Kabir Samsi

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Student researcher & software engineer passionate about combining programming languages, compilers & systems with software engineering & machine learning to build elegant software. Skilled in software engineering, systems programming, functional 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:** Algorithms, Honors Data Structures, Programming Languages, Systems Programming, Functional Programming, Graduate Software Systems, Machine Learning, Computational Algebra, Linear Algebra
- **GPA 3.8/4.0, Dean's List Recipient** (All Semesters), Pursuing CS Honors (PL & SWE Specialization)

RESEARCH & TEACHING EXPERIENCE

PL & Compiler Design Researcher   June 2024 – Present
Capra Research @ Cornell University   *Ithaca, NY*
- Student researcher advised by Professor Adrian Sampson at Cornell's Capra Research Group.
- Researching and developing DSLs for software-defined networking & programmable packet scheduling.
- Developing the Pollen framework & compiler, a hardware accelerator for pangenome graphs.

Head Teaching Assistant   August 2023 – Present
CS3110 (Data Structures & Functional Programming) @ Cornell University   *Ithaca, NY*
- Taught functional programming, data structures, PL/interpreters & 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.

WORK EXPERIENCE

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, 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