

Vincenzo Imperati

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Software engineer focused on backend systems and data infrastructure, with end-to-end ownership of **OpenSats-funded BigBrotr**, from implementation and performance optimization to self-hosted operations. **First author at USENIX Security 2025** and active contributor to the Nostr protocol. Based in Zurich and available now.

Professional Experience

OpenSats <i>Software Engineer</i>	Zurich, Switzerland Aug 2025 - Present
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- Independently built and operate **BigBrotr**, an open-source platform combining verified event archiving with active health and uptime monitoring of **5,000+ Nostr relays**, preserving where each event was observed.
- Made **ClickHouse indexes rebuildable** from the append-only journal without recollecting events from relays; verified recovery of event content, source provenance and tags after database loss.
- Made **lossless archive compression crash-safe**: flush and verify the compressed copy before retiring raw journal files, keeping the authoritative records recoverable through interrupted compaction.
- Own deployment and operation of a **self-hosted Linux server** with Proxmox and ZFS, including storage and backup management, plus application and host monitoring and alerts through Prometheus and Grafana.

Freelance <i>Software Engineer</i>	Rome, Italy Sep 2024 - Jul 2025
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- Built a React Native app for **Gen4Olive (EU Horizon 2020)**, identifying 600+ olive cultivars and disease from photos; separated on-device preprocessing from server inference so models update independently of the app.

Cantina Royale <i>Data Engineer</i>	Remote Sep 2022 - Aug 2024
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- Unified **four data streams** (on-chain transactions, gameplay telemetry, asset metadata and market prices) into one analytical layer for a live game's player and economy analysis.
- Detected and escalated a **reward-farming exploit** by reconciling on-chain reward payments against the gameplay outcomes that should have earned them.

Publications

USENIX Security 2025 (first author): *The Conspiracy Money Machine: Uncovering Telegram's Conspiracy Channels and their Profit Model*. Built the measurement pipeline over **120K+ channels and 498M+ messages**, tracing monetization links to crowdfunding campaigns reporting nearly USD 71M raised.

IEEE Access 2025 (co-author): *Hard to See, Harder to Block: Exploring the Challenges in Email Tracking Pixels Detection*. Evaluated anti-tracking defenses on **44,710 real emails** and 22 commercial tracking services.

Projects

Nostr protocol: Contributed **four merged specification changes** and two merged storage-backend fixes, including a tag-index correction that prevents queries for one tag from matching another.

Scientific infrastructure: Merged a **path-traversal fix** in INSPIRE-HEP's plot extractor and corrected calibration lookup ordering in the conditions database used by sPHENIX and Belle II.

nSealr (pre-production): Built an air-gapped Nostr signing system with **four implementations sharing one protocol**, separating network-facing software from offline key custody.

Awards

Awarded a competitive **OpenSats grant** in 2025 to develop BigBrotr as open-source data infrastructure.

Completed the Sapienza **Honors Programs** alongside both the bachelor's and master's degrees.

Named **Outstanding University Student**, Sapienza 2025: top 400 students of the same birth year.

Won **17 prizes across 10 international hackathons**, leading teams of three to five from idea to prototype.

Education

Visiting Researcher , ETH Zurich, then University of Zurich	Sep 2025 - Aug 2026
PhD candidate, Computer Science , Sapienza University of Rome	Nov 2023 - Present
Master of Science (MSc) in Computer Science , Sapienza University of Rome	Sep 2021 - Oct 2023
Teaching Assistant , Sapienza University of Rome	Apr 2021 - Jul 2023
Bachelor of Science (BSc) in Computer Science , Sapienza University of Rome	Sep 2018 - Jul 2021

Technical Skills

Languages: Go, Python, SQL, C, C++, TypeScript, JavaScript, Rust, Bash, Java, Kotlin, HTML, CSS, Solidity
Databases: PostgreSQL, ClickHouse, SQLite, DuckDB, Redis, BadgerDB; ETL, streaming, indexing, query optimization
Backend and web: FastAPI, Django REST Framework, Node.js, React, Next.js, React Native, Expo, Firebase; REST
Infrastructure: Linux, Docker, Docker Compose, GitHub Actions, CI/CD, Proxmox, ZFS, Prometheus, Grafana
Engineering: System design, distributed systems, concurrency, profiling, unit and integration testing, code review, Git
Data and AI: Pandas, NumPy, PyTorch, scikit-learn, OpenCV, ChromaDB; semantic search, LLM integration, MCP
Network security: TCP/IP, HTTP, DNS, TLS, WebSockets; authentication, authorization, digital signatures