Caitlin **Brown**

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**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, R, Bash, SQL, MATLAB

LIBRARIES/FRAMEWORKS: OOP, scikit-learn, pandas, Polars, NumPy, tidyverse, R Markdown

STATISTICAL METHODS: Regression, classification, clustering, PCA, neural networks

DATA VISUALIZATION: ggplot2, Matplotlib, Seaborn, Tableau

VERSION CONTROL: Git: GitHub, BitBucket (including issues, pull requests, version tagging, etc.)

TYPESETTING TOOLS: LaTeX, Microsoft Word (including template creation and VBA macros)

**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 spatial 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 include: statistical inference, linear regression, data visualization best practices, maximum likelihood estimation, Bayesian methods.
* 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 and spreadsheets) for technical and economic analysis (*e.g.,* multinomial Monte Carlo life-cycle cost analysis for appliances), 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 energy efficiency standards and their implications.
* Collaborate on a small team to streamline and modernize a widely used Python software package, utilizing object-oriented programming (OOP) to enhance functionality and user experience.
* 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 current methodologies (boosted decision trees) using extensive data visualizations and a suite of performance metrics.
* Constructed reference dictionaries of large national-level survey datasets to improve 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*

* Created a neural network 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 and mutations) into 3D voxel grids to improve 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 local university thrift shop to gain valuable insights on sales trends.

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

* Facilitated group study sessions, graded homework, and provided assistance in algebra classes, resulting in improved outcomes for several regular students.
* Tutored individuals in mathematics ranging from arithmetic to calculus in an open lab setting.

**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.

**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, 3*. (2022). [doi: 10.3389/ffutr.2022.894654](https://doi.org/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 (Big Data)*, Orlando, FL, USA, 2021, pp. 3700-3704. [doi: 10.1109/BigData52589.2021.9671286](https://doi.org/10.1109/BigData52589.2021.9671286).
3. “​​Using Neural Networks to Study SARS-CoV-2 Mutations”. **C. Brown** and J. Arsuaga. *MURALS Research Journal* (2021).

**AWARDS AND GRANTS**

* 2022 LBNL SPOT Award. “Extraordinary efforts to finalize the Room Air Conditioners, Pool Heaters, and Pool Pump Motors Notice of Proposed Rulemaking (NOPR) Technical Support Documents (TSDs).”
* 2021 DOE Science Undergraduate Laboratory Internship (SULI).

**PROFESSIONAL DEVELOPMENT ACTIVITIES**

TOASTMASTERS INTERNATIONAL *Jan 2025 to Present*

* Member, Golden Gate club

LINKEDIN LEARNING, COURSERA

* 30+ courses on various topics including: leadership, programming, unit testing, data science.

**TEACHING AND VOLUNTEER EXPERIENCE**

BERKELEY LAB SCIENCE ACCELERATING GROWTH & ENGAGEMENT (SAGE) CAMP *Summer 2025 cohort*

* Teach robotics (ultrasonic sensor, coding, Arduino) to high school students.
* Support students in exploring STEM careers through job shadowing, hands-on projects, and professional development, fostering early interest in scientific discovery and innovation.

BERKELEY LAB DIRECTOR’S APPRENTICESHIP PROGRAM *2024-2025 cohort*

* Teach programming and data science to high school students.
* Advise students over the course of their school year as they develop a sample data science project, including constructing a survey and analyzing the responses.