Michael Tarekegn

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Education

Los Angeles Center for Enriched Studies — Los Angeles, CA
GPA 5.18 W, SAT 1530 — *Expected June 2027*

- **Coursework:** AP Calculus BC, AP Physics 1, AP Statistics, AP Chemistry, AP Computer Science Principles, Symbolic Logic

Publications

M. Tarekegn et al. "Precision or Optimizer? Crossing Arithmetic Precision and Optimizer Configurations in PINN Training." *NeurIPS Workshop on Optimization for Machine Learning (OPT)*, Dec. 2026 (to appear).

M. Tarekegn, A. Erlikhman, P. Juang. "Interpretable Multilingual Attribution of Frontier LLMs." In *Proc. IEEE BigData High School Symposium*, Phoenix, AZ, Dec. 2026 (to appear). **Best Paper Finalist** (12 of 130 accepted papers).

Research Experience

Cal State LA — May 2026 – Present
ML Research Volunteer — *Los Angeles, CA*

- Modeling asthma-related ER visits from air pollution exposure in an NSF and NASA funded lab
- Trained a random forest regressor over 1,514 records spanning 52 California counties, 8 years, and 4 age brackets, reaching R^2 0.62 and RMSE 16.6 against a linear baseline at RMSE 22.4

UCLA Department of Mathematics — Sep 2025 – Aug 2026
Math and ML Researcher — *Los Angeles, CA*

- Characterizing the full critical point structure of linear self-attention under cross-entropy loss
- Derived the general gradient equations for the query, key, and value weight matrices

Algoverse AI — Aug 2025 – Sep 2026
ML Researcher

- Designed a controlled 40-run study crossing 2 floating-point precisions with 2 optimizers across 8 configurations, including mid-training switches, on 4 benchmark PDE families (Allen-Cahn, wave, reaction, Burgers)
- Built a modular PyTorch pipeline tracking residual, boundary, and initial condition loss components alongside gradient norms and per-epoch time
- First-author paper accepted to NeurIPS OPT 2026

Projects

Ledger | *VisionHack District 9 Champions*

- Co-founded and built a license and permit tracker for independent stores: owners enter licenses once and it tracks renewals across 18 federal, state, and local programs
- Built a check that compares photographed supplier invoices against SNAP stocking rules

Self-Attribution Is Not Self-Recognition: A Peer Baseline for LLM Judges

- Co-first author on a peer-baseline method separating self-recognition from general text identifiability, collecting 950 judgments from 5 frontier models over 190 anonymized responses and 38 prompts
- Measured self-advantage spanning 56 points across models, from +32.9 to −23.7, and built a stylometric random forest over 18 features reaching 86.3% accuracy against a 20% chance floor

Black-Scholes & Greeks Options Pricing Model

- Implemented Black-Scholes from scratch to price European options, deriving the pricing from the underlying PDE instead of relying on a library
- Computed the Greeks (delta, gamma, theta, vega) alongside each price

Awards

IEEE BigData High School Symposium: Best Paper Finalist, 12 of 130 accepted papers

Y Combinator Startup School: Accepted and awarded over $30,000 in compute credits

Citadel Securities Terminal High School Competition: Top 10

Technical Skills

Languages: Python, C++, LaTeX
Libraries & Tools: PyTorch, NumPy, pandas, scikit-learn, Matplotlib, Git, Jupyter, Colab