

GRAHAM TIERNEY

319-330-1093

graham.tierney@duke.edu

<http://g-tierney.github.io>

EDUCATION

Duke University

2018 – 2023 (Expected)

PhD Candidate in Statistical Science

- GPA: 3.9/4.0
- Selected Coursework: Bayesian methods, causal inference, machine learning, time series.
- Research agenda focused on causal inference with complex data: how natural language causes political polarization and counterfactual forecasting for multivariate time series.

RESEARCH EXPERIENCE

Duke Polarization Lab (Causal Inference with Text Data)

2018-Present

Work with Alexander Volfovsky (advisor), Chris Bail, and Sunshine Hillygus.

- Designed and analyzed a field experiment to reduce political polarization by randomly pairing Democrats and Republicans to have anonymous conversations. First author on submitted paper.
- Used NLP methods to identify interpretable conversation features that contribute to depolarization. Produced a procedure to benchmark these causal mediation effects in text data. Published in the *First Workshop on Causal Inference & NLP* at EMNLP 2021. [ACL Link](#).
- Extended LDA topic model to analyze Twitter data, jointly clustering users and tweets. Implemented a Gibbs sampler and variational approximation. [Code](#) and [paper](#).

84.51 Collaboration (Causal Inference with Time Series Data)

2020-Present

Work with Mike West.

- Developed multivariate forecasting models for high-dimensional time series at a major grocery chain. Identified meaningful cross-product relationships wherein discounts for some products materially affect sales of other products. Published in *Applied Stochastic Models in Business and Industry* as a [discussion paper](#).
- Extended models to estimate causal impacts of store-level interventions via synthetic controls, while accounting for dependence among treated units with multivariate forecasting models. Developed methods to generalize estimated effects among treated units to all experimental units and system-level results.

INDUSTRY EXPERIENCE

Causal Inference & Experimentation Intern

Summer 2022

Netflix – Programing and Audience Team

- Improved lifetime value models used to study price changes by incorporating dependence across subscribers. Previous methods analyzed cohorts of subscribers independently, which underestimated uncertainty in the total effect across all subscribers. I developed a multivariate forecasting methodology that incorporated dependence across cohorts to resolve the issue.
- Implemented the multivariate models in production code in Python and Metaflow.

Summer Research Intern & Student Technical Assistant

Summer 2021

MIT Lincoln Laboratory – AI & Algorithms Group

- Designed an intervention that used text generated by a GPT-2 language model to discourage COVID-19 vaccine-related misinformation in a simulated social media environment.
- Developed methods to study causal effects of social media interventions deployed on live platforms to account for interference and estimate peer effects.

LANGUAGE SKILLS

Proficient in Python, R, SQL. Exposure to C++, cluster computing (SLURM), and parallelization.