Ethan Chen

machine learning, optimization, and geometry | 470-494-1588 | chenethan323@gmail.com

Education

Georgia Institute of Technology Atlanta, GA

Bachelor of Science in Mathematics, Bachelor of Science in Computer Science *Aug 2023 - May 2026*

- President and co-founder of GT Competitive Math, Co-President of GT Undergrad Math Advisory Committee
- **Undergraduate:** Probability Theory, Natural Language Processing, Graph Theory, Algorithms, Statistical Theory
- **Graduate:** Convex Optimization, Measure Theory, Differential Geometry, Graphical Models in ML, Statistical Machine Learning

Experience

Georgia Institute of Technology *Atlanta, GA*

Machine Learning Researcher *June 2025 – Present*

- Investigating algorithmic and theoretical foundations of diffusion models on general Riemannian manifolds, with an emphasis on applications to Lie groups, by employing advanced techniques from optimal transport and differential geometry.

Machine Learning Researcher *Feb 2025 – Present*

- Developing and implementing discrete diffusion models for structured data, including sequences and natural language, with applications to protein modeling
- Engineered novel predictor-corrector sampling strategies, inspired by k-Gillespie methods, to enhance convergence and generation quality.

Mathematics Researcher *May 2024 – Present*

- Advancing research on the Cartan–Hadamard conjecture in CAT(0) spaces by developing novel differential geometry techniques to analyze curvature bounds in non-smooth metric spaces, addressing fundamental challenges in geometric analysis.

NLP Researcher *Feb 2024 – Dec 2024*

- Engineered robust data pipelines for large-scale T5 model training, efficiently processing over 500,000 text pairs and incorporating custom semantic similarity metrics for enhanced model performance.
- Co-authored research submitted to EMNLP on optimizing transformer fine-tuning, achieving a 12% BLEU score improvement through novel attention mechanism modifications.

HyTech Racing (Formula SAE) Atlanta, GA

Optimization Lead *Jan 2025 – Present*

- Migrated MATLAB data pipeline to Python, implementing real-time telemetry validation, reducing processing errors by 18%
- Developed ML models for power distribution optimization, achieving 15% performance gain through ensemble gradient boosting techniques

Scale AI Remote

Artificial Intelligence Researcher *Feb 2024 – Present*

- Designed olympiad-level math problems focusing on combinatorial optimization and stochastic processes for LLM training.

Projects

Quantitative Portfolio Analytics Platform Dec 2024 – Present

Django, AWS, MySQL, Python

- Designed and developed a full-stack quantitative analytics platform leveraging Django (Python) and AWS (EC2, S3, RDS for MySQL), architected for robust, scalable ingestion and near real-time processing of over 1M daily financial data points.
- Engineered comprehensive backend systems featuring RESTful APIs for data retrieval and analytical functions, and optimized MySQL database schemas for efficient data warehousing, significantly improving query performance (35% reduction in analysis time).
- Implemented automated data ETL pipelines, managed deployment configurations on AWS EC2, and utilized Git for version control and collaborative development, adhering to best practices in software engineering.

Awards and Honors

AIME Qualifier (3x) (2021, 2022, 2023) — Putnam (2023, 2024) (27, 21) — 5th Place GT Trading Competition (2025)

Technical Skills and Interests

Programming Languages: Python, Java, SQL

Technologies: AWS (EC2, RDS, S3), Django, MySQL, MySQL Workbench, TensorFlow, PyTorch, NumPy, Scipy, Bitbucket, Git