



# VITALII ZNAK

Senior / Lead Full-Stack Engineer

~ \$ whoami

→ 10+ yrs · TypeScript/Python · real-time · fintech · applied AI

📍 Zurich, Switzerland 🇵🇹 Portugal (EU), Ukraine 🇨🇭 Swiss Permit B · no sponsorship needed 👤

🌐 [linkedin.com/in/vitalii-znak](https://www.linkedin.com/in/vitalii-znak) 📄 [github.com/vitaliiznak](https://github.com/vitaliiznak) ✉️

🌐 [signumspace.net](https://signumspace.net)

## PROFESSIONAL OVERVIEW

Senior/lead full-stack engineer, 10+ years in TypeScript and Python. I've built and scaled products across real-time streaming (WebRTC/DRM), financial systems, and applied AI/ML — mapping flows, dependencies, and failure modes before writing code, and reaching for the smallest design that holds under load. Roughly six of those years were independent — founding, contracting, advising — interleaved with senior full-time roles: work chosen by the problem, not the payroll. Mathematics background, first-principles habit. I write about how I think at [signumspace.net](https://signumspace.net).

## SKILLS AND EXPERTISE

### ★ Main Tech Stack:

TypeScript/JavaScript, Node.js, Python, SolidJS, React, SQL, Docker

### 🔧 Programming Languages

**Extensive** (10 yrs): TypeScript/JavaScript, Node.js

**Proficient** (5 yrs): Python

### 📦 Backend

Node.js, Next.js, NestJS, GraphQL, REST APIs, RabbitMQ, FastAPI, Nginx

### 🖥️ Frontend

React, SolidJS, Vite, Canvas/WebGL, CSS-in-JS, MobX, Chrome extensions

### 🗄️ Data Storage

PostgreSQL, MongoDB, Redis, BigQuery, DuckDB

### 📊 Data Engineering

Polars ETL pipelines, DuckDB, time-series analytics, data modeling & analytics workflows

### 🏠 Infrastructure & DevOps

Linux, Docker, Kubernetes, AWS, Azure, CI/CD, Git

### 🏗️ Software Architecture

Distributed systems, microservices, event-driven architecture; clean architecture & DDD; system optimization, API design, scalable solutions.

### 🧠 Applied AI / LLM

RAG pipelines, LLaMA/Ollama, OpenAI API, LangChain, vector DBs; LLM application engineering and computer-vision integration (SAM).

### 🗨️ Domains & Specialisms

Real-time streaming (WebRTC, DRM, WebSockets), Blockchain, Protobuf, Turborepo, React Native

### 🗣️ Spoken Languages

English (fluent), Portuguese (fluent), Ukrainian (native), German (A2)

## WORK EXPERIENCE

### enshift AG | Senior Software Engineer

Mar 2025 – May 2026 | Zurich, Switzerland

**Project(s) domains:** Solar energy — PV sustainability simulation, computer-vision rooftop analysis, solar-site monitoring

- Built a solar-panel **sustainability & yield simulation** to model rooftop PV viability and long-term performance, informing investment and planning decisions.
- Developed a **computer-vision pipeline** to analyze rooftops from imagery using Meta's [Segment Anything Model \(SAM\)](#) — automating roof segmentation and usable-area estimation for solar-potential assessment.
- Built **monitoring for operational solar sites** — **Polars ETL pipelines** feeding **DuckDB** to ingest and process high-volume time-series data for fast analytics over fleet performance, served through a **FastAPI** backend.

**Tech:** Python, FastAPI, DuckDB, Polars (ETL), SAM (Segment Anything), Computer Vision, time-series analytics

## Self-Employed | Independent Consultant & R&D Engineer

Dec 2023 – Feb 2025 | Zurich, Switzerland

- Built and consulted on a full-stack RAG application (TypeScript/React/Python, LLaMA via Ollama, vector DB) integrated with an e-commerce platform for product description generation — improved content quality and SEO signals.
- Technical advisor to [BLCKMGC](#) (AI Data Bank): designed data privacy, security, and monetization workflows for personal data control.
- Self-directed deep dive into ML and statistics — [Karpathy's Zero-to-Hero](#), [StatQuest](#), Python/TypeScript projects around model training and statistical analysis; interactive data visualization with Canvas/WebGL.

Tech: [TypeScript](#), [React](#), [Python](#), [LLaMA](#), [Ollama](#), [vector DBs](#), [Canvas](#), [WebGL](#)

## Bexio AG | Lead Full-stack Engineer

Jun 2023 – Nov 2023 | Zurich | Hybrid

Project(s) domains: Accounting Software

- Joined as Lead to drive the rebuild of a stalled accounting platform; delivered an **architecture & code review** that pinpointed the key scalability and performance bottlenecks.
- **Designed a new data model** and led the team onto a better-fitting stack (Next.js / Nest.js / Prisma); chose to move on once the new direction was set.

Tech: [Next.js](#), [Nest.js](#), [TypeScript](#), [React.js](#), [MySQL](#), [Prisma](#)

## Phenix Real Time Solutions | Full Stack Software Engineer

Jan 2022 – Jan 2023 | Zurich | Hybrid

Project(s) domains: Real-time video streaming, DRM

- Worked with the [castLabs team](#) to [integrate DRM into the WebRTC stack](#) — joint architecture sessions, paired through the gnarly edge cases. The PoC became the basis of the publicly-announced Phenix x castLabs partnership.
- Tuned the streaming pipeline for stability and low-latency delivery under real production load.

*Phenix was [acquired by StatsPerform](#) (Jan 2026).*

Tech: [Node.js](#), [Express](#), [RabbitMQ](#), [TypeScript](#), [BigQuery](#), [SQL](#), [WebRTC](#), [WebSockets](#)

## Komgo SA | Full Stack Software Engineer

Jan 2020 – Jan 2022 | Geneva | Hybrid

Project(s) domains: commodity trading, KYC

- Designed the GraphQL layer in collaboration with the backend and frontend teams — shared ownership, no thrown-over-the-wall handoffs.
- Built REST and GraphQL APIs and React interfaces for commodity trading and KYC workflows in a microservices environment.
- Worked cross-functionally with product, design, and other engineering teams on complex financial processes.

Tech: [Node.js](#), [Express](#), [RabbitMQ](#), [TypeScript](#), [Apollo GraphQL](#), [React](#), [Redux](#)

## Self-Employed | Technical Lead & Full-stack Engineer (Contractor)

May 2016 – Jan 2020 | Remote

Led multiple projects across diverse domains, including AI, machine learning, blockchain, and web development, employing scientific methodologies to drive innovation and deliver robust solutions.

### Key projects:

- **Brainalyzed (AI/ML)**: Led an AI-driven data-preparation UI — a Python data-processing/API backend plus a drag-and-drop TypeScript/React interface, streamlining model-training workflows for data scientists.
- **Chromaway (Web3, Blockchain)**: Built blockchain prototype apps and led the initial PoC of the Green Assets Wallet. Contributed to the "**Mental Poker**" cryptographic protocol — implementing and optimizing algorithms for secure, private, decentralized transactions.
- **IntellectEU (Web3, Blockchain)**: Delivered Hyperledger-based identity-management solutions.
- **TvAppAgency (acquired by Brightcove) (SmartTV, Video Streaming)**: Built a CMS API and data-collection solution for Smart TV apps.

Tech: [TypeScript](#), [React.JS](#), [MobX](#), [Ant design](#), [Python](#), [Go](#), [Rechart.js](#), [webpack](#), [Canvas API](#)

## E-Borealis — Software Engineer (Full-time) — Funchal, Madeira, Portugal

2014 – May 2016 | Funchal, Madeira, Portugal

At [E-Borealis](#), engineered database, caching, and front-end performance for one of the higher-traffic video-streaming platforms in its market — sustaining **~100,000 concurrent viewers at peak**. Embedded in the product team and hands-on throughout.

Tech: [PHP \(Laravel/CodeIgniter\)](#), [jQuery](#), [MySQL](#), [Nginx](#)

## Founder & CTO — VsComments — Funchal, Madeira, Portugal

Feb 2013 – 2014 | Funchal, Madeira, Portugal

Founded [VsComments](#) — a third-party commenting platform — through the Startweb programme at Startup Madeira. Built it from concept to market, owning product, architecture, and technical go-to-market.

Tech: [Node.js](#), [React](#), [MongoDB](#), [ArangoDB](#)

## ENGINEERING PHILOSOPHY

How I approach building systems — correctness, clarity, and real value. The short version (full manifest at [signumspace.net/manifest](#)):

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|---|---|
| <p><b>How I think</b></p> <ul style="list-style-type: none"><li>• <b>Curiosity before convention</b> — understand how things actually work before accepting standard practice.</li><li>• <b>First-principles reasoning</b> — decisions grounded in evidence and how the system actually behaves.</li><li>• <b>Clarity creates speed</b> — deep comprehension prevents more waste than fast typing.</li><li>• <b>Systems, not fragments</b> — every local fix should strengthen the whole.</li></ul> | <p><b>How I build</b></p> <ul style="list-style-type: none"><li>• <b>Simplicity as strength</b> — the smallest design that holds under load.</li><li>• <b>Trust through transparency</b> — important outputs stay traceable and explainable.</li><li>• <b>Code as a thinking tool</b> — exploration and assumption-testing are real engineering work.</li><li>• <b>Refinement through iteration</b> — excellence emerges through learning and validation.</li></ul> |
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## EDUCATION

### Universidade da Madeira

Licenciatura (BSc) | Engenharia Informática (Computer Engineering) | 2010 – 2016

### Taras Shevchenko National University of Kyiv

Mathematics | attended 2008 – 2011, transferred to Portugal (not completed)

### Advanced Professional Development & Self-Directed Study

- Self-directed study via [MIT OpenCourseWare](#)  
Worked through MIT's computer-science curriculum on OpenCourseWare — algorithms and data structures through to AI and machine learning.
- Ongoing Professional Development  
Regularly take advanced online courses on [edX](#) and other OpenCourseWare platforms to enhance skills in statistics, data visualization, machine learning, and programming. Read papers and blog posts on computer science and software engineering, and watch educational content from channels like [StatQuest](#) and [3Blue1Brown](#).

### Hackathons

- **1st place — Hackathon, 2017.** Solo build of a "SeeFood" image classifier — the "Not Hotdog" app from *Silicon Valley*.
- **TAD Hack Lisbon, 2016.** Solo: "HungryHippos" — a multiplayer game embedded inside a live video chat. (*Node.js, WebRTC, Socket.io, Canvas*)
- **2nd place — Hackaton Madeira, 2015.** Solo, 24-hour build: a Levenshtein-distance engine that surfaces the most common phrasing across many inputs. (*Node.js, ArangoDB, MongoDB*)

## HOBBIES & INTERESTS

Learning, science, programming, traveling, swimming, hiking, backpacking, SUP boarding, and running