

CHRISTOS MALOGIANNIS

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SUMMARY

PhD candidate at Sorbonne Université (CNRS/LIP6) developing hardware-compliant spiking neural network frameworks for FPGA-based neuromorphic accelerators. Built a GPU-accelerated end-to-end pipeline for surrogate-gradient learning, quantization-aware training, and event-driven inference, validated on neuromorphic vision datasets including N-MNIST and DVS Gesture. Strong background in PyTorch, snnTorch, and neuromorphic hardware-software co-design.

EDUCATION

PhD in Neuromorphic Computing

May 2024 – Present

Sorbonne Université (CNRS, LIP6)

Paris, France

Topic: Neuromorphic algorithms and their hardware implementation

Developing a hardware-compliant software framework for SNN training and inference, with algorithm–hardware co-design methodologies for energy-efficient edge AI on FPGA-based neuromorphic accelerators.

Supervisor: Haralampos-G. Stratigopoulos

Integrated Master in Electrical and Computer Engineering

2017 – 2023

Aristotle University of Thessaloniki

Thessaloniki, Greece

Specialization: Electronics and Computer Engineering

Diploma Thesis: Design and Construction of an Electrical Power System (EPS) on a Nanosatellite — Grade: 10/10

Overall Grade: 7.29/10

TECHNICAL SKILLS

Programming Languages: Python, MATLAB (advanced); R, C++ (intermediate); C, Java (basic)

Frameworks / Libraries: PyTorch, snnTorch, NumPy, SciPy, Pandas, Matplotlib

Neuromorphic Computing: Spiking Neural Networks (SNNs), surrogate-gradient learning, quantization-aware training (QAT), event-driven processing, hardware-compliant SNN simulation, hardware-software co-design

Neuromorphic Datasets: N-MNIST, DVS Gesture, SLOW_POKER_DVS

Hardware & EDA Tools: Verilog (basic), Altium Designer, OrCAD, PSpice, KiCad, EAGLE (from Master's thesis & PCB design internship)

Development Tools: Git, Linux, LaTeX, VS Code / Cursor, Jupyter, Eclipse

Languages: Greek (native), English (C2, Michigan Proficiency)

PROFESSIONAL EXPERIENCE

PhD Researcher – Neuromorphic Computing

May 2024 – Present

Sorbonne Université (CNRS, LIP6)

Paris, France

- Developing a GPU-accelerated software framework for hardware-compliant Spiking Neural Network (SNN) training and inference, aligned with an FPGA-based neuromorphic accelerator.
- Implementing quantization-aware training (QAT), surrogate-gradient learning, and truncated backpropagation through time (TBPTT).
- Designing event-driven inference pipelines validated on neuromorphic vision datasets.

Military Service — Corps of Engineers

May 2023 – Feb 2024

737 Directorate of Military Constructions, NRDC-GR

(NATO Rapid Deployable Corps Greece, Engineers Brigade)

- Completed mandatory 9-month military service within the Engineers Brigade of NATO Rapid Deployable Corps Greece (NRDC-GR).
- Assigned to the 737 Directorate of Military Constructions, supporting the planning and implementation of construction projects.
- Recognized by the Directorate for reliability, organizational skills, and effective time/resource management under deadlines.

PCB Design & Testing Intern

Late 2022

Modihive M. IKE — Research & Development

Thessaloniki, Greece

- Designed printed circuit boards (PCBs) for power supply systems using Autodesk EAGLE, covering schematic capture, layout, and routing.
- Performed hardware testing, validation, and troubleshooting of power supply boards as part of an R&D development

cycle.

- Gained hands-on experience in power electronics design and industrial PCB workflows, collaborating with the engineering team.

ACADEMIC PROJECTS

Heart Disease Prediction — Logistic Regression in R

2022

Aristotle University of Thessaloniki [Statistics course].

- Built a binary classification pipeline in R to predict heart disease risk on the UCI Heart Disease dataset (1,025 patients, 14 clinical features including age, cholesterol, resting blood pressure, ECG).
- Performed exploratory data analysis (boxplots, contingency tables, cross-tabulations) to identify predictive features.
- Fitted generalized linear models (GLM) with binomial family (logistic regression), both single- and multi-variable, evaluating statistical significance via z-tests, p-values, and AIC.
- Generated probability predictions and evaluated classification performance using confusion matrices and deviance analysis.

GSM 06.10 Speech Codec Implementation (RPE-LTP)

2022

Aristotle University of Thessaloniki [Multimedia Systems course].

- Implemented a GSM 06.10 Full-Rate speech encoder/decoder in MATLAB based on the ETSI EN 300 961 standard, covering Regular Pulse Excitation with Long-Term Prediction (RPE-LTP) coding.
- Built the Short-Term Analysis stage: preprocessing (offset compensation, FIR pre-emphasis), order-8 Linear Predictive Coding (LPC), and quantization of reflection coefficients via Log-Area Ratios (LAR).
- Developed the Long-Term Analysis stage: pitch period estimation (40–120 samples), long-term prediction gain computation, and analysis-by-synthesis decoder loop for cross-correlation-based pitch detection.
- Operated on 8 kHz speech signals segmented into 20 ms frames (160 samples, 4 subframes), achieving standard-compliant encoding and decoding pipelines.

Satellite Reliability Analysis — Sentinel-6 Michael Freilich

2022

Aristotle University of Thessaloniki [Systems Reliability course].

- Performed end-to-end space mission reliability analysis for the Sentinel-6 ocean-monitoring satellite using OMERE (CNES/TRAD).
- Modeled the LEO trajectory (1339–1350 km, 66° inclination) and simulated exposure to trapped particles, solar protons, cosmic rays, and solar flares over a 5.5-year mission lifetime.
- Computed total ionizing dose vs. aluminum shielding thickness, LET spectra, and Single Event Effect (SEE) rates for commercial and rad-hard components (Cypress EZ-USB FX2, Freescale MR2A16A MRAM, Atmel ATC18RHA).
- Fitted Weibull cross-section curves from heavy-ion test data to estimate in-flare and out-of-flare upset rates.

On-Chip Spiral Inductor — HFSS Electromagnetic Simulation

2022

Aristotle University of Thessaloniki [Telecommunications Electronics].

- Designed a 2.5-turn square spiral inductor ($w = 9 \mu\text{m}$, $D = 160 \mu\text{m}$) on a multi-layer silicon technology stack (Si substrate, SiO_2 dielectric, copper Metal 8/9 with via under-pass) in Ansys HFSS.
- Performed full-wave 3D electromagnetic simulation from 1 GHz to 150 GHz, extracting S-parameters (S11, S12) in magnitude and phase.
- Derived frequency-dependent inductance (L), resistance (R), and quality factor (Q) from Y-parameter analysis, characterizing the inductor's RF behavior up to mm-wave frequencies.

PUBLICATIONS (IN PREPARATION)

[1] C. Malogiannis, P. Kling, S. Raptis, H.-G. Stratigopoulos.

- "[Software Framework title]." In preparation, 2026. [First author]

[2] [First author], [...], C. Malogiannis, [...].

- "[Hardware title]." In preparation, 2026.

TALKS & PRESENTATIONS

"Training Event-Driven Neuromorphic Systems."

Invited talk, LIP6 IASD Axis Seminar,

Sorbonne Université, Paris, France. June 2025

ACTIVITIES

- Attendee, GDR-IASIS Workshop — "Algorithm-Architecture Co-design and NAS for Efficient AI," CNRS National Research Group, France. 2025.
- Participant, ECESCON 11 & 12 — Electrical & Computer Engineering Student Conference, Greece (2021, 2022).