Abdullah Ahmed

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RESEARCH INTERESTS

Numerical PDEs in modeling and simulation, SciML, Probabilistic ML, Mathematical Formalization for ML, Foundational PDE Models, PDEs and Geometry.

EDUCATION

University of Maryland (College Park), August 2024–Present — Maryland, United States
PhD. in Mathematics, Second Year

Lahore University of Management Sciences, August 2020 – May 2024 — Lahore, Pakistan
Bachelor of Science in Mathematics, Minor in Physics — *CGPA: 3.98/4.00*

RESEARCH, PROJECTS, AND TEACHING EXPERIENCE

Fraud Detection for JPMorgan Chase Transaction Data — September 2025-November 2025
Data Science Bootcamp — *The Erdos Institute*
- Built a lightweight surrogate fraud detection model on JPMorgan transaction data to act as a live pre-processing filter on incoming transactions to pass on only high risk cases to a human agent. Increased efficiency of the system up to an order of magnitude. (**GitHub**)

Graduate Research Assistant — January 2025 - August 2025
Supervisor: Dr. Maria Cameron, supported by the ONR MURI progam — *University of Maryland, College Park*
- Investigating the effect of heterogeneity in coupled networks of Stuart Landau oscillators in order to develop the mathematical theory for building sensitive sensors (pre-print incoming).

Graduate Teaching Assistant — Fall 2024/2025
MATH 140: Calculus I and MATH 206: Introduction to Matlab — *University of Maryland, College Park*
- Graded worksheets, quizzes, and exams. Also held discussion sessions along with office hours weekly.

Head Teaching Assistant — Fall 2023
MATH 309: Introduction to Analysis II and MATH 204: Introduction to Formal Mathematics — *LUMS*
- Graded all assignments/quizzes, and held tutorials along with office hours.

Math Circles Instructor and Consultant — 2023-2024
Lahore University of Management Sciences
- Conducted math circles in the underprivileged schools of Gilgit Baltistan in the Summer Fiesta 2023. (**Article**)

ACADEMIC DISTINCTIONS

2024 Rhodes Scholar Finalist — October 2023
Rhodes Trust, Oxford University — *Lahore, Pakistan*
- Was one of 10 students from all of Pakistan who qualified for the final interview of the 2024 Rhodes Scholarship.

Graduate Fellowship — August 2024–May 2026
University of Maryland, College Park — *Maryland, United States*
- Was awarded a Graduate Fellowship by UMD for the first two years of the Mathematics PhD program.

Dean's Honor List Scholarship — August 2021 – May 2024
Lahore University of Management Sciences — *Lahore, Pakistan*
- Placed 3rd overall after Junior Year, and qualified for a 100% merit scholarship.

International Olympiad Teams — 2019 – 2020
Pakistan
- Selected for the Asian-Pacific Math Olympiad, Iranian Geometry Olympiad, and reserve 2020 International Math Olympiad Pakistan team.

UNDERGRADUATE RESEARCH PROJECTS/PRESENTATIONS (CAN ALSO BE FOUND IN WEBSITE ABOVE)

Senior Thesis on Symplectic Geometry   2023 – 2024
Supervisor: Dr. Shaheen Nazir   *Lahore University of Management Sciences*
- Introduced fundamentals of Symplectic Geometry and its connections to Toric Varieties. (**Thesis Report**)

DRP on Manifold Theory and De Rham Cohmology   Summer 2023
Supervisor: Dr. Haniya Azam and Dr. Shaheen Nazir   *Lahore University of Management Sciences*
- Read *"An Introduction to Manifolds"* by Loring W.Tu, documenting daily for 3 months. (**74-page Book Survey**)

Course Project and Presentation on Elliptic Curves   Spring 2023
MATH 426: Elements of Algebraic Geometry   *Lahore University of Management Sciences*
- Motivated the topological and algebraic structure of Elliptic Curves through the Chord-Tangent Law and Toric parameterization. Was part of a group report on Complex Projective Cubic Plane Curves. (**PDF Section 6 & 7**)

Course Project and Presentation on Knot Theory   Spring 2023
MATH 407: General Topology   *Lahore University of Management Sciences*
- Introduced and proved foundational/classical results in Knot Theory. (**Handwritten Project Report**)

GRADUATE COURSES + QUALIFIERS

UMD Real + Complex Analysis Qualifier (Spring 2025): 56/60
UMD Algebra Qualifier (Spring 2025): 59/60
MATH 4013 (LUMS): Differential Geometry (IM Masters Course) (Fall 2023): A
MATH 426 (LUMS): Computational Algebra and Algebraic Geometry (Spring 2023): A+
MATH 407 (LUMS): General Topology (Spring 2023): A+
PHY 404 (LUMS): Relativistic Electrodynamics (Fall 2022): A
PHY 412 (LUMS): Advanced Quantum Mechanics (Fall 2022): A-
MATH 325 (LUMS): Convex Optimisation (Spring 2022): A

SEMINARS, CONFERENCES, AND WORKSHOPS

Contemporary Issues and Future Opportunities in Applied Mathematics (Webpage)
October 2025, Brin Mathematics Research Center, University of Maryland College Park

Statistical and Computational Challenges in Probabilistic Scientific Machine Learning (Webpage)
June 2025, Institute for Mathematical and Statistical Innovation, University of Chicago

Sayas Numerics Day 2025 (Webpage)
May 2025, University of Delaware

Perspectives in Modern Mathematics: The Fifth Duke Mathematical Journal Conference (Webpage)
April 2025, Duke University

Emergent Behavior in Complex Systems of Interacting Agents (Webpage)
March 2025, Institute for Mathematical and Statistical Innovation, University of Chicago
- Presented poster on "Dynamics of a feed-forward network of Stuart-Landau oscillators." (**Poster**)

42nd Southeastern-Atlantic Regional Conference on Differential Equations (Webpage)
November 2024, West Virginia University

Fall Fourier Talks and Workshop on Harmonic Analysis and Machine Learning (Webpage)
October 2024, University of Maryland, College Park

CIMPA Research School on Algebra and Algebraic Geometry for Applications (Webpage)
March 2024, Lahore University of Management Sciences

John Conway Spirited Seminar Series (Webpage)
2021 - 2024, Lahore University of Management Sciences

SKILLS

Languages: Possess proficiency in Python, C++, MATLAB, and LaTeX.

Libraries: Possess proficiency in Pandas, Numpy, scikit-learn, neuralops, PyTorch.