

Melanie N. Mayer

Date of Preparation: October 9, 2024

I am a Post Doctoral Fellow at the University of Pennsylvania, currently working with Drs. Rebecca Hubbard and Blanca Himes on statistical methods for analyzing EHR data for asthma outcomes. My research interests include causal inference methods and their applications to health disparities and policy. My additional research projects lie at the intersection of machine learning and causal inference, primarily developing methods for environmental mixtures, where one analyzes the effect of multiple, continuous, and correlated exposures using observational data. In addition to research, I am also passionate about teaching and mentoring. My mission is to make meaningful and practical contributions to statistical methods for observational data, developing and applying methodologies to drive well-informed decision making to improve public health outcomes.

Education

- May 2024 Ph.D. in Biostatistics
Mailman School of Public Health, Columbia University, New York, NY
Advisor: Dr. Linda Valeri
- December 2017 B.S. in Statistics & B.A. in Economics
Minor in Actuarial Science
University of Florida, Gainesville, FL

Fellowship and Grant Support

- August 2024 - Present Perelman School of Medicine, University of Pennsylvania
Department of Biostatistics, Epidemiology and Informatics
Postdoctoral Fellow
- September 2021 - May 2024 TL1 TR001875, Irving Institute for Clinical and Translational Research
National Institute of Health (NIH)
Predoctoral Fellow
Project title: Evaluating external validity of observational studies for targeted interventions
- August 2018 - August 2020 Mailman School of Public Health, Columbia University
Initiative for Maximizing Student Development (IMSD) Fellow

Teaching Experience

Teaching Assistant

- Fall 2020/2021/2022 Statistical Methods for Causal Inference
Biostatistics Department, Columbia University
- Spring 2022/2023 Latent Variable Measurement and Structural Equation Modeling in the
Health Sciences
Biostatistics Department, Columbia University
- Spring 2021 Statistical Inference
Biostatistics Department, Columbia University

Summer 2019 Introduction to Biostatistics
Biostatistics Epidemiology Summer Training (BEST) Program
Biostatistics Department, Columbia University

Workshops

October 2023 Guest lecturer, Introduction to High Performance Computing (HPC)
Department of Biostatistics Computing Club, Columbia University

July 2019/2020/2021 Course Guide, Causal Mediation Analysis Training Boot Camp
Department of Environmental Health Sciences, Columbia University

January 2020 Teaching Assistant, R Markdown and Interactive Dashboards Workshop
RStudio::conf

March 2019 Workshop leader, Data Analysis Workshop
Exxon Mobil Annual Team Training

Work Experience

May 2022 - August 2022 **Google - YouTube**

Data Science Intern, San Bruno, CA

- o Developed various baseline and machine learning explainable classifiers to drive strategy in measurement modeling of a top-line metric (completed in Python)
- o Collaborated with stakeholders (engineers and PMs) to productize classifier to help best protect YouTube users

February 2018 - June 2018 **Techo-Chile**

Centro de Investigación Social Intern, Santiago, Chile

- o Formed part of the team responsible for providing all analytical reports needed within the 5 areas of the NGO
- o Analyzed variables across slums, such as overcrowding and precarious material, to formalize approach for selecting slums to build houses in
- o Evaluated data of previously selected families living in slums for whom houses were built for to assess selection process

June 2017 - June 2018 **MIT Abdul Latif Jameel Poverty Action Lab (JPAL)**

Education Sector Intern, Cambridge, MA

- o Worked with MIT's and JPAL's Micromasters in Data, Economics, and Development Policy team
- o Edited material/topics presented in the course "Data Analysis for Social Scientist" and served as a teacher's assistant for 20,000+ students
- o Conducted analyses on past students' demographics and performances to improve retention rates and program accessibility worldwide

May 2016 - August 2016 **Columbia University Mailman School of Public Health**

Research Intern, New York, NY

- Researched transferability of motor skills from one side of the body to the other under Dr. Jeff Goldsmith
- Learned biostatistical methods in a rigorous classroom setting and applied them to lab research under the Biostatistics Epidemiology Summer Training (BEST) program

Leadership

August 2019 - May 2024 **Biostatistics Department's Graduate Student Research Seminar (GSRs) Series**

Organizer, New York, NY

- Organize monthly presentations to disseminate new/current research being conducted within the department
- Provide a platform for biostatistics doctoral students and post-docs to practice presenting their research and obtain feedback from their peers

January 2016 - Dec. 2017 **Latin STEM Fair**

High School Outreach Chair, Gainesville, FL

- Organized annual fair for over 400 people to spread STEM interest amongst Latinos in the Gainesville Community
- Motivated and aided groups of high school students to manage tables with STEM-related activities at the fair
- Presented career options within STEM to high school students

Presentations

1. Mayer M, Ribeiro A, Coull B, Bareinboim E, Navas-Acien A, Valeri L. Statistical Methods for Transporting an Environmental Mixture Effect. Presented at the Columbia Biostatistics Annual Research Symposium (CBARS), invited speaker, 2023.
2. Mayer M, Ribeiro A, Coull B, Bareinboim E, Navas-Acien A, Valeri L. Statistical Methods for Transporting an Environmental Mixture Effect. Presented at the Joint Stat. Meetings (JSM), oral presentation, 2023.
3. Mayer M, Ribeiro A, Bareinboim E, Navas-Acien A, Coull B, Valeri L. Statistical Methods for Transporting the Effect of an Environmental Mixture Across Populations. Presented at the American Causal Inference Conference (ACIC), traditional poster presentation, 2023.
4. Mayer M, Ribeiro A, Bareinboim E, Navas-Acien A, Coull B, Valeri L. Statistical methods for transporting the effect of an environmental mixture across populations. Presented at the Translational Science Meeting (ACTS), traditional poster presentation, 2023.
5. Mayer M, Domingo-Relloso A, Navas-Acien A, Coull B, Valeri L. Methods for analyzing environmental mixtures effects on survival outcomes and application to population-based cohort study. Presented at the Annual Superfund Research Program (SRP) Meeting, traditional poster presentation, 2022.
6. Mayer M, Domingo-Relloso A, Navas-Acien A, Coull B, Valeri L. Statistical learning approaches for environmental mixtures studies with survival outcomes and their application to the strong heart study. Presented at the Joint Statistical Meetings (JSM), traditional poster presentation, 2022.
7. Mayer M, Domingo-Relloso A, Navas-Acien A, Coull B, Valeri L. Machine learning approaches for environmental mixtures studies with time-to-event outcomes and their application to the Strong Heart Study. Presented at the 32nd Annual Conference of the International Society of Environmental

Epidemiologists (ISEE), traditional poster presentation, 2021.

Publications

Mayer, M., Domingo-Relloso, A., Kioumourtzoglou, M.A., Navas-Acien, A., Coull, B., & Valeri, L. (2023). Comparison of methods for analyzing environmental mixtures effects on survival outcomes and application to a population-based cohort study. <https://arxiv.org/abs/2311.01484> (*Manuscript submitted to Environmental Health Perspectives*)

Relevant Coursework

Advanced Statistical Methods, Statistical Inference, Machine Learning, Probability, Bayesian Statistics, Causal Inference (both in the Biostatistics and Computer Science Department)

Languages

English (Fluent) & Spanish (Fluent)