

# Jack Fan

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## Technical Skills

**Programming Languages:** Python, Rust, Go, R, C, C++, Javascript (React, Next, Node), Typescript, HTML/CSS, SQL, NoSQL, Cypher

**Frameworks & Tools:** TensorFlow/Keras, PyTorch, LiteLLM/OpenAI/Gemini/Claude, FastMCP

**Databases & Cloud:** MongoDB, Supabase, Firebase, GCP, AWS, Pinecone, Turbopuffer, HelixDB

**Development Tools:** Git, Docker

## Experience

### Researcher

*Kempner Institute at Harvard University*

Dec 2025 - Present

*Cambridge, MA*

- Applied AI/ML research under Yilun Du and Embodied Minds Lab, working with Zhenting Qi and Karly Hou. Design and implementation for a novel, tree-based decentralised multi-agent architecture that improves Tau2-bench performance by 10% compared to baseline single- and multi-agent systems.

### Forward-deployed/Research Engineer

*ThirdLayer (YC W25)*

Sep 2025 - Present

*San Francisco, CA*

- Product and forward-deployed work** (Next.js/Typescript backend): built custom Asana and Attio integration infrastructure (OAuth/API interfacing + custom tools/schemas, subagent prompts, evals/tests) + custom MCP subagent architecture (frontend interfacing, Vercel AI SDK-powered OAuth and authenticated MCP operations, prompting). **2x overall user count + DAU/WAU**
- Applied AI research/evals work:** built agentic memory evaluation framework (Python) based on Meta's Agentic Research Environment (ARE). Task, data, and agentic harness design for tool-calling benchmark focussing on learning behaviours for effective extraction of and execution based on idiosyncratic user preferences.

### Founding Lead Engineer

*Series*

Apr 2025 - Aug 2025

*New York, NY*

- Solo engineer for alpha version. Fully built and deployed Python backend (server logic, OpenAI/Gemini applied AI stack + prompts + tools, iMessage communication logic, MongoDB, deployed on GCP), and React/Typescript frontend (deployed on Vercel). **From 3k to 14.8k total signups, 7k users on the platform in 2 months.**
- Lead engineer for beta version (v3) including build/deploy for Python/Go backend (FastAPI, MongoDB, OpenAI/PydanticAI agent layer, deployed on GCP) and Next.js 15.3.3 frontend (deployed on Vercel); **From 0 to 200,000+ matchable profiles and 0 to 10,000+ signups within 3 weeks** (left to remain at school for Fall '25 semester).

### Senior Software Engineer

*Harvard Tech for Social Good*

Oct 2024 - Jan 2025

*Cambridge, MA*

- Lead engineer for 5-person team. Developed comprehensive impact statistics dashboard + weekly cron job update workflow used by 90+ Ersilia contributors, tracking 20+ key metrics, 180+ models across 17 countries and 200+ partner organizations. Full-stack app built on Plotly Dash, Python/GitHub Actions to aggregate and calculate data from Airtable and WHO APIs.

### Software Engineer

*Harvard Tech for Social Good*

Sep 2024 - Dec 2024

*Cambridge, MA*

- Built LLM-powered webscraper on Gemini 1.5 Flash to automate AmpleHarvest's maintenance of food pantry directory; 650x reduced scanning time across 8000+ pantries in the directory; reduced hallucinations by 6x, pipeline runtime by 1.5x, and increased accuracy by 2x through prompt engineering and efficient caching.

### Research Assistant

*Columbia University Medical Centre*

Sept 2022 - Apr 2023

*New York, NY*

- Computational neuroscience research; Python/R scRNAseq data analysis targeting potential effects of SETD1A gene on psychiatric disorder expression. Preprint publication on Biorxiv: <https://www.biorxiv.org/content/10.1101/2025.03.26.645419v1.full.pdf>.

## Projects

### Custom Autodiff/Backprop/MLP

*GitHub*

Dec 2025

- Toy vectorised autodiff engine implemented in Numpy, inspired by `autograd`; manual backprop and gradient descent computations supported. Optimised 2-layer MLP on MNIST to  $\leq 0.4$  loss.

### Personal Knowledge Management System

*GitHub*

Mar 2024 – Nov 2024

- FastAPI-based backend with MongoDB integration; custom PageRank/GraphRAG pipeline for knowledge graph maintenance and organisation.

Publications

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Qi, Z., **Fan, J.**, Hou, K., Han, S. S., Lakkaraju, H., Du, Y. (2026). *Scaling Agentic Intelligence with Principled Multi-Agent Decentralization*. Submitted to *International Conference on Machine Learning (ICML)*, pre-review.

Sun, Z., Zhu, H., He, X., Lendemeijer, B., **Fan, J.**, et al. (2025). *Genomic and transcriptomic signatures of SETD1A disruption in human excitatory neuron development and psychiatric disease risk*. *bioRxiv* preprint, doi:10.1101/2025.03.26.645419.

**Fan, J.** (2023).  
*A Quantum Leap Forward*. ISBN: 979-8387719516.

Education

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<b>Harvard University</b>	Cambridge, MA
<i>Computer Science</i>	<i>Sep 2024 – May 2028</i>
<b>Relevant Coursework:</b> Compositional AI Systems, Intro to Systems, Data Structures and Algorithms, Software Engineering in the Age of Generative AI, Advanced Topics in Data Science (applied ML and deep learning), Intro to Probability Theory, Linear Algebra	