Jiuru Lyu

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EDUCATION

B.S. in Applied Mathematics and Statistics, Minor in Computer Informatics   Aug 2022 – May 2026
Emory University, Emory College of Arts and Sciences   *Atlanta, GA*

- **Cumulative GPA**: 3.99/4.0, **Major GPA**: 4.0/4.0; Dean's List
- **Coursework**: Iterative Methods (Grad), Numerical Linear Algebra (Grad), Numerical Analysis (Grad), Real Analysis, Optimization Methods, Mathematical Statistics, Differential Equations, Graph Theory, Machine Learning, Deep Learning, Regression Analysis, Causal Inference, Data Structures & Algorithms, Database System
- **Research Interests**: Iterative Methods, Numerical Optimization, Mean-Field Games, Machine Learning

SKILLS AND INTERESTS

- **Skills**: LaTeX, MATLAB, Python, R, Java, PostgreSQL, HTML, CSS, JavaScript, TypeScript, Angular
- **Languages**: Mandarin Chinese (Fluent), English (Fluent), Spanish (Elementary)
- **Interests**: Specialty Coffee, Traveling, Photography, Hiking, Musicals, Mathematics Through Movement

RESEARCH EXPERIENCES

Research Assistant: Global Optimization   Oct 2023 – Present
Department of Mathematics, Emory University   *Atlanta, GA*

- Conducted independent research on Double Descent with Color Intermittent Diffusion (DD-CID) and other Global Optimization methods under the supervision of Dr. Manuela Manetta; to develop results into an honors thesis
- Implemented a log-barrier regularization and the continuation method to enhance the algorithm for finding Morse Potential problems with high-dimensionality; cross-validated outcomes against the Cambridge Database
- Applied the algorithm to COVID-19 modeling; recasted ODE constraints to an adjoint-based dual form for efficient optimization; improved the ODE solver by manually employing Crank-Nicolson method
- Utilized the land exploring nature of the algorithm to solving benchmark PINN problems, aiming to overcome the bottleneck of getting stuck at saddle points and inability to find global optimum solutions
- Explored ways to integrate derivative-free optimization techniques into the algorithm to enhance efficiency

Research Assistant: PDHG Algorithm for Non-Potential Mean-Field Games   Feb 2025 – Present
Department of Mathematics, Emory University   *Atlanta, GA*

- Conducted research on a PDHG solver for non-potential mean-field games supervised by Dr. Levon Nurbekyan
- Developed a general-purpose Python implementation of Primal-Dual Hybrid Gradient (PDHG) solver for non-potential Mean-Field Games (MFGs) with space-time discretization using sparse linear algebra package SciPy
- Assembled discrete operators and block matrices; engineered convergence diagnostics and invariants for MFG structure; accelerated the solver via iterative methods and matrix caching; parallelized the solver

Research Assistant: Spectral Graph Theory   Jan 2025 – Jul 2025
Department of Mathematics, Emory University   *Atlanta, GA*

- Studied the relationship between Spectral Graph Theory and ODEs under the guidance of Dr. Manuela Manetta
- Led weekly discussion sessions on papers related to spectral graph theory and their relationships with ODEs
- Implemented centrality and other Network Analysis pipelines for the Emory Mathematics Department faculty network; identified communities/bridges and summarized collaboration insights
- Compared symmetrization schemes for directed graphs and their impact on diffusion and ODE dynamics

AWARDS AND HONORS

Wilson Family Undergraduate Research Award   May 2025
Department of Mathematics, Emory University   *Atlanta, GA*

- Merit-based funding award chosen by a faculty committee to advance the Global Optimization research project

Emory Pathway Internship Funding   Jun 2024
Pathway Center, Emory University   *Atlanta GA*

- Received $3,000 Emory Pathway Internship Funding for outstanding internship experience at Baker Hughes

DataFest Competition Finalist   April 2024
American Statistical Association (ASA)   *Atlanta, GA*

- Analyzed real-life data from CourseKata Company on students' learning behavior using regression analysis
- Provided consulting advice on course and exam format to instructors to facilitate learning efficiency

Phi Eta Sigma Honor Society   Feb 2023
Emory Chapter of Phi Eta Sigma National Honor Society   *Atlanta, GA*

- National-wide freshman honor society; invitation based on scholastic achievements during freshman year

TEACHING/MENTORING EXPERIENCES

Academic Success, Emory Office of Undergraduate Education   Sep 2023 – Present
Peer Tutor in Mathematics   *Atlanta, GA*

- Provided 1-to-1 tutoring services for Calculus, Multivariable Calculus, and Linear Algebra
- Helped 30+ students prepare for exams and improve grades; 200+ hours committed

Emory Department of Data and Decision Sciences   Aug 2024 – Dec 2024
Teaching Assistant for DATASCI 151 (Scientific Computing with Python)   *Atlanta, GA*

- Held weekly 1-hour office hours to help students clarify confusions and prepare for homework
- Designed homework assignment connecting SQL with Python based on real-world data extracted from Kaggle

INTERNSHIPS

Baker Hughes   Jun 2024 – Aug 2024
Digital Technology Intern   *Shanghai, China*

- Applied Agile development workflows to a valve lifecycle management system (VKAM); implemented soft-delete and advanced-filter features; improved customer report UI designs for better user experience
- Wrote and executed 100+ regression test cases, gained hands-on experience in database validation; discovered 30+ bugs or outdated tests; helped maintain consistent test case writing styles

Algory Capital   Jan 2023 – Aug 2024
Quantitative Investment Analyst   *Atlanta, GA*

- Oversaw risk assessment of Algory Capital, a student-managed fund with $100,000 AUM; implemented Monte Carlo Simulations to calculate Conditional Value at Risk (cVaR); integrated insights into a grid search algorithm
- Developed advanced trading strategies (e.g., mean reversion pair trading and ADF tests); performed sentiment analysis using Reddit API and web-scraping tools to inform portfolio management decisions

SELECTED INFORMAL PRESENTATIONS

- *An Analysis on Faculty Connection Network*, Spectral Graph Theory Project   Apr 25, 2025
- *Global Optimization of Morse-Cluster Potential*, Global Optimization Project   Feb 7, 2025
- *Numerical Optimization*, Emory Math Directed Reading Program   Dec 4, 2025