Siddarth Shinde

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Education

North Carolina State University — Raleigh, NC
Bachelor of Science in Computer Science (Dept. Honors) — *Aug. 2022 – May 2026*
GPA: 3.87

Vasavi College of Engineering (Transfer) — Hyderabad, Telangana, India
Bachelor of Engineering in Computer Science and Engineering — *Nov. 2021 – Feb. 2022*
GPA: 4.0

Research Interests

Quantum computing systems and architectures, quantum computer security, and quantum algorithms.

Research Experience

Undergraduate Research Assistant — Jun. 2025 – Aug. 2025
Northwestern University, Computer Architecture and Security Lab (PI: Prof. Jakub Szefer) — *Evanston, IL*

- Developed a KL-divergence based *information-per-dollar* metric to quantify accuracy-cost tradeoffs on commercial quantum processing units by executing canonical circuits (e.g., Bell states).
- Engineered a reproducible Python pipeline to fetch, normalize, and analyze **200+** quantum jobs across vendors/clouds; computed TVD/KL, aggregated by shots, and produced plots.
- Implemented vendor-aware cost models (e.g., runtime-based or per-shot pricing) to enable cross-hardware comparisons of measurement quality vs. spend.
- Maintained analysis artifacts (JSON/CSV) and figure export scripts for reproducibility.
- Co-developing a manuscript on cost-accuracy tradeoffs in commercial QPUs.

Independent Study: Communication Complexity (CSC 499) — May 2024 – Jul. 2024
North Carolina State University — *Raleigh, NC*

- Studied one-way communication complexity and streaming models; surveyed frequency-moment estimation and sketching algorithms.
- Implemented the Flajolet–Martin algorithm in C and evaluated estimation variance under stream variations; authored an internal writeup summarizing findings and open directions.

Publications & Preprints

Shinde, S., & Szefer, J. (in preparation). *Quantum Fidelity-per-Cost: a Metric for Evaluation of Quantum Computing Systems.* Northwestern University, 2025.

Teaching Experience

Teaching Assistant — Aug. 2023 – Dec. 2024
Department of Computer Science, North Carolina State University — *Raleigh, NC*

- Supported learning for **200+** students across three courses via office hours, live debugging, Q&A, and grading of assignments, projects, and exams.
- Collaborated with faculty in weekly meetings to align rubrics, identify common misconceptions, and adjust instructional materials.

CSC 333: Automata, Grammars, and Computability — *Aug. 2024 – Dec. 2024*

- Conducted oral homework sessions to evaluate proof strategies and guide problem-solving.

CSC 116: Introduction to Computing (Java) — *Jan. 2024 – May 2024*

- Automated grading for Zybooks assignments with a custom Python script, improving turnaround.

CSC 110: Computer Science Principles — *Aug. 2023 – Dec. 2023*

- Built a Python tool using Piazza's API to batch-assess discussion posts.

Projects

QPU Benchmarking Toolkit | *Python, Qiskit Runtime, AWS Braket SDK, qBraid, Matplotlib* Jun. 2025

- CLI/data pipeline to fetch results across vendors, normalize measurement outcomes, compute TVD/KL, and export figures/data for papers.
- Modular cost-model layer for cross-device comparisons; reproducible configs for circuits, shots, and devices.

RPi Router Instructions Website | *Hugo, GitHub Pages* Nov. 2025

- Co-authored and edited step-by-step networking instructions (VPN, DNS, ad-blocking) on a public documentation site that teaches beginners how to turn a Raspberry Pi into a secure router using RaspAP.
- Maintaining the Hugo-based documentation stack and GitHub Pages deployment (site: RPi Router Instructions), updating content as router software and OS images evolve.

HACK Hardware, *nand2tetris* | *HDL* Aug. 2024

- Developed schematics for various hardware components based on guidelines provided by nand2tetris.
- Implemented elementary logic gates, 16KB memory unit, program counter and ALU from scratch in HACK HDL.

CoffeeMaker | *Java, AngularJS, Spring, Hibernate, MySQL, JUnit* May 2024

- Designed and implemented a full-stack coffee ordering site in Java with a team of five.
- Engineered **10+** REST endpoints and AngularJS UI, improving perceived performance and decreasing load times by **30%**.
- Architected and deployed backend auth (Spring Security + Hibernate).

Maze | *DOSBox, x86 Assembly* Aug. 2023

- Wrote an 8086 assembly subroutine that navigates a 2D maze in under **5,000** instructions for **20** mazes of size **5 KB**.

SpellCheck | *C, Vim, Git* Jul. 2023

- Created a spell-checking program in C that dynamically allocates memory for a user provided dictionary.
- Designed a hash function that hashes **143,000 words** and populates a hash table within **100 milliseconds**.
- Performed spell checking on text containing **568,000 words** in less than **1 second**.

Awards & Honors

Dean's List, *all semesters*, North Carolina State University

Technical Skills

Languages: Python, C, Java, JavaScript, SQL, x86 Assembly, HTML/CSS
Libraries/Frameworks: NumPy, Pandas, Matplotlib, Qiskit Runtime, Spring, Hibernate, AngularJS, JUnit
Tools/Platforms: Git, Docker, Linux, ROS