Arjun Shanmugam

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EDUCATION

Brown University   Providence, RI | May 2023
B.S. in Computer Science-Economics   **GPA:** 3.96/4.00; 4.00 within major. **GRE:** 170/170 Q; 166/170 V; 5/6 W
Relevant Coursework: Advanced Topics in Econometrics, Bayesian Statistics, Big Data, Computational Linguistics (NLP), Computational Probability and Statistics, Deep Learning, Differential Equations, Discrete Mathematics, Linear Algebra, Machine Learning, Mathematical Econometrics, Multivariable Calculus, Probability, Real Analysis, Software Engineering, Statistical Inference
Skills: Causal inference, statistics, empirical Bayes, SciPy stack (NumPy, Polars, Scikit-Learn, statsmodels), Dask, SQL, TensorFlow

EXPERIENCE

Uber Technologies, Inc.   New York, NY | April 2025 – Present
Applied Scientist
- Devised novel Bayesian shrinkage algorithm for two noisy surveys, reducing MSE in correlation estimates by 40% relative to classical measurement error correction

Opportunity Insights at Harvard University   Cambridge, MA | June 2023 – Present
Pre-doctoral Fellow under Professors Raj Chetty, John Friedman, and Nathan Hendren
- Estimated the causal effect of elite college attendance using restricted admissions records and IRS tax data for "Diversifying Society's Leaders?" covered by The New York Times
- Performed calculations to estimate the joint distribution of SAT score and parent income, covered by The New York Times
- Applied statistical tools such as inverse propensity score reweighting and instrumental variables to causal questions
- Built a Python and SQL codebase that processes the universe of raw American tax forms into a 12 billion row database ("The IRS Databank") used by the IRS and Treasury, reducing build time from one month to 3 days
- Transitioned lab's big data and computing infrastructure from SAS to Python and SQL, resulting in huge efficiency gains

Opportunity Insights at Harvard University   Cambridge, MA | May 2022 – September 2022
NLP Research Assistant to Professors John Friedman, Amy Handlan, Nathan Hendren
- Examined differences in language used by male vs. female reviewers at the *Journal of Public Economics*
- Engineered NLP pipeline using pandas and Scikit-Learn to extract features from manuscripts and reviewer reports
- Trained and tested cross-validated LASSO machine learning models on document term matrices extracted from text
- Devised an algorithm which separates papers' introductions from the rest of their text with over 70 percent accuracy
- Formulated parametric and nonparametric models of referee report text, each controlling for paper content in different ways
- Parallelized computationally intensive processes such as the estimation of likelihood ratios using joblib

COVID-19 School Data Hub   Providence, RI | February 2022 – May 2023
Machine Learning Research Assistant to Emily Oster
- Trained machine learning models using cell phone traffic data to predict schooling mode (virtual, in-person, hybrid)
- Built logit regression models and neural networks using Python, achieving above 75 percent testing accuracy
- Created frameworks to systematically contextualize prediction accuracy and reported results in whitepaper

PROJECTS

Eviction and Crime: Quasi-Experimental Evidence from Boston   Providence, RI | September 2022 – Present
Author
- Won Outstanding Honors Thesis Award in Economics (best undergraduate economics thesis at Brown)
- Spatially joined every attempted eviction in Boston since 2019 with 1 million crime incidents using computing cluster
- Estimated propensity scores using maximum likelihood estimation to balance treatment and control group on observables
- Estimated effect of eviction on crime around the property with staggered, doubly robust difference-in-difference design

Predicting Sleep/Wake Status Using a Neural Network   Providence, RI | November 2021 – December 2021
- Won third place in Brown Mathematical Contest in Modeling
- Built neural network to predict sleep status in given 15-minute interval using step count data, achieving 90% testing accuracy

LEADERSHIP

Brown Club Tennis   Providence, RI | September 2019 – May 2023
President
- Received 3rd place at National Tournament (USTA Tennis on Campus Nationals)
- 5.0 NTRP / 10.0 UTR player
- Taught tennis to middle school and high school players during summers

Brown Department of Economics   Providence, RI | January 2022 – May 2023
Teaching Assistant, Mathematical Econometrics, Professor Jonathan Roth
- Taught econometric theory and causal inference to 60 students, earning top reviews (mean 4.8/5, median 5/5)
- Received strong feedback: *"Arjun is single handedly the most fantastic TA I have had while at Brown. His deep understanding of topics and his willingness and availability to explain difficult concepts made him more than just a TA!"*