

Jason Yi

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EDUCATION

University of North Carolina at Chapel Hill

Chapel Hill, NC

Bachelor of Science in Computer Science, Statistics and Analytics

Aug. 2022 – May 2026

- **Coursework:** Distributed Systems, Operating Systems, Machine Learning, Algorithms, Data Structures, Databases, Models of Languages and Computation, Computer Organization, Stochastic Modeling, Probability
- **TA:** Algorithms (Spring 2025), System Fund. in C (Fall 2024), Data Structures in Java (Fall 2023, Spring 2024)

TECHNICAL SKILLS

Languages: C/C++, Python, Java, Kotlin, TypeScript, JavaScript, HTML/CSS, Assembly, Swift/SwiftUI

Frameworks/Libraries: React.js, GraphQL, Angular, Node.js, PostgreSQL, NumPy, Pandas, Matplotlib, JUnit

Developer Tools: VSCode, Git, GitHub, Vim, Jira, Jenkins, Splunk, IntelliJ, Linux Kernel, AWS, XCode

EXPERIENCE

Amazon Web Services

May 2025 - Aug. 2025

Software Development Engineer Intern

Seattle, WA

- Built a scalable mock data generation system for **AWS Compute Optimizer** in **Kotlin** with **AWS Fargate**, **OpenSearch**, and **S3** to reduce Sev-2 (high-priority) alerts by decoupling canary tests from upstream data
- Accelerated bug bash validation by **20%** by integrating **TypeScript**-driven **AWS Lambda** and **Glue** workflows to automate mock data ingestion and indexing, enabling faster, reliable end-to-end testing for new features
- Prototyped a **GenAI**-driven agentic workflow to automate bug bash processes by integrating mock data systems, schema validation, and test orchestration to streamline testing and accelerate validation timelines

NSF RTG Networks | UNC Statistics Department

Sep. 2024 – Dec 2024

Undergraduate Research Assistant

Chapel Hill, NC

- Advised by Dr. Chudi Zhong to develop **Interpretable Machine Learning** algorithms/pipelines by refining models such as Decision Trees and Generalized Additive Models to ensure better decisions in high-stakes situations
- Optimized the TreeFARMS algorithm in **C++** and **Python**, reducing runtime by **20%** through parameter tuning and tree depth constraints, enabling faster enumeration of almost-optimal **Decision Trees**

Fidelity Investments

June 2024 - Aug. 2024

Software Engineer Intern

Durham, NC

- Developed Backend services in **GraphQL** via **Experience API** for **Account Opening** which impacts **50+ million users**, and Frontend services in **Angular** and **TypeScript** for Crypto IRA
- Implemented customer info, address validation, and risk analysis services to prevent user fraud or illegal activity during account opening using **TypeScript** and **GraphQL** by matching data from multiple downstream APIs

PROJECTS

CQLite 🍷 | C, Ruby, RSpec, Bash

- Built a persistent **B-Tree** database engine in **C** by modeling **SQLite**'s internal structure, supporting **O(log n)** key lookup, in-order traversal across leaf pages, and dynamic splitting of internal and leaf nodes
- Implemented page-level memory management and cursor-based traversal, enabling range queries, recursive visualization, and structural correctness across **50+** randomized inserts
- Wrote **15+** integration tests in **RSpec** using pseudorandom insertions to validate structural integrity

CC Compiler 🍷 | C++, LLVM, GNU Bison, Flex

- Built a custom toy programming language compiler in **C++** using **GNU Bison** for parsing and **Flex** for lexical analysis, generating an **Abstract Syntax Tree (AST)** and transforming it into **LLVM IR** code for execution
- Walked over the **AST** to generate byte/machine code for each node, and integrated **LLVM** to compile and execute the generated code, utilizing **llvm-config** for streamlined builds and testing

AutoReturns 🍷 | Python, PyTorch, Scikit-learn, NumPy, Pandas, Seaborn, Matplotlib

- Analyzed **30M+** rows of U.S. stock return data (**CRSP**, **S&P 500**, **Russell 3000**) to document stylized facts (e.g., volatility clustering, fat tails) using PCA, autocorrelation, and return histograms
- Reduced dimensionality of stock return data by **90%** using kernel PCA in **scikit-learn** and autoencoders in **PyTorch**, preserving **≥85%** variance and uncovering latent relationships across asset classes
- Clustered PCA and autoencoder embeddings with **KMeans** to identify sectoral and macroeconomic groupings