Tyler J. S. Smith, PhD, MPH

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Summary

- A data scientist with a STEM PhD and 13 years of professional experience in maintaining complex data sets and applying a wide variety of statistical and machine learning algorithms using Python, R, and SQL.
- Expert at sharpening ambiguous research questions, developing scalable and reproducible data analysis workflows, visualizing data, and reporting actionable results to decision-makers.
- Comfortable working with leaders and stakeholders at all levels and communicating with technical and non-technical audiences.

Education

2023 **PhD, Exposure Science and Environmental Epidemiology** Baltimore, MD
Johns Hopkins University

2015 **MPH, Epidemiologic and Biostatistical Methods** Baltimore, MD
Johns Hopkins University

2011 **BA, History** Baltimore, MD
Johns Hopkins University

Professional Experience

2023-Present **Postdoctoral Research Fellow (Machine Learning for Public Health)** New York, NY
Icahn School of Medicine at Mount Sinai

- Develop software to implement causal inference techniques with parametric and nonparametric models to quantify improvements in child development under simulated reductions in air pollution across 12 countries.
- Train Bayesian machine learning models to estimate associations between air pollution mixtures and folate metabolism among pregnant women in Canada to guide revisions to national folate supplementation recommendations.
- Disseminate research via peer-reviewed scientific journal articles (career total: 9) and international and national conference presentations (12); share code via GitHub.

2019-2023 **Doctoral Researcher (Data Science for Environmental Health)** Baltimore, MD
Johns Hopkins University

- Leveraged advanced machine learning methods to quantify maternal and child health benefits under simulated interventions to reduce arsenic exposure:
  - Implemented dimensionality reduction (*e.g.*, principal components analysis [PCA]) and cluster analysis (*e.g.*, self-organizing maps) to extract relevant exposure patterns from large data sets.
  - Fitted flexible regression models for a variety of outcome distributions (*e.g.*, Gaussian, logistic, Poisson, beta, and Dirichlet) to estimate relationships between exposures and health outcomes.
  - Applied multiple imputation to handle missing data and inverse probability weights (IPW) to reduce selection bias.
  - Employed causal inference techniques (*e.g.*, g-computation) to generate actionable estimates of benefits for decision-makers.
- Constructed scalable and reproducible data analysis pipelines with SQL, Python, and R and implemented version control using Git and GitHub for internal collaboration.
- Designed static and interactive data visualizations for journal articles and presentations using ggplot2, plotly, and other packages.

2016-2019 **Staff Scientist** New York, NY
Earthjustice

- Led scientific and technical research in support of high-impact litigation, building process-based models of environmental exposure and risk.
- Communicated scientific issues to technical audiences (*e.g.*, organized and presented in scientific conference sessions) and non-technical audiences (*e.g.*, prepared memoranda for attorneys, testified before state legislatures, wrote op-eds).

2015-2016 **Manager and Consultant** Yonkers, NY
Consumer Reports

- Analyzed datasets on antibiotic use in food animals, arsenic in food, and other food and agriculture topics for publication in *Consumer Reports*.
- Ensured technical accuracy of content published in *Consumer Reports*, upholding the stringent editorial standards of a prominent brand in a litigious environment.

2011-2015 **Program Officer** Baltimore, MD
Johns Hopkins Center for a Livable Future

- Developed process-based models of environmental exposure and risk, including cancer risks associated with food additives, and documented models for non-technical clients.
- Led outreach to policymakers, organizing Capitol Hill briefings, representing the organization in Congressional and agency meetings, drafting op-eds, and advising advocacy coalitions on scientific and technical questions.

Select Publications and Presentations

2024 Air Pollutants and Plasma Total Folate among Pregnant Women in Canada, 2008-2011. *Society for Pediatric and Perinatal Epidemiologic Research (SPER) Annual Meeting*.

2023 Estimating Causal Effects of Interventions on Early-life Environmental Exposures Using Observational Data. *Current Environmental Health Reports* [Link].

2023 Anthropometric Measures and Arsenic Methylation among Pregnant Women in Rural Northern Bangladesh. *Environmental Research* [Link].

2023 The Pregnancy, Arsenic, and Immune Response (PAIR) Study in Rural Northern Bangladesh. *Paediatric and Perinatal Epidemiology* [Link].

2022 Drinking Water Arsenic, Hemoglobin, and Anemia among Pregnant Women in Rural Northern Bangladesh. *International Society for Environmental Epidemiology Annual Meeting*.

2021 Using Self-organizing Maps to Identify Metal Mixture Exposures in Pregnant Women in Rural Northern Bangladesh. *International Society of Exposure Science Annual Meeting*.

Technical Skills

Analysis R (tidyverse, ggplot2, tidymodels), SQL, Python (NumPy, pandas, scikit-learn), Tableau, Power BI

Infrastructure AWS, dbt, Docker, Git/GitHub, Markdown, Microsoft Office, MLflow, Shell