

# Barnett Yang

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## EDUCATION

### University of California, Berkeley

B.A., double major in Computer Science and Mathematics, EECS Honors Student

Expected: May 2024

GPA: 4.0/4.0

#### Relevant Coursework

- Computer Science:** Neural Networks and Deep Learning, Artificial Intelligence, Operating Systems, Efficient Algorithms and Intractable Problems, Data Structures, Computer Security, Databases, Machine Structures, Information Devices and Systems
- Mathematics:** Discrete Mathematics and Probability Theory, Linear Algebra, Multivariable Calculus, Numerical Analysis, Differential Equations, Real Analysis, Mathematical Economics, Game Theory

## TECHNICAL SKILLS

**Languages:** Python/PyCharm, Java/IntelliJ, C, q/KDB, Go, SQL, JavaScript/TypeScript, HTML/CSS, LaTeX, RISC-V

**Data Science/Machine Learning:** NumPy, Scikit-learn, PyTorch, Pandas, Matplotlib/Seaborn, Bayes Server

**Software Engineering:** Cloud Services, AWS, CI/CD, SCRUM/Agile Workflows, Git/Github, Software Design Patterns

**Web Development:** Node, Express, React, MongoDB, MySQL, Bootstrap, EJS, Heroku, REST API Development, Figma

## WORK AND LEADERSHIP EXPERIENCE

### Citadel Securities

Chicago, IL

Software Engineering Intern – Citadel Execution Services (CES)

June 2023 – August 2023

- Pioneered an efficient KDB API that shortened on-disk database retrievals by a factor of 30 via an in-memory caching mechanism. This allowed for ad-hoc historical queries by complex enrichment processes (CEPs) to be integrated into trading and metric tracking systems in real-time, allowing for a rich alerting framework. The API was successfully benchmarked against synthetic and production datasets and presented and demoed to Citadel Securities' Head of Execution Services Technology.
- Developed and modified KDB CEPs and C++ data feedhandlers and gateways in support of trader console UI development within Citadel Execution Services (CES). KDB development work generated greater visibility into exchange data and the states of client orders, expanded the feature set and capabilities of the current infrastructure, and enabled the migration of deprecated and slow data-ingestion software to a more performant KDB architecture.

### Amazon

San Francisco, CA

Software Development Engineer Intern – Amazon ReCommerce

May 2022 – August 2022

- Designed and deployed services for repair operation (RO) transparency, helping return vendors verify RO proactively, reducing tech team workloads, improving operational efficiency, and establishing a proof of concept for a unified repair portal. The design included analyzing various tradeoffs between compute/storage options and backend cloud architectures, and implementation of the services required integrating various AWS compute engines, authentication services, CDNs, and inventory/database services.
- Presented and demoed completed applications to directors of Amazon ReCommerce and Warehouse Deals organizations.

### Sandia National Laboratories

Albuquerque, NM

Machine Learning R&D Intern – Math Analysis and Decision Science

May 2021 – May 2022, September 2022 – Jan 2023

- Performed machine learning research culminating in a first-authored publication accepted for HICSS-56 proceedings presenting applications of Bayesian networks and their relevant methodologies, best practices, and heuristics in cyber-attack detection.
- Investigated novel methods in feature selection, random forest MDI discretization, and structural learning for Bayesian network (BN) training and development, improving statistical robustness metrics by over 15% on imbalanced red-team cybersecurity datasets with applications in corporate network anomaly detection.
- Constructed a scikit-learn compatible Java to Python extension library that streamlined BN and dynamic BN creation and testing pipelines, reducing the prior BN manual workflow by 90% and allowing accelerated machine learning development, with utilization across multiple labs and projects at Sandia.

## PROJECTS, PUBLICATIONS, AND AWARDS

### Pathfinding and Sorting Visualizers

User-interactive teaching aid for [Dijkstra's, A\\*, and bidirectional pathfinding algorithms](#) and [comparison and radix sorting algorithms](#).

### COVID-19 Data Analysis Exercise

Data analysis study examining the economic effects of the COVID-19 pandemic on the racial achievement gap using BLS and HSLs data. Findings were compiled into a research report and published on [Towards Data Science Editors' Picks](#) with over 2000 views.

Yang, B., Hoffman, M., Brown, N.: Bayesian Networks for Interpretable Cyberattack Detection. Sandia National Laboratories, HICSS-56 Proceedings, 2023.

Yang, B.: Impacts of the COVID-19 Pandemic on the American Socioeconomic Academic Achievement Gap Through the Perspective of Race, Income, Unemployment, and Poverty. Towards Data Science, 2020.

Twice American Invitational Mathematics Examination (AIME) Qualifier