Michael Mansour

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SUMChain: MMwxCo6U35xubBLi6N3ouktKiT7FM2gFE

EDUCATION

University of California, Los Angeles (UCLA) **Spring 2026**
B.S. Mathematics of Computation — GPA: 3.70
Relevant Coursework: Network/Graph Theory, Optimization, Numerical Analysis, Deep Learning, Algorithms/Complexity, Real Analysis, Probability Theory and Statistics, Signal Processing/Fourier Analysis, Cryptography

Pasadena City College **Spring 2024**
Mathematics & Computer Science — GPA: 4.00

EXPERIENCE

UCLA, Mathematics Directed Research **2026 – Present**
Researcher

- Conducting DARPA-backed research on inexact attributed subgraph matching over AML-oriented transaction graphs. Developing and evaluating approximate subgraph isomorphism algorithms to identify laundering typologies in large-scale, noisy financial networks from a DARPA dataset. Directed by Prof. Paolo Climaco and Prof. Andrea Bertozzi.

Caltech, Lunar Trailblazer **2023 – 2024**
Mission Operations and Ground Data Systems Intern

- Managed spacecraft simulated maneuvers and hardware/software troubleshooting for NASA-led lunar mission. Developed telemetry applications and dashboards using Python, InfluxDB, and OpenMCT — used by dozens of operators to monitor hundreds of telemetry streams in real time.
- Analyzed quaternion/spatial rotation telemetry for attitude determination and control system telemetry analysis, specifically to monitor Keep-Out Zone Violations of maneuvers.
- **Publication:** E. Scire, B. Ehlmann, . . . , M. Mansour *et al.*, "Lunar Trailblazer Ground System Development," *Proc. SPIE 13098*, 130981K (2024). [DOI: 10.1117/12.3027493]

PORTFOLIO

SUM: Layer-1 Blockchain & Web3 Ecosystem (SUMChain / SUMail / SNIP) **2025 – Present**

- Co-designing a Layer-1 PoA/PoS blockchain entirely in Rust. Proposed a round-robin validator rotation for deterministic block production and protocol-level token standards.
- Fully architected a Chrome Extension using TypeScript for secure signing/authentication, featuring a private vault where keys exist only in memory after PBKDF2 decryption. Developed a React/Vite-based interface and a SwiftUI mobile wallet, integrating protocol-level endpoints to retrieve, verify, and display on-chain data directly from SUMChain.
- Storage Node Interface Protocol (SNIP): Designed and implemented a native decentralized file storage protocol in Rust with deterministic 3× replication, BLAKE3 content addressing, Proof-of-Retrievability challenges, parallel upload/download orchestrators, a self-healing MarketSync worker, garbage collection, and WAN connectivity via Kademlia DHT over a libp2p P2P mesh.

hangg: Real-Time Social Platform **2025 – Present**

- Developing a full-stack social platform (React Native, Next.js, NestJS, PostgreSQL on GCP) with Firebase auth, Cloud CDN and signed-cookies, cross-platform deep linking, and adaptive Socket.IO polling to balance real-time accuracy against server load. Engineered a location verification system with 4 fallback layers that survive app force-quit, feeding a spatial clustering algorithm that gates feature access based on physical proximity of group members. Optimized frontend rendering and media delivery with disk caching and prefetching.

GNN for Ethereum Anti-Money Laundering Detection **2026**

- Adapted IBM's Multi-GNN architecture from edge-level Bitcoin AML classification to node-level Ethereum sanctions detection using transfer learning with extreme class imbalance (14,140:1 ratio) and weighted cross-entropy loss. [training]
- Identified distinct laundering phases (placement, layering, integration) through ego-centric subgraph analysis and SHAP/gradient feature attribution on 2-hop neighborhoods. [visualization]
- Engineered a Rust data pipeline with crash recovery to collect, label, and aggregate blockchain transactions into weekly directed graphs in Parquet format (90M+ transactions, 33M+ addresses). [preprocessing, modeling]

SKILLS & TEACHING

Languages/Tools: C++, Rust, Python (PyTorch, NumPy, Pandas, scikit-learn, Matplotlib), SQL, Swift, JavaScript/TypeScript (React, Tailwind), Docker/Kubernetes, GCP (BigQuery, Dataflow, Cloud Composer), Git
Teaching: Undergraduate Reader (Grader) for UCLA Math 115A (Linear Algebra); Mathematics Tutor at PCC Success Center (Multivariable Calculus, ODEs, Physics); Mathnasium Instructor.