Francis Fan

📱 484-802-6820 | ✉ francis.fan@yale.edu | 🏠 Philadelphia, PA | 🔗 LinkedIn | ⬡ Github | 🔗 Portfolio

EDUCATION

Yale University — Aug 2023 – May 2027

Bachelor of Science in Computer Science — *GPA: 3.96/4.00*

- **Activities:** Yale Club Swim (Captain), Yale Computer Society, Yale Undergraduate Capital Partners (Associate)
- **Courses:** Data Structures, Systems Programming and Computer Organization, Algorithms, Parallel Programming, Machine Learning, Compilers and Interpreters, Computational Intelligence for Games, Quantum Computing, Discrete Mathematics, Real Analysis, Linear Algebra, Software Engineering, Probability Theory, Theory of Statistics

EXPERIENCE

Ramen Inc. (Series A Startup) — May 2025 - Aug 2025

Software Engineering Intern — *Boston, MA*

- Tested and engineered modular multi-step AI agents using MLflow, RAG pipelines, and ChromaDB to power user-adaptive UI components, boosting diagnostic engagement by 50% and reducing time-to-diagnosis by 35%
- Deployed AI agents with PostgreSQL, Kubernetes, and Docker, achieving 99.9% system uptime and enhancing output coherence through automated behavior validation against live database state and performance benchmarks

Yale Computer Society — Sept 2024 - Present

Lead Software Engineer for Yale Clubs — *New Haven, CT*

- Shipped club management platform with secure student authorization using TypeScript, React.js, and Yale authentication, reducing manual administrative workload by 70% and safeguarding data for 6,000+ students
- Designed an AI-powered event verification tool using OpenAI APIs, Node.js, and MongoDB, integrated with JWT authentication, enabling secure and scalable event submissions beyond club activities, increasing user engagement

Yale Department of Computer Science — Sept 2023 – Present

Undergraduate Research Intern under Prof. Danny Rakita — *New Haven, CT*

- **Project 1: Diffusion Policy for Manipulation** - Implemented diffusion policy, reinforcement learning (RL), and behavioral cloning script on models trained by GANs using ROS, PyTorch, and Python on dual robotic arms, optimizing viewpoints and object manipulation to achieve a 90% success rate across various movements
- **Project 2: Robotics Generative AI Reinforcement Learning Pipeline** - Developed a high-throughput, autonomous reward-gen and task-analysis pipeline with PyTorch, ROS (publisher/subscriber nodes), and OpenAI Gymnasium, enabling continuous RL training in a virtual environment and reducing manual intervention by 25%

PROJECTS

Auren - Technical Cofounder | *Next.js, Node.js, Prisma, Stripe, Vercel, TailwindCSS* — July 2025 - Present

- Raised 200k pre-seed to engineer a multi-tenant SaaS platform empowering users to instantly launch, customize, and manage e-commerce storefronts on unique subdomains, with real-time AI-driven site/page/product generation
- Integrated Stripe for secure, multi-variant payments and automated tax calculation, orchestrated serverless deployment with 99.9% uptime on Vercel and implemented Redis caching for faster storefront load times

Parallelizing Large Number Multiplication | *C++, OpenMP, ParlayLib* — Feb 2025 - May 2025

- Engineered high-performance implementations of Karatsuba and 3-way Toom–Cook multiplication algorithms for arbitrary-precision integers, leveraging cache-aware data structures and optimized vectorized digit arithmetic
- Designed novel parallelization of 3-way Toom–Cook using OpenMP and ParlayLib primitives, exploiting divide and conquer independence for fine-grained concurrency, achieved $535.25\times$ speedup, with asymptotic scaling analysis

Brain Matter Data Analysis | *SHAP, Random Forests, SVM, Multiple Linear Regression* — June 2022 - Aug 2023

- Utilized an interpretable model to quantify and confirm the cerebellum's importance in predicting risk tolerance and evaluated the performance of several machine learning techniques using 1000 runs of 10-fold cross-validation
- Published work using machine learning to assess the relationship between risk tolerance and brain gray matter volume as first author, and presented at the Organization for Human Brain Mapping (OHBM) Conference 2023

ADDITIONAL

Technical Skills: Python (PyTorch, Scikit-learn), C/C++, Java, Javascript, ReactJS, Typescript, HTML, XML, SQL, R, CSS, Racket, x86-64 assembly, Git, Github, PostgreSQL, Jupyter Notebook, LaTeX(Overleaf/R Markdown), VS Code, Robot Operating System, Linux, Windows, Bash, Excel, React, Node.js, Figma, Jira, Jenkins, Vercel, Render, WordPress

Preprints/Publications: X. Sun, F. Fan, Y. Chen, D. Rakita. "A Comparative Study on State-Action Spaces for Learning Viewpoint Selection and Manipulation with Diffusion Policy." arXiv preprint, 2024. arXiv:2409.14615; Xiatao Sun, Shuo Yang, Yinxing Chen, Francis Fan, Yiyan (Edgar) Liang, Daniel Rakita. "Dynamic Rank Adjustment in Diffusion Policies for Efficient and Flexible Training" RSS, 2025