Amiri Hayes

Aspiring PhD Candidate

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> **Research Statement:** I'm a student interested in developing mathematical models using ideas from machine learning, stochastic processes, and graph theory to analyze and address social, technical & environmental issues.

EDUCATION:

New Jersey Institute of Technology Honors College   **2023 - 2026 | GPA: 3.75/4**
B.S. Applied Mathematics & M.S. Artificial Intelligence   Expected Magna Cum Laude

Selected Coursework: Machine Learning, Stochastic Simulation, Reinforcement Learning, Deep Learning, Linear Algebra, Natural Language Processing, Multivariate Distributions, Mathematical Analysis, Mathematical Modeling, Advanced Calculus, Complex Variables, Partial Differential Equations, Numerical Methods, Math Capstone I & II

Rowan College of South Jersey - Gloucester   **2021 - 2023**
A.S. Physics, A.S. Mathematics, A.S. Computer Science   GPA: 3.95/4

PUBLICATIONS & POSTERS:

[1] POSTER: **Filtering Attention Heads through Automable Interpretability Experiments |** *Amiri Hayes*, Belinda Li, Jacob Andreas, MIT Summer Research Program 2025, [link]

[2] POSTER: **Deep Generative Approaches to Network Science for Social System Simulations |** Siying Ding, Mia Greene, *Amiri Hayes*, Mariia Sinkevich, Joint Mathematics Meeting 2025, [link]

[3] PUBLICATION: **ASPIRE: A Model for Quantitatively Rating Transportation Methods in U.S. Cities |** *Amiri Hayes*, IEEE XPlore 2024, [link]

[4] PUBLICATION: **Mechanical-Based Design for Airfoil Structural Morphing |** Mattia Butera, Amanda Butler, *Amiri Hayes*, Evan Schaffer, Niti Sinha, Jay Kapasiawala, Prosenjit Bagchi, IEEE XPlore 2022, [link]

RESEARCH PROJECTS:

LINGO | Language & Intelligence Group, MIT [REU]   **Cambridge, MA**
MACHINE LEARNING RESEARCHER, JUN 2025 - AUG 2025   Poster Link, Report Link
Advisors: Jacob Andreas, Belinda Li

- Collaborated with MIT researchers to design weekly research goals, resulting in a preprint submission for [maybe?]
- Engineered an interpretability library for filtering attention heads by functionality in large language models (LLM)
- Deployed & validated experiments on a computer cluster to ensure robust, reproducible analysis on linguistic tasks

IPAM | Institute for Pure & Applied Mathematics, UCLA [REU]   **Los Angeles, CA**
APPLIED MATHEMATICS RESEARCHER, JUN 2024 - AUG 2024   Poster Link, Report Link
Advisors: Susana Serna, Yuanzhou Adrian Chen, Raffaele Vardavas

- Directed group of undergrads as project manager on nine-week research project at UCLA for industry sponRAND
- Investigated generative machine learning models to create large-scale graph datasets for epidemiological simulations
- Designed network fusion techniques to impute missing vaccination data by integrating & aligning social networks

Center for Applied Mathematics & Statistics, NJIT   **Newark, NJ**
MACHINE LEARNING RESEARCHER, SEP 2022 - JAN 2024   Poster Link, Publication Link
Advisors: Eliza Michalopoulou, Tufajjal Hossain

- Submitted independent research rating transportation mode viabilities for any U.S. city in Python for publication
- Implemented data collection pipeline & custom mathematical model, educated myself on ML for frequency data

-   Related Certifications: Stanford Deep Learning Specialization, Google Data Analytics, AWS Cloud Practitioner

Governor's School Of Engineering & Technology, Rutgers   New Brunswick, NJ
STUDENT RESEARCHER, JUN 2022 - AUG 2022   [Publication Link](#)
Advisors: Prosenjit Bagchi, Jay Kapasiawala

-   Completed four-week research project at Rutgers University proving the efficiency of amorphous aircraft design
-   Developed scripts in MATLAB for data collection and to calculate fuel efficiency and aerodynamic coefficients
-   Accepted to MIT and Rutgers symposiums to present research and demonstrate our prototype and simulations

WORK EXPERIENCE:

UPS | United Parcel Service   **Parsippany, NJ**
SOFTWARE ENGINEERING INTERN, NOV 2023 - APR 2024

-   Collaborated with many developers in globally distributed team executing UPS business rules in Java and Eclipse
-   Wrote code utilizing a decision governance framework to outline & test business rules before moving to production
-   Introduced over fifty new business rules to the system & improved data integrity, reducing processing delays by 6%

LEADERSHIP EXPERIENCE:

VICE PRESIDENT & COFOUNDER: CFCIC INVESTMENT CLUB | 2020 - Current | I help lead a 7 person club to manage an investment portfolio with over $10k pooled in assets. I continually analyze stock trends & direct all technological efforts.

TEAM LEAD & MENTOR: NEW JERSEY GOVERNOR'S STEM SCHOLAR | 2024 - 2025 | I mentored a group of 6 high school students to ideate & develop a prototype of a machine that utilizes computer vision to separate and sort garbage.

TREASURER: RCSJ BLACK STUDENT UNION | 2022 - 2023 | I managed the organization's budget, meticulously tracking income and expenses to ensure we could successfully fund our cultural programming and community-building events.

PROGRAMMING SKILLS:

Languages	Python, Javascript, C++/C, SQL, R, Java
Machine Learning	PyTorch, TorchGeometric, TorchVision, Tensorflow, Pandas, Numpy, SciKit, Transformers, NLTK
Web Development	React, HTML/CSS, NodeJS, ExpressJS, Django, Flutter, Bootstrap, Matplotlib, Netlify
Data Engineering	AWS [S3, Lambda, RDS, EC2, ...], Apache [Hadoop, Spark], Google BigQuery, Docker, Git, Bash

AWARDS & HONORS:

Research:	-	NJIT Applied Math Kawhulia Award Recipient for Research in Mathematics (2024 - 2025)
	-	New Jersey Governor's STEM Scholar and Mentorship Lead (2024 - 2025)
Academic:	-	$192,000 Merit-Based Full Academic & Housing Scholarship, NJIT Honors College (2023-2027)
	-	STEM Department Representative at Class of 2023 RCSJ Commencement
Hackathon:	-	Columbia DivHacks 2023, Best Beginner Project	PennApps 2023, Top 20 Project

   * Note of Graduate Fellowships Applied for: NSF Graduate Research Fellowship (GRFP) | DOE CSGF | GEM Fellowship

CONFERENCES:

FIELD OF DREAMS 2024, ATLANTA	JOINT MATHEMATICS MEETING 2025, SEATTLE
MIT IEEE URTC 2022 & 2024, CAMBRIDGE	NJIT DANA KNOX SHOWCASE 2024, NEWARK