Miruna Oprescu

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Summary

I develop robust and reliable machine learning algorithms for causal inference and data-driven decision-making. My research addresses challenging settings, including imperfect compliance in experiments, sensitivity analysis in observational data, reinforcement learning for dynamic decisions, and complex structured datasets. My work aims to build trustworthy, effective models for real-world, data-limited, and high-impact applications.

Education

Cornell University (Cornell Tech) *Fall 2021 – Present*
Ph.D. Candidate in Computer Science. Adviser: Nathan Kallus
M.S. in Computer Science (2024, awarded en route to Ph.D.)
Department of Energy Computational Science Graduate Fellow

Harvard University *2011 – 2015*
Joint A.B. degree in Physics and Mathematics. Minor in Computer Science
Cum laude in field with High Honors in Physics and Mathematics

Experience

Machine Learning Research Intern *Summer 2025*
Netflix, New York City, NY
- Building causal models of user engagement and retention, with applications to content value and membership dynamics. Mentors: Nathan Kallus, David Hubbard.

Research Intern *Summer 2024*
Brookhaven National Laboratory, Brookhaven, NY
- Developed causal inference methods for spatiotemporal applications in Earth Science. Mentor: Shinjae Yoo.

Machine Learning Research Intern *Summer 2022*
Netflix, Los Gatos, CA
- Built a causal ML model for estimating the effect of watching a new title on long-term user engagement. Mentors: Sudeep Das, Aish Fenton.

Senior Data and Applied Scientist *2019 – 2021*
Microsoft Research, Cambridge, MA
- Drove core research in causal ML, weather forecasting, and cancer modeling; results published in top venues.
- Core contributor to the EconML library.

Software Development Engineer *2015 – 2017*
Microsoft, Cambridge, MA
- Developed and published scalable ML algorithms as a core contributor to the MMLSpark library.

Selected Publications

† equal contribution, ‡ alphabetical authors. Full publication list available on Google Scholar.

Preprints

[1] **Miruna Oprescu**, Brian M Cho, and Nathan Kallus. Efficient adaptive experimentation with non-compliance. *arXiv preprint arXiv:2505.17468*, 2025.

[2] **Miruna Oprescu**, David K Park, Xihaier Luo, Shinjae Yoo, and Nathan Kallus. Gst-unet: Spatiotemporal causal inference with time-varying confounders. *arXiv preprint arXiv:2502.05295*, 2025.

Conference Publications

[1] **Miruna Oprescu** and Nathan Kallus. Estimating heterogeneous treatment effects by combining weak instruments and observational data. *Advances in Neural Information Processing Systems*, 37:118777–118806, 2025.

[2] Andrew Bennett[‡], Nathan Kallus[‡], **Miruna Oprescu**[‡], Wen Sun[‡], and Kaiwen Wang[‡]. Efficient and sharp off-policy evaluation in robust markov decision processes. *Advances in Neural Information Processing Systems*, 37:112962–113000, 2025.

[3] **Miruna Oprescu**, Jacob Dorn, Marah Ghoummaid, Andrew Jesson, Nathan Kallus, and Uri Shalit. B-learner: Quasi-oracle bounds on heterogeneous causal effects under hidden confounding. In *Proceedings of the 40th International Conference on Machine Learning*, pages 26599–26618. PMLR, 2023.

[4] Nathan Kallus[†] and **Miruna Oprescu**[†]. Robust and agnostic learning of conditional distributional treatment effects. In *International Conference on Artificial Intelligence and Statistics*, pages 6037–6060. PMLR, 2023.

[5] Keith Battocchi[‡], Eleanor Dillon[‡], Maggie Hei[‡], Greg Lewis[‡], **Miruna Oprescu**[‡], and Vasilis Syrgkanis[‡]. Estimating the long-term effects of novel treatments. *Advances in Neural Information Processing Systems*, 34:2925–2935, 2021.

[6] **Miruna Oprescu**[†], Vasilis Syrgkanis[†], and Zhiwei Steven Wu[†]. Orthogonal random forest for causal inference. In *International Conference on Machine Learning*, pages 4932–4941. PMLR, 2019.

[7] Vasilis Syrgkanis, Victor Lei, **Miruna Oprescu**, Maggie Hei, Keith Battocchi, and Greg Lewis. Machine learning estimation of heterogeneous treatment effects with instruments. *Advances in Neural Information Processing Systems*, 32:15193–15202, 2019. **Spotlight presentation.**

[8] **Miruna Oprescu**[†], Vasilis Syrgkanis[†], Keith Battocchi[†], Maggie Hei[†], and Greg Lewis[†]. EconML: A Machine Learning Library for Estimating Heterogeneous Treatment Effects. In *CausalML Workshop, NeurIPS*, 2019. **Spotlight presentation.**

Talks

- *Causal Inference for Spatiotemporal Interventions*, SIAM CSE, 2025.
- *Reliable Treatment Effect Estimation Using Weak Instruments and Observational Data*, Workshop in Operations Research and Data Science (WORDS), Duke University, 2024.
- *Uncertainty Quantification in Causal Inference: Sharp and Efficient Bounds on Heterogeneous Causal Effects Under Hidden Confounding*, Computational Science Seminar, Brookhaven National Lab, 2023.
- *Causal Inference and Machine Learning in Practice with EconML and CausalML*, SIGKDD, 2021.
- *EconML: A Machine Learning Library for Estimating Heterogeneous Treatment Effects*, ODSC East, 2019.
- *MMLSpark: Lessons from Building a SparkML Compatible Machine Learning Library*, Spark Summit, 2017.

Honors & Awards

- Department of Energy Computational Science Graduate Fellowship 2022–2026
- DOE Communicate Your Science & Engineering (CYSE) Award 2025
- Meta PhD Research Fellowship Finalist 2022
- *Cum laude*, Harvard University 2015
- High Honors, Harvard Physics Department 2015
- Derek C. Bok Award for Distinction in Teaching (Data Science), Harvard 2014

Professional Service

- Director, Summer Science Program (SSP) 2023–Present
- Reviewer, NeurIPS 2021–2025
- Reviewer, ICML 2024–2025
- Reviewer, AISTATS 2024

Teaching

- Teaching Assistant, Cornell University
  - Learning, Inference, and Decision Making from Data — Spring 2022
  - Applied Machine Learning — Fall 2021
- Teaching Fellow, Harvard University
  - Mechanics and Special Relativity — Fall 2014
  - Data Science — Fall 2014
  - Linear Algebra and Real Analysis — Spring 2013
  - Algebra I — Fall 2013