# Michael Stafford

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https://mraystaf.github.io/PersonalWebsite/

## Education

**BS, Applied & Computational Mathematics Emphasis (ACME)**
**Second Major: BS, Economics** **December 2024**
*Brigham Young University* *Provo, Utah*

- ACME Emphasis: Economics and Financial Markets
- GPA: 3.97
- Relevant Coursework:

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|---|---|---|
| Linear and Nonlinear Analysis | Computer Science | Multivariable Calculus |
| Computation and Optimization | Mathematical Programming | Price Theory |
| Econometrics | Financial Markets | |

## Experience

**Research Assistant – Computer Vision** **September 2024 – Present**
*Brigham Young University Economics Department – Record Linking Lab* *Provo, UT*

- Implemented and maintained object detection models to programmatically interpret census records.
- Explored key point detection models to detect census record gridlines.

**Software Engineer** **May 2023 – September 2024**
*Select Bankcard* *Lehi, UT*

- Created a monitoring system that uses SQL stored procedures to examine internal services.
- Developed a file compression system to compress over 2 million files.
- Managed an internal application and its associated API, using C#, Angular, and SQL.

## Skills

- Proficient in C#, SQL, C++, and python (numpy, pandas, statsmodels, pytorch, and sklearn libraries).
- Basic knowledge of Stata, Angular, and HTML.
- Mathematics Skills:

| | | |
|---|---|---|
| Numerical optimization | Dynamic optimization | Fourier analysis & Wavelets |
| Numerical linear algebra | Gaussian quadrature | QR and singular value decompositions |
| Importance and rejection sampling | PageRank algorithm | Thompson sampling |
| Machine learning/neural networks | Hidden Markov models | State-space models |
| Kalman filter | ARIMA models | Mathematical statistics |
| Bayesian modeling | Sampling (MCMC) | Modeling with differential equations |
| Dynamical systems | Optimal Control | Numerical methods for differential equations |

## Relevant Projects

**Optimal Control: Pollution Tax Rates**

- Used optimal control principles (Pontragyin's Maximum Principle and numerical solvers) to determine optimal tax rates for polluting companies.
- Used python (scipy library) to code up solutions and different variations of the optimal control problem.

**Time Series Analysis: United States GDP**

- Used the Kalman Filter, an ARIMA model, and structural models to filter and predict GDP trends in the United States.
- Coauthored a paper and presented our results