

# Miruna Oprescu

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## Summary

I design machine learning algorithms for causal inference, reinforcement learning, and data-driven decision-making under uncertainty. My work tackles fundamental challenges including imperfect compliance in experiments, robustness to unobserved or limited data, off-policy evaluation, and learning from structured datasets such as spatiotemporal and networked data. My overarching goal is to develop trustworthy and effective models for high-stakes applications in healthcare, scientific research, and AI-assisted decision-making.

## Education

### Cornell University (Cornell Tech)

*Fall 2021 – Present*

Ph.D. Candidate in Computer Science. Advisor: 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: David Hubbard, Yonatan Gur.

### 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

*2017 – 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<sup>†</sup>**, Wen Sun, and Kaiwen Wang<sup>†</sup>. 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<sup>†</sup> and **Miruna Oprescu<sup>†</sup>**. 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<sup>‡</sup>, Eleanor Dillon<sup>‡</sup>, Maggie Hei<sup>‡</sup>, Greg Lewis<sup>‡</sup>, **Miruna Oprescu<sup>‡</sup>**, and Vasilis Syrgkanis<sup>‡</sup>. Estimating the long-term effects of novel treatments. *Advances in Neural Information Processing Systems*, 34:2925–2935, 2021.
- [6] **Miruna Oprescu<sup>†</sup>**, Vasilis Syrgkanis<sup>†</sup>, and Zhiwei Steven Wu<sup>†</sup>. 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<sup>†</sup>**, Vasilis Syrgkanis<sup>†</sup>, Keith Battocchi<sup>†</sup>, Maggie Hei<sup>†</sup>, and Greg Lewis<sup>†</sup>. 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

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- 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