

Dhruv Patel

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Education

- **Stony Brook University** Aug 2025 – May 2027
Master of Science in Computer Science, GPA: 3.61/4.00
- **Dhirubhai Ambani University** Nov 2020 – May 2024
B.Tech. (Honours) in ICT, Minor in Computational Science, GPA: 3.45/4.00
Gandhinagar, India

Projects

- **Aaron Technologies: B2B Procurement & Sourcing Platform** (*Client Project*) *Next.js, React, TypeScript, Firestore, HubSpot*
 - Shipped and maintain the live production site for a B2B industrial sourcing company, working directly with the founder and sales stakeholders to scope **RFQ and supplier-quoting workflows** from business requirements.
 - Developed an interactive **landed-cost calculator** modeling freight, duty, and handling, alongside **15+ responsive pages** spanning product, catalog, industry, and RFQ workflows using Next.js, React, and TypeScript.
 - Architected a **serverless backend** on Firestore with API routes for persistence, transactional email, and automated **HubSpot CRM lead sync**; hardened for production with **WCAG 2.1 AA accessibility**, JSON-LD structured data, and SEO, scoring **100 Performance / 97 Accessibility / 100 Best Practices / 100 SEO** on Lighthouse with **0ms blocking time and 0 layout shift**.
- **Mise: Video-to-Recipe Extraction Platform** *Next.js 15, TypeScript, React, FastAPI, gRPC, Redis, Postgres, GCP*
 - Built and deployed a production full-stack platform that converts cooking videos into typed, structured recipes, architected as a **Next.js 15 App Router BFF** communicating over **gRPC** with a Python extraction service and bridging results to the browser via **Server-Sent Events**.
 - Designed a shared recipe contract in **Zod** and **Pydantic** validated from both sides against common fixtures to prevent schema drift, and a **Redis-backed job queue** with retry, dead-letter handling, and caching for a stateless worker pool.
 - Implemented **Google OAuth2** with JWT sessions and **RBAC** over Postgres; maintained **626 automated tests** and **31 Playwright E2E specs**, provisioned infrastructure with **Terraform**, and shipped via **GitHub Actions to Cloud Run**.
- **OnboardOps: AI-Powered Repository Onboarding Platform** *FastAPI, Next.js, React, TypeScript, MCP, GitHub API*
 - Built a full-stack developer onboarding platform with a **Next.js/React frontend** and FastAPI backend, exposing a **custom MCP server** to automate exploration of unfamiliar, large software systems.
 - Engineered real-time **WebSocket** streaming workflows and repository retrieval pipelines using GitPython and GitHub APIs to surface dependency graphs, entry points, code hotspots, and project conventions.
- **ARGUS: Local AI Site Compliance Platform** *Python, FastAPI, React, CUDA, PyTorch*
 - Architected an on-device, privacy-preserving **multimodal AI platform** orchestrating five models to ground construction-site video findings in OSHA and NYC DOB regulations via retrieval-augmented search.
 - Built the **REST API and React interface** over the pipeline, integrated **7 live NYC Open Data datasets**, and optimized **CUDA inference** via detector reuse, VLM batching, and SDPA attention.
- **Freight Room: Multi-Agent Supply Chain Response Platform** *Winner – Band of Agents Hackathon 2026*
 - Built a distributed platform that detects vessel delays from a **live AIS feed** and dynamically recruits **7 specialized agents across 3 frameworks** (LangGraph, PydanticAI, CrewAI) to coordinate logistics incident response.
 - Designed an auditable human-in-the-loop workflow using quorum voting, adversarial dissent review, and **demurrage estimation** grounded in published carrier tariffs to produce traceable procurement decision dossiers.
- **Raft Consensus & Multi-Paxos Sequencer** *C++, Raft, Multi-Paxos, MAKO, Masstree*
 - Implemented Raft consensus with leader election, replicated logs, and fault-tolerant recovery for a distributed key-value system, then extended it with a global sequencer and Multi-Paxos for strictly serializable execution, achieving **200+ TPS across 3 replicas** on the TPC-C benchmark.

Experience

- **Research Work** Jan 2024 – Jul 2024
Integrating DL with 2D-3V Particle-in-Cell Simulations of Low Temperature Plasmas (APS GEC 2025) *DA-IICT, India*
 - Accelerated device-scale **Particle-in-Cell (PIC-MCC) plasma simulations** by replacing charge-deposition, Poisson-solver, and electric-field stages with a **U-Net surrogate model**, achieving a **45% execution-time reduction** on 128x128 grids with 2.6×10^5 particles.
 - Enforced physical fidelity using **Physics-Informed Neural Networks**, holding mean percentage error **under 5%** against baseline PIC-MCC across 500-iteration ExB test cases; co-authored the resulting **APS GEC 2025** submission.
- **Summer Research Intern** May 2023 – Aug 2023
Software Testing and Test Case Prioritization *DA-IICT, India*
 - Implemented and benchmarked four test-case prioritization techniques across **30 open-source Java projects** ranging up to 87K SLOC and 5,000+ test cases, using runtime and mutation-based APFD evaluation.
 - Profiled execution bottlenecks and automated the evaluation pipeline in Python, **reducing runtime by 30%**.

Technical Skills

Languages: Python, TypeScript, JavaScript, C++, C, Java, SQL, MATLAB, R
Frontend: React, Next.js, TypeScript, Tailwind CSS, Responsive Design, Web Accessibility (WCAG 2.1 AA)
Backend / APIs: FastAPI, Node.js, Flask, REST APIs, gRPC, Protobuf, WebSockets, Server-Sent Events, API Design, OAuth2, JWT, RBAC
Databases / Cloud: PostgreSQL, Redis, Firestore, MongoDB, MySQL, Docker, Terraform, AWS, GCP (Cloud Run), GitHub Actions, CI/CD, Vercel, pytest, Vitest, Playwright
Systems / AI: Distributed Systems, Concurrency, System Design, Performance Optimization, Unix/Linux, PyTorch, LangGraph, MCP, FAISS

Leadership

- **Deputy Convenor** Apr 2021 – Apr 2023
Annual Techno-Cultural Festival Committee *DA-IICT, India*
 - Led the technical team for one of Gujarat's largest techno-cultural festivals, coordinating **cross-functional** logistics, sponsorship, and operations committees for **25,000+ attendees**.