Vladimir Dvorkin, Ph.D.

EECS Assistant Professor at the University of Michigan

Ann Arbor, MI dvorkin@umich.edu Scholar DvorkinVladimir

Appointments & work experience

University of Michigan — Ann Arbor, US
Assistant Professor — 1/2024 - present
Department: Electrical Engineering and Computer Science

Massachusetts Institute of Technology — Cambridge, US
MSCA–FIBE Postdoctoral Fellow — 3/2022 - 12/2023
Postdoctoral Associate — 2/2021 - 2/2022
Department: Laboratory for Information and Decision Systems & Energy Initiative

Georgia Institute of Technology — Atlanta, USA
Research Visitor — 07/2019 - 12/2019
Department: Industrial & Systems Engineering

Higher School of Economics — Moscow, Russia
Research Assistant — 12/2013 - 08/2017

Education

Technical University of Denmark (DTU) — Lyngby, Denmark
Ph.D. – Electrical Engineering — 09/2017 - 03/2021
M.Sc. – Sustainable Energy — 09/2015 - 07/2017
Supervisors: Profs. Pierre Pinson and Jalal Kazempour

Higher School of Economics (HSE) — Moscow, Russia
M.Sc. – Energy Economics — 09/2012 - 06/2014

Moscow Power Engineering Institute (MPEI) — Moscow, Russia
B.Sc. – Electrical Engineering — 09/2008 - 06/2012

Awards

- Outstanding Reviewer, IEEE Trans. on Energy Markets, Pol. and Reg. — 2024
- Marie Skłodowska-Curie Actions Postdoctoral Fellowship — 03/2022–02/2024
- Best Paper Award, IEEE Transactions on Power Systems — 2021
- Outstanding Reviewer, IEEE Transactions on Power Systems — 2021
- LANL Grid Science Winter School Scholarship — 2019
- Outstanding Reviewer, IEEE Transactions on Sustainable Energy — 2018
- DTU Tuition Fee Waiver for MSc Students — 08/2015–06/2017
- HSE Scholarship for Science Achievements — 2014
- HSE Scholarship for Excellency — 09/2012–06/2014
- Semifinalist at the Youth Russian Petroleum&Gas Case Championship — 2013
- MPEI Scholarship for Academic Achievements — 09/2008–06/2012

Publications

Submitted

S1. Zhao D., Delikaraoglou S., **Dvorkin**, V., Botterud A., Lamadrid A., 2024. Optimizing bidding curves for renewable energy in two-settlement electricity markets. Submitted to *European Journal of Operational Research*

S2. **Dvorkin**, V., Fioretto, N., Van Hentenryck, P., Kazempour, J. and Pinson, P., 2024. Privacy-preserving convex optimization: When differential privacy meets stochastic programming. Submitted to *INFORMS Journal on Optimization* https://doi.org/10.48550/arXiv.2209.14152

Journal Publications

J1. Wu, S., **Dvorkin**, V. 2025. Synthesizing grid data with cyber resilience and privacy guarantees. *IEEE Control Systems Letters* https://doi.org/10.48550/arXiv.2503.14877

J2. Liu, X., **Dvorkin**, V. 2025. Optimization over trained neural networks: Difference-of-convex algorithm and application to data center scheduling. *IEEE Control Systems Letters* https://doi.org/10.48550/arXiv.2503.17506

J3. **Dvorkin**, V. 2025. Regression equilibrium in electricity markets. *IEEE Transactions on Energy Markets, Policy and Regulation.* https://doi.org/10.1109/TEMPR.2025.3530266

J4. **Dvorkin**, V. 2025. Agent coordination via contextual regression (AgentCONCUR) for data center flexibility. *IEEE Transactions on Power Systems.* https://doi.org/10.1109/TPWRS.2024.3442954

J5. Kenis M., **Dvorkin** V., Schittekatte T., Bruninx K., Delarue E., Botterud A., 2024. Evaluating offshore electricity market design considering endogenous infrastructure investments: Zonal or nodal? *IEEE Transactions on Energy Markets, Policy and Regulation.* https://doi.org/10.1109/TEMPR.2024.3399611

J6. Zhao, D., **Dvorkin**, V., Delikaraoglou, S., Lamadrid, A.J., Botterud, A. 2023. Uncertainty-informed renewable energy scheduling: A scalable bilevel framework. *IEEE Transactions on Energy Markets, Policy and Regulation*, in print. https://doi.org/10.1109/TEMPR.2023.3344126

J7. **Dvorkin**, V., Botterud, A. 2023. Differentially private algorithms for synthetic power system datasets. *IEEE Control Systems Letters*, vol. 7, pp. 2053-2058 https://doi.org/10.1109/LCSYS.2023.3284389

J8. **Dvorkin**, V., Mallapragada, D. and Botterud, A., 2023. Multi-stage decision rules for power generation & storage investments with performance guarantees. *IEEE Transactions on Power Systems* (in print) https://doi.org/10.1109/TPWRS.2023.3257129

J9. **Dvorkin**, V., Mallapragada, D., Botterud, A., Kazempour, J. and Pinson, P., 2022. Multi-stage linear decision rules for stochastic control of natural gas networks with linepack. *Electric Power Systems Research (XXII PSCC edition)*, 212, p.108388. https://doi.org/10.1016/j.epsr.2022.108388

J10. **Dvorkin**, V., Ratha, A., Pinson, P. and Kazempour, J., 2021. Stochastic control and pricing for natural gas networks. *IEEE Transactions on Control of Network Systems*, 9(1), pp.450-462. https://doi.org/10.1109/TCNS.2021.3112764

J11. **Dvorkin**, V., Fioretto, F., Van Hentenryck, P., Pinson, P. and Kazempour, J., 2021. Differentially private optimal power flow for distribution grids. *IEEE Transactions on Power Systems*, 36(3), pp.2186-2196.
🏆 Best Paper Award for the period 2019–2021
https://doi.org/10.1109/TPWRS.2020.3031314

J12. **Dvorkin**, V., Kazempour, J. and Pinson, P., 2019. Electricity market equilibrium under information asymmetry. *Operations Research Letters*, 47(6), pp.521-526. https://doi.org/10.1016/j.orl.2019.09.005

J13. **Dvorkin**, V., Delikaraoglou, S. and Morales, J.M., 2018. Setting reserve requirements to approximate the efficiency of the stochastic dispatch. *IEEE Transactions on Power Systems*, 34(2), pp.1524-1536. https://doi.org/10.1109/TPWRS.2018.2878723

Conference Publications

C1. Kim, M., **Dvorkin**, V. and Kim, J., 2025. Probabilistic dynamic line rating forecasting with line graph convolutional LSTM. *2025 IEEE Power & Energy Society General Meeting (PESGM)* https://doi.org/10.48550/arXiv.2411.12963

C2. **Dvorkin**, V., Fioretto, F. 2023. Price-aware deep learning for electricity markets. *NeurIPS 2023 Workshop on Tackling Climate Change with Machine Learning* https://doi.org/10.48550/arXiv.2308.01436

C3. **Dvorkin**, V., Chevalier, S., Chatzivasileiadis S., 2023. Emission-constrained optimization of gas networks: Input-convex neural network approach. In *2023 62th IEEE Conference on Decision and Control* (in print).
🏆 Also selected for as a spotlight talk at 2023 ICLR-CCAI Workshop 🔗
https://doi.org/10.48550/arXiv.2209.08645

C4. Zhao, D., **Dvorkin**, V., Delikaraoglou, S., Lamadrid, A. J., Botterud, A., 2023. A scalable bilevel framework for renewable energy scheduling. In *The 14th ACM International Conference on Future Energy Systems (e-Energy) 2023* https://doi.org/10.1145/3575813.3595199

C5. **Dvorkin**, V., Kazempour, J. and Pinson, P., 2020, August. Chance-constrained equilibrium in electricity markets with asymmetric forecasts. In *2020 International Conference on Probabilistic Methods Applied to Power Systems* (pp. 1-6). IEEE.
🏆 Best Paper Award Nomination
https://doi.org/10.1109/PMAPS47429.2020.9183423

C6. **Dvorkin**, V., Van Hentenryck, P., Kazempour, J. and Pinson, P., 2020, December. Differentially private distributed optimal power flow. In *2020 59th IEEE Conference on Decision and Control* (pp. 2092-2097). IEEE. https://doi.org/10.1109/CDC42340.2020.9303768

C7. Radoszynski, A.M., **Dvorkin**, V. and Pinson, P., 2019, June. Accommodating bounded rationality in pricing demand response. In *2019 IEEE Milan PowerTech (pp. 1-6)*. IEEE. https://doi.org/10.1109/PTC.2019.8810419

C8. **Dvorkin**, V., Kazempour, J., Baringo, L. and Pinson, P., 2018, December. A consensus-ADMM approach for strategic generation investment in electricity markets. In *2018 IEEE Conference on Decision and Control* (pp. 780-785). IEEE. https://doi.org/10.1109/CDC.2018.8619240

Thesis

T1. **Dvorkin**, V., 2021. Stochastic and private energy system optimization. *Ph.D. Thesis*. Technical University of Denmark. (Supervised by Pinson P., Kazempour J. Examined by Chatzivasileiadis, S., Shapiro, A., Wierman, A.) https://drive.google.com/file/d/1_OwDZOnnH0tFnDeQ1S-eeW8QYoRJNRa4/view

T2. **Dvorkin**, V., 2017. Multi-stage strategic investment in CCGTs and wind power units via progressive hedging. *M.Sc. Thesis*. Technical University of Denmark. (Supervised by Pinson P., Kazempour J. Examined by Boomsma, T.K.) https://drive.google.com/file/d/16MFeiUVbQ4IQ-d6wvUF9jZYUU-RHUcYa/view

Courses

1. *EECS 598: Computational power systems* — Winter 2025
2. *EECS 463: Power system design and operation* — Fall 2024
3. *EECS 559: Optimization methods for SIPML* — Winter 2024
4. *Renewables in Electricity Markets* — DTU
   Head teaching assistant — Spring 2020
   Teaching assistant — Spring 2017
5. *DTU Summer School on Energy Optimization, Learning and Game Theory* — DTU
   Teaching assistant — Summer 2017–2019
6. *Advanced Optimization in Electricity Markets* — DTU
   Teaching assistant — Fall 2018
7. *Decomposition Techniques for Energy Systems Applications* — Skoltech
   Teaching assistant, lecturer — Fall 2018

Ph.D. students

1. Xinwei Liu — starting Fall 2024
2. Shengyang Wu — starting Fall 2024
3. Milad Hoseinpour Valoujaei — starting Fall 2024

M.Sc. students

1. Xinwei Liu, Decision-focused post-processing of trained neural networks. Winter 2024, UMich.
2. Hyun June Kim, Synthesizing data for linear programming. Winter 2024, UMich.
3. Samuel A. Abel, Fueling an energy transition: Designing an optimal portfolio of competing fuels under uncertainty. Spring 2023, MIT.
4. Gretta Marija Nikkare, Co-optimization of green hydrogen and power system expansion planning. Spring 2022, MIT.
5. Rafal Michal Mikulowski, Power systems operation and planning using chance-constrained programming. Fall 2019, DTU.
6. Andrea Marin Radoszynski, Demand response and bounded rationality in electricity markets. Spring 2018, DTU.
7. Eirini Ioanna Barmpati, Stochastic equilibrium models for capacity investment in energy systems. Spring 2018, DTU.

UROP students

1. Shreya Chaudhary, Synthetic Energy Dataset Generation. Winter 2023, MIT

Visiting Ph.D. students

1. Philipp Gunkel , Renewable energy trajectory of no-regret. Fall 2023, MIT.
2. Michiel Kenis, Toward off-shore bidding zones: the role of generation and transmission capacity investments. Fall 2022, MIT.

PhD Thesis Committees

1. Hannah Moring, University of Michigan – Ann Arbor — 2024
2. Sunny Chen, University of Michigan – Ann Arbor — 2024
3. Austin Lin, University of Michigan – Ann Arbor — 2024

Teaching training

1. MIT Kaufman Teaching Certificate Program (description ↗). Fall 2022.

Selected Invited Talks

1. *Grid-aware AI: Operational and market strategies for large-scale data centers*
   Boston University (Workshop) May, 2025.
2. *Data center–power grid coordination under engineering and privacy constraints*
   Boston University (CISE Seminar) November, 2024.
3. *Regression Nash equilibrium in electricity markets*
   University of Michigan (Control Seminars) November, 2024.
4. *Carbon-aware computing: How to get power systems and data centers to talk*
   2024 IEEE Control Systems Society Day October, 2024.
5. *Formal privacy guarantees for optimization datasets in power systems*
   University of Michigan (Comm. & Signal Processing Seminar) March, 2024.
6. *Privacy-preserving optimization and learning via stochastic optimization*
   Georgia Institute of Technology (AI4OPT) March, 2023.
7. *Optimization and learning in energy systems: Privacy and performance.*
   University of Michigan (ECE Department) May, 2023.
   Massachusetts Institute of Technology (CEE Department) February, 2023.
   University of Wisconsin–Madison (ECE Department) February, 2023.
   University of Minnesota (ISyE Department) January, 2023.
   University of Edinburgh (School of Mathematics) December, 2022.
8. *Differential privacy meets stochastic programming.*
   Copenhagen University (Department of Computer Science).
   Hosted by: Yevgeny Seldin November, 2022.
9. *Performance guarantees for investments in power systems under uncertainty.*
   Technical University of Denmark (DTU Management).
   Presented at: Seminar on Economics of Green Transition November, 2022.
10. *Privacy-preserving perturbation of convex optimization programs.*
    California Institute of Technology.
    Hosted by: Adam Wierman and Steven Low August, 2022.
11. *Privacy-preserving perturbation of convex optimization programs.*
    Massachusetts Institute of Technology.
    Presented at Stats&LIDS Tea Talks seminar series May, 2022.
12. *Algorithmic privacy for energy system optimization.*
    Massachusetts Institute of Technology.
    Presented at MITEI Research Meets seminar series May, 2022.
13. *Stochastic control and market design for natural gas networks.*
    Massachusetts Institute of Technology.
    Hosted by: Audun Botterud September, 2020.
14. *Differentially private optimization of power systems.*
    Georgia Institute of Technology.
    Presented at DOS Seminars seminar series December, 2019.
15. *Electricity market equilibrium under information asymmetry.*
    Johns Hopkins University.
    Hosted by: Benjamin Hobbs January, 2019.

Conferences & Workshops

1. *US electric grid decarbonization pathways under market and policy uncertainties*
   Workshop at National Academies (poster) September, 2024.
2. *Regression Nash equilibrium in electricity markets*
   2024 INFORMS Annual Meeting, Seattle October, 2024
3. *Machine learning in electricity markets: Is there equilibrium?*
   Institute for Mathematical and Statistical Innovation, Chicago August, 2024
4. *Equilibrium forecasting in electricity markets*
   2024 IEEE Power & Energy Society General Meeting July, 2024
5. *Trustworthy deep learning for electricity market applications*
   Federal Energy Regulatory Commission July, 2024
6. *Forecast equilibrium in electricity markets*
   33rd European Conference on Operational Research July, 2024
7. *Price-aware forecasting in electricity markets*
   Institute for Mathematical and Statistical Innovation, Chicago June, 2024
8. *Privacy-preserving synthetic dataset generation for power systems research*
   2023 INFORMS Annual Meeting. October, 2023
   Federal Energy Regulatory Commission. July, 2023
9. *Emission-constrained optimization of gas systems with input-convex neural nets*
   ICLR Workshop: Tackling Climate Change with Machine Learning May, 2023
10. *Privacy-preserving machine learning by means of stochastic optimization.*
    2023 MLTea talks at MIT February, 2023
11. *Algorithmic privacy for energy systems optimization.*
    2022 INFORMS Annual Meeting. October, 2022
12. *Multi-stage stochastic generation investment with performance guarantees.*
    MITEI Future Energy Systems Center Fall 2021 Workshop. December, 2021
13. *Multi-stage investment decision rules for power systems: sensitivities, deterministic equivalents, and performance guarantees.*
    2021 INFORMS Annual Meeting. October, 2021
14. *Multi-stage stochastic generation investment with performance guarantees.*
    Federal Energy Regulatory Commission. June, 2021
15. *Differentially private optimal power flow for distribution grids.*
    IEEE PES Madrid PowerTech 2021. June, 2021
16. *Stochastic control and market design for natural gas networks.*
    2020 INFORMS Annual Meeting. October, 2020
17. *Differentially private optimal power flow for distribution grids.*
    2020 INFORMS Annual Meeting. October, 2020
18. *Differentially private distribuited optimal power flow.*
    2019 GeorgiaTech Energy Systems and Optimization Workshop. November, 2019
19. *Electricity market equilibrium under information asymmetry.*
    2019 INFORMS Annual Meeting. October, 2019
20. *Electricity market equilibrium under information asymmetry.*
    2019 IEEE PES General Meeting. August, 2019
21. *Electricity market equilibrium under information asymmetry.*
    XV International Conference on Stochastic Programming. August, 2019
22. *Power system optimization under information asymmetry.*
    Grid Science Winter School, Los Alamos National Laboratory. January, 2019

23. *Consensus-ADMM approach for strategic investment in electricity markets.* 2018 IEEE Conference on Decision and Control. December, 2018
24. *A solution framework for strategic investment problems via progressive hedging.* XV Conference on Computational Management Science. May, 2018

Proposal review

1. NSF: Electrical, Communications and Cyber Systems (ECCS) Devision 2025

Conference session chair

1. INFORMS: Algorithms for Grid Integration of AI 2025
2. L4DC: Learning-based Control 2025
3. INFORMS: Power Systems on the Road Between Optimization and Learning 2024

Reviewer service

1. ICLR Tackling Climate Change with Machine Learning Workshop since 2024
2. IEEE Transactions on Smart Grids since 2019
3. IEEE Transactions on Automatic Control since 2019
4. IEEE Transactions on Sustainable Energy since 2018
5. IEEE Transactions on Power Systems since 2018
6. European Journal of Operational Research since 2020
7. International Transactions on Electrical Energy Systems since 2017
8. PSCC – Power Systems Computation Conference since 2018
9. IEEE Conference on Decision and Control since 2018
10. IEEE PES PowerTech since 2019
11. IEEE American Control Conference since 2018

GitHub repositories

1. PrivateOpt: Differentially Private Convex Optimization
2. InvestmentLDR: Investment Linear Decision Rules for Power Systems
3. DP-CC-OPF: Differentially Private Chance-Constrained OPF
4. GasLDR: Linear Decision Rules for Stochastic Control of Gas Networks
5. Stochastic Control and Pricing for Natural Gas Networks

Professional Memberships

IEEE, Member (Power and Energy Society) since 2017
INFORMS, Member (Energy, Natural Resources and Environment section) since 2019.

Other

1. Founder of the enOPTIMAL: Energy, Optimization and Learning seminar series at MIT to bridge energy researchers during the pandemic.