Matthew (Gray) Marshall

Austin, TX

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Education

The University of Texas at Austin **Expected May 2028**
Bachelor of Science in Computer Science *Austin, TX*

- **Coursework:** Operating Systems, Computer Architecture, Data Structures, Cloud Computing, Machine Learning

Experience

Longhorn Sim Racing **Mar 2025 – Present**
Co-Founder & Chief Technology Officer *Austin, TX*

- Architected and deployed a full-stack TypeScript platform (Next.js, React, Supabase, PostgreSQL) serving 170+ members and 60+ active drivers.
- Built scalable event registration and admin systems supporting 28+ competitive events with role-based access control.
- Integrated custom storefront UI with Shopify checkout and transactional email workflows; deployed via Vercel CI/CD.
- Implemented structured SEO (schema markup, sitemaps, metadata), achieving #1 ranking for organization name and 3.7K page views in first 30 days.
- Collaborated cross-functionally on sponsor relations, business planning, and infrastructure scaling decisions.

Longhorn Racing Electric (Formula SAE EV Team) **Sep 2024 – Present**
Telemetry Software Engineer & Planning Lead *Austin, TX*

- Develop distributed real-time telemetry pipeline ingesting 60–120Hz vehicle sensor streams via MQTT.
- Built React dashboards used by 20+ engineers trackside for live timing, energy analysis, and driver input visualization.
- Integrated PostgreSQL-backed storage on local server infrastructure for replay, analytics, and performance modeling.
- Designed and implemented 20K+ LOC on-car driver display system optimized for clarity and low-latency feedback.
- Owned web server and client interface architecture for telemetry visualization stack.
- Designed replay/test harness enabling faster-than-real-time playback for validation and performance analysis.
- Led architecture whiteboarding and planning phases for distributed telemetry system.

Projects

Operating Systems Kernel (Pintos) | *C*

- Implemented kernel threading, scheduling, synchronization primitives, and process management.
- Built virtual memory subsystem with paging, address translation, and page fault handling.
- Designed concurrent file system with buffering and persistent storage.
- Debugged race conditions and memory faults in multi-threaded kernel environment.

chArm-v3 CPU Pipeline & Cache Simulator | *C*

- Built cycle-accurate 5-stage 64-bit CPU pipeline simulator with hazard detection, forwarding, and branch resolution.
- Implemented write-back, write-allocate cache with LRU replacement and variable memory latency modeling.
- Validated correctness using trace-driven binaries and reference test suites.

Dynamic Memory Allocator (MM) | *C*

- Implemented explicit free-list allocator with block splitting, coalescing, and alignment guarantees.
- Designed heap consistency checks to validate invariants under adversarial allocation patterns.
- Optimized for fragmentation reduction and memory safety under dynamic workloads.

Technical Skills

Languages: TypeScript, Python, C, Java, JavaScript
Frontend: React, Next.js, WebSockets
Backend & Data: PostgreSQL, Supabase, Prisma, Cloudinary, SQLAlchemy
Systems: Distributed Systems, Concurrency, Virtual Memory, CPU Architecture, Real-Time Data Processing
Infrastructure: AWS EC2, AWS S3, Vercel, Git, MQTT, GCP