Kai Barker

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EDUCATION

University of California, Santa Barbara Expected Graduation: June 2026
B.S. in Statistics and Data Science Major GPA: 3.89 | Cumulative GPA: 3.80
Relevant Coursework
Machine Learning, Time Series, Regression Analysis, Stochastic Processes, Computational Science, Differential Equations, Technology Management, Probability and Statistics, Problem Solving with Computer Science

WORK EXPERIENCE

Blockchain and Property Rights Research September 2024- Present
Research Assistant Santa Barbara, CA

- Analyzed wealth inequality in cryptocurrency markets by examining 100+ million Ethereum wallets using Python
- Implemented a data cleaning pipeline to filter wallets and ensure accurate representation of market participants
- Produced comprehensive visualizations and statistical analyses using to quantify wealth distribution patterns

Tillys (Management) July 2024- August 2025
Assistant Store Manager Santa Barbara, CA

- Generated over $50,000 in personal sales through customer service skills and extensive product knowledge
- Managed the sales floor, monitoring employees and customers to meet sales goals and enhance store performance
- Assessed team strengths and areas for improvement to optimize efficiency and elevate customer experience

PROJECTS

NeurIPS Ariel Data Challenge July 2024- September 2025
Project Santa Barbara, CA

- Developed ensemble machine learning models (XGBoost + Gaussian Process Regression + Ridge) to predict exoplanet atmospheric compositions from 200+ GB of noisy spectral telescope data for ESA's Ariel mission
- Preprocessed and analyzed 14,000 messy image files across 1,100+ exoplanets, implementing advanced signal processing and noise reduction techniques for space-based observations
- Achieved Gaussian Log-Likelihood score of 0.311 predicting atmospheric signals and their uncertainties across 283 wavelength channels

Message Decryption using MCMC and Simulated Annealing April 2025- June 2025
Project Santa Barbara, CA

- Implemented Metropolis-Hastings MCMC algorithm for message decryption using alphabet permutation search
- Applied simulated annealing optimization from TSP to enhance the algorithm and improve exploration of the permutation state space
- Analyzed MCMC convergence properties and investigated temperature scheduling strategies to balance algorithm exploration

Statistical Modelling for NBA Player Performance July 2024- October 2024
Project Santa Barbara, CA

- Developed machine learning models (Random Forest, XGBoost) and engineered features to predict player rebounds using time series NBA API data
- Implemented SHAP for model interpretability and feature importance analysis, significantly improving prediction accuracy over baseline models
- Processed and analyzed performance outcomes to identify trends and validate predictions against real outcomes

SKILLS & HONORS

Technical Skills: Python, R, SQL, JavaScript, Java, C++, Gaussian Process Regression, XGBoost, Markov Chain Monte Carlo, Feature Engineering, Statistical Modelling, Data Pipeline Development, HTML, CSS, Typescript, Microsoft Excel, Git, API Integration, Canva, Microsoft Office Suite, Pandas, NumPy, Matplotlib, Scikit-learn

Honors: High School Valedictorian, Seal of Biliteracy (Spanish), UCSB Dean's List for Academic Excellence