Frank Shi

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EDUCATION

Purdue University — **West Lafayette, IN**
B.S in Computer Science (Honors College) — *Expected Graduation: May 2026*
GPA: 3.74/4.00

PROFESSIONAL EXPERIENCE

Jianguo Wang Research Group — **West Lafayette, IN**
Vector Database Systems Team - Research Assistant — *May 2024 - Present*

- Improved **pgvector** IVFFlat vector search speeds by up to **600%** & HNSW by up to **60**%
- Integrated **FAISS** IVFFlat & HNSW indices into **PostgreSQL**'s extension **pgvector**
- Built FAISS indices using **SIFT1M** dataset & stored into PostgreSQL shared memory for fast access
- Ran vector search to find top-K nearest neighbors & stored results into pgvector's sortstate data structure

27 Stores LLC — **West Lafayette, IN**
Intern — *May 2024 - Aug. 2024*

- Integrated shipping label printer & barcode scanner allowing **10x** faster automated printing
- Setup **MongoDB Atlas** database to store & query receipt info, resulting in **4x** faster data retrieval
- Utilized **ReactJS** and **Flask** to develop serial number scanner & shipping label printer web application

Purdue University CERIAS — **West Lafayette, IN**
Intern — *June 2021 - Aug. 2023*

- Implemented **Python** client-server program for continuous delivery of 3D printer data to **AnalytiXIN**
- Wrote **Java** program in **Replit** to calculate frequencies of hundreds of seminar title keywords
- Redesigned CERIAS website using **Markdown** to update awards, faculty, & research staff pages

PROJECTS

Tasklist Website - *ReactJS, CSS, Flask, Python, MongoDB* — *Jan. 2024 - Apr. 2024*

- Designed and developed tasklist web application with CRUD and filtering functionalities
- Utilized HTTP requests between **ReactJS** frontend to **Flask** backend for displaying info
- Stored, modified, and queried task info in **MongoDB Atlas** database

Personal Unix Shell - *C++, Lex & Yacc* — *Mar. 2024 - Apr. 2024*

- Implemented complex terminal command parsing using **Lex & Yacc**
- Developed core features like process creation, file redirection, piping, and input handling
- Improved efficiency with advanced features like subshells allowing for parallel process execution
- Enabled faster file searching with wildcards, environment variables, and tilde expansions

Malloc-Inspired Memory Allocator - *C++* — *Jan. 2024 - Feb. 2024*

- Created custom library in **C++** designed to handle memory allocation & deallocation; inspired by malloc
- Employed multiple free lists to index different sized free blocks, allowing quicker access & allocation
- Optimized memory allocation with mechanism to split larger blocks, reducing wasted memory
- Increased memory deallocation speeds with free block coalescing & boundary tag verification

SKILLS

Relevant Coursework: OOP, Programming in C, DS&A, Computer Architecture, Systems Programming, Info Systems, Linear Algebra, Multivariate Calc
Honors: Dean's List & Semester Honors (Fall 2022, Spring 2023, Fall 2023, Spring 2024)
Skills and Technologies: Java, C/C++, Python, x64 Assembly, ReactJS, CSS, SQL, MongoDB, Neo4J, R