TANMAY **GHAI**

Software Engineer | Researcher

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San Francisco Bay Area my homepage

I am a software engineer at Twitter and a security, distributed systems & machine learning researcher in the networking and cybersecurity division at the Information Sciences Institute.

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 **Software Engineer II, Twitter Inc.**
- Engineer for the security infrastructure team focused on core cryptographic libraries, credential lifecycle management, and internal access controls. We manage Twitter's public key infrastructure, and certificate management system, which scales to ~10M certificates and secret management and distribution services which reach peak ~500k RPS.
- Building end-to-end encrypted DM's, our team owns Twitter's public-key registration service and API, which allows bootstrapping for secret conversations.
- Before that, I was a tech lead for Twitter's threat intelligence platform - an end-to-end ingestion pipeline and backing, de-duplicated datastore of third-party IoC's.

July 2020 – Present **Researcher, Information Sciences Institute**
- Visiting researcher in the USC D-Security lab advised by Prof. Srivatsan Ravi.
- Before that, graduate research asst. in the same lab while pursuing my master's degree.
- We are working on privacy-preserving techniques focused on applications for many classical machine learning problems: federated learning, entity resolution, knowledge graphs.

July 2019 – May 2022 **Software Engineer I – II, Workday Inc.**
- Team lead for Workday's analytics engine - a multi-tenanted, performant, in memory processing engine responsible for over 2 billion+ queries monthly. Productionized a framework reducing latency of analytic data sources 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 an initiative to scan all uploads & downloads onto the platform.

Publications

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, C++, Golang
Frameworks Spring, Bazel, Gradle, AWS EC2, GCP, Mesos, Docker, Git, Bash
Data Storage MySQL, MongoDB, BigQuery, Spark, HDFS
Other PyTorch, Tensorflow, OpenFHE