Harry Guan

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Education

Northwestern University **Expected June 2027**
B.A. in Mathematics and Computer Science, B.M. in Trombone Performance *Evanston, IL*

- **Cumulative GPA:** 3.8/4.0 | **Major GPA:** 3.9/4.0 | **Dean's List:** 6/6 Quarters
- **Relevant Coursework:** Probability and Stochastic Processes, Derivatives Markets, Linear Regression, Machine Learning, Operating Systems, Database Systems, Parallel Computing, Linear Algebra, Design and Analysis of Algorithms

Experience

IMC Trading **June 2026 – September 2026**
Incoming Quantitative Trading Intern *Chicago, IL*

LinkedIn **June 2025 – September 2025**
Machine Learning Engineer Intern - Ads *Mountain View, CA*

- Engineered a **Dirichlet**-parameterizing deep CTR model that predicts full click-type probability distributions (replacing prior scalar pCTR) using **DCNv2** interaction towers, and isotonic calibration embeddings, enabling **Thompson Sampling** by outputting α, β parameters and **optimizing a digamma-based loss** to jointly model accidental, intentional, and no-click events
- Improved inference accuracy and **reduced loss by 17%** via architecture enhancements including vectorized murmur-hash input pipelines and single-pass isotonic calibration, validated in A/B tests to **increase annualized ad revenue by $1.2M+**
- Implemented **clipped inverse propensity weighting** in training to address selection bias, applied **isotonic calibration** to chargeability and click-type heads for improved probability alignment, and instrumented per-head ranking quality metrics to monitor **calibration and performance** across engagement, legacy, and website-visit objectives

IMC Trading **May 2025**
Launchpad - Quantitative Trading Cohort *Chicago, IL*

- Secured **1st place** out of 30 in IMC Trading's futures market-making competition by implementing dynamic bid-ask spread sizing using the **Avellaneda–Stoikov** model and data-feed pipeline monitoring to capture order-flow edge
- Engaged in intensive lectures and simulations covering **options pricing, futures mechanics**, market microstructure, and overall quantitative trading strategies, with hands-on applications in **risk management** and position sizing

Susquehanna International Group **April 2025**
Discovery Day - Quantitative Trading Cohort *Bala Cynwyd, PA*

- Achieved the **highest PnL** in the trading cohort of 40 by engineering a pandas-based batch processing pipeline to analyze **30,000+ BTC order book records** across multiple exchanges, identifying arbitrage opportunities and securing profit.

Projects

NU FinTech Club Trading Competition (GitHub) **Jun. 2025 – Present**

- Advancing a **C++ exchange simulator** to support dynamic market scenarios, including manual trading and multi-exchange arbitrage; researching current market structure to inform order book and participant design
- Engineered Python trading agents, including sporadic signal-based traders and participants placing information-rich large orders, to simulate complex market dynamics and test algorithm robustness in volatile exchange conditions

Texas Hold'em Poker Solver (GitHub) **December 2024 – May 2025**

- Developed a **Counterfactual Regret Minimization solver** to compute Nash Equilibria across over $\mathbf{10^{17}}$ **non-deterministic game states**, leveraging **ordinal bucketing** to reduce game tree analysis time by over **78%**
- Created an **open-source** research-focused C++ poker engine library, optimizing source code to **reduce average simulation runtime by 72.3%** by improving memory access patterns for **cache locality** and identifying bottlenecks

Honors and Awards

IMC Trading Market-Making Competition | *1st Place Overall*

USA Coding Olympiad | *Gold Division, Top 7% in Contestants*

Susquehanna International Group Arbitrage Competition | *1st Place Overall*

IMC Trading Low Latency Competition | *2nd Place Overall*

Northwestern University Algorithmic Trading Competition | *2nd Place Cryptocurrency Exchange*

American Invitational Mathematics Examination Qualifier (4x) | *Top 5% in the American Mathematics Competition*

Additional

Programming Languages: Python, C++, C, Golang, Rust, Java, TypeScript, Bash, x86 Assembly
Frameworks/Libraries: NumPy, TensorFlow, Pandas, PyTorch, scikit-learn, PyTest, PyBind, GTest, Node.js, Matplotlib
Infrastructure: UNIX, CUDA, Amazon Web Services, GCC, OpenMP, Nginx, Jenkins, Docker, Git, GitHub + Actions
Interests: Texas Hold'em Poker, Teamfight Tactics, League of Legends, Merge Tactics, Classical Music, Orchestral Conducting