HAEGAN MCGARRY

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EDUCATION

California State University San Marcos, B.S. Computer Science — Expected May 2030
AWS Certified Cloud Practitioner (CLF-C02), Jul 2026. **Awards:** Greater San Diego Science and Engineering Fair winner (Physics and Astronomy), AP Scholar with Honors

TECHNICAL SKILLS

Languages: Python, Go, C, TypeScript/JavaScript, SQL, Lua
Cloud and infrastructure: AWS (Lambda, API Gateway, Step Functions, DynamoDB, SQS), Terraform, SAM, Docker
Distributed systems and data: CRDTs, hybrid logical clocks, anti-entropy sync, DynamoDB conditional writes, SQLite
Security: IAM least privilege, scoped STS credentials, permissions boundaries, digest-pinned images, Trivy, CodeQL
Testing: property, fuzz and mutation testing, deterministic simulation, ASan/UBSan, pytest, moto, GitHub Actions
AI tools: Claude Code (custom subagents, skills, tested hooks), Codex CLI

PROJECTS

HoldFast: CRDT state replication for edge nodes on lossy networks — Nov 2026 to present
Go, Docker Compose, netem, Terraform, Lambda, DynamoDB, Prometheus, Grafana | github.com/haeganm/holdfast

- Edge nodes share one map of aircraft reports with no coordinator: a property-tested CRDT (commutative, associative, idempotent) of last-writer-wins registers ordered by a hybrid logical clock, synced by digest anti-entropy.
- All 60 windows of a recorded hour (444 aircraft) converged under 20% injected packet loss (p95 1.37 s) and after a 23.6 s partition; with no loss, sync was 2.8x faster at p95 than a central server (8 windows).
- A seeded fault simulation (loss, duplication, partitions, clock jumps, restarts) checks invariants after every step and found 2 bugs the measured runs missed; mutation testing caught all 131 planted bugs; 97 Go tests, 2 fuzz targets.
- Cloud peer reuses the nodes' merge code: Terraform deploys a Go Lambda behind API Gateway, and DynamoDB conditional writes accept only a track that wins the merge; one measured AWS run: 1,758 invocations, 0 errors.

Agentic NetOps: closed-loop AWS network remediation — Jul 2026 to present
Python, SAM, Step Functions, Lambda, DynamoDB, EventBridge, Bedrock | github.com/haeganm/agentic-netops

- Detects VPC drift from CloudTrail events, proves it against a declared baseline, measures impact with VPC Reachability Analyzer and converges the network back to baseline; the LLM proposes, deterministic checks decide.
- Self-healed a seeded network fault in 191 s with no human touch, and remediated 9 of 9 seeded fault classes (security groups, route tables, NACLs, ENI attachments, DNS) in a live AWS account; 301 automated tests, $0 idle.
- Least privilege: repairs run under per-incident STS credentials inside a tag-scoped permissions boundary, behind fail-closed approval tiers; every decision goes to a hash-chained DynamoDB ledger with a verifier CLI.

walkforward: volatility and risk library in C with Python bindings — Jan 2026 to present
C11, CMake, ctypes, cibuildwheel, PyPI | github.com/haeganm/walkforward

- Every function is checked against pandas, numpy, scikit-learn and arch on a 12-job CI matrix (gcc, clang, macOS, Windows, 32-bit, ASan/UBSan, fuzz sweep); PyPI releases (v3.4.2) use trusted publishing (OIDC).

AsOf: self-grading market intelligence engine — Aug 2026 to present
TypeScript, Next.js 16, SQLite, SEC EDGAR | github.com/haeganm/AsOf

- Seals each signal (Form 4 insider buys, 8-K events) at the instant it became public, then grades it against SPY at 5, 20 and 60 trading days; a full-stack app over a daily SEC EDGAR ingest, with 103 offline checks in CI.

OPEN SOURCE

- 8 merged upstream PRs, each a reproduced bug with a failing test first: nautilus_trader #4914, statsmodels #10229, moto #10234, scikit-bio #2580, pandas_market_calendars #485, biotite #946, anndata #2652, PyLabRobot #1273. Open: mypy #21926, aws-cdk #39647, cloud-custodian #11301, powertools-lambda-python #8772, s3fs #1088.

EXPERIENCE

Independent web designer, preview sites for small businesses — Nov 2026 to present

- Built and deployed 11 free preview sites on Cloudflare Workers for small businesses with no website, backed by a Python pipeline (lead finder across 39 cities, lock-serialized deploys) and a Playwright phone check.

Riffyx Labs Mentorship, Collaborator — Jun 2025 to Jun 2026

- Mentored AWS projects: debugging, plus Git branch and pull-request workflows alongside Cisco professionals.

Independent developer, 2026 to present: four public Roblox games.