Akash Dubey

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Education

Rutgers University Honors College, School of Arts and Sciences — New Brunswick, NJ

Bachelor of Science in Computer Science and Math — *Anticipated May 2027*

- **GPA**: 3.97/4.0 | SAT: 1580
- **Relevant Coursework**: Tensor Networks, Systems Programming, Algorithms, Data Structures, Statistics I, Honors Calculus III & IV, Intro to Math Reasoning, Math Theory of Probability, Computer Architecture.
- **Academic Programs & Research**: Directed Research Reading Program on Symmetric Functions (representation theory for combinatorial optimization); Physics Learning Theory Seminar (statistical mechanics in high-dimensional learning), Dean's List.
- **Activities**: Quantitative Finance Club, Road to Silicon Valley Program (Cohort 6), ESL Instructor, Basketball.

Engineering Experience

Scarlet Sync — New Brunswick, NJ

Founder — *Jan 2025 – Present*

- Created a modern Rutgers class scheduling app with thousands of users for degree planning and notifications, utilizing AI-assisted parsing of unstructured data from legacy university services.
- Architected a robust data ingestion pipeline using Python and LLMs to reverse-engineer legacy data, indexing over 2,500 classes and 500+ degree programs for real-time querying.
- Negotiating enterprise deal with Rutgers IT to replace outdated systems with AI-enhanced tools.

Lykke — Los Angeles, CA

Software Engineer — *Sep 2025 – Present*

- Helping design and expand a multi-model AI pipeline to ingest, parse, and structure high-velocity, multi-modal data (texts, voice memos, docs) for a conversational RAG-based and agentic chat application.
- Engineered a fully local, browser-based RAG system by implementing a local embedding model optimized with WebGPU for client-side hardware acceleration, ensuring high performance and privacy.
- Architecting the integration of Canvas LMS to build a rich, domain-specific knowledge graph, enhancing AI reasoning and significantly reducing hallucinations in structured outputs for students.

Samaritan Scout — Cranford, NJ

Full Stack Engineer — *May 2023 – Aug 2025*

- Developed an agentic scraping system leveraging OpenAI and Gemini structured outputs to autonomously extract data from over 100,000 non-profit websites, reducing manual data entry time by over 90%.
- Developed a full-stack search engine using React, TypeScript, and PostgreSQL to index 35,000+ volunteer opportunities, implementing semantic search algorithms with hallucination filters to ensure accurate matching.

Research

Rutgers Economics Labs — New Brunswick, NJ

President (formerly Research Director, Team Lead) — *Oct 2024 – Present*

- Leading quantitative research projects for partners including NJDOL, NJDEP, NJBPU, Federal HUD, U.S. Census Bureau; applied econometric models in Python/R to analyze large datasets and project economic trends.
- Previously led a team of five researchers to evaluate the efficacy of the Urban Enterprise Zone program for the NJDCA, utilizing econometric methods in R and Python to analyze complex census datasets.

Rutgers Department of Computer Science — New Brunswick, NJ

Research Assistant (Advisor: Prof. Zhao Zhang) — *Jan 2026 – Present*

- Exploring second-order optimizers (e.g., Shampoo) to accelerate convergence in large-scale ML training, with applications to efficient AI model optimization.
- Designing agentic systems for non-sequential code generation, focusing on decoupling reasoning from syntax to improve error correction and inference efficiency in LLMs for generating code from research papers.

Algorithmic Robotics and Control Lab in Rutgers's Dept. of CS — New Brunswick, NJ

Research Assistant (Advisor: Prof. Jingjin Yu) — *Jan 2026 – Present*

- Optimizing robot motion planning algorithms using CUDA for parallel computation in high-dimensional spaces, enabling scalable algorithmic pathfinding (pRRTC and FCIT*).
- Working with foundational vision language action models and their applications in robotics (NVIDIA GR00T).

Kwan Lab, Rutgers Cancer Institute of New Jersey New Brunswick, NJ

Computational Biology Research Assistant (Advisor: Prof. Kelvin Kwan) *Jan 2026 – Present*

- Engineered an AlphaGenome AI-powered deletion sensitivity scanner that systematically tests 12 genomic positions across three deletion sizes (10/40/80 kb) to quantify TAD boundary functional importance; identified a critical chr12 insulator ranked #1/12 in insulation weakening across mouse ESC and olfactory neuron cell types.
- Built a custom 3D polymer simulation engine using overdamped Langevin dynamics to reconstruct chromatin architecture from Hi-C contact matrices, with multi-scale TAD boundary detection via insulation score and directionality index methods across 70+ automated tests.

Selected Technical Projects

Local Coworker: Native macOS Computer-Use Agent | *Swift, MCP, Gemini Vision* (private code)

- Built a native desktop agent capable of autonomous computer use by integrating Gemini Vision with macOS Accessibility APIs, AppleScript, and JXA.
- Implemented the Model Context Protocol (MCP) to orchestrate specialized sub-agents (UI Interaction, Shell, App Research) for planning and executing complex multi-app workflows.
- Engineered a "Research Agent" that expands the system's capabilities by autonomously searching documentation to learn new automation patterns and add them to its skill library.

SLM Optimization & Post-Training (GSM8k) | *PyTorch, HPC*

- Fine-tuned small language models (SLMs) on the GSM8k math reasoning dataset to see the effects of different model sizes and architectures on math reasoning capabilities.
- Deployed models on the Rutgers High Performance Computing (Amarel) cluster, utilizing quantization and structural pruning to maximize inference throughput on constrained compute.

Awards & Skills

Awards: 8090 AI Top Coder (5th), Rutgers Shark Tank (2nd and 3rd), ASA Fall Data Challenge (Top 3).
Languages: Python, C++, CUDA, Java, SQL, TypeScript, R, Bash, Git
Technologies: PyTorch, WebGPU, Transformers, Generative AI, Pandas, AWS, Scikit-learn, HPC Clusters