🏛️ Ship of Theseus | High-Performance Research Node

🔬 Research Vision

I am an Electrical Engineering student at **Texas State University** (Concentration: **Micro & Nano Devices**). This workstation, the "Ship of Theseus," is my primary hub for self-directed research, simulating experiments, and bridging theoretical coursework with physical engineering.

Everything built here is a foundational step toward my ultimate objective: earning a **PhD in Materials Science, Engineering, and Commercialization (MSEC)**.

📅 Professional Availability

I am actively seeking **Co-op opportunities (Summer 2026 – Winter 2026)** or Research Assistant positions.

- **Target Roles:** Digital Logic Design, RTL Verification, Hardware Diagnostics, or Bio-MEMS Research.
- **Commitment:** Prepared for 6-8 month extended rotations to support long-term engineering pipelines.

🛠️ Hardware Architecture (The Physical Layer)

Designed for raw performance and high-throughput engineering simulations.

Component	Specification	Research Utility
CPU	AMD Ryzen 9 9950X (16-Core)	High-speed RTL simulation & multi-threaded workloads.
GPU	ASUS ProArt RTX 5080 OC Edition	CUDA acceleration for AI-driven discovery & Bio-MEMS.

Component	Specification	Research Utility
RAM	64GB G.SKILL DDR5 (6000MT/s)	Handling large datasets for Digital Twin simulations.
Storage	2TB Crucial T700 Gen 5 SSD	Ultra-fast I/O for real-time diagnostic logging.
OS	Fedora Linux	Native environment for Rust and SystemVerilog development.

🚀 Active Projects & Lab Work

1. Neuromorphic Logic Design (SystemVerilog & Rust)

- [cite_start]Developing bio-inspired AND gate models to explore neural-weight behavior versus standard RTL logic[cite: 8].
- [cite_start]Creating testbenches to verify signal behavior and strengthen digital logic fundamentals[cite: 9].

2. "Ship of Theseus" Dev Agent (Rust CLI)

- [cite_start]Building a command-line tool to organize local AI model sessions and track development logs on Fedora Linux[cite: 10, 11].

3. Hardware Forensics: RX 5700 PCB Diagnostics

- [cite_start]Using a digital multimeter and schematics to map power rails and identify shorts on a non-functional GPU[cite: 14].
- [cite_start]Bridging schematic theory with real-world PCB behavior and board-level repair[cite: 15].

4. Thermal ML Watchdog (In-Pipeline)

- Developing a localized Machine Learning model to monitor system thermals and performance metrics during heavy compute cycles.

🛠️ Technical Skill Matrix

- **Languages:** Rust, SystemVerilog, C++, Python (Pandas/Matplotlib), JavaScript.
- [cite_start]**Engineering:** Digital Logic, Signal Timing, PCB Probing, Circuit Analysis[cite: 16].
- [cite_start]**Tools:** Git/GitHub, VS Code, Fedora Linux, Muse EEG Hardware[cite: 16].

📫 Connect with Me

- [cite_start]**LinkedIn:** Raul Montoya Cardenas [cite: 2]
- [cite_start]**University:** Texas State University - San Marcos [cite: 5]
- [cite_start]**Portfolio:** raul-biomems.github.io [cite: 1]