Alex Guha

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EDUCATION

Arizona State University Tempe, Arizona

M.S. in Robotics and Autonomous Systems (Artificial Intelligence) **Graduated May 2026**

- Thesis: Estimating the Representational Capacity of Decoder-based Language Models GPA: 3.60

B.S. in Computer Science **Graduated May 2024**

- Coursework specializing in Artificial Intelligence GPA: 3.46
- Dean's List

RESEARCH

Representational Capacity: Geometric Limits on Feature Representation in Transformer Language Models **2026**

- A measurable proxy for near-orthogonality tolerance plus an adjusted JL bound gives a quantitative cap on features a transformer can represent.
- Under review at NeurIPS 2026 · arXiv:2606.02765 · Code & paper source.

PROJECTS

RPLib · *Relational-positioning SVG diagramming library - 3 npm packages* **2026**

- Shipped a headless SVG core with anchor-based relational layout, recursive JSON components, edit/navigation history, lifecycle hooks, and a pluggable view-resolver for custom DSLs.
- Layered a browser editor and slim read-only viewer on top, published as separate npm packages.
- KaTeX-aware text rendering targets ML architecture diagrams; authoring environment deployed via GitHub Pages.

WynnSolver · *Build optimizer with closed-loop combo simulator on a ~10^{20} search space* **2026**

- Designed a multithreaded heuristic search (work-stealing Web Workers, dominance pruning, sensitivity-based item priority, suffix-sum feasibility gates) returning ranked builds in seconds across an otherwise-intractable space.
- Built a full closed-loop combo simulator: sequence-aware damage, mana/HP sustainability across looped sub-sequences, per-ability buff/recast dynamics.
- Pure JS, zero-backend; incremental statMap updates and pre-allocated scratch maps keep per-leaf GC churn near zero.

Personal Website · *Interactive 3D graph homepage - Rust → WebAssembly via wgpu* **2026**

- Built a 3D graph homepage where each node is a navigable sub-page, rendered against a real starmap; reusable wgpu crate handles rendering with no DOM/input coupling, and the wasm graph crate handles layout, input, and navigation.
- Authored an autonomous boids flock that drifts around the graph - vectorized neighbor queries, separation/alignment/cohesion tuned for the 3D camera, and idle-time animation that doesn't fight user interaction.

Home Lab **Ongoing**

- OPNsense router and TrueNAS server hosting personal media, photos, a password manager, and custom Docker apps.
- Spare desktop compute hosting game servers (mostly Minecraft) over WSL with wake-on-LAN.

RAG-based Q&A System for CS Courses · *Team Lead - ASU Bachelor's Capstone* **Aug 2023 – Jul 2024**

- Worked closely with a professor to design and implement a machine learning pipeline utilizing retrieval augmented generation and OpenAI's ChatGPT to answer students' questions.
- Synthesized a complex text dataset from the various resources in multiple computer science classes at ASU.
- Presented the project at an international Intel competition hosted in Shanghai and won a second place award.
- Won an additional cash prize at a separate international competition.

SKILLS

Languages : Python, JavaScript, Rust, Java, Go, C++, HTML, CSS

ML / AI : PyTorch, transformers, RAG

Tools & Infra : Git, Docker, Linux, wasm, WebGPU, npm, GitHub Pages, OPNsense, TrueNAS

Interests : Rock climbing (collegiate nationals - men's intermediate), drone photography, cooking