

## Experience

**Amazon Web Services (AWS)** — *Economist II, Central Economics & Science Team* Feb 2025 – Present

- **Partner Program Evaluation:** Developed matched difference-in-differences (DiD) framework with placebo tests to estimate causal revenue incrementality of AWS's partner incentive program. Low incrementality drove the decision to wind down the program (est. **\$150–175M annual savings**).
- **Partner Value Measurement:** Designed AIPW framework to measure incremental revenue attributable to reseller and managed service provider partners. Determined AWS's 2026 MSP program incentive structure.
- **Pilot Design & Evaluation (\$140–180M):** Built simulation-based power analysis using synthetic control methods for a payment extension pilot, including a custom parallel-computing package (32+ hours → 6 hours). Informed go/no-go decision through sensitivity analysis of effect size assumptions.
- **Growth Diagnostics Framework:** Built customer lifetime value framework decomposing growth into acquisition, retention, and per-customer trajectories, along with a separate churn prediction models (survival analysis) for the sales ops team. Adopted by 5+ teams across AWS as the standard outcome metric for program evaluation and included in monthly leadership reporting.
- **LLM-Based Causal Inference:** Developed counterfactual prediction framework by fine-tuning Mistral-7B (LoRA) on text-templated customer journeys, extending Athey et al.'s LABOR-LLM approach to causal settings with sequential treatment histories. Currently under test to identify the causal effect of sales coverage on customer revenue growth.

**Tesla** — *Senior Data Scientist, Core Business (Sales, Service, Delivery)* Apr 2024 – Feb 2025

- Built ML-based service demand forecasting for 250+ North American service locations (50% accuracy gain over baseline), directly informing staffing and capacity allocation decisions (\$10M+ impact).
- Applied synthetic control methods to estimate causal sales lift from marketing campaigns; designed A/B tests with HTE estimation to identify high-conversion customer segments for targeted lead generation.

**Netflix** — *Experimentation & Causal Inference Intern* Jun – Sep 2023

- Developed IPW and entropy balancing methods to correct non-response bias in large-scale user surveys; built ensemble ML models (GBM, RF) as proxy quality metrics to guide content evaluation decisions. Collaborated cross-functionally with engineering and design teams to operationalize metrics into product decisions. Hiring recommendation received.

**Analysis Group** — *Analyst, Economic Consulting* Aug 2016 – May 2017

- Applied a DiD method to quantify macroeconomic impact of client products across Latin American markets. Supported expert testimony and policy briefs in litigation and regulatory proceedings.

## Research

**Dissertation:** *Essays in Political Economy: Status Perceptions and Survey Experiments* Stanford GSB, 2024

Chair: Matthew Gentzkow · Committee: Neil Malhotra, Ken Shotts

- Conducted randomized survey experiment ( $N > 10,000$ ) estimating causal effects of status perception shocks on populist attitudes. Applied HTE estimation, causal mediation analysis, and ordinal data methods.
- Proposed control-augmented Thompson Sampling algorithm for best-arm identification, demonstrating precision gains over uniform randomization in budget-constrained multi-arm experiments.

## Selected Working Papers:

- *LLM-Based Causal Inference for Counterfactual Prediction* (2025) — Extends Athey et al.'s LABOR-LLM approach to causal settings; fine-tuned Mistral-7B for HTE estimation in panel data with sequential treatment histories.
- *Electoral Insecurity & Federal Spending: Panel Matching and Synthetic Control Methods* — Demonstrates improved covariate balance and robustness over conventional DiD using matching and synthetic control.
- *Predicting Roll Call Votes using Machine Learning Methods* (with F. Zhang) — Ensemble stacking of bill text embeddings and legislator features; outperforms existing prediction methods.

## Education

**Stanford University** Stanford, CA  
Ph.D., Political Economy · M.S., Statistics (Advisor: Percy Liang) 2017 – 2024

**Middlebury College** Middlebury, VT  
B.A., Economics, Summa Cum Laude · Phi Beta Kappa · Class Salutatorian 2012 – 2016

## Technical Skills

**Causal Inference:** Difference-in-Differences, Synthetic Control, Propensity Score Methods (IPW, AIPW), Instrumental Variables, Regression Discontinuity, Matching, Survey Experiments

**Economic Research:** Large-Scale Data Analysis, Structural Estimation, Panel Econometrics, Time Series Forecasting, Heterogeneous Treatment Effects (HTE), Power Analysis, Simulation-Based Evaluation Design, Sequential Testing

**ML/AI:** Transformers (Mistral-7B, LoRA fine-tuning, vLLM), Gradient Boosting (XGBoost, LightGBM), Random Forests, Survival Analysis, LSTM, NLP, Ensemble Methods

**Programming:** Python (pandas, scikit-learn, PyTorch, statsmodels, Hugging Face), SQL, R, Stata · Distributed training (FSDP), cloud infrastructure (AWS SageMaker)