

BASEL ASHRAF FIKRY

hello@baselashraf.com | baselashraf.com | github.com/BaselAshraf81 | linkedin.com/in/basel-askar

Solo systems and software engineer building production tools with a zero-dependency, client-first philosophy. Work spans in-browser numerical PDE solvers, layout engine internals, MCP developer tools, and scalable web platforms. Multiple projects organically validated by 100K+ users, Hacker News front page (×2), Wikipedia citations, and a citable Zenodo DOI.

FEATURED ENGINEERING & PRODUCTS

Eigendrum · Creator & Solo Engineer · eigendrum.com Aug 2026 – Present

- Built a browser physics engine meshing arbitrary outlines and solving 2D Dirichlet Laplacian eigenvalue problems via custom P1 finite elements; synthesizes modal acoustics in ~800 ms in a Web Worker (zero dependencies, no backend).
- Computationally verified the 1992 resolution to Mark Kac's 1966 open problem ("Can one hear the shape of a drum?"), confirming Gordon–Webb–Wolpert isospectral drum frequencies match published spectra to $1.07 \times 10^{-7}\%$.
- Earned **150 GitHub stars**, registered DOI (10.5281/zenodo.22019539), and was featured on Hacker News (front page ×2), Wikipedia's external links, kottke.org, and 52+ publications across 8 languages.

Prolific Tea · Creator & Solo Engineer · prolifictea.com Apr 2026 – Present

- Built a community-funded researcher review and pay-transparency platform serving **100,000+ page views** and 1,582 indexed researchers, with zero ads, investors, or required accounts (Next.js, PostgreSQL, PWA).
- Developed a companion Chrome extension that intercepts study network traffic to match and surface researcher fairness and rejection ratings inline, before participants accept a task.

holystitch · Creator · github.com/BaselAshraf81/holystitch (23 ★) · TypeScript · MCP Server

- Built a Model Context Protocol (MCP) server that compiles Google Stitch designs directly into production React and Next.js component trees via native API calls, with zero LLM inference tokens spent.

layout-sans · Creator · github.com/BaselAshraf81/layout-sans (67 ★) · TypeScript · npm package

- Engineered a 2D flex/grid layout engine in ~17 kB gzipped (zero dependencies, no DOM/WASM), running **2–3× faster** than Meta's Yoga with an 18× smaller bundle. Added interactive canvas text: selection, clipboard copy, Ctrl+F search, and a screen-reader accessibility tree.

SELECTED SYSTEMS, SECURITY & DATA

- **Legal Document RAG** (Python · LlamaIndex · FAISS) — Built hybrid vector/keyword search over **25,303 legal documents**, serving **230+ concurrent users** on a single T4 GPU via a custom asynchronous request queue with zero out-of-memory failures.
- **fastemporal** (Rust · docs.rs) — Reimplemented Luxon and TC39 Temporal in pure Rust, benchmarked **7–216× faster** and validated against **332 ported conformance tests**.
- **Photophane** (TypeScript · WebGL) — Computed 3D-printable optical relief plates (10.97 mm depth) projecting photographs onto a wall via refracted caustic light (**72 upvotes** on r/photogrammetry).
- **M-Pesa Bug Bounty** (HackerOne) — Found and reported a stored XSS in M-Pesa's PDF receipt generator via font descriptor injection; accepted through HackerOne.
- **Passion of Rugs ETL** (Python, part-time) — Unattended pipeline restructuring **120,000+ records** from 1,200+ inconsistent spreadsheets into a normalized CRM schema, using the OpenAI API for field mapping; cut API costs 13% via deduplication and caching.

SKILLS

Languages	TypeScript, JavaScript, Rust, Python, Java, SQL
Frontend & Web	Next.js, React, Node.js, Web Audio API, Web Workers, Chrome Extension API, Canvas API, Tailwind CSS
Systems & AI	Finite Element Method (FEM), Model Context Protocol (MCP), LlamaIndex, FAISS, PostgreSQL, Supabase, Docker, Linux, Git
Security & Testing	Burp Suite, web security research, conformance testing (TC39 / Luxon)

EDUCATION

BSc in Computer Engineering and Software Systems (Dual Degree) · University of East London & Ain Shams University Feb 2021 – Expected Nov 2026

Graduate Summer School — Università di Pisa Human-Centric ICT for Industry 5.0, Pisa, Italy — scholarship, Sep 2025
graded 29/30

Foreign Exchange, Hanyang University Seoul, South Korea — GPA 4.0/4.5 Sep 2024 – Jan 2025