

Karl GÉRARD

Computer Science & Embedded Systems Engineer

Software Development · Full-stack · AI · Data

*From systems to products,
from data to real-world use.*

Nantes, France

[LinkedIn ↗](#)

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01 / CHOOSE YOUR PATH

Three paths to explore

A / Real-world Systems

- A1 NAVBOX**
Navigation · experience p. 1
- A2 Connected Cellar**
STM32 sensors · project p. 2
- A3 Roi de l'Hexagone**
Arduino game · project p. 2

B / AI & Data

- B1 Florence**
3D cell detection · experience p. 1
- B2 SmartSearch**
Multimodal search · p. 2
- B3 Archipel**
Local AI agents · project p. 2

C / Product & User Experience

- C1 L'Infinie**
Running & GPS · project p. 2
- C2 QR Menu SaaS**
Ordering & kitchen · p. 2
- C3 JunkE VR**
Waste sorting · project p. 2

Three ways to explore · clickable projects · a visual nod to my trail running practice

02 / EXPERIENCE

A1 THALES SIX GTS ↗

09.2023 — 09.2026 · 3-year apprenticeship

- Final-year project:** development of a navigation simulator using Rockwell, NMEA and SBG ECom protocols, with a full-stack user interface and database.
- Infrastructure & Security:** deployment of monitoring and inventory-management solutions.
- DevOps:** automated sensor monitoring and CI/CD integration.
- Systems & Hardware:** improvements to software deployment tools and functional hardware testing.

Embedded C++ · Python · FastAPI · React · TypeScript · Docker · Jenkins
ctest · pytest · Vitest · Wazuh · Zabbix · GLPI · Grafana · OpenSearch

B1 UNIVERSITÀ DI FIRENZE ↗

Summer 2025 · 12-week internship

3D cell detection: optimization of a Weighted Mean Shift pipeline with PCA filtering. Automated parameter selection using Random Forest regression. Development of a 3D visualization and evaluation interface using precision, recall and F1 metrics.

Python · NumPy · scikit-learn · Napari · Weighted Mean Shift · PCA · Random Forest · Grid Search

SAMSIC EMPLOI

Summer 2022 — Summer 2023

U-Logistique · Night-shift order picker during university holidays

03 / EDUCATION

2023 — 2026

ENSIM

Engineering Degree
Computer Science &
Embedded Systems

2021 — 2023

ENSIM

Integrated Preparatory Program
Polytech Group

2018 — 2021

LA COLINIÈRE HIGH SCHOOL

French Scientific Bacculaureate
Mathematics · Physics & Chemistry
Basketball Sports-Study Program

From software to real-world use

04 / PROJECTS

B2 ACADEMIC · TEAM OF TWO

SmartSearch / MAYbe Here ↗

Multimodal search across images, PDFs, CSV files and text. Incremental streaming ingestion, vector indexing and hybrid retrieval with local semantic arbitration.

> 20 GB · ~100,000 images · CPU / GPU testing

Python · FastAPI · Streamlit · Docker
LanceDB · Apache Arrow · CLIP · Mistral · Ollama

C2 PERSONAL · IN DEVELOPMENT

QR Menu SaaS ↗

QR menus, ordering and kitchen display system for multiple restaurants. Tenant isolation, authentication, roles, idempotency and controlled state transitions.

API & user-flow testing · Pre-launch

React · Vite · TypeScript · Tailwind · Node.js
Express · Zod · SQLite · Better Auth
Vitest · Supertest · Playwright

C1 PERSONAL · 2026

L'Infinie de la Chaize ↗

Backyard ultra event in Noirmoutier: branding, invitations, website, GPS tracking, trailer and on-site materials. Authenticated webhooks, mapping dashboard and automated video capture.

End-to-end GPS tracking tested in real-world conditions

Next.js · React · TypeScript · Tailwind · Framer Motion
MapLibre · Traccar · Webhooks · Playwright · ffmpeg
Local JSON storage

B3 PERSONAL · IN DEVELOPMENT

Archipel ↗

Specialized local AI agents. Orchestration, human validation of actions and explicit data boundaries. Capability contracts, testing and verified frontend flows.

Local AI · Controlled actions · Observable results

Python · FastAPI · Pydantic · Uvicorn · SQLite
React · TypeScript · Vite · Playwright · Ollama
ComfyUI · SearXNG · Docker Compose

A2 Connected Cellar ↗

Temperature and humidity monitoring, LCD display and joystick.

C · STM32 · DHT22 · CubeIDE / CubeMX

A3 Roi de l'Hexagone ↗

Electronic board game for 2 to 6 players, with a custom-designed and 3D-printed enclosure.

C/C++ · Arduino · I2C · Fusion 360

C3 JunkE VR ↗

VR waste-sorting experience with physical interactions and an in-world user interface.

Unity · C# · XR · Object Pooling

OTHER EXPLORATIONS

Active Learning / NLP ↗

Amazon → Twitter sentiment adaptation using active data selection.
Python · TF-IDF · scikit-learn · NLTK

NeuroSteady ↗

Adaptive interface using biosignals to modulate scrolling and visual feedback.
Python · BITalino · BioSPPy · Selenium · MongoDB

Multi-Agent Reinforcement Learning ↗

Simulation of learning shepherd agents and multi-agent coordination
Python · PyTorch · Stable-Baselines3 · PPO / TD3 / DQN

05 / SKILLS

PROGRAMMING LANGUAGES

Java · JavaScript · C / C++ / C# · Rust · Python
SQL · TypeScript · Flutter / Dart · HTML / CSS
Bash · Assembly

WEB, MOBILE & SYSTEMS

React · Angular · Tailwind CSS · Flutter
Android Studio · Windows · Linux

DEVOPS & SPECIALIZED TOOLS

Docker / Podman · Jenkins · Git · OpenSearch
STM32CubeMX · Unity (VR) · SOLIDWORKS · LabVIEW

DEVELOPMENT ENVIRONMENTS

Cursor · IntelliJ · VS Code · Eclipse

AI & DATA — HANDS-ON EXPERIENCE

Machine Learning: Random Forest, PCA.
Multimodal Search: CLIP, local LLMs.
Agents: orchestration, validation and testing.

TEAM LEADERSHIP / BASKETBALL

Design and delivery of training programs, team activity coordination, leadership and communication.

SCIENTIFIC & TECHNICAL SKILLS

Complex problem solving.
Analytical and synthesis skills. Creativity.

LANGUAGES

French · Native / English · B2