

Giovanni Nicosia

Security Engineer

🌐 giovanninicosia.dev ✉ work@giovanninicosia.dev
🌐 [linkedin.com/in/giovanni-nicosia](https://www.linkedin.com/in/giovanni-nicosia) 🌐 github.com/no-mood

Introduction - whoami

Security engineer focused on backend, platform, and infrastructure engineering, with experience in APIs, CI/CD workflows, reproducible development environments, and declarative systems. I favor an Everything as Code approach and use Nix and NixOS across development, deployment, and self-hosted infrastructure. My academic and research background includes RISC-V, hardware security, systems programming, and Linux kernel development.

Technical Skills

Languages: C, C#, Rust, Python, Go, Java, Kotlin, Nix, Bash, SQL.

Backend: ASP.NET Core, Django, REST APIs, PostgreSQL, MySQL.

Systems: Linux, NixOS, eBPF/XDP, containers, networking, systemd, namespaces/cgroups.

Infrastructure: Nix, Terraform, Kubernetes, Docker, GitHub Actions, GitLab CI/CD, AWS (Lambda), Cloudflare, reverse proxies.

Observability: Prometheus, Grafana, Loki.

Security: SOPS, OAuth 2.0, OpenID Connect, SAML2, Keycloak.

Hardware & Low Level: RISC-V, hardware security, Linux kernel (LKM).

Experience

Research Assistant

November 2024 – December 2025

SMILIES - Research Group of the DAUIN at Politecnico di Torino

Turin

- Conducting research in hardware security with a focus on Physical Unclonable Functions (PUFs).
- Developed a Linux PMU kernel module that exposes RISC-V hardware performance counters, provided by a custom gem5 patch (University of Athens), to the standard Linux `perf` subsystem, enabling profiling of hardware events (cache, TLB, branch prediction, CPU pipeline) inside full-system RISC-V simulations.

Full Stack Developer

March 2020 – March 2023

Casamorana - An e-commerce platform for local products.

Sicily, Italy

- Led the development of front-end and back-end features for the Casamorana e-commerce platform using PHP, HTML, JavaScript and CSS.
- Implemented secure payment gateways, ensured compliance with data protection standards, and optimized website performance.

Education

Politecnico di Torino

Turin, Italy

Master's Degree in Cybersecurity - Computer Engineering, 110 Cum Laude

October 2023 – March 2026

Politecnico di Torino

Turin, Italy

Bachelor's Degree in Computer Engineering

October 2019 – March 2023

Citizenship and Languages

Citizenship: Italian and American

Languages: Italian (mother tongue), English (proficient)

Last update: 2026.07.20

Projects and Personal Interests

Master's Thesis

SpinalHDL, RISC-V, Verilog, SoC, TRNG, Nix, Nix Flakes

- **Reproducible Design and Verification Workflow for TRNG Integration in a RISC-V SoC**
- The VE-HEP project (2024) demonstrated a fully open-source RISC-V Hardware Security Module, but explicitly lacked a TRNG. This thesis fills that gap by integrating a physical TRNG based on the OpenTRNG project into a VexRiscv SoC, covering APB3 wrapper design, register mapping, firmware control, and end-to-end functional verification.
- The entire toolchain is packaged as Nix derivations with Flakes, serving also as a practical guide for reproducible workflows in academic development.

ESCAPE Seminars – QR Attendance System Python, Django, PostgreSQL, SAML2, Nix, devenv

- SAML2 authentication integrated with the institutional Identity Provider via a Keycloak broker, allowing students and staff to log in with their PoliTO credentials.
- Django REST API for attendance tracking via QR code generation and scanning, with a PostgreSQL backend and an admin dashboard for course and seminar management.
- Fully reproducible development and production environment managed with Nix and devenv.sh, covering service orchestration (PostgreSQL, Keycloak, Caddy), database migrations, and deployment.

eBPF Vulnerability Testing Suite |

C, Go, eBPF/XDP, Python

- Testing suite demonstrating security vulnerabilities in eBPF/XDP kernel code by implementing rules from the ISO-IEC TS 17961-2013 C coding standard, developed for the Security Verification and Testing course at PoliTO.
- Includes XVTLAS, a Go-based automation suite for vulnerability patch injection, eBPF program loading via `bpftool`, and structured verifier analysis reporting; complemented by a Python verifier output formatter and a standardized KVM/QEMU-provisioned Ubuntu environment for isolated kernel-level testing.

PoliTO Student – Open Resources for Students |

Nix, devenv, GitLab Pages, CF Workers

- GitLab organization offering open-source course notes and exercises to Politecnico di Torino students, with the secondary goal of introducing students to open source and Git best practices.
- PDF artifacts are built as reproducible Nix derivations, managed with `devenv.nix`, and published automatically through GitLab CI/CD to GitLab Pages.
- Serverless bot deployed on Cloudflare Workers handling GitLab membership requests with institutional email domain validation; secrets injected at deploy time via Wrangler.

NixOS System Configuration |

NixOS, Nix, Nix Flakes

- Declarative, multi-host NixOS configuration managed as a Nix flake, covering workstations and a homelab server with self-hosted services running as NixOS containers, exposed over a private VPN. Per-host secrets managed with SOPS; automated backup infrastructure.

Nix Contributions

Nix, nixpkgs

- Contributing to the development and maintenance of the `nixpkgs` package repository.

Capture The Flag (CTF)

- Occasional CTF player, mainly focused on binary exploitation, reverse engineering, and kernel challenges.