**Shakil Rafi**, Ph.D.

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# Education

**University of Arkansas** Fayetteville, AR

*Ph.D. in Applied Mathematics Jan. 2020 – May 2024*

**University of Arkansas** Fayetteville, AR

*M.Sc. in Pure Mathematics Aug. 2018 – Dec 2019*

# Experience

**Lecturer** Jan. 2023 – July 2024

*Department of Data Science, Sam M. Walton College of Business, University of Arkansas Fayetteville, AR*

* Taught R, Python, Git, and bash to 100+ incoming first-year students. 80% received an A/B.
* Mentored 30+ students in an advanced course on optimization methods using Pyomo and Gurobi. 50% of students showed an improved grade compared to previous year.

**Health Economics Intern** May 2023 – Aug. 2023

*Arkansas Blue Cross and Blue Shield Springdale, AR*

* ETL’d data from Snowflake using SQL.
* Developed models, using Keras and TensorFlow for patient claims volumes from a dataset of 40000+ claims, going back to 2018. Model showed 85% accuracy.
* Explored the relationship between the social determinants of health and birth outcomes for our clients using gradient boosted decision trees, XGBoost, LASSO and ridge regression models with 90% accuracy.
* Built a Markov model of childbirth using Pandas and scikit-learn.

**Senior Graduate Assistant** Jan. 2020 – Dec. 2022

*Department of Mathematics, University of Arkansas Fayetteville, AR*

* Taught pre-calculus, Calculus, Linear Algebra, Differential Equations and intro Statistics.
* Planned lessons and liaison-ed with the course coordinator in a team of five other instructors.

**Graduate Teaching Assistant** Aug. 2016 – Dec. 2019

*Department of Mathematics, University of Arkansas Fayetteville, AR*

* Graded and held office hours for classes of 30+ students
* Designed courses and planned lessons.

# Projects

**Who rides Uber anyway?** *| Python, Pandas, GeoPandas, scikit-learn, Plotly, SQL* Jan 2022 – Oct 2023

* Developed a K-means clustering alrgorithm to analyze how richer census tracts in Chicago used Uber compared to poorer census tracts.
* Created an analytical pipeline for large-scale transportation data from the City of Chicago data poral.
* Research presented at the *SIAM Mathematics of Data Science* Conference in San Diego, CA and the Fall ’23 OAK Conference and pre-print on TechrXiv

**UAV Impacts on airplane nose-cones** *| MATLAB, C++, Bash, Git* Jan. 2022 – Aug. 2022

* Modeled the impact of UAVs (drones) on airplane nosecones using Boeing USDZ data.
* Ran simulations using the deal.ii finite element method software on campus superclusters.

**Pandemic loan inequality** *| R, ggplot2, tidyverse* May 2022 – Aug. 2022

* Developed a regression model to see whether black and women owned business in Arkansas received lower initial federal loans.
* Work presented at the *Arkansas Summer Research Institute*, 2022.

# Technical Skills

**Languages**: Python, C/C++, SQL, JavaScript, Julia, R

**Tools**: Microsoft Office, Linux, Bash, Git, Google Cloud Platform, VS Code, pySpark, PowerBI

**Libraries**: pandas, NumPy, Matplotlib, Keras, TensorFlow, tidyverse, GeoPandas, Pyomo, scikit-learn

**Interests**: Reading, hiking, and cooking.