Maanav Singh

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Education

University of North Carolina at Chapel Hill — Chapel Hill, NC
Bachelor of Science in Computer Science, Bachelor of Science in Mathematics — *Aug 2021 – Dec 2024*

- **3.95** GPA + **4.0** Major GPA w/ Dean's List
- Teaching Assistant for **Operating Systems**, **Files and Databases**, and **Programming Intelligent Physical Systems**
- Accelerated Research Scholarship
- Competitive Programming Club (**ICPC** Competitor)
- **Coursework:** Algorithms and Analysis, Data Structures, Operating Systems, Parallel and Distributed Computing, Programming Languages, Computer Organization, Computer Systems, Internet Services and Protocols, Files and Databases, Control Theory, Software Engineering, Machine Learning, Numerical Analysis

Technical Skills

Interests: Operating Systems, Programming Languages, High Performance Computing, Distributed Systems
Languages: Python, C++, Rust, C, Java, Kotlin, SQL (Postgres), Typescript/JavaScript, SML, Prolog, HTML/CSS, Matlab
Tools and Frameworks: Linux, Cuda, FastAPI, Kubernetes, Spark, Tensorflow, PyTorch, AWS, GCP, Azure

Experience

Susquehanna International Group — May 2024 – Aug 2024
Software Engineer Intern — *Bala Cynwyd, PA*

- Implemented a **kernel bypass** networking library using **modern C++**, **C**, and Solarflare's **ef_vi** interface to take advantage of cutting edge hardware features in trading logic. Delivering **40%** lower latency than the legacy setup.
- Performed research to identify bottlenecks and reduce the latency of SIG's trading platforms across the hardware, kernel, and software. Collaborated with Strategy Developers to implement my insights.

Palantir Technologies — January 2024 – May 2024
Software Engineer Intern — *Washington, DC*

- Designed and implemented **point-in-time-restore** strategy to persist the state of highly distributed Palantir systems with **Java**, **Golang**, **Kubernetes**, and **Postgres**, delivering data consistency following restore
- Refactored distributed storage controller microservice to enable **parallelized** configuration updates to **Cassandra** node clusters, accelerating scaling operations **50x** end to end.
- Heavily contributed to internal libraries and services to: improve reliability of **async long running operations**, generate **Prometheus** metrics to detect error cases, and automatically **garbage collect** orphaned cloud resources

Susquehanna International Group — May 2023 – Aug 2023
Software Engineer Intern — *Bala Cynwyd, PA*

- Implemented and benchmarked latency-sensitive **message parsers** for a quoting gateway in **C++**, **C#**, and **F#** to process **10M+** messages every day on a new US equity options exchange emulator.
- Deployed distributed **pub/sub** service to validate server to exchange connections increasing market up-time.

Cash App — Sep 2022 – Jan 2023
Machine Learning Engineer Intern — *San Francisco, CA*

- Worked on Recommendations & Incentives Machine Learning Team (RIML) to provide a recommendation micro-service serving **75M+** customers and **1K+ gRPC** requests per second.
- Architected in-house low-latency distributed Recommendation Store for serving offline recommendations with AWS **SQS, Lambda, ElastiCache**, and **DynamoDB** saving **$200K** annually over legacy store.
- Improved logging performance and quality for service ranking engine by storing and querying metrics concurrently with **Snowflake, Datadog**, and **Kotlin**.

Amazon Web Services — May 2022 – Aug 2022
Software Development Engineer Intern — *Seattle, WA*

- Developed in-production customer-impacting features for **AWS Elastic Beanstalk** and **App Runner**
- Automated console localization workflow with **Python** by automatically merging updates and anticipating parsing failures resulting in **90%** reduced engineer intervention.
- Integrated ML recommendation services with **React** and **Angular.js** to simplify customer experience and reduce avg. search arrival times by **14%**
- Engineered persistent preference caching **Node.js** service with **JavaScript** for **250M+** AWS console users.

Projects

Rucket | *Rust, CPython Interpreter, Networking* — April 2023 – May 2023

- Flexible and performant reliable data transport library for **Python** over **UDP**
- Implemented congestion control, flow control, and re-transmission to control packet loss with **Rust**
- Provides **15%** reduced latency over Ubuntu's TCP Cubic Algorithm after tuning
- Transmits medium-sized objects at an average **23%** higher throughput than TCP Reno