

Barnett Yang

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EDUCATION

University of California, Berkeley

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

May 2024

GPA: 4.0/4.0

Relevant Coursework

- **Computer Science:** Programming Languages and Compilers, Machine Learning, Operating Systems, Efficient Algorithms and Intractable Problems, Data Structures, Computer Security, Databases, Artificial Intelligence
- **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/C++, OCaml, Q/KDB, Go, SQL, JavaScript/TypeScript, HTML/CSS, MATLAB

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

Software Engineering: Linux, Cloud Services, AWS, CI/CD, SCRUM/Agile, Git/Github, VSCode, 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 60 via an in-memory caching mechanism.
 - Enabled ad-hoc historical queries to be integrated into trading and metric tracking systems in real-time, resulting in a rich alerting framework that directly influenced trades executed by the desk.
 - Benchmarks were successfully performed against synthetic and production datasets and the API was presented and demoed to Citadel Securities' Head of Execution Services Technology.
- Created and modified KDB complex enrichment processors (CEPs) and C++ data feedhandlers and query engines in support of trader console UI development and business operations within Citadel Execution Services (CES).
 - Generated greater visibility into exchange data and the states of client orders, expanded the capabilities of the existing infrastructure, and enabled the migration of deprecated data-ingestion software to a more performant KDB architecture.

Amazon

San Francisco, CA

Software Development Engineer Intern – Amazon ReCommerce

May 2022 – August 2022

- Developed 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.
- RO services design involved analyzing tradeoffs between compute/storage options and backend cloud architectures.
 - Implementing the design required managing deployments and integrating various AWS compute engines, authentication services, CDNs, React frameworks, and inventory/database services using AWS's Cloud Development Kit.

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 (BNs) and their relevant methodologies, best practices, and heuristics in cyber-attack detection.
- Improved statistical robustness metrics by over 15% on imbalanced red-team cybersecurity datasets through novel methods in BN feature selection, random forest MDI discretization, and structural learning.
- Constructed a patent-pending scikit-learn compatible extension library that reduced the prior BN manual workflow by 90%.
 - Streamlined BN and dynamic BN creation and testing workflows via a well-documented and structured Java to Python API, allowing for accelerated machine learning development across multiple labs and projects at Sandia.

PROJECTS, AWARDS, AND PUBLICATIONS

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.

Twice American Invitational Mathematics Examination (AIME) Qualifier.

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.