

Katrina (Tin Nam) Liu

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EDUCATION

University of Pennsylvania, School of Engineering & Applied Science, Philadelphia, PA Expected May 2025
Candidate for Bachelor of Science in Engineering in Computer Science (Minor in Mathematics); GPA: **3.95/4.00**
Relevant Coursework: Artificial Intelligence, Scalable and Cloud Computing, Computer Operating Systems, Data Structures and Algorithms, Database and Information Systems, Linear Algebra
Honors: Dean's List; Tau Beta Pi Honors

PROFESSIONAL EXPERIENCE

Undergrad Researcher (Programming Languages) | University of Pennsylvania | Philadelphia, PA Apr 2023 – Present

- Added a code parser as a workload for Etna, a platform written in Haskell for property-based testing (PBT), with the goal of exploring PBT for round-trip properties under Professor Benjamin C. Pierce's supervision.
- Enhanced Etna's infrastructure, such as transitioning from single-file to directory-wide file access, in Python and Haskell.

Head TA of CIS 1200 | University of Pennsylvania | Philadelphia, PA Sep 2022 – Present

- Instructed weekly recitations and held office hours for 400+ students across six semesters for an intro coding course (OCaml and Java).
- Headed the Pre/Post committee with more than seven TAs in reporting and resolving issues in the course's assignments using Git.
- Oversaw and Coordinated course logistics, working closely with a team of over 40 TAs, as the head TA.

Software Engineer (Program Analysis) | Semgrep | San Francisco, CA May 2024 – Jul 2024

- Enhanced Semgrep's static analysis engine (written in Python and OCaml) by adding path sensitivity, reducing false positives in vulnerability detection.
- Introduced a dashboard widget using Mantine to display vulnerabilities across different SCM branches, contributing to a project that resolved 10+ tickets and reduced engineer-customer interactions by 50%.

Software Engineer | Peregrine | Philadelphia, PA Jan 2023 – Sep 2023

- Coordinated the software development of Peregrine's initial prototype development, utilizing Python, Swift, Firebase, and OpenCV, enhancing real-time surveillance footage analysis for optimized service delivery.
- Secured formal interest from Penn Medicine Emergency Department leadership and won the Wharton Innovation Fund.

Undergrad Researcher (Human Computer Interaction) | University of Pennsylvania | Philadelphia, PA Sep 2022 – Jun 2024

- Performed NLP using the Twitter API, sentiment analysis libraries (Vader and TextBlob), and R to evaluate anonymity-related expression under social discourse.
- Authored a paper in a team of five under Professor Danaë Metaxa's supervision. Presented the paper's abstract in IFoRE.

PUBLICATIONS

Automating Responses to Patient Portal Messages Using Generative AI | medRxiv (Preprint) May 2023 – Present

- Fine-tuned LLaMA using PyTorch and Hugging Face.
- Engineered a model that out-performs human responses in automating physician communications on patient portals through LLM prompt engineering, under the supervision of Professor Kevin Johnson.

PROJECTS

InstaLite | React, TypeScript, MUI, SQL, Axios, Node.js, Express.js, AWS, ChromaDB, Kafka, Livy Jan 2024 – May 2024

- Engineered a social media platform with an intuitive UI, real-time interactions, and personalized feeds, utilizing SQL optimizations, Kafka, and AWS for scalability. Enhanced search with ChromaDB and NLP, and integrated graph analysis for friend recommendations.

Oat to X86 Compiler | OCaml Jan 2024 – May 2024

- Developed an optimized compiler in OCaml that translates Oat, a simplified programming language, into x86 assembly.

PennOS | C Jan 2024 – May 2024

- Designed and implemented a lightweight operating system in C in a team of four, focusing on core functionalities such as process management and memory allocation.

Distraction Free YouTube | Swift, Storyboard Aug 2021 – Dec 2021

- Co-created a distraction-free version of YouTube and individually created four other mobile applications in weekly sprints.

SKILLS

Technical: Proficient in Java, OCaml, Haskell, C, Python, and SQL. Has prior experience in Coq, Swift, C++, R, HTML, CSS, JavaScript, TypeScript, React, and Assembly. Used Git, LaTeX, AWS, Linux, Docker, Figma, and the Adobe Suite (Ai, Ps, Id, Pr, Ae, Au) in projects.

Languages: Native speaker of English and Chinese (Mandarin and Cantonese)

Interests: Running, EMT, Arts and Design, Microfilm Production