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 hospital patients, matching for causal inference with high-dimensional data, and multilabel learning for predicting rare medical 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 where I built machine learning models and automated deployment pipelines.

With an interdisciplinary academic background and hands-on industry experience, I am well-versed in solving complex problems and delivering practical, data-driven solutions.

Academic Affiliation

Ph.D. Biostatistics & Bioinformatics
Topic: *Leveraging Maching 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 Akras, 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

- Developed a domain-adapted, model-based approach for offline counterfactual evaluation of large-scale ad-ranking models, improving pre-deployment testing of ML systems. Work accepted at the 2024 *Causality, Counterfactuals & Sequential Decision-Making Workshop* at *RecSys* and the 2024 *Conference on Digital Experimentation @ MIT*.
- Designed and ran empirical analyses comparing multiple evaluation methods, identifying conditions where the proposed approach outperforms existing benchmarks.
- Bridged observational causal inference and experimentation by enhancing offline evaluation techniques for models later tested via A/B experiments.

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, Introdution 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 Akras, 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 Doezema. 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. Strong Experience with SQL. Experience with Java (Oracle Certified Associate, Java SE 8 Programmer), R, JavaScript.
Libraries: Proficient in Scikit-learn, Pandas, Numpy, Seaborn, Matplotlib. Experience with PySpark, PyTorch, Tensorflow, d3rlpy, Flask.
Tools: Proficient in GitHub, cluster computing (Slurm). Strong Experience with Docker, Jenkins, Kubernetes. Experience with OpenShift, AWS, 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

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Matthew M. Engelhard
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