Caitlin **Brown**

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PROFESSIONAL SUMMARY

Energy Policy Analyst and data scientist with a background in applied mathematics, specializing in turning complex datasets into actionable insights for clean energy policy and regulatory decision-making. Experienced in statistical modeling, economic impact analysis, and technical writing, with a strong focus on collaboration and equitable, mission-driven outcomes.

PROFESSIONAL EXPERIENCE

Lawrence Berkeley National Laboratory

ENERGY/ENVIRONMENTAL POLICY RESEARCHER I *Sep 2023 to Present*

SENIOR RESEARCH ASSOCIATE *Jan 2022 to Sep 2023*

- Conduct cluster analysis on large-scale geospatial data to uncover patterns in traffic flow and density, informing targeted policy interventions and guiding resource allocation for electric vehicle charging.
- Co-lead a data science seminar series, fostering collaboration and knowledge sharing among colleagues. Topics: inference, regression, data visualization, Bayesian methods, machine learning.
- Analyze energy policies to support the U.S. Department of Energy in developing federal standards for residential appliances and commercial equipment, reducing carbon emissions and water use.
- Design and maintain advanced tools (software, spreadsheets) for techno-economic analysis (*e.g.,* multinomial Monte Carlo life-cycle cost analysis), using engineering and scientific principles to provide reliable insights.
- Contribute to official reports and government notices by drafting key sections, ensuring clarity and accuracy in communicating policy changes and their implications.
- Streamline and modernize a widely used legacy software package, reducing overall lines of code by over 60%, total number of methods by over 50%, and runtime by over 25%.
- As one of a select few, ensure the accuracy and professional presentation of Technical Support Documents and Federal Register Notices through meticulous final formatting in Microsoft Word.

Lawrence Berkeley National Laboratory - AFFILIATE INTERN *Mar 2021 to Dec 2021*

- Developed and applied a dynamic econometric model to enhance forecasts of household vehicle ownership, providing insights into factors driving energy efficiency trends and informing policies to promote sustainable transportation.
- Implemented multinomial logistic and ordered logit and probit regressions, comparing their accuracy to boosted decision trees using extensive data visualizations and a suite of performance metrics.
- Constructed reference dictionaries of large national-level survey datasets, improving data curation and standardization.
- Won the most poster and presentation votes at the summer poster conference.

Topological Molecular Biology Lab, UC Davis - UNDERGRADUATE RESEARCHER *Sep 2020 to May 2021*

- Coded a neural network from scratch to predict the binding affinity of observed and theoretical mutations to the SARS-CoV-2 Spike protein, enabling researchers to anticipate and mitigate the impact of potential high-risk variants before they emerge.
- Reconstructed 2D information (protein structures, mutations) into 3D voxel grids, improving model predictions.
- Effectively communicated findings to both scientific and non-scientific audiences at the UCD Undergraduate Research Conference.

Aggie Reuse Store, UC Davis - DATA ANALYTICS INTERN *Oct 2021 to Dec 2021*

- Conducted analytics on financial data of a university thrift shop to gain valuable insights on sales trends.

Sonoma County Regional Parks - PARK RANGER ASSISTANT *May 2014 to Sep 2018*

- Collaborated with park rangers to enhance visitor experiences, support park maintenance and landscaping efforts, and assist with ensuring safety and compliance with park regulations.

EDUCATION

UNIVERSITY OF CALIFORNIA, DAVIS

- Bachelor of Science in Applied Mathematics *2021*
- Minor in Computer Science

SANTA ROSA JUNIOR COLLEGE

- Associate of Science in Natural Sciences, high honors *2018*
- Associates of Arts in Social & Behavioral Sciences and Humanities, both with high honors

SKILLS

PROGRAMMING LANGUAGES: Python (OOP), R, Bash, SQL, MATLAB
LIBRARIES/FRAMEWORKS: scikit-learn, pandas, Polars, NumPy, tidyverse
STATISTICAL METHODS: Regression (OLS and variants, MLE), classification, clustering, PCA, neural networks
DATA VISUALIZATION: ggplot2, Seaborn, Tableau, Excel (advanced formulas, pivot tables, VBA automation)
VERSION CONTROL: Git: GitHub, BitBucket (issues, pull requests, version tagging, etc.)
TYPESETTING TOOLS: LaTeX, R Markdown, Microsoft Word (template creation and VBA macros)

PEER-REVIEWED RESEARCH PUBLICATIONS

1. "What Makes You Hold on to That Old Car? Joint Insights From Machine Learning and Multinomial Logit on Vehicle-Level Transaction Decisions," L. Jin, A. Lazar, **C. Brown**, Q. Chen, A. Sim, K. Wu, S. Ravulaparthy, V. Garikapati, and C. A. Spurlock. *Frontiers in Future Transportation* (2022). doi: 10.3389/ffutr.2022.894654.
2. "Performance of the Gold Standard and Machine Learning in Predicting Vehicle Transactions," A. Lazar, L. Jin, **C. Brown**, C. A. Spurlock, A. Sim, and K. Wu. *IEEE International Conference on Big Data* (2021). doi: 10.1109/BigData52589.2021.9671286.
3. "Using Neural Networks to Study SARS-CoV-2 Mutations". **C. Brown** and J. Arsuaga. *MURALS Research Journal* (2021).

TEACHING AND VOLUNTEER EXPERIENCE

San Francisco Public Library - READING TUTOR *Aug 2025 to Present*

- FOG Readers is a reading intervention program for struggling readers in grades 1-4.

Berkeley Lab - SCIENCE ACCELERATING GROWTH & ENGAGEMENT (SAGE) CAMP *2025*

- Teach robotics to high school students.

Berkeley Lab - DIRECTOR'S APPRENTICESHIP PROGRAM (BLDAP) *2024-2025*

- Teach programming and data science to high school students.

Santa Rosa Junior College - TEACHING ASSISTANT & TUTOR *Jan 2017 to Dec 2018*

- Facilitated group study sessions, graded homework, and provided classroom assistance.
- Tutored individuals in mathematics ranging from arithmetic to calculus in an open lab setting.

PROFESSIONAL DEVELOPMENT ACTIVITIES

TOASTMASTERS INTERNATIONAL *Jan 2025 to Present*

- Member, Golden Gate club

LINKEDIN LEARNING, COURSERA

- 30+ courses on: leadership, programming, unit testing, data science, game theory, accounting, etc.