Parker Patton

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Education

The University of Alabama May 2028
Bachelor of Science in Mathematics, Computer Science, GPA: 3.76/4.00 *Tuscaloosa, AL*
Fall 2026 Coursework: Data Structures & Algorithms, Software Engineering, Calculus III, Differential Equations

Experience

AI Safety Lab Sep. 2026 – Present
The University of Alabama *Tuscaloosa, AL*

- Developed a low-dimensional latent-space attack using v2v models to generate adversarial inputs for downstream classifiers; executed **24-shard, 2,400-clip** GPU campaign, achieving **94.5% ASR** at **27–30 dB PSNR**.
- Mapped decoder–classifier geometry with Jacobian and gradient projections; found **47.3× above-chance** task gradient concentration while **90.7% ASR** persisted outside dominant decoder modes across 300 K400 clips.

LLM Interpretability Research May 2026 – Sep 2026
Algoverse AI Research *Remote*

- Designed a content-matched 2×2 **factorial experiment** with over **11,520 matched prompts** and three Llama checkpoints; extracted residual-stream representations at each transformer block; fit held-family-out linear probes.
- Identified a prompt-format confound: naive probes achieved only **0.600–0.682 AUC**, while format-controlled probes reached **0.989–0.998 AUC** and generalized across unseen formats at **0.940–0.985 AUC**.

Financial ML Research June 2024 – May 2025
The University of Alabama at Birmingham *Birmingham, AL*

- Built a diffusion-empirical model for next-day return distributions across **5 assets** and **45 walk-forward folds**.
- Raised volatility R^2 from **0.179 to 0.197**; Reduced CRPS by **0.30%** versus EWMA across **14,175** OOS forecasts
- Presented research at ASFA Symposium; **awarded Honorable Mention** in CARSEF Math & CS.

Projects

tablet.ears.cat [GitHub] | *Python, TypeScript, C, ARM Firmware* Sep. 2026 – Present

- Developed custom firmware for the Gaomon S620 graphics tablet; Deployed web-installer to over **8,500 users**.
- Reverse-engineered OEM firmware; increased polling from **266Hz to 1,000Hz**; eliminated **>15ms** input latency.

NullMap (HackMIT 2026) [Link] | *Python, FastAPI, Elasticsearch, React* Sep. 2026

- Built a resumable ingestion and embedding pipeline indexing **2.1M+** OpenAlex and ClinicalTrials.gov studies.
- Implemented **BM25 + kNN** retrieval for optimized LLM context, reducing cost by **88%** to **19sec** and **$0.021**.
- Deployed in **24 hours** and won **2nd Place** in Elastic's **"Find the Signal"** sponsor challenge at HackMIT 2026.

osu!rankguess [GitHub] | *Python, PyTorch, FastAPI, ONNX, PostgreSQL* Mar. 2026 – Aug. 2026

- Built and published osu!3k, a multimodal dataset of **3,000 gameplay videos**, replay files, and player metadata.
- Trained CatBoost/CV ensemble; reached **0.846** R^2 and **1.84% MAE** predicting percentile from a single sample.
- Deployed a FastAPI/ONNX platform on Vercel with replay parsing, CPU inference, and PostgreSQL storage.

Independent Smart-Contract Security Research | *Solidity, Foundry, EIP-712, HyperEVM* June 2026

- Responsibly disclosed **2 settlement vulnerabilities** in live options contracts by reverse-engineering EIP-712 signatures, packed calldata, and balance-debit paths.
- Found **38 post-expiry settlements** across **800 live transactions** and reproduced both flaws on a mainnet fork.

Technical Skills

Languages: Python, C/C++, TypeScript, SQL, Solidity
ML & Data: PyTorch, scikit-learn, NumPy, pandas, CatBoost, ONNX
Backend & Web: FastAPI, PostgreSQL, Elasticsearch, Next.js, React
Tools & Platforms: Git, Linux, Docker, Slurm, Vercel, GCP, AWS, GitHub Actions