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Engineer who works across hardware and software. I design and fabricate printed circuit boards, write the firmware that runs on them, and specify the protocols they speak. I built the Rust runtime behind them and the web product it powers. I have also taken a physical product to paying customers and built every part of it. Four years of software engineering, most of it independent.

EXPERIENCE

Software Engineer (contract)

Apr 2024 — Present

Soapbox

Remote

- [nostr-canvas](#) lets any compatible client run third-party mini-apps with no client-side code change. Plugins are sandboxed Lua programs published as Nostr events, and the same plugin renders in monorail, tile-studio, and Ditto, three independent clients that share no UI code. I wrote the runtime, the plugin specification, and the Rust core.
- The core is a **19k-line Rust crate** compiled to WebAssembly through `wasm-bindgen` and `tsify`, behind a TypeScript embedding layer and React components (26k lines) that hosts drop into their own applications. Every plugin gets an isolated Lua engine and no DOM access, so one plugin cannot crash another or reach the host.
- **Capability grants** gate fetch, event publishing, encryption, and Bitcoin signing. Rust enforces them, out of reach of the host's JavaScript, so revoking a grant takes effect inside the running worker. The specification carries an explicit dependency graph and three conformance levels.
- Extracted the plugin-authoring agent into a reusable **nostr-canvas devkit** and integrated it into **Ditto**, a separate production client. Its `edit-code` tool addresses lines by **content hash** to keep edits token-efficient.
- Signing, across four surfaces: a [browser extension](#) with per-site permissions and PSBT, Taproot, and BIP-375 silent payments; [traystr](#), a Rust desktop daemon keeping the key in the OS keyring; an [ESP32 hardware signer](#) I designed the board and firmware for; and [NIP-LR](#), a specification and reference implementation carrying events over LoRa mesh radio.
- Worked deeply on the Mastodon API implementation in [Ditto v1](#), a Hono server that speaks the Mastodon client API so existing apps work against it unchanged. Ditto v2 is a React and TypeScript single-page application.
- Contributed to [Nostrify](#), a core framework in Soapbox's Nostr tooling. I wrote the initial version of its Postgres storage adapter, compiling protocol filters to Kysely queries over postgres.js and setting up its migrations and benchmarks, and worked around a Deno compatibility bug in postgres.js to get it running. I also built SQLite- and LMDB-backed event stores, and migrated the Nostrify package graph off JSR onto npm so AI coding tools could resolve and build, and set up typechecking in CI.

Founder and engineer

2023 — 2025

The Attention Button — an IoT desk toy, designed and sold

Bangalore

- One person, whole product: parametric OpenSCAD enclosure, a [board I designed and fabricated](#), the ESP8266 firmware, a backend service, the website, an illustrated instruction leaflet, and a packaging-layout generator. Sold to paying customers, with the design files open.
- **Design for manufacture.** Iterated the chassis across roughly **55 STL revisions** to v12 and a pre-production part. Ran print-parameter studies for layer height and surface roughness, then produced **batch plates for 1, 2, 5, and 9 parts** with slow-quality profiles for the production run.

Freelance Software Engineer

2022 — Present

Fractional Finance · Ready Cloud Consulting · Common Ground Practice

Remote

- **Common Ground Practice:** built and deployed the full content site on Payload CMS and Next.js with Postgres and Docker Compose, including the admin model and the deploy path. Sole engineer.
- **Fractional Finance (later Frabric):** Vue front end and Ethereum integrations for a decentralised finance platform.
- **Ready Cloud Consulting:** Angular front-end components for enterprise clients.

Earlier freelance work

2019 — 2022

Alongside study at VIT Chennai

HARDWARE

PCB design+fabrication, firmware, and parametric CAD (OpenSCAD) work for various hardware projects.

- [Soapbox hardware signer](#) — ESP32-WROVER-E with a 2.4-inch ILI9341/ST7789 TFT and a six-button pad with physical confirm and cancel, so each signature is approved on the device. I wrote its firmware as well.
- [cardea](#) — Trezor Model One modified for USB-C and easy hand assembly.
- [The Attention Button](#) — the board inside the product above: ESP-12F, a rotary encoder, a MAX7219 LED matrix, and a buzzer. 0805 passives chosen for hand assembly in small batches.

AGENT AND DEVELOPER TOOLING

Thursday — A work in progress: a coding-agent harness that folds aidos and dotfiles-ai into a single product of their own — aidos contributing the enforcement and evidence model, dotfiles-ai the observability and cheaper-workflow plugins.

aidos — A coding-agent harness with enforced gates. Tickets cannot leave verification without human evidence, [xyzshantaram/aidos](#) and the harness stamps evidence authorship from the entry point so an agent cannot forge a human sign-off. Human and agent share one board, and every action a person takes on it reaches the agent as structured data.

tile-studio — A browser IDE for authoring plugins, built on the nostr-canvas devkit: a chat pane, a live [xyzshantaram/tile-studio](#) sandboxed preview, and a publish pipeline.

dotfiles-ai — A set of experiments in agent observability and cheaper workflows, shipped as DeepSeek [xyzshantaram/dotfiles-ai](#)

Harness plugins: a bash guard that rewrites a wrong call, a graph of each command chain and its exit codes, inline actions on tool calls, per-role model fallbacks, a unified subscription view, and more.

SELECTED OPEN SOURCE

campfire — A reactive web framework: chainable DOM builder, reactive stores, no build step, no virtual DOM. [campfire.js.org](#)

Maintained since 2021 on npm and JSR, with a docs site.

omnilua — Found and fixed a garbage-collector memory leak in a pure-Rust Lua interpreter: allocations made with no active heap guard were linked onto no owner list, so nothing ever freed them. Roughly 29KB lost per VM. Fix merged upstream.

stupid-simple-kv — Key-value crate with order-preserving binary tuple keys, pluggable memory [xyzshantaram/stupid-simple-kv](#) and SQLite backends, and generic serde values.

orange-ticket — Physical Bitcoin vouchers where no single party knows the key at issuance. [xyzshantaram/orange-ticket](#)

writers-jam — A weekly writing exercise and anti-social network. Deno service, running in production: [writersjam.shantaram.xyz](#)

361 posts and 102,302 views to date.

etu — Time-clock CLI for freelancers, in Deno and compiled to a single binary. KV storage, and invoicing through [xyzshantaram/etu](#)

Liquid/Typst templates fed a JSON context. I have billed my own contract work with it daily since 2024.

ink-editor — WYSIWYG markdown editor on CodeMirror 6, with vertical and horizontal modes. [xyzshantaram/ink-editor](#)

wizardkit — Build a step-by-step wizard as a Deno script, served as HTML over HTTP so the same [@xyzshantaram/wizardkit](#) script runs in a browser or a desktop window.

luacheck-ts — A 22k-line Lua static analyzer ported to TypeScript for the browser, Deno, and Node. [@xyzshantaram/luacheck-ts](#)

dsh-compaction-instant — Deterministic context compaction for coding agents: it com- [xyzshantaram/dsh-compaction-instant](#) presses history in milliseconds with no model call and keeps the original tokens, never replacing them with a summary. I fixed checkpoints consuming each other and added per-tool retention.

SKILLS

Languages	Rust, TypeScript, C, C++, Lua, Python, JavaScript
Systems	Rust to WebAssembly (wasm-bindgen , tsify), sandboxing and capability security, memory-safety debugging, garbage collector internals, Web Workers, language tooling
Agents	Harness design, tool and permission gating, evidence and audit models, MCP servers, plugin systems
Protocols	Nostr (NIP-01, 05, 07, 19, 44, 46, 55, 98). Authored NIP-LR. Bitcoin: PSBT, Taproot, BIP-375, rust-bitcoin . Blossom, nsite, ActivityPub
Hardware	PCB design in EasyEDA, schematic through layout and BOM. ESP32, ESP8266, STM32, SPI displays, LoRa radio, Web Serial, Web BLE. Parametric CAD in OpenSCAD, FDM process tuning, fixturing
Web and ops	Deno, Node, React, Vue, Svelte, Vite, CodeMirror, Postgres, SQLite, Linux, Docker, dokku, nginx. I run my own relays and services in production

EDUCATION AND SPEAKING

VIT Chennai 2020 — 2025

B.Tech, Electrical and Electronics Engineering Chennai, India

pideck — Best Capstone project of 2024 in the Electrical and Electronics Engineering department at VIT Chennai. A [slides](#) handheld modular computer, my final-year project: a carrier board integrating a Raspberry Pi Zero W, a 3.5-inch LCD, a matrix keypad, and boost and audio stages, with custom footprints for each module. I wrote the keyboard matrix driver in C against Linux 6.1, plus the [launcher](#). Full BOM and cost analysis, itemised to the resistor. Three working units.

"Hackable By Default" — Talk at bitcoin++ Nairobi, 2026, on software that empowers users to extend it [youtu.be/PO1lggcj-Ic](#) themselves, by building systems easy for both people and computers to understand.

REFERENCES

Chad Curtis — Soapbox James Sutton — Fractional Finance Jared Ready — Ready Cloud Consulting *Contact details on request.*