Kabir Samsi

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Software engineer & student researcher with strong passions for system & software engineering, with particular interests in intersecting compiler & programming language design with machine learning to build elegant software. Skilled in SWE, systems programming, PL & ML research, full-stack development, data engineering, team leadership & teaching.

Education

Cornell University Ithaca, NY

Bachelor of Arts – Computer Science, Mathematics & Music *Aug. 2022 – May 2026*

- **Relevant Coursework:** Software Systems*, Compilers*, Programming Languages*, Algorithms, Operating Systems, Data Structures (Honors), Functional Programming, Machine Learning, Computational Algebra
- **GPA 3.8/4.0, Dean's List Recipient** (All Semesters), Pursuing CS Honors (PL & SWE Specialization)

Work Experience

Researcher (Programming Language & Compiler Design) June 2024 – Present

Capra Research Group @ Cornell University *Ithaca, NY*

- Researched optimizations for software-defined networking & language design for programmable packet scheduling.
- Designed a compiler for a domain-specific language (DSL) for expressive, programmable policy design on FPGAs.
- Created the first PIEO, Calendar Queue & multidimensional memory designs on the Calyx compiler system.

Head Teaching Assistant August 2023 – Present

CS3110 (Data Structures & Functional Programming) @ Cornell University *Ithaca, NY*

- Taught functional programming, data structures, interpreter design & formal verification to thousands of students.
- Created & led all pre-exam recitations; designed the course lab material; ran OH/discussions; led all TA meetings.
- Recipient of Cornell's Outstanding Computing & Information Science Teaching Assistant Award.

Software Development Engineer August 2023 – Present

CMSX @ Cornell University *Ithaca, NY*

- Advised by Professor Andrew Myers at Cornell's Course Management System X (8000+ users & 100+ courses).
- Redesigned and overhauled the staff grading interface; developed new CSV integrations; significantly improved UX.
- Reinforced type safety and refactored large portions of the Java codebase; migrated the frontend stack to React.js.

Machine Learning Developer & Data Analyst October 2022 – May 2024

Cornell Lab of Ornithology *Ithaca, NY*

- Classified 5000+ images and developed audiovisual bird ID models & data cleaning scripts for the Merlin Project.
- Curated database profiles for 300+ species splits for the EBird packs in Indonesia & Taiwan.

Projects

KLaTsL | *OCaml* November 2023 – Present

- A functional, typed & interpreted linear algebra-focused DSL introducing an elegant type system and syntax featuring matrix comprehensions & factorizations, typed transformations, dimensional typing and more.

Franz | *Rust* March 2024 – Present

- A compiled programming language to represent music, Franz introduces features including rhythm comprehensions, recursive scales & motivic pattern matching. Compiles to ChucK, an audio production and representation language.

Saberchat (Team Lead) | *MEAN Stack* June 2020 – May 2022

- Led the development of a community platform infrastructure used by schools & organizations. Includes content-sharing systems, an online tutoring center & a streamlined preorder/inventory interface for retail groups.

FindYourBird (Founder & Lead) | *MEAN Stack* June 2020 – May 2024

- Founded and built a bird ID, info & observation logging platform used by amateur ornithologists. Includes a search & identification system, information pages on 200+ different species & user-specific target species and locations.

Technical Skills

Languages: Java, C, C++, Swift, OCaml, Rust, JavaScript, Python, Go, Haskell, Go, Assembly, Verilog, HTML, CSS
Frameworks: MEAN Stack, React, Ajax, LLVM, Yacc, Rocq, Flask, Pandas, Numpy, TensorFlow, PyTorch
Databases & Systems: MongoDB, SQL/PostgreSQL/MariaDB, Neo4j, Linux, Git, Docker, AWS
Expertise: PL & Compilers, SWE, Research, Machine Learning, Systems Programming, Fullstack Development