

# Kabir Samsi

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Software engineer & researcher with strong skills & experience in software design, compiler engineering, programming language theory/research & full-stack development. Passionate about software engineering, research, leadership & teaching.

## EDUCATION

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### Cornell University

Ithaca, NY

*Bachelor of Arts – Computer Science, Mathematics & Music*

- **Graduate Coursework:** Compilers, Programming Languages, Software Systems
- **Relevant Undergraduate Coursework:** Algorithms, Data Structures & OOP (Honors), Machine Learning, Functional Programming, Operating Systems, Databases, Abstract Algebra, Linear Algebra, Probability Theory
- **GPA 3.8/4.0, Dean's List** (All Semesters), **CS Honors Track** (Focus in Programming Languages/Compilers)

## WORK EXPERIENCE

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### Lead Undergraduate Researcher

June 2024 – Present

*Capra Research Group @ Cornell University*

*Ithaca, NY*

- Researching programming language design for packet scheduling & networking, advised by Adrian Sampson.
- Developing the Rio language, compiler & arbiter for compiling packet scheduling policies onto FPGA hardware.
- Led the design, formalization & hardware representations of the PIEO and PIEO Tree data structures.
- Developed a type system, typechecker and formally verified semantics for the Rio programming language.
- Coauthoring a publication on formalisms, semantics & hardware abstractions in programmable packet scheduling.

### 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.
- Led the course's lab material development & organization; hosted weekly discussion sections & office hours.
- Inaugurated and led hosting of the course's pre-exam recitation program; created 200+ slides of recitation material.
- Trained 60+ TAs over multiple semesters in lab management and discussion teaching.
- Two-time recipient of Cornell's Outstanding Computing & Information Science Teaching Assistant Award.

### Software Development Engineer

August 2023 – Present

*Course Management System X (CMSX) @ Cornell University*

*Ithaca, NY*

- Core full-stack developer for Cornell COE/CIS's main course management system, advised by Andrew C. Myers.
- Team's expert and supervisor on the structure, development & maintenance of the platform's JSP frontend.
- Developing a staff-side model for securely serializing, importing & exporting course templates in XML & JSON.
- Led development of an optimized regrade system & secure student enrollment for 100+ courses and 8K+ users.
- Implemented parsing, verification and new integrations for staff-side, grading-related CSV uploads.

### Data Engineer

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 throughout Eastern & Southeast Asia.

## PROJECTS

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### Franz | Rust

March 2024 – Present

- A domain-specific programming language & compiler targeted towards compact and modular musical composition, using a medium of text-based musical notation. Compiles to ChuckK, an audio representation language.

### Saberchat (Team Lead) | MEAN/MERN

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/MERN

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

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**Languages:** Java, Rust, TypeScript, JavaScript, Python, OCaml, C, C++, Swift, Haskell, Ruby, Go, HTML, CSS

**Frameworks:** Express.js, Node.js, React.js, NextJS, Ajax, LLVM, Coq, Flask, Pandas, TensorFlow, PyTorch

**Databases & Systems:** MongoDB, SQL/PostgreSQL/MariaDB, Neo4j, Linux, Git, Docker, AWS

**Expertise:** Software Design, Compiler Design, Programming Languages, Full-Stack Development, Machine Learning