# Manavi Chaudhry

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## EDUCATION

**University of Illinois at Urbana-Champaign(UIUC)**
**B.S. in Mathematics & Computer Science** AUGUST 2023 - PRESENT
Relevant Coursework: Machine Learning, Natural Language Processing, Database System, Operating System, Networking, Cloud Computing, High Frequency Trading Tech, Computer Security, Parallel Programming, Distributed Systems, Numerical Analysis & Methods

## EXPERIENCE

**Johnson Controls,** *Software AI Engineering Intern* APRIL 2026 - PRESENT
• Led the development & C#/.NET migration of an MCP server originally built in Python, reducing the agent-facing tool surface by 47% through delegating facade, structured input schema, & argument validation; backed the rewrite with 800+ automated tests & Linux CI.
• Built a self-contained .NET data-ingestion pipeline, supporting cursor-paginated REST extraction & bulk site snapshots while achieving byte-for-byte parity with the legacy exporter.
• Designed the multi-tenant architecture & authentication system, including per-site credential isolation, delegated/local authentication modes, authenticated-endpoint verification, & fail-closed startup checks.
•Instrumented the distributed stack with OpenTelemetry & benchmarked LLM/NLP inference end to end, separating cold start effects from true regressions & validating lower latency configuration across a 30-case evaluation suite.
• Built an RDF/SPARQL knowledge graph connecting equipment, sensor/point, & spatial relationships to live operational data, enabling LLM agents to query connected system context while reducing memory overhead by removing a in-memory graph; presented the architecture & results to senior leadership within my first six weeks.

**Distributed And Storage Systems Laboratory(DASSL),** *Undergraduate Researcher* AUGUST 2026 - PRESENT
• Investigating how to snapshot and fork live Apache Flink jobs without stopping the original pipeline, using Chandy-Lamport-style state capture for recovery, debugging, and what-if analysis.
• Built realistic Kafka/Flink workloads from public production architectures, incorporating keyed state, joins, windows, and live rule updates to evaluate snapshot behavior under representative real-time conditions.
• Contributed to 3-node bare-metal experiments measuring checkpoint and fork latency as state size, pipeline depth, and traffic vary.

**Distributed Protocol Research Group(DPRG),** *Undergraduate Researcher* SEPTEMBER 2025 - JANUARY 2026
• Explored distributed LLM inference in llama.cpp across resource-constrained machines, using RPC to split inference across nodes and evaluate when added compute could outweigh network latency and bandwidth costs.

**Narb,** *R & D Software Intern* JUNE 2025 - AUGUST 2025
•Built WebGL & Node.js tools for real-time visualization of live geospatial data, making complex movement & location data easier to make complex movement and location data easier to analyze.

**Edument Pathways,** *Software Engineering Intern* MAY 2025 - JULY 2025
•Built a React Native & Node.js application & Dockerized services to streamline enrollment workflows for 70+ students, improving process efficiency by 22% while integrating an AI chatbot for student support.

## PROJECTS

**GPS-Independent Radio Localization Engine** - *SDR; Angle of Arrival Estimation* | *poster presentation*
• Developed an SDR-based localization system that estimates transmitter direction from ambient FM signals when GPS is unavailable, processing 15 MS/s data with C++, GNU Radio, FFTs, & phase analysis.
• Validated angle-of-arrival estimates against FCC transmitter locations, adding automatic phase calibration to correct systematic bias & make directional estimates more reliable.
• Implemented FPGA-based FFT acceleration with Vitis HLS, offloading compute-intensive DSP to hardware & creating a path toward lower-latency, real-time localization.

**Emergent Reasoning Network (ERN)** - *Multi-Agent LLM Strategy Discovery System*
• Built an agentic 6-agent LLM system for quantitative strategy discovery, autonomously generating, validating, backtesting, and refining symbolic signals from tick-level market data.
•Designed a secure execution pipeline for model-generated strategies, using AST validation, sandboxed runtimes, and timeout guards to safely evaluate untrusted code during automated experiments.
•Developed an evolutionary optimization loop with elite selection and feedback-driven mutation, iterating across 50+ generations and discovering novel signals with positive Sharpe performance.

**DwellX** - *Smart District Ranking Platform*
•Built a React/PostgreSQL platform ranking Chicago neighborhoods using user preferences, 15+ district metrics, & Mapbox.

**Self-Directed Research** - Quant Research
• Backtested statistical arbitrage strategy with transaction cost & slippage, then built real-time indicator pipeline with Kafka & AWS Lambda.

## SKILLS

**Languages:** C++ · Python · C# · Java · Rust · JavaScript/TypeScript
**Systems & Infrastructure:** Flink · Kafka · Docker · Kubernetes · Linux · AWS · GCP · CI/CD · OpenTelemetry
**AI :** LLM Inference · Agentic Systems · MCP · Retrieval/RAG · Model Evaluation · Latency Optimization · Performance Benchmarking
**Data / Quant:** NumPy · Pandas · SciPy · Backtesting · Statistical Modeling · Monte Carlo Simulation

## AWARDS & CERTIFICATIONS

Top 3% in **IMC Prosperity** 2025; 3rd in iSTEM Math **Olympiad** 2022 ; **MongoDB** Women in SWE Tech Summit 2025