

# Quinn Lanners

Ph.D. Student

Department of Biostatistics & Bioinformatics  
Duke University

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## Summary

I am a Biostatistics & Bioinformatics Ph.D. student at Duke University working with Profs. Cynthia Rudin, David Page, and Alexander Volfovsky. I research the use of machine learning to facilitate interpretable causal inference, with a particular focus on medical applications. My recent work includes estimating dynamic treatment regimes for ICU patients, developing an interpretable method for observational causal inference, and reviewing the machine learning literature in polymer biomaterials. My collaborations span statistics, computer science, medicine, and chemistry. Prior to starting my Ph.D., I worked in industry as a data scientist at Optum. I functioned as an end-to-end machine learning expert building and deploying machine learning models and automating the development team's deployment pipeline. Before that, I worked with Thomas Laurent on deep learning as an undergraduate at Loyola Marymount University. My professional and academic background makes me especially adept at understanding complex concepts and problems and implementing practical solutions across multiple disciplines.

## 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

Harsh Parikh\*, **Quinn Lanners\***, Zade Akas, Sahar F. Zafar, M. Brandon Westover, Cynthia Rudin, and Alexander Volfovsky. Estimating trustworthy and safe optimal treatment regimes, 2023 [**Under Review**]

**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

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

## Professional Experience

### Duke University

Ph.D. Student | 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.

### 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

## Conference Presentations

**Quinn Lanners**, Harsh Parikh, Alexander Volfovsky, Cynthia Rudin, and David Page. Variable importance matching for causal inference. Presented 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. Presented at International Conference of Computational Social Science in Copenhagen, Denmark, 2023

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

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

## Relevant Coursework & Skills

**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

**Programming Languages:** Python, Java (Oracle Certified Associate, Java SE 8 Programmer), JavaScript, R, HTML

**Libraries:** PyTorch, PySpark, Scikit-learn, Tensorflow, Flask, d3.js, Pandas, Numpy, Seaborn, Matplotlib

**Other:** Docker, Kubernetes, OpenShift, Jenkins, GitHub, Slurm, Amazon Web Services, Hadoop

**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

**Cynthia Rudin**

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**David Page**

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**Alexander Volfovsky**

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**Lucas Johnson**

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