

# Quinn Lanners

Ph.D. Candidate  
Department of Biostatistics & Bioinformatics  
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## Summary

I am a Biostatistics Ph.D. candidate at Duke University researching interpretable causal inference using machine learning under Profs. Cynthia Rudin, David Page, and Alexander Volfovsky. I focus on complex real-world data with recent projects on dynamic treatment regime estimation for ICU patients, observational causal inference methods, and a multilabel learning approach for predicting rare clinical events. My collaborations span statistics, computer science, medicine, and chemistry. I also conducted deep learning research as an undergraduate with Prof. Thomas Laurent.

My professional experiences include interning at Meta as a Research Scientist. There, I developed a domain-adapted model-based approach for offline counterfactual evaluation of ad-ranking models. I also worked as a data scientist at Optum to build machine learning models and automated deployment pipelines.

My interdisciplinary academic expertise enables me to solve complex problems, while my professional experience allows me to deliver practical solutions.

## Academic Affiliation

### Ph.D. Biostatistics & Bioinformatics

Topic: *Leveraging Machine Learning for Interpretable Causal Inference*

Advisors: Cynthia Rudin, David Page, & Alexander Volfovsky

Dept. of Biostatistics & Bioinformatics, Duke University, 2021-Present

### B.S. Applied Mathematics, Biochemistry Minor, *Summa cum Laude*

Topic: *Neural Machine Translation & Deep Learning*

Advisor: Thomas Laurent

2019 Program Scholar – Top student in department

Dept. of Mathematics, Loyola Marymount University, 2015-2019

## Publications

**Quinn Lanners\***, Qin Weng\*, Marie-Louise Meng, and Matthew M Engelhard. Common event tethering to improve prediction of rare clinical events. In *The 40th Conference on Uncertainty in Artificial Intelligence*, 2024

Harsh Parikh\*, **Quinn Lanners\***, Zade Akas, Sahar Zafar, M Brandon Westover, Cynthia Rudin, and Alexander Volfovsky. Safe and interpretable estimation of optimal treatment regimes. In *International Conference on Artificial Intelligence and Statistics*, pages 2134–2142. PMLR, 2024

**Quinn Lanners**, Harsh Parikh, Alexander Volfovsky, Cynthia Rudin, and David Page. Variable importance matching for causal inference. In *Uncertainty in Artificial Intelligence*, pages 1174–1184. PMLR, 2023

Samantha M McDonald, Emily K Augustine, **Quinn Lanners**, Cynthia Rudin, L Catherine Brinson, and Matthew L Becker. Applied machine learning as a driver for polymeric biomaterials design. *Nature Communications*, 14(1):4838, 2023

Marie-Louise Meng, Yuqi Li, Matthew Fuller, **Quinn Lanners**, Ashraf S Habib, Jerome J Federspiel, Johanna Quist-Nelson, Svati H Shah, Michael Pencina, Kim Boggess, et al. Development and validation of a predictive model for maternal cardiovascular morbidity events in patients with hypertensive disorders of pregnancy. *Anesthesia & Analgesia*, 2022

**Quinn Lanners** and Thomas Laurent. Neural machine translation. Honors thesis, Loyola Marymount University, 2019

\* Denotes co-first authorship.

## Professional Experience

### Duke University

Ph.D. Candidate | Durham, NC | Aug 2021 - Current

- Developed an interpretable method for estimating dynamic treatment regimes that reduced the probability of an adverse medical event by over 20 percentage points when operationalized on a real-world ICU dataset.
- Engineered a new method for large scale, computationally inexpensive, and interpretable causal inference that is over 100 times faster than existing benchmarks.

### Meta

Research Scientist Intern | Seattle, WA | May 2024 - Aug 2024

- Wrote an internal technical report detailing a domain-adapted model-based approach for offline counterfactual evaluation of ranking models. Work accepted as short paper to the 2024 Causality, Counterfactuals, & Sequential Decision-Making workshop at RecSys and the 2024 Conference on Digital Experimentation @ MIT.
- Provided empirical and theoretical results showing the settings under which different variants of the proposed approach are better than existing benchmarks.

### Optum

Data Scientist | Eden Prairie, MN | Jun 2019 - Jul 2021

- Built and deployed a multimodal time-series model assessing the risk of every development team's proposed application update that remains used at the company to present day.
- Detected suspicious activity as lead python programmer for fraud investigation in the payout of the U.S. Government's COVID-19 HHS CARES Act Provider Relief Fund facilitated by Optum.
- Automated development team's Jenkins environment by creating customizable Jenkinsfiles to deploy machine learning models to Kubernetes.
- Summarized bank transaction and account activity logs into feature vectors using PySpark, and used Spark's MLlib library to detect irregular account activity.

Data Scientist Intern | Eden Prairie, MN | Jun 2018 - Aug 2018

Big Data Intern | Eden Prairie, MN | Jun 2017 - Aug 2017

## Teaching Experience

*Teaching Assistant*, Software Tools for Data Science, Duke University, Durham, NC. Spring 2023

*Teaching Assistant*, Statistical Program for Big Data, Duke University, Durham, NC. Fall 2022

*Teaching Assistant*, Data Analytics and Visualization, Trilogy Education Services, St. Paul, MN. Aug 2019 - Mar 2020

*Teaching Assistant*, Deep Learning, Loyola Marymount University, Los Angeles, CA. Fall 2018

*Tutor*, Calculus I,II, & III, Loyola Marymount University, Los Angeles, CA. Jan 2018 - Dec 2018

*Teaching Assistant*, Research & Exhibition, Loyola Marymount University, Los Angeles, CA. Fall 2017

*Teaching Assistant*, Introduction to Honors, Loyola Marymount University, Los Angeles, CA. Fall 2016

## Awards & Achievements

National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP), *Honorable Mention*, 2022

James B. Duke Fellowship (\$20,000), Duke University, 2019 - 2023

NSF National Research Trainee (NRT), *AI for Understanding and Designing Materials* (\$100,000), 2019 - Present

Trustee Scholar (\$350,000) – Merit-based full tuition room and board scholarship, Loyola Marymount University, 2015 - 2019

Program Scholar, Loyola Marymount University Department of Mathematics, 2019

Alpha Sigma Nu Merit-Based Jesuit Honors Society Member, 2019

Intrafraternal Scholar of the Year, Loyola Marymount University, 2018

## Short Papers

Mohamed A Radwan, Himaghna Bhattacharjee, **Quinn Lanners**, Jiasheng Zhang, Serkan Karakulak, Houssam Nassif, and Murat Ali Bayir. Counterfactual evaluation of ads ranking models through domain adaptation. In *Causality, Counterfactuals & Sequential Decision-Making workshop at RecSys*. arXiv:2409.19824, 2024

## Conference Presentations

**Quinn Lanners**, Harsh Parikh, Cynthia Rudin, Alexander Volfovsky, and Srikar Katta. Almost-exact matching for interpretable and trustworthy causal inference. Presentation at the Joint Mathematical Meetings in Seattle, WA, USA, 2025

**Quinn Lanners**, Harsh Parikh, Cynthia Rudin, and Alexander Volfovsky. Partial identification of heterogenous treatment effects when combining data from observational and experimental studies. Poster at the International Conference on Health Policy Statistics in San Diego, CA, USA, 2025

**Quinn Lanners**, Harsh Parikh, Cynthia Rudin, and Alexander Volfovsky. Assessing robustness to unobserved confounding by combining experimental and observational data. Presentation at INFORMS Annual Meeting in Seattle, WA, USA, 2024

**Quinn Lanners**, Harsh Parikh, Cynthia Rudin, Alexander Volfovsky, and Caleb Miles. Combining rct and observational study data in the presence of unmeasured confounding. Presentation at the Joint Statistical Meetings in Portland, OR, USA, 2024

**Quinn Lanners**, Harsh Parikh, Alexander Volfovsky, Cynthia Rudin, and David Page. Flexible almost-exact matching for trustworthy causal inference. Poster at the Joint Statistical Meetings in Portland, OR, USA, 2024

**Quinn Lanners\***, Qin Weng\*, Marie-Louise Meng, and Matthew M Engelhard. Common event tethering to improve prediction of rare clinical events. Spotlight presentation at The 40th Conference on Uncertainty in Artificial Intelligence in Barcelona, Spain, 2024

Harsh Parikh\*, **Quinn Lanners\***, Zade Akas, Sahar F. Zafar, M. Brandon Westover, Cynthia Rudin, and Alexander Volfovsky. Estimating trustworthy and safe optimal treatment regimes for treating seizures in critically ill icu patients. Poster at Duke Health Data Science Showcase in Durham, NC, USA, 2023

**Quinn Lanners**, Harsh Parikh, Alexander Volfovsky, Cynthia Rudin, and David Page. Variable importance matching for causal inference. Presentation at INFORMS Annual Meeting in Phoenix, AZ, USA, 2023

**Quinn Lanners**, Harsh Parikh, Alexander Volfovsky, Cynthia Rudin, and David Page. Matching using feature importance: An auditable approach to causal inference. Presentation at International Conference of Computational Social Science in Copenhagen, Denmark, 2023

**Quinn Lanners**. Neural machine translation. Presentation at Optum Analytics Conference in Eden Prairie, MN, USA, 2019

**Quinn Lanners** and Lambert Doezeema. The current state of atmospheric gas concentrations in california. Poster at Southern California Conferences for Undergraduate Research in Pomona, CA, USA, 2017

## Relevant Coursework & Skills

**Programming Languages:** Proficient in Python. Experience with Java (Oracle Certified Associate, Java SE 8 Programmer), R, JavaScript.

**Libraries:** Proficient in Scikit-learn, PyTorch, d3rlpy, Pandas, Numpy, Seaborn, Matplotlib. Experience with PySpark, Tensorflow, Flask.

**Tools:** Proficient in Docker, Jenkins, GitHub, cluster computing (Slurm). Experience with Kubernetes, OpenShift, Amazon Web Services, Hadoop.

**Coursework:** Machine Learning, Probability & Measure Theory, Statistical Inference, Linear Algebra, Artificial Intelligence, Deep Learning, Real and Complex Analysis, Group Theory, Discrete Methods, Organic Chemistry, Biochemistry.

**Other Activities:** Puppy trainer at Whole Dog Institute. Past volunteer work as an EMT at Loyola Marymount University and a clinical research associate at Hennepin County Medical Center.

## References

**David Page**

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**Cynthia Rudin**

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**Alexander Volfovsky**

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**Thomas Laurent**

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