Oswaldo Ramirez

773-999-6376 oramirez10102@gmail.com oramirez2025.github.io linkedin.com/in/oswaldo-ramirez2025

Education

Carnegie Mellon University **Expected May 2027**
Master's of Science in Computer Science *Pittsburgh, PA*

- **Research Advisor**: David Woodruff

Carnegie Mellon University **August 2021 – May 2025**
Bachelor's of Science in Computer Science & Mathematical Sciences *Pittsburgh, PA*

- **Concentration**: Algorithms & Complexity
- **Relevant Coursework**: Distributed Systems, Computer Systems, Algorithms for Big Data, Parallel Algorithms, Algorithm Design & Analysis, Quantum Computing, Linear Algebra, Graph Theory, Combinatorics, Probability

Experience

Air Lab @ Carnegie Mellon University Robotics Institute **September 2023 – Present**
Research Assistant *Pittsburgh, PA*

- Optimized **C++** algorithm for informed pathfinding by improving runtime of root-finding in a complex equation, achieving a **100x** speedup in computation
- Developed an algorithm for solving curve-curve-curve trochoid path problem, leveraging 2D Newton-Raphson
- Assembled fan-based wind-field simulation and motion capture integration to validate trochoid path algorithm

FLIP National Fellowship @ FLIP National **May 2024 – August 2024**
Technology Fellow *New York City, NY*

- Redesigned and developed FLIP National's website using **React** and **Tailwind CSS**, improving user experience and accessibility
- Implemented a mailing list component integrated with HubSpot, managing **200+** subscriptions and streamlining communication
- Created a contact page to enhance user engagement and facilitate inquiries and built a secure donation page with PayPal and Stripe APIs, enabling seamless transaction processing

Relevant Projects

Rafts Consensus Algorithm | *Go, RPC, Distributed Systems* **Fall 2024**

- Implemented the Raft consensus algorithm to maintain consistency across replicated state machines under network failures
- Designed leader election, log replication, and heartbeat mechanisms with randomized timeouts to ensure fault tolerance
- Verified correctness under adversarial conditions (dropped, reordered, and delayed RPCs) using **100+** automated tests

Distributed Bitcoin Miner | *Go, Networking, Concurrency* **Fall 2024**

- Built a distributed system that allocated proof-of-work hash computations across multiple miners via a custom RPC protocol
- Designed and implemented the Live Sequence Protocol (LSP) for reliable, ordered, and fault-tolerant communication in addition to UDP
- Developed a load-balancing server that divided mining jobs into sub-tasks, reassigned failed jobs, and aggregated results to minimize mean response time

Dynamic Storage Allocator | *C* **Fall 2023**

- Developed a dynamic memory allocator in **C**, supporting malloc, free, realloc, and calloc with 16-byte alignment and safe handling of edge cases like zero-size allocations and overflow
- Implemented segregated free lists with explicit doubly-linked blocks, LIFO insertion, and block splitting/coalescing, optimizing memory utilization and reducing fragmentation
- Built a robust heap checker to validate invariants, including header/footer consistency, free list integrity, alignment, and prologue/epilogue correctness, ensuring allocator reliability during dynamic testing

Technical Skills

Computer Languages: Python, C++, C, SQL, Standard ML, Julia, HTML/CSS, JavaScript
Technologies/Frameworks: LaTeX, Linux, Git, Unreal Engine, Manim, Docker, React
Certificates: 2025 Amazon Campus Prep Series, Deloitte Digital's Salesforce Academy, Meta Back-End Developer Professional (In-progress), Amazon Junior Software Developer Professional (In-progress)