Shistata Subedi

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RESEARCH INTERESTS

Distributed systems, security, and databases. I work on authenticated data structures that let clients check what an untrusted server tells them, including what data looked like in the past, and on services that can recover from overload on their own.

EDUCATION

University of Oregon, Eugene, OR · Graduate Student, Computer Science — Sep 2024 – present
Advisor: Prof. Suyash Gupta

Vellore Institute of Technology, India · B.Tech., Computer Science and Engineering — May 2019 – Apr 2023

PUBLICATIONS

[1] **Smaran: Serving Authenticated Time-Travel Queries.** Asim Nepal*, Shistata Subedi*, Shubham Mishra*, Aniket Kate, Hein Meling, Suyash Gupta. *ACM SOSP 2026*. *Equal contribution. [Paper] [Code]

[2] **Samurai: Slash Your Decentralized Storage.** Shistata Subedi. *Middleware 2025 Doctoral Symposium*. [Paper]

RESEARCH PROJECTS

Smaran: authenticated time-travel queries · Co-first author — SOSP 2026

Time-travel queries ask what a record looked like at a past time or over an interval, for example which key Bob had when Alice messaged him, or an account's balances for a year. Smaran lets a client verify the answer from an untrusted server using a constant number of fixed-size proofs, no matter how long the range is.

- Co-designed the core structure and built it in Go: a segment tree of hashes flattened into one KZG vector commitment, layered so that full trees move up into a parent tree and history can keep growing, with versioned commitments so epochs with no updates take no space.
- Built the key transparency application and its evaluation, including reimplementing OPTIKS from its paper since no code was public. With 10K users and up to 2,047 key versions per user, Smaran had 5.7× the query throughput of OPTIKS and 113× that of CONIKS, and sent 95.2% less data.
- On a full year of Ethereum blocks (2.6M), Smaran answered time-travel queries with up to 589× the throughput and 99.94% lower latency than Merkle trees.

HotSwap: keeping proofs cheap when updates are skewed · Ongoing — 2026 – present

In systems like Smaran, values are committed in groups, so one update forces proof work across its whole group. On Ethereum a few accounts change constantly while most sit idle for months.

- Designing a layout where every account keeps a cold home with proofs made on demand, and busy accounts move into small hot groups whose proofs are kept up to date, without weakening what clients can verify.
- Built a cost model in Rust that decides when moving an account pays off. 3rd place, ACM Student Research Competition at SOSP 2026.

Cry-for-Help: recovering from metastable failures — 2026 – present

Some outages outlast their cause: a spike pushes a service into overload, clients retry, and the retries keep it overloaded. We are asking whether a service can detect this state and get itself out.

- Co-designed a custom IPv4/UDP protocol (DISTRESS, ADVERTISE, AVAIL, COMMIT) that moves new requests off overloaded servers to helper nodes through a P4 switch and a software load balancer.
- Deployed it on a multi-node Linux testbed with a physical P4 switch, RDMA NICs and storage, and a kernel-module overload detector; set up policy routing and ARP on every node.

- Wrote a Python harness that clean-builds each part, records build hashes, injects failures, captures packets with tcpdump, and checks every response.

MiniSpanner: a sharded, replicated database · [Code] 2025

- Built on Apache ResilientDB in C++, with PBFT replication inside each shard and a commit protocol across shard leaders for transactions that span shards.

EXPERIENCE

Teaching Assistant, Web Programming · University of Oregon Sep 2024 – Mar 2026

- Taught lectures and ran debugging labs for 140+ students; graded assignments and gave one-on-one feedback.

Software Engineer · Leapfrog Technology, Kathmandu, Nepal Apr 2023 – Jun 2024

- Led the rebuild of Pulse, the employee review and feedback tool in Vyaguta, the company ERP used by 500+ people; shipped the MVP in two weeks.
- Built ERP features in Node.js, NestJS, React, and MySQL; sped up dashboard APIs by 30% by profiling endpoints and rewriting slow SQL queries.
- Added email and Slack notifications on AWS SQS and Lambda, and built Java/Micronaut APIs for Aspen Biosciences' drug discovery platform.
- Shipped releases to production, took on-call shifts, and reviewed code on a 15–20 person team.

OPEN SOURCE

VisIt (LLNL, C++) · [#20981] [#21001]

- Fixed two bugs merged upstream: a file reader that hung on malformed input, and a Tecplot reader that loaded 0 meshes from a user's file (2 after the fix).

HONORS AND AWARDS

3rd Place (Graduate), ACM Student Research Competition at SOSP, for HotSwap 2026
Lokey Award for Graduate Excellence, University of Oregon 2024 – 25
Frank Vignola Microgrant, Eugene–Kathmandu Sister City Association 2025
Highest Academic Scholarship (COMPEX), Embassy of India 2019 – 23

TALKS AND SERVICE

Poster, ACM Student Research Competition, SOSP 2026
Talk, Doctoral Symposium, Middleware 2025
Poster, USENIX OSDI 2025
Reviewer, IEEE Transactions on Dependable and Secure Computing (TDSC)
Shadow Reviewer, ACM Internet Measurement Conference (IMC) 2025
Artifact Evaluation Committee, Middleware 2025

SKILLS

Languages	Go, Rust, C++, Python, Java, JavaScript, TypeScript, SQL
Systems	Linux, Docker, CloudLab, P4, RDMA, PebbleDB, Ethereum (Geth), MySQL
Cryptography	KZG vector commitments (BLS12-381), Merkle and Verkle trees