

# Eduardo Rodríguez Sánchez

COMPUTER ENGINEER · HPC MASTER STUNDENT

Madrid, Spain

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“Forty-two, said Deep Thought, with infinite majesty and calm.”

## Education

### UNILU (Université du Luxembourg)

Belval, Luxembourg

M.S. IN HIGH PERFORMANCE COMPUTING

Sep. 2025 - May 2026

- Currently in my first semester under the program EUMaster4HPC for a double degree.
- I will spend my first year on Université du Luxembourg, and the second year in Sofia University St. Kliment Ohridski.

### GT (Georgia Insitute of Technology)

Georgia, USA

B.S. IN COMPUTER SCIENCE

Aug. 2023 - May. 2024

- Comprehensive knowledge of computer systems architecture and implementation with focus on distributed computing environments.
- Proficient in systems-level programming and designing robust networked applications for modern computing infrastructures.
- Relevant coursework: Advanced Operating Systems, Embedded Systems, Database implementation and Cyber Security.
- GPA: 4/4

### UC3M (Universidad Carlos III de Madrid)

Madrid, Spain

B.S. IN COMPUTER ENGINEERING

Sep. 2020 - Jun. 2023

- Solid foundation in mathematics and statistics; as well Artificial Intelligence, Software Engineering, Cyber Security, among many others.
- Completed capstone project: Developed project HERMES (High Performance Engineer for Routing and Mirroring Encrypted Streams) in C++, a proxy for load-balancing millions of connections within an internal network.
- Courses include: Operating Systems, Networks, Distributed Systems, Computer Architecture, Software Engineering, Machine Learning and Cryptography.
- GPA: 9.1/10

## Skills

<b>Low-level / Systems</b>	Linux, Virtualization, CPU Architecutre, GDB, Valgrind
<b>High-Performance Computing</b>	Multithreading, Vectorization (AVX), Profiling, Benchmarking
<b>Distributed Systems</b>	Kubernetes, Load Balancing, Distributed Storage, 5G Networking
<b>Observability / Monitoring</b>	Grafana, Prometheus, gRPC
<b>Programming Languages</b>	C, C++, Go, Python
<b>Languages</b>	Spanish, English

## Experience

### Ericsson

Madrid, Spain

SOFTWARE DEVELOPER

Dec. 2024 - Aug. 2025

- **5G Core Research and Development:** Developed features for User Plane Analytics and optimization in 5G core networks, including antenna geo-redundancy algorithms, multi-thread contention reduction, and resolution of trouble reports such as segment violation errors.
- **5G RIB Solution Design:** Led the migration and adaptation of a 5G Routing Information Base (RIB) codebase from a remote team to our Madrid office. Redesigned the implementation to enable intra-forward communication between modules within the Kubernetes network, eliminating reliance on external networks or the internet.

### Samsung Electronics (Zhilabs)

Madrid, Spain

SOFTWARE ENGINEER

Jun. 2023 - Oct. 2024

- **Recursive Descent Binary Parser for Network Traces:** Developed a fully functional recursive descent binary parser to efficiently access and collect network error data from traces. Enhanced system performance by providing quick and reliable data extraction for troubleshooting and network optimization.
- **Parallel Network Traffic Simulation:** Upgraded an existing network traffic simulator from sequential execution to parallel simulation across multiple antennas, significantly improving performance and enabling scalable testing of network scenarios.
- **High-Performance Network Trace Proxy:** Designed and implemented a high-performance proxy for network traces, achieving 86 Gb/s throughput for unencrypted packet forwarding. Presented as Bachelor's Thesis during Summer 2024.
- **RAN (Radio Access Network) Assistant:** Participated from PoC stage, designing and implementing a multi-agent system leveraging LLM, NLP, ML, and heuristics. Features included Telco Q&A, anomaly detection, root cause analysis, and solution proposal.

# Research

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## SnT (Interdisciplinary Centre for Security, Reliability and Trust)

Kirchberg, Luxembourg

RESEARCH ASSISTANT

Oct. 2025 - Apr. 2026

- Developing and maintaining prototypes of Byzantine fault-tolerant consensus systems for research evaluation.
- Implemented a PBFT-based replica prototype in C++ on top of an asynchronous networking stack, focusing on correctness and performance.
- Contributing to the design and implementation of a consensus protocol for coordination across replica groups.
- Built tooling and test scenarios to validate behavior under failures and measure performance in reproducible experiments.

# Projects

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## Rule110 Fast

GITHUB.COM/NEKRONOS-GH/RULE110

- Optimized Rule 110 simulation using AVX2 SIMD intrinsics.
- Maximised memory throughput via memory alignment and OpenMP multi-threading.
- Utilized hardware directives and C++23 features for efficient state analysis.

## TinyFile

GITHUB.COM/NEKRONOS-GH/TINYFILE

- Developed a file compression service using a hybrid IPC architecture combining POSIX Message Queues control signals and Shared Memory for data transfer.
- Engineered a state-machine based Ring Buffer to manage concurrent data chunks, utilizing zero-copy memory access between the client library and daemon service.

## PBFT

GITHUB.COM/NEKRONOS-GH/PBFT-CPP

- Implemented Practical Byzantine Fault Tolerance (PBFT) protocol in C++ using Salticidae for network connection, together with Prometheus and Grafana for monitoring.
- Three phase consensus protocol (pre-prepare, prepare and commit phases), that handles primary errors through view changes.
- Included state checkpointing for garbage collection and state synchronization.

# Conferences & Activities

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- **ETP4HPC Conference 2026** — Presented as a student representative of the EUMaster4HPC program.
- **NWERC 2025 (Northwestern Europe Regional Contest)** — Competed as part of the University of Luxembourg team.
- **BAPC 2025 (Benelux Algorithm Programming Contest)** — Competed as part of the University of Luxembourg team.
- **Scynergy 2026 (LuxProvide)** — Attended workshops on Rust for GPU programming, GPU profiling, and quantum machine learning.
- **Winter School on Operating Systems (WSOS 2026)** — Attended; focused on European research in operating systems.