TANMAY **GHAI**

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San Francisco Bay Area my homepage

I am a software engineer at X (formerly known as Twitter) with a passion for security, privacy, and distributed systems.

Education

2020 – 2021 **Master of Science in Computer Science**, University of Southern California
2015 – 2019 **Bachelor of Arts in Computer Science**, University of California, Berkeley

Experience

May 2022 – Present **Senior Software Engineer, X Corp. (fka Twitter Inc.)**

- Tech lead for the security infrastructure team focused on core cryptographic services and libraries that promote security by default in our platform. We own and manage many tier-0 and tier-1 large-scale, microservices consisting of X's certificate management system and secrets distribution service which scale to ~10M certificates and peak ~500k RPS respectively.
- Recently, I've also been contributing to the core services team (which owns the major read/write paths for posts, users, and social relationships on the platform) working on projects to improve our suspended user experience as well as an intelligent graceful degradation layer with request prioritization for our large, horizontally-scaled backends.
- Built end-to-end Encrypted DMs v1 - stood up the public key registration service, which enables the bootstrapping of secret DM conversations via lookups of user public key material.

July 2019 – May 2022 **Software Engineer I – II, Workday Inc.**

- Engineer for Workday's analytics engine - a multi-tenanted, performant, in memory processing engine responsible for over 2 billion+ queries monthly.
- Productionized Cosmos - a framework reducing latency of out-of-the-box analytic data sources and applications by 5x, saving 99% of compute using delta caches.
- Before that, engineer and scrum-master for the web-server infrastructure team responsible for all in/e-gress traffic. Led initiative to virus-scan all uploads & downloads onto the platform.

Research & Selected Publications [Google Scholar]

While I was a master's student at USC, I also worked as a graduate research assistant at the Information Sciences Institute, advised by Prof. Srivatsan Ravi. After graduating in Dec 2021, I stayed on as a visiting researcher until Aug 2023.

2023 Lessons Learned: Building a Privacy-Preserving Entity Resolution Adaptation of PPJoin using End-to-End Homomorphic Encryption. 2023 IEEE European Symposium on Security and Privacy Workshops (Euro S&PW), pages 117-124. [paper]

2022 Evaluating the Feasibility of a Provably Secure Privacy-Preserving Entity Resolution Adaptation of PPJoin using Homomorphic Encryption. arXiv, 2022. [pre-print]

2022 Secure Federated Learning for Neuroimaging. arXiv, 2022. [pre-print]

2021 Secure neuroimaging analysis using federated learning with homomorphic encryption. In 17th International Symposium on Medical Information Processing and Analysis, volume 12088, pages 351–359. SPIE, 2021. [paper]

2021 AMPPERE: A Universal Abstract Machine for Privacy-Preserving Entity Resolution Evaluation, page 2394–2403. Association for Computing Machinery, New York, NY, USA, 2021. [paper]

Awards

2022 Viterbi Master's Student Award for Best Research in the Computer Science Department. An article published to the USC Viterbi website detailing my work and award can be found here.

2020 Member of the 2020 Cohort of the Viterbi Summer Honor's program (VSOP).

2018 UC Berkeley's Dean's List for the College of Letters & Sciences in the Spring 2018 semester.

Skills

Programming Languages	Python, Java, Scala, C++, Go
Frameworks	Spring, Bazel, Gradle, AWS EC2, GCP, Mesos, Docker, Git, Bash
Data Storage	MySQL, MongoDB, BigQuery, Spark
Other	PyTorch, Tensorflow, OpenFHE