

# Joe Tsai

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## EDUCATION

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**Stanford University** *M.S. in Computer Science*

*Sep. 2023 - Jun. 2025 (Expected)*

- **GPA:** 4.22/4.30

**National Taiwan University (NTU)** *B.S. in Computer Science*

*Sep. 2018 - Jun. 2022*

- **GPA:** 4.28/4.30; **Rank:** 1/181; **Honors:** Phi Tau Phi (Honor for **top 1%** students)

## WORK EXPERIENCE

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**Vectra AI**

*Jun. 2024 - Sep. 2024 (Expected)*

*Software Engineer Intern*

*San Jose, CA*

- Integrated Celery to replace Kubernetes CronJobs, reducing EKS costs by hundreds of dollars daily and eliminating the overhead of pod creation and teardown.
- Migrated long-running tasks to Celery, improving API/UI responsiveness by implementing polling and priority task queue design.
- Enhanced application logging and implemented real-time visualizations in Grafana, including RDS stats, Redis task queue size, and task execution status.

**Academia Sinica**

*Jun. 2022 - Dec. 2022*

*Research Assistant*

*Taipei, Taiwan*

- Implemented an intermittent system operating with scarce energy supply on STM32 devices in C, overcoming low-level programming challenges such as interrupt handling, race conditions, and memory I/O.
- Established Bluetooth Low Energy communication and optimized parameters to support data exchange between multiple devices.
- Developed algorithms for optimal intermittent computation and data exchange, achieving 30% less latency than existing methods.

**Synology**

*Jul. 2021 - Dec. 2021*

*Software Engineer Intern, Development Infrastructure Team*

*New Taipei, Taiwan*

- Developed a CI/CD pipeline, streamlining builds for 10+ iOS and Android apps while minimizing user's script-writing effort.
- Configured and set up LVM, Postfix, Samba, Docker images and containers for the build service on bare-metal servers.
- Rewrote legacy build scripts in PHP, Ruby, and Bash into reusable Python scripts to improve script maintainability.

**Microsoft**

*Jul. 2020 - Jun. 2021*

*Software Engineer Intern, Geocoding Team, AI Bing Department*

*Taipei, Taiwan*

- Increased the queries-per-second rate of a Bing Maps analysis tool by ~20% by identifying I/O bottleneck and using async I/O.
- Led the integration of a query parsing model and the analysis tool to replace heuristic parsing, allowing the tool to analyze location queries of different countries.
- Designed a pipeline to collect geographical information from terabytes of logs in C# and SQL, and perform data cleaning and processing with Python to create machine learning datasets for geocoding models.

## SELECTED PROJECTS

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**Byzantine Fault-tolerant RAID-like Filesystem** — C++, gRPC, FUSE

- Designed and Implemented a distributed, RAID-like filesystem capable of tolerating up to  $\lfloor \frac{n-1}{2} \rfloor$  Byzantine faults.
- Implemented integration with FUSE, allowing existing applications using ordinary I/O operations to work with the filesystem.

**Pintos** — C

- Implemented core operating system functionalities, including thread scheduling, synchronization mechanisms, and virtual memory.
- Deepened understanding of the interaction between the kernel and user processes through the implementation of system calls.

**NetCut** — C++

- Developed an ARP spoofing tool capable of scanning users and disrupting the Internet connection of targeted devices.
- Utilized socket programming and multi-threading to manipulate the Internet connections of multiple targets concurrently.

## TECHNICAL SKILLS

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- **Programming Languages:** C, C++, Python, Go, JavaScript
- **Tools and frameworks:** Linux, Docker, Git, CI/CD (GitHub, GitLab), Kubernetes, AWS, PySpark, Pytorch, Django