

DONNA GLASSBRENNER, PH.D.

DATA SCIENTIST AND STATISTICIAN

CONTACT

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Portfolio: <https://dglassbrenner1.github.io/>

EDUCATION

Ph.D., Mathematics, University of Michigan

B.A. Mathematics, Yale University

TECHNICAL SKILLS

Models: XGBoost, random forests, neural networks, logistic regression, generalized linear models, support vector machines, gradient boosting, stacked ensembles, data mining

Methods: SMOTE, class imbalance techniques, cost-sensitive learning, prequential cross-validation, feature engineering, data visualization, dashboard creation, bagging, boosting, stacking, ensembles

Math and statistics: multivariate constrained optimization, gradient descent, quantifying uncertainty, confidence intervals, Monte Carlo simulation, sensitivity analysis, time series, forecasting and nowcasting, hypothesis tests, jackknife variance estimation, chi-square tests, stratified and clustered sample design, overdispersion, linear algebra, multivariate calculus, ANOVA

TECH STACK

Python, SQL, SAS, Jupyter, GitHub, scikit-learn, pyodbc, scipy, statsmodels, matplotlib, Tableau, Visual Studio Code, Docker containers, GPU-accelerated parallel processing, Hugging Face Spaces, Streamlit, MLflow, Azure Databricks, FastAPI, Pydantic, Dotenv

WHAT SETS ME APART

- A deep understanding of math and statistics that enables me to customize methods to address business objectives and data particularities.
- A passion for collaborating across disciplines to accomplish more than could be done individually.
- A proven record of thriving in ambiguity and solving tough problems.

EXPERIENCE

Machine Learning / Data Science Research

Federal Deferred Resignation Program | June 2025 – Present

- Composing a [technical blog](#) on advanced machine learning techniques, focusing on business objectives, visualizations, model deployments, and the underlying math.
- Investigated the functional forms of predictive models and their regularized log-loss, producing visualizations to aid interpretability.
- Optimized investigative resources supplementing hourly model runs targeting a given precision and recall.
- Deployed an XGBoost model integrated into an interactive Databricks dashboard to monitor suspicious transactions and model performance.
- Built and hosted a Streamlit-based fraud detection API on Hugging Face Spaces to enable interactive model demos and testing.

Mathematical Statistician

National Highway Traffic Safety Administration | 2001 - Sept 2025

- Conducted the primary statistical and predictive analyses for Federal regulations and defects investigations affecting millions of vehicles.
- Collaborated across disciplines (with engineers, IT professionals, lawyers, and others), earning 12 NHTSA and 4 DOT team awards.
- Developed a custom data mining algorithm that revealed insights and detected errors missed by existing protocols.
- Customized a time series smoothing method to meet objectives, outperforming traditional techniques (LOESS, exponential, Holt).

SELECT PUBLICATIONS

Estimating the Rupture Rate and Projecting Future Ruptures for the Subject Inflators, with two NHTSA colleagues, 2024. [Regulations.gov docket NHTSA-2023-0038](#)

An Analysis of Recent Improvements to Vehicle Safety, NHTSA Report, DOT HS 811 572, 2012

*Risk Assessments and Predictive Modeling, NHTSA-2016-0124 Notice of Agency Decision, **Federal Register** 81 FR 85640, 2016*

How Big Should the New System Be? NHTSA Report to Congress, DOT HS 812 128, 2015

*Estimating the Lives Saved by Safety Belts and Air Bags, **Proceedings of the 18th International Conference on the Enhanced Safety of Vehicles**, Paper No. 500, DOT HS 809 543, 2003*

A Target Population for Automatic Emergency Braking in Heavy Vehicles, with A. Morgan et al. NHTSA Report, DOT HS 812 390, 2017

*Designing Samples to Satisfy Many Variance Constraints, **Proceedings of the 2001 Conference of the Federal Committee on Statistical Methodology**, 2001*

*Singularities of Certain Ladder Determinantal Varieties, with K. Smith, **Journal of Pure and Applied Algebra**, Vol 101, Issue 1, pp. 59-75, 1995*

*The Impact of a Nationwide Effort to Reduce Airbag-Related Deaths Among Children, J. Nichols et al. **Journal of Safety Research**, Vol 36, Issue 4, pp. 309-320, 2005*

*Strong F-Regularity in Images of Regular Rings, **Proceedings of the American Mathematical Society**, Vol 124, No. 2, pp. 345-353, 1996*

*The Cohen-Macaulay Property and F-Rationality in Certain Rings of Invariants, **Journal of Algebra**, Vol 176, No. 3, pp. 824-860, 1995*

- Optimized NHTSA's investigative resources using Williams-adjusted fixed-effects logistic regression, decision trees, generalized linear models, LASSO, stepwise selection, and multi-fold cross-validation.
- Conducted a landmark study showing that improvements collectively prevented over 700,000 crashes in a single year. (Modeling: negative binomial, log-linear, generalized logistic, and cumulative logistic.)
- Nowcasted crashes from overnight data feeds accounting for reporting lag. Developed crash dashboards consulted by senior leaders.
- Quantified individual versus collective risk and estimated failure rates for widespread defects with Monte Carlo simulation, jackknife covariance estimation, and Poisson, proportional hazards, logistic, and Weibull models.
- Applied ANOVA to address lab-to-lab variation in tests for compliance with federal regulations.
- Developed custom hypothesis tests for ratios that were more precise than out-of-the-box solutions.
- Smoothed time series to uncover signal from noise in crash patterns during the Covid-19 pandemic.
- Provided the primary analysis determining the numbers of crashes to sample in flagship NHTSA databases.
- Authored technical sections for Reports to Congress, regulations, and Federal Register notices.
- Recognized with 5 NHTSA awards for outstanding individual work.

Mathematical Statistician

U.S. Census Bureau | 1998 - 2001

- Designed samples for economic indicators to satisfy several variance constraints.
- Developed Jackknife-based procedures to estimate margins of error.
- Co-taught an in-house course on survey design.

Visiting Assistant Mathematics Professor

Reed College | 1994 - 1998

- Taught real and complex analysis, algebraic structures, single- and multi-variable calculus, statistics, and Gödel's Incompleteness Theorem.
- Conducted research in theoretical mathematics.

Whyburn Instructor of Mathematics

University of Virginia | 1992 - 1994

- Taught group theory, ring theory, and calculus.
- Conducted research in theoretical mathematics.