Gabriel Smithline

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Personal Profile

I am passionate about exploring the intersection between AI, economics & computation, multi-agent systems, and complexity. I hold United States and Polish citizenship.

Personal Website: `https://gsmithline.github.io/`

Education

University of Michigan Ann Arbor — *Ann Arbor, MI*

Incoming PhD in Computer Science and Engineering — *August 2024 - Expected May 2028*

- Joining the Strategic Reasoning Group in the AI Lab
- **First Year Advisor:** Michael P. Wellman

Tufts University — *Medford, MA*

MS in Computer Science — *May 2022 - May 2024*

- **GPA:** 3.97
- **Main Track:** Theoretical Computer Science
- **Minor Track:** AI

Lafayette College — *Easton, PA*

BA Statistics, Economics, and Data Science — *August 2017 - May 2021*

- Data Education and Feminism Scholar at Lafayette and Beyond (DEFLAB)
- 4 year Division 1 Student-Athlete on the men's lacrosse team committing 30 plus hours a week to activities on top of school
- Winner of the 2021 Heard Unsung Hero Award for my contributions to the men's lacrosse program and athletic department at Lafayette
- Men's Lacrosse Academic Athletic Award and Patriot League All Academic Team
- USILA All American

Industry Work Experience

Tufts University — *Medford, MA*

Machine Learning Course Assistant — *August 2023 - May 2024*

- Helped run office hours, grade assignments, run recitations, answer questions for students, and generally support them in the machine learning course.
- **Technical Skills:** Python with various statistical packages, Statistics and Probability, Linear Algebra, Calculus, and Machine Learning

Jefferies — *New York, New York*

Quantitative Risk Summer Associate — *June 2023 - August 2023*

- Interned for summer 2023 working to model risk for fixed income trading as well as helping to build out the banks e-trading and algorithmic trading business. Specifically I helped to automate VaR and Monte-Carlo VaR simulations as well as help develop software to price certain fixed income securities.
- I also developed internal software to run VaR calculations on full fixed income trading data to help move the bank move away from external vendors. This software will be used by analysts across the firm to help mitigate risk.
- The results of my work helped speed up systematic risk calculations by 50%
- **Technical Skills:** Python with various statistical packages, Statistics and Probability, Monte Carlo Simulations, Econometrics, Scripting, Git, Microsoft Azure, AWS, MDX, SQL.

Capital One — *Washington, DC*

Software Engineer, Enterprise Data and Machine Learning — *August 2021 - December 2022*

- Scaled and designed API to handle more than 52,000 transactions per second with less than 7 ms response time.
- Enabled canary deployments, identified/remediated bottlenecks in code, built features to track lineage of all data flowing through the API.
- Helped data scientists and ml engineers run models and perform inference in low latency environments.
- Became Certified AWS Solutions Architect.
- Left December 2022 to pursue masters education full time.
- **Technical Skills:** AWS, Python, Scala, Java, Terraform, Git.

Projects and Research

Improving Multi-Agent Strategies through Learning — *Shalimar, Florida*

Happ George Summer Fellow, AI and Control Research Lab Eglin Air force Base — *May 2024 - August 2024*

- Will be spending the summer researching multi-agent systems, differential game theory, pursuit-evasion, Geometric Deep Learning, and Graph Theory.
- I am being hosted by Dr. Scott Nivison

Complexity Theory, Algorithmic Game Theory, and Security Research *Remote*

Tufts University *August 2023 - May 2024*

- Worked to develop models of deception as a defensive strategy against attackers using various optimization techniques, Game Theory, AI, Mechanism Design, and other concepts from Computer Science.
- **Technical Skills:** Python, CVXPY, Numpy, Jax, SK-Learn, Game-Py, and other various python packages

Algorithms, Law, and Policy Working Group Member *Remote*

Equity and Access in Algorithms, Mechanisms, and Optimization (EEAMO) *September 2023 - Present*

- Member of the Algorithms, Law, and Policy group which is working on research, implementation, and advocacy projects.

Quantitative Research Analyst: AI Index *Medford, MA*

The Fletcher School *June 2023 - September 2023*

- Helping to do PCA and Unsupervised learning (specifically K-Means and Spectral Clustering) to abstract patterns in AI usage data between countries and regions.
- Created unique and interactive visualizations to explain these patterns in a more immersive and user friendly way.
- This was part of a greater initiative by Fletcher to put out a report on who is winning the AI race.
- **Technical Skills:** R, Python, Matplotlib, Plotly-Dash, Machine Learning, Probability and Statistics.

Data Education Scholar: Understanding Eviction Rates *Easton, PA*

Lafayette College *January 2021 - May 2021*

- Developed a model to predict the causes of evictions using different Geospatial, ANOVA Modeling, VIF, Regression Subsets Techniques in R/Python.
- Validated to find the best model using Tukey HSD tests to compare possible combinations and test their variables between their means, all while adjusting the higher p-value threshold to compensate for many statistical tests being run. I found I was statistically able to model eviction rates locally given the features I used to model.
- Taught intro level statistics classes about what I found and created exercises for them in R to teach them the power of data science and programming.
- Built Dashboards in Plotly-Dash and Shiny to present my findings in a more user friendly way.
- **Technical Skills:** R, Python, Matplotlib, Plotly-Dash.

Capstone Project: Computational Simulations of Markets and Behaviors with Agent Based Modeling *Easton, PA*

Lafayette College *January 2021 - May 2021*

- Used Netlogo to create Agent Based Models to model complex systems found in everyday life.
- Explored different market structures and analyzed how different distributions of rational agents led to different market outcomes.
- **Technical Skills:** Netlogo