Zain Dana Harper

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Field Crew Leader, Independent Cross-Domain Researcher & Systems Architect

30-Second Work-Sample Proof Strip

- **11 Yrs Field Lead:** Tree crew ops, safety & client teaching
- **30 Studies / 13 DOIs:** 12 null results; open reproductions
- **1,004,693 DLs:** Elder ENB + 5 shipped platforms
- **41 PRs / 34 Repos:** External maintainer-reviewed work

Executive Profile

Multi-domain field leader, independent researcher, systems architect, and educator with 11 years operating and leading commercial arboriculture crews in the Seattle area alongside 13 years of continuous systems, graphics, and empirical research work. Connects living ecology, structural biology, human behavior, ethics, optics, and verifiable computing into concrete, testable artifacts. Every major claim below links to a public repository, published DOI, automated test suite, or verifiable work sample.

Core Capabilities & Skills

Field Leadership & Education: Tree-Care Crew Leadership, High-Hazard Aerial Rigging & Crane Coordination, Site Scoping & Client Expectations, Explaining Tree Biology & Structure via Organic Analogies, Safety Checklist Discipline

Research, Policy & Synthesis: Empirical Study Design, Preregistered Controls & Honest Null Publication, AI Accountability & Disclosure Investigations, Cross-Domain Associative Synthesis (Ecology, Ethics, History, Optics, AI)

Verification & AI Systems: Fail-Closed Oracles (Three-Plate 115/115), SHA-256 engine-receipt/1 Ledgers, RLVR/Oracle Post-Training (JFC3P-7B-Oracle-v1), Neural Operators (NOH-3/NOH-4), Multi-Agent Research Direction

Graphics, Compilers & Data: DirectX 12, HLSL SM 6.10, Vulkan 1.3, WebGPU, BT.2020/2100 Spectral Optics, Rust (BuildLang 1.15.0), Embedded SQL (BuildDB qdb.exe), C++23, Python, TypeScript (MV3), SQLite FTS5, DuckDB/Parquet

1. Field Leadership, Arboriculture & Client Education

Tree Care Crew Lead & Commercial Arboriculture Operations | Legendary Tree

Seattle Area, WA | April 2015 - June 2026

- **High-Hazard Crew Operations:** Operated and led commercial tree-care crews across 11 years of Pacific Northwest urban canopy work, managing dynamic rigging loads, crane clearances, drop zones, and 100+ ft aerial hazard envelopes with zero-margin safety discipline.
- **Client Expectations & Biology Education:** Conducted on-site assessments with homeowners and property managers, setting transparent scope expectations and teaching tree biology, structural load paths, and the reasoning behind every intervention using clear organic analogies.
- **Field-to-Model Synthesis:** Translated practical canopy mechanics and weather exposure directly into Williams/Almeras tree-stress simulations in Superframe and natural-light atmosphere presets in Elder ENB.

Technical Networking Support Specialist | Stream/Convergys (Xbox / Microsoft Product Contract)

Wilsonville, OR | 2014 - 2015

- **Calm Public Troubleshooting:** Diagnosed TCP/IP, DNS, NAT, router, firewall, and console hardware faults by phone and chat at high volume, documenting clear repeatable steps for team handoffs.

2. Independent Research, Architecture & Shipped Systems

Founder, Researcher & Independent Systems Architect | Harper Research & Open-Source Ecosystem

Seattle, WA | 2025 - Present (Independent Engineering & Research since 2013) | harperz9.github.io | github.com/HarperZ9

Architected, directed, verified, and released five unified open-source platforms under a registered Washington sole proprietorship, combining deterministic verification, native graphics, compilers, AI evaluation, and civic archival.

Flywheel 2.0.0, JFC3P-7B-Oracle-v1 & NOH-3 / NOH-4 (AI Verification & Models) | HarperZ9/flywheel (PyPI: flywheel-verify)
github.com/HarperZ9/flywheel

- **Fail-Closed Verification, Rowan Router & Receipts:** Consolidated 30 verification, harness, and memory packages behind cryptographic engine-receipt/1 SHA-256 ledgers and the Rowan unified local/subscription/API router (46.73% AVTR-4R token savings, strict offline refusal); Three-Plate achieved 115/115 (100%) planted-defect recall with 0 false accepts (vs 6.09% single-plate baseline); steered-agent request-vs-action guards caught 64/66 harmful tool calls (vs 1/66 schema).
- **Local Oracle Training & Neural Operators:** Trained and quantized JFC3P-7B-Oracle-v1 (4.68 GB Q4_K_M), lifting adversarial trap rejection from 16.67% to 95.83% (+33.33 pp, Fisher exact p = 4e-6) under Arm C; designed NOH-3/NOH-4 Buckingham-Pi scale-normalized operators achieving 18x to 24x OOD MSE reduction and 78.0x post-fault recovery MSE wins.
- **Deterministic Writing & Recall Tooling:** Shipped Articulate 0.19.1 (PyPI deterministic prose linter CLI/LSP/SARIF GitHub Action, 2,096 passing tests) and IDF-Gated Federated Recall (91.25% hit@5 in 2.00 ms).

RAW DX12 (Wave 72), Superframe & Elder ENB (Real-Time Graphics & Simulation) | HarperZ9/superframe & Nexus Mods
github.com/HarperZ9/superframe

- **Native Multi-Title DX12 Pipeline:** Built RAW DX12 Wave 72 (commit 5e49f67) spanning Skyrim SE, Fallout 4, and Starfield with 19 GPU compute solvers averaging 1.57 ms combined, 0 D3D12 debug errors, 522/522 runtime tests, 96/96 live moving-camera checks, and 14/14 DXC Shader Model 6.10 shaders.
- **Multi-API Engine, Optics & Audio:** Engineered Superframe (DX12/Vulkan 1.3/WebGPU, commit e3091922; 600 Vulkan frames matching D3D12 WARP hash for hash) uniting BT.2020/2100 spectral optics, 6-DOF/EKF dynamics, Williams/Almeras tree biomechanics, physical-model CLAP/VST3 instruments, and the Low Water playable slice (250 tests).
- **Real-World Visual Shipping:** Shipped Elder ENB (38 HLSL lighting/atmosphere presets) reaching 1,004,693 total downloads, 179,218 unique downloads, and 2,418 endorsements on Nexus Mods; released build-color 1.0.2 and calibrate-pro 2.0.1 on PyPI.

BuildLang 1.15.0, BuildDB (qdb.exe), CMMNS & Multimodal Corpus Brain | HarperZ9/buildlang & HarperZ9/cmmns
github.com/HarperZ9/buildlang | github.com/HarperZ9/cmmns

- **12-Target Compiler, Universal Hourglass & V5 Superoptimizer:** Shipped BuildLang 1.15.0 on crates.io (12-target Rust capability-effect compiler adding MSL, WGSL, and RISC-V64; 147/147 reproducible hashes; 2,132.3x procgen and 115x-191x f64 kernels), deterministic Universal Hourglass lifters (C/Python/Plain-English → .bld with 0 LLM in loop), V5 certified e-graph superoptimization (1.88x to 2.59x at -O3, 0.0 error), BuildDB qdb.exe (2.89 MB paging, 31.31 ms query, 0/500 fuzz), and a 1.18M-record pure-BuildLang corpus engine (156 ms cold, 86 MB RSS).
- **Civic Provenance, Multimodal Brain & Zero-Friction Distribution:** Shipped CMMNS 3.10.0 (cross-browser MV3 universal web-archival and provenance tool, 1,735 tests, 91.0% pooled precision), fail-closed 1-command SHA256SUMS installers across all flagships (159 public repos including bio-research and crypto-margins), and a streaming workstation decompiler indexing 14.45M files, 6,558 videos (304x reduction), and 6.01M scrubbed FTS5 words in 3.66 ms.

3. Empirical Studies, Zenodo DOIs & Upstream Open-Source Record

30 Empirical Studies (12 Published Null Results) & 13 Zenodo DOI Records
2025 - 2026 | harperz9.github.io/findings/ | orcid.org/0009-0001-7175-5393

- **Open Empirical Archive:** Published 30 reproducible studies spanning 13 disciplines with explicit negative controls and reproduction scripts, archiving 12 honest null results alongside 13 minted Zenodo DOIs (e.g., doi.org/10.5281/zenodo.21230267) and Who Knew First (nine AI-agent disclosure incidents).
- **Physical & Numerical Verification:** Verified 91 IEEE-754 float64 kernels across optics, color, ecology, and physics (91/91 known-answer and planted-wrong kills) and benchmarked a 512^3 CUDA P3M cosmological N-body solver within 3% of Cosmic Emu across 14 bands.

41 Merged Pull Requests Across 34 External Open-Source Repositories
2025 - 2026 | harperz9.github.io/portfolio.html

- **Selected Upstream Contributions:** python-grimp/grimp (#303-#305 Python/Rust fixes), DeepEval (#2822), Pydantic AI (#6205), Datasette (#2815, #2861), TOMLKit (#549), Biome (#11518), AgentFence (#253, #261, #262), Free Law Project litigant-portal (#820), Hebbian Robotics hflow (#157), and Voxwire (#44).

4. Cross-Domain Synthesis, Communication, Credentials & Education

Communication, Teaching & Accessibility

- **Associative Synthesis & Clear Explanation:** Connects insights across ecology, tree biology, ethics, history, sociology, human behavior, optics, and AI verification; translates technical and biological complexity into grounded everyday language and shipped data-driven accessibility specs for 148/148 public charts.

Verified 2026 Credentials & Education

- **Credentials:** Google DeepMind badges (Train A Small Language Model, Multi-Agent Systems, 100/100); 4 Microsoft Applied Skills (Secure AI, Entra, Azure Storage, Azure DevOps Pipeline Security); 6 Qualys Specialist exams; Cisco Ethical Hacker (100%); BlueDot Impact AGI Strategy.
- **Education:** High School Diploma, Wilsonville High School, Wilsonville, Oregon (2013). Open to formal university study and research fellowships.