Joseph Zhang

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Education

University of Pennsylvania Philadelphia, PA

M.S.E. Computer Science and B.S.E. Networked and Social Systems Engineering *May 2025*

- **Accelerated Master's Degree Program.** Graduate GPA: **4.0/4.0**. Undergraduate GPA: **3.99/4.0**.
- **Teaching Assistant**: CIS 5050 (Distributed Systems) and CIS 1901 (C++)
- **Coursework:** Distributed Systems, Operating Systems, Machine Learning, Big Data Analytics, Discrete Math, Probability
- **Awards:** USA Computing Olympiad Platinum (**top 250** internationally), National Merit Scholar

Technical Skills

Languages: C++, Python, C, Java, JavaScript
Tools/Technologies: Linux, Vim, tmux, gdb, gRPC, Protobuf, AWS, React JS, Volatility Memory Forensics

Experience

Five Rings Jun. – Aug. 2024

Software Development Engineer Intern *New York, NY*

- **Developed binary serialization for scope timer** benchmark output using C++ and gtest, **decreasing output file size by 55%** and **improving parsing runtime by 97%**.
- **Implemented scope timer output parsers in C++** to generate comparison and statistical tables which summarize code runtime improvements and are integrated with Phabricator. Also **wrote E2E pytests** to maintain parser correctness.
- **Consolidated exchange fee manager cache entries** for symbols with shared instruments to reduce memory usage

Citadel GQS – Execution Algo Engineering Jun. – Aug. 2023

Quantitative Research Engineer Intern *Chicago, IL*

- **Implemented and deployed market gateway controls** for China by checking cancellation rate and existing opposite direction orders on QFII and SC exchanges and blocking non-compliant orders using **C++** and **gtest**
- **Automated fill model refitting pipelines** using Airflow and improved US darkfar model child order fill rates by **8.6 bps**, working with research team to transform manual processes to pipelines that are easy to run and monitor
- Wrote **Python** framework to generate DAG workflows with support for **recursive variable definitions**, **file template variable substitution**, and **parallel model evaluation** with integrated Jira ticket signoffs
- Developed three-way comparison that generates diff between prod, old model, and new model execution sims on key TCA metrics, helping **extend midfill and darkfar models to the EU** and facilitating algo research

Amazon May – Aug. 2022

Software Development Engineer Intern *Sunnyvale, CA*

- Created an escalation service API using **Java and various AWS resources** to append question-answer pairs to escalated cases and publish them to an **SNS topic** for ingestion into data lake for further analysis
- Rewrote **E2E tests** by integrating a faster log event filter API, resulting in a **91% reduction** in test run time
- Developed a tool to convert **JSON** question hierarchies to cards and workflows defined in **XML**, so workflows can be automatically published – the former process required manually writing **thousands** of lines per workflow
- Led and facilitated team communication as **scrum master** during daily stand-ups for a two-week sprint

CyFI Lab – Georgia Tech May 2020 – Jun. 2023

Research Assistant *Atlanta, GA*

- Authored paper with team of PhD students about detecting backdoor attacks on deep learning models using **memory forensics** to ensure the benignity of **online-learning Linux systems**
- Developed **Volatility** plugins to introspect memory images, the **CPython** interpreter, and the **Tensorflow VM** and recover the model's layers and weights, allowing us to perform backdoor detection on the model

Publications & Projects

D. Oygenblik, C. Yagemann, **J. Zhang**, A. Mastali, J. Park, B. Saltaformaggio, "AI Psychiatry: Forensic Investigation of Deep Learning Networks in Memory Images," *USENIX Security Symposium 2024*, Philadelphia, Penn., 2024.
https://www.usenix.org/system/files/sec24summer-prepub-517-oygenblik.pdf

PennCloud | *C++, gRPC, Protobuf, CMake, React*

- Developed a distributed, fault tolerant Google Apps style cloud platform with email (POP3 + SMTP) and storage. Features a **distributed key-value storage service** which replicates user data across tablet groups and maintains consistency using remote write primary-based protocol.

PennBook | *React, Node.js, DynamoDB, S3, EC2, Apache Spark*

- The Facebook Clone won **Best Project Award** out of a class of 160 students.