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Alan Geirnaert

Software Engineer

Summary

Software engineer focused increasingly on scientific computing, numerical simulation, and computational approaches to physical systems. Experienced in C++, Python, N-body simulation, scientific data analysis, and production software engineering, with a particular interest in dynamical systems, emergence, and complex systems.

Featured Projects

Goldilocks - The Search for Earth 2.0, *goldilocks-search.vercel.app*

Scrollytelling data visualisation - NASA Exoplanet Archive - Next.js, Three.js, Plotly, Python

- Won **Best Data Visualization** at the Codédex 2026 February Data Science Challenge.
- Analysed 6,100+ exoplanets from the NASA Exoplanet Archive using a custom multi-criteria habitability scoring algorithm built in Python.
- Built an interactive 3D narrative experience using Next.js, Three.js (spinning planet globes), and Plotly, combining open scientific data with accessible public-facing storytelling.

EntropyCosmos, *https://github.com/alangnt/entropy$_c$osmos*

A 3D N-body gravitational simulator modeling 1,000 celestial bodies in C++/Python.

- Built a 3D N-body simulator in C++ using Barnes-Hut/octree for O(N log N) performance.
- Parallelized physics calculations with OpenMP for multi-core efficiency.
- Created a Python (matplotlib) tool to visualize orbital trajectories in 3D.

Papermind, *papermind.ch*

AI-powered scientific paper search engine - Next.js, MongoDB Vector Search, Groq SDK

- Architected a full RAG pipeline: ingestion, embedding, vector search (MongoDB Atlas), query re-ranking, and source-linked answers through FastAPI, then switched to Next.js.
- Designed a research-focused UX emphasising filtering, provenance, and workflow reproducibility.
- Built authentication, caching layer, and a shared contract system between frontend and backend.

Experience

Dec 2024 – Present

Full-Stack Developer, *App'Ines*, Remote, France

Healthcare recruitment platform (PWA) serving more than 60,000 registered healthcare professionals.

- Shipped a real-time messaging feature (WebSockets) in production.
- Built and deployed an internal dashboard with Angular + Ionic (Capacitor): JWT auth, role-based guards, secure token refresh, and protected routing.
- Designed REST APIs in Node.js/Express/MongoDB with typed DTOs, request validations, and shared contracts, significantly reducing runtime errors.
- Contributed to the V3 platform rebrand and the Archimed™ design system; refactored frontend into reusable accessible components with route-level code splitting, improving load performance and maintainability.

Nov 2025 – Jan 2026 **Head of Technical Program Management**, *SSIP*, Hybrid, Lucerne - Switzerland

- Key organiser and named counterparty to CNES and ESA for ActInSpace Switzerland 2026 - covering programme design, institutional liaison, partner management and on-site operations.
- Negotiated and managed national and commercial partnerships for the programme, including Red Bull as official partner.
- Led development of the official SSIP web platform (public pages, internal coordination tools for events and analytics).
- Translated executive strategy into operational programs, platform roadmaps, and team workflows; promoted to Head of Technical Program Management on the strength of the ActInSpace delivery.

Jul 2024 – Sep 2024 **Software Engineer**, *Headstarter AI*, Remote, USA

- Built AI features using RAG and embeddings for knowledge-aware responses in a fast-paced US remote engineering environment.
- Developed data pipelines and evaluation scripts; profiled latency and improved prompt consistency across environments.

Education

Dec 2024 – Dec 2026 **Bachelor of Science (B.S.) in Computer Software Development**, *OpenClassrooms* WSCUC Accredited (French State RNCP Level 6 Equivalent). Industry placement: App'Ines (full-stack, production) - Part-time remote program alongside industry work. Focus on full-stack engineering, cloud deployment, testing, and Agile development.

Oct 2025 – Dec 2025 **Aspire Leaders Program**, *Aspire Institute/HarvardX* Selective global leadership program supported by HarvardX coursework. Certifications in project management and data analytics.

Skills

Core	TypeScript, Angular, Next.js, Node.js
Backend/APIs	Express, FastAPI, RESTful design, JWT authn, Go
AI/Data	RAG pipelines, embeddings, vector search, Groq SDK, Scikit-learn
Geospatial	MapLibre, satellite imagery (Sentinel-1/2), GIS data pipelines, Plotly
Databases	MongoDB, PostgreSQL, Prisma
DevOps	GCP, Docker, GitHub Actions, Vercel, Linux CLI, CI/CD
Scientific	C++, Python, Barnes-Hut N-body simulation, OpenMP, 3D visualization
Testing	Jest, Vitest, Joi, Zod, Sentry

Recognition & Community

NASA Space Apps Challenge Navigator 2026 - Selected as a 2026 Navigator, supporting participants alongside Universal Event judging and Global Judging.

Mentor, NASA Space Apps Challenge 2026 - Confirmed mentor for the upcoming 2026 edition in Bern, Switzerland

Codédex February 2026 Challenge - Best Data Visualization (Goldilocks)

Codédex Learner Story 001 - Featured as the platform's first community inspiration story

Speaker, NASA Space Apps Challenge 2025 - Two talks in Lucerne on hackathons and their role in space exploration, alongside representatives of EPFL, CSEM and Maxon Motor

NASA Space Apps Challenge 2024 - Global Nominee in Zurich, Switzerland

Codédex Winter Hackathon 2024 - 1st Place (Back to the NASA)