Nikhil Nayak

nnayak7@wisc.edu | 503-443-9760 | linkedin.com/in/nayak-nikhil | github.com/nikhilanayak

Computer Engineering & Math student passionate about AI, hardware/software co-design, and databases.

EDUCATION

University of Wisconsin-Madison **Graduation:** May 2028
BS Computer Engineering, BS Mathematics
3.9 GPA | Dean's List
Relevant Coursework: Circuit Analysis, Linear Algebra, Intro to Computer Hardware, Data Structures (C++)

TECHNICAL SKILLS

Languages: C++, C, Python, Java, Rust, SQL, JavaScript
Frameworks & Tools: Linux, Git, AWS, Docker, Kubernetes, DataFusion, Grafana, Apache Kafka, PostgreSQL
AI/ML: PyTorch, Tensorflow/Keras, Jax, scikit-learn, CUDA, LangChain, Model Quantization
Hardware: Verilog/SystemVerilog, Quartus, x86 Assembly

EXPERIENCE

Hardware Engineering Intern | *Cloudflare* **May 2026 - Present**
* Designing a **synthetic CPU benchmark** to guide procurement of servers running Cloudflare's DB workloads.
* Analyzing CockroachDB production data from Durable Objects, KV, and R2 workloads running on **~90,000 cores**, analyzing hardware profiles (IPC, cache misses, vector utilization, etc.) and high-level software bottlenecks.
* Replicated SQL workload shape to achieve **90%+ accuracy** in performance prediction, delivering a standalone benchmark guiding the procurement of **x86 & Arm CPUs** (AMD EPYC, Ampere Altra, NVIDIA Grace/Vera).

Software Engineering Intern | *Cloudflare* **May 2026 - Aug 2026**
* Led a flagship user growth promo for .dev/.app domains at $1 (**90% discount**) for paid Workers users, designing a distributed system across three microservices while maintaining durability, concurrency, and high throughput.
* Architected the pricing/eligibility engine end-to-end, considering failsafes, abuse, and monitoring/observability.
* Collaborated with three internal teams to ship promotion, seeing 15,000+ registrations in the first month of release.

Research Assistant - *Liquid Cache Project* | *University of Wisconsin-Madison* **January 2025 - Present**
* Co-developing a high-performance caching engine in Rust and DataFusion for reducing SQL query latency.
* Leveraged query-engine pushdown and execution plan optimizations to reduce ingress & simplify query evaluation.
* Designed benchmarking experiments to evaluate Liquid Cache engine, seeing 99% reduction in first-byte latency.

PROJECTS

Text2Synth (github: nikhilanayak/Text2Synth)
* Architected a high-throughput FPGA-based real-time DSP audio synthesizer for zero-shot text-to-patch generation.
* Implemented a custom SystemVerilog hardware accelerator running stochastic gradient descent (SGD) over joint Audio-CLIP embedding space to solve for optimal FM/subtractive synthesis parameters under low-latency constraints.
* Benchmarked sub-10ms edge inference across 100+ synthesized patches, maintaining steady-state 48kHz audio output.

EngrAAV (github: nikhilanayak/EngrAAV)
* Engineered a deep learning pipeline to synthesize AAV capsid sequences, reducing manufacturing cost by ~96%.
* Trained a stacked LSTM on 300k+ sequences, utilizing a bespoke pipeline guided by biological constraints.
* Achieved desired cost reduction while preserving stability; 8 generated capsids were experimentally validated.

LEADERSHIP

Founder & Director, *Northwest Data Science Collective (NWDSC) Nonprofit* **January 2022 – Present**
* Founded a 501(c)(3) to expand tech education across **5 rural Oregon cities**, teaching **100+** students.
* Launched 3 course tracks (Python, AI, Game Design) in partnership with NWRESD and 6 peer mentors.