October 2022
11. "An Efficient Approach for Discrete Programming Problems: Implications on Stochastic Job-Shop Scheduling, Agile Manufacturing and Supply Chains," Embry Riddle Aeronautical University, April 2022.
12. "Optimization of Systems Operations: An Efficient Approach for Discrete Programming," Cornell, Systems Engineering, March 2022.
13. "Efficient Solution Methodology for Combinatorial Optimization Problems and its Applications in Power Systems," IEEE PES Foothill Section Seminar, May 2021.
14. "Efficient Decision Making through Price-Based Decomposition and Coordination," Seminar at Nova Southeastern University, Department of Decision Sciences, March 2021.
15. "Efficient Solution Methodology for Combinatorial Optimization Problems," Seminar at Eastern Michigan University, Department of Computer Sciences, March 2021.
16. "Are Practical Mixed-Integer Linear Optimization Problems Hopeless to Solve?" Seminar at UMass-Dartmouth, December 2020.

Best Paper Session:

17. "Surrogate Lagrangian Relaxation and Branch-and-Cut for Unit Commitment with Combined Cycle Units," IEEE Power and Energy Society General Meeting 2014.
18. "Efficient Surrogate Optimization for Payment Cost Co-Optimization with Transmission Capacity Constraints," IEEE Power and Energy Society General Meeting 2013.

Conference:

19. "Novel Exploitation of Convex Hull Invariance for Solving Unit Commitment by Using Surrogate Lagrangian Relaxation and Branch-and-Cut," IEEE Power and Energy Society General Meeting 2015.
20. "Solving Payment Cost Co-Optimization Problems," IEEE Power and Energy Society General Meeting 2012.
21. "Payment Cost Minimization Using Lagrangian Relaxation and Modified Surrogate Optimization Approach," IEEE Power and Energy Society General Meeting 2011.

Poster:

22. "Economic Dispatch for a Distribution Network with Intermittent Renewables and Tap Changers," IEEE Power and Energy Society General Meeting 2018.

23. "Toward Coordinated Transmission and Distribution Operations," IEEE Power and Energy Society General Meeting 2018.
24. "Distributed and Asynchronous Unit Commitment and Economic Dispatch," IEEE Power and Energy Society General Meeting 2017.
25. "An Efficient Approach for Unit Commitment and Economic Dispatch with Combined Cycle Units and AC Power Flow," IEEE Power and Energy Society General Meeting 2016.
26. "An Efficient Surrogate Subgradient Method within Lagrangian Relaxation for The Payment Cost Minimization Problem," IEEE Power and Energy Society General Meeting 2012.

Funding: $3,701,838 (PI: $409,049; Co-PI: $2,192,789; SP: $800,000; GA: $360,000)

1. "California's Deep Decarbonization Pathways: A Holistic Multi-Layer Assessment," University of California Office of the President, LFRP 2022 Collaborative Research and Training Awards, **Co-PI**, $650,000, 03/01/2022-02/28/2025
2. "Efficient Resolution for UC with Energy Storage Resources," ISO-NE, **PI**, $21,000, 10/2021-10/2022.
3. "Optigrid: Planning & Optimizing the Power Grid During the Low Carbon Transition in Connecticut," Eversource, **Co-PI**, $60,000, 09/2021-08/2023.
4. "Machine Learning-Based Optimization for Sub-Hourly Unit Commitment," Midcontinent ISO, **PI**, $58,000, 08/2021-08/2022.
5. "Advanced Control Architectures and Algorithms for Agile Manufacturing," DOD/Air Force Research Laboratory, **Co-PI**, $547,864, 08/23/2020-08/22/2023.
6. "Development of a Planning, Operation, and Control Framework for Hybrid Energy Storage and Renewable Generation Systems," Brookhaven National Laboratory, **PI**, $74,997, 01/2021-09/2023.
7. "Stochastic Sizing and Operation of Grid-Level Energy Storage Systems under Intermittent Renewable Generation and Increasing Load Forecasting Uncertainties," Brookhaven National Laboratory, **PI**, $14,000, 11/2020-07/2021.
8. "Investigation of Pricing with Inter-Temporal Constraints," ISO-NE, **PI**, $20,000, 09/2020-09/2021.
9. "Unit Commitment with Parallel SAVLR and Formulation Tightening," Midcontinent ISO, **PI**, $58,000, 08/2020-05/2021.
10. "Unit Commitment with Parallel SAVLR and Formulation Tightening," Midcontinent ISO, **PI**, $28,000, 01/2020-05/2020.
11. "Investigation of Convex Hull Pricing," ISO-NE, **Co-PI**, $66,918, 09/2019-09/2020.

12. "Novel Formulation and Optimization of Semiconductor Packaging Scheduling Problems," National Cheng Kung University, $148,010, **Co-PI**, 04/2019-11/2021.
13. "Unit Commitment with Parallel SAVLR and Formulation Tightening," Midcontinent ISO, **PI**, $49,994, 04/2019-12/2019.
14. "Efficient Network Constrained Unit Commitment Phase 2: Convergence and Parallel Implementation of SAVLR and B&C," ABB, **Co-PI**, $19,999, 03/2019 - 8/2019.
15. "Unit Commitment with SAVLR and Enhanced Formulation," Midcontinent ISO, **Co-PI**, $40,000, 10/2018-01/2019.
16. "SCC: Empowering Smart and Connecticut Communities through Programmable Community Microgrids," National Science Foundation, **Senior Personnel**, $800,000, 09/2018-08/2021.
17. "Support for Stochastic Sizing and Operation of Grid-Level Energy Storage Systems under Intermittent Renewable Generation and Increasing Load Forecasting Uncertainties," Brookhaven National Laboratory, **Co-PI**, $300,000, 08/2018-07/2021.
18. "A Revolutionary Way to Tackle Challenging MILP Problems in Power Systems through Accelerated Convergence, Formulation Tightening and Asynchronous Optimization," National Science Foundation, **Co-PI**, $359,998, 08/2018-07/2022.
19. "Efficient Network Constrained Unit Commitment: A Parallelized Surrogate Absolute-Value Lagrangian Relaxations + Branch-and-Cut Approach," ABB, **PI**, $85,058, 04/2018-12/2018.
20. "Contingency-Constrained Unit Commitment with High Penetration of Intermittent Renewables," National Science Foundation ECCS-1509666, $360,000, 08/2015-07/2018.

Teaching Experience

University of Connecticut:

Graduate Courses:

ECE 5101 - Introduction to System Theory (Fall 2018, Fall 2019 – hybrid (in-class/distance learning), Fall 2020 – hybrid/online; Online and hybrid learning modes are operationalized through Kaltura, WebEx and BB Collaborate.)

ECE 6104 - Information, Control & Games (feat. AlphaZero and Deep Neural Networks) (Spring 2020 (in-class/online), co-taught with Professor Peter B. Luh)

ECE 6161 - Modern Manufacturing System Engineering (Spring 2019, co-taught with Professors Peter B. Luh and Bing Yan)

Undergraduate Courses:

OPIM 3103 - Business Information Systems (Fall 2009 – online, Spring 2010 – in-class)

University of Nebraska-Lincoln:

Undergraduate Courses:

PHYS 141 - Humanized Physics part I/II (Spring 2007/Fall 2007)

PHYS 221 - Integrating Multimedia Tools into University Physics Laboratories (Fall 2006)

Teaching Achievements: "Excellence in Teaching," Fall 2020.

Teaching Interests: Optimization Theory, Power Systems, Neural Networks, System Theory, Manufacturing, Information Theory, Game Theory.

Outreach Activities: The da Vinci Project. Teachers seeking to integrate engineering concepts into their curriculum participate in the da Vinci Project, a unique one-week residential short course for math and science teachers is offered at the University of Connecticut annually. Teachers can earn up to three continuing education credits for attending the da Vinci Project. 2011, 2012, 2013, 2016, 2018 and 2019.

Supervision and Mentorship (measurable outcomes are underlined, major advisors and affiliations are in parentheses):

1. Anderson, Osten (University of California, Riverside, ECE), 08/2022 – Present (Nanpeng Yu)
2. Feng, Fei (Stony Brook University, ECE), 05/2021 – Present (Peng Zhang).
    a. 1 journal paper
3. Gurevin, Deniz (University of Connecticut, ECE), 06/2020 – 02/2021 (Omer Khan).
    a. 1 conference paper.
    b. Student graduated with M.S.
4. Hyder, Farhan (Rochester Institute of Technology, EEE), 08/2021 – Present (Bing Yan)
    a. 1 conference paper.
5. Liu, Anbang (Tsinghua, Automation), 09/2019 – Present (Peter B. Luh).
    a. 2 journal papers
6. Lin, Wei (Chongqing University), 09/2019 – 10/2020.
7. Nikmehr, Nima (Stony Brook University, ECE), 08/2019 – Present (Peng Zhang).
    a. 2 journal papers
    b. 1 conference paper (Best Paper)
8. Qin, Jingtao (University of California, Riverside, ECE), 08/2022 – Present (Nanpeng Yu).
9. Raghunathan, Niranjan (University of Connecticut, ECE), 08/2018 – Present (Peter B. Luh).
    a. 1 journal paper

10. Sun, Yuting (University of Connecticut, ECE), 05/2020 – 07/2022 (Liang Zhang).
    a. 1 journal paper
11. Wan, Wenfeng (University of Connecticut/Stony Brook University, ECE), 01/2018 – 11/2022 (Peng Zhang).
    a. 3 journal papers
    b. 3 conference papers
    c. Student graduated with Ph.D.
12. Wang, Xingyu (University of Connecticut, CEE), 11/2020 – Present (Baikun Li).
13. Wang, Zigeng (University of Connecticut, CSE), 10/2020 – 10/2022 (Sanguthevar Rajasekaran)
    a. 1 conference paper
    b. Student graduated with Ph.D.
14. Wu, Jianghua (University of Connecticut, ECE), 08/2018 – Present (Peter B. Luh/Zongjie Wang).
    a. 1 journal paper
    b. 1 conference paper
    c. 1 journal paper under review
15. Zhou, Shanglin (University of Connecticut, SCE), 09/2020 – 09/2022 (Caiwen Ding).
    a. 1 journal paper
    b. 1 conference paper

Summary of Measurable Outcomes:

- 12 journal publications (F. Feng, A. Liu, N. Nikmehr, N. Raghunathan, Y. Sun, W. Wan, J. Wu, S. Zhou)
- 9 conference papers (J. Wu, W. Wan, Z. Wang, D. Gurevin, N. Nikmehr, S. Zhou, F. Hyder)
- 1 M.S. Defended (D. Gurevin)
- 2 Ph.D. Defended (W. Wan, Z. Wang)

Membership in Professional Organizations

IEEE (Senior Member)

IISE

INFORMS

Power & Energy Society (Senior Member)

Service

Session Organizer/Chair:

- "State-of-the-art Review on TSO-DSO Coordination Models and Solution Techniques" at 2023 IEEE Power and Energy Society General Meeting (forthcoming)
- "Machine Learning for Discrete Optimization" at 2022 INFORMS Annual Meeting (invited/sponsored)
- "Power System Operations Paper Forum" at 2022 IEEE Power and Energy Society General Meeting
- "Energy Systems Optimization – II" at IISE Annual Conference & Expo 2022
- "Advances in Integer and Combinatorial Optimization" at 2022 INFORMS Optimization Society Conference
- "Optimization for Machine Learning" at 17th INFORMS Computing Society Conference 2022
- "Computational Optimization" at 17th INFORMS Computing Society Conference 2022

Ad-hoc Reviewer:

Annals of Operations Research

Annual Reviews in Control

Computers and Industrial Engineering

Computers and Operations Research

CSEE Journal of Power and Energy Systems

IEEE Access

IEEE Open Journal of Signal Processing

IEEE Power and Energy Society General Meeting

IEEE Power Engineering Letters

IEEE Robotics and Automation Letters

IEEE Transactions on Automation Science and Engineering

IEEE Transactions on Emerging Topics in Computational Intelligence

IEEE Transactions on Energy Markets, Policy and Regulation

IEEE Transactions on Mechatronics

IEEE Transactions on Power Systems

IEEE Transactions on Quantum Engineering

IEEE Transactions on Signal Processing

IEEE Transactions on Smart Grid

IET Generation, Transmission and Distribution

CV: Mikhail Bragin

International Journal of Geographical Information Science

International Journal of Production Research

International Journal of Simulation and Process Modelling

Journal of Optimization Theory and Applications

Journal of Computational Design and Engineering

References

Available upon request