MUHAMMAD ATIF ZAHEER

Department of Mathematics,
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Research Interests

Analytic number theory: moments of L-functions, zero-free regions, and pair correlation of zeros of (derivatives of completed) L-functions

Arithmetic statistics: field counting with congruence conditions on discriminant

Education

- Ph.D. in Mathematics, Penn State University, 08/24 - 05/29 (expected)
  Advisor: Amita Malik
- M.S. in Mathematics, Lahore University of Management Sciences, 09/22 - 05/24
  Advisor: Emanuel Carneiro
  Thesis Title: *On Pair Correlation Conjecture and Bounds for the Averages of Montgomery's F-function*
- B.S. in Mathematics, National University of Sciences and Technology, 08/18 - 05/22

Awards and Honors

- Jack and Eleanor Pettit Scholarship in Science, Eberly College of Science, Penn State University, 2024
- National Management Foundation Gold Medal, Lahore University of Management Sciences, 2024
- Dean's Honour List, Lahore University of Management Sciences, 2024
- Full Merit Scholarship, Lahore University of Management Sciences, 2022 - 2024
- High Achiever Award, National University of Sciences and Technology, 2022
- First Place - Pakistan Calculus Contest, IBA Sukkur University, 2022
- Second Place - National Undergraduate Mathematics Contest, Punjab University and National Mathematical Society of Pakistan, 2021
- Honor Roll, National University of Sciences and Technology, 2019

Papers and Preprints

- *Some Series Related to Extended Riemann Hypothesis for Dedekind Zeta Functions*, preprint, arXiv:2512.19761, 2025

Teaching

Instructor, Penn State University

- Math 41: Trigonometry and Analytic Geometry, Fall 2026
- Math 26: Plane Trigonometry, Fall 2026
- Math 26: Plane Trigonometry, Spring 2026
- Math 26: Plane Trigonometry, Fall 2025

Teaching Assistant, Penn State University

- Math 26: Plane Trigonometry, Summer 2025
- Math 220: Matrices, Summer 2025
- Math 441: Matrix Algebra, Spring 2025
- Math 441: Matrix Algebra, Fall 2024

Teaching Assistant, Lahore University of Management Sciences

- Math 320: Algebra I, Spring 2024
- Math 230: Probability, Fall 2023
- Math 120: Linear Algebra, Summer 2023
- Math 205: Introduction to Analysis I, Spring 2023
- Math 101: Calculus I, Fall 2022

Talks

- *An Unconditional Form of Farmer, Gonek, and Lee's Theorem on Pair Correlation of Zeros of* $\xi'(s)$, PANTS XLI, Georgia Tech, October 2026
- *On a Theorem of Farmer, Gonek, and Lee on Pair Correlation of Zeros of* $\xi'(s)$, ANT'eater, UC Irvine, August 2026
- *Littlewood's Proof of Prime Number Theorem and the Theory of Almost Periodic Functions*, Number Theory Student Seminar, Penn State University, March 2026
- 10^{12} *Equivalent Statements of Riemann Hypothesis*, Number Theory Student Seminar, Penn State University, November 2025
- *On Pair Correlation Conjecture and Bounds for the Averages of Montgomery's F-function*, Thesis Defense, Lahore University of Management Sciences, May 2024
- *The Pair Correlation of the Zeros of the Riemann Zeta Function*, Graduate Student Seminar, Lahore University of Management Sciences, November 2023
- *Google Page Rank Algorithm*, Guest lecture for Math 120, Lahore University of Management Sciences, June 2023

Conferences and Workshops Attended

- *PANTS XLI*, Georgia Tech, Atlanta, October 2026
- *ANT'eater*, UC Irvine, August 2026

- *Arithmetic Geometry at UNT 2*, University of North Texas, Denton, August 2026
- *International Congress of Mathematicians (ICM) 2026*, Philadelphia, July 2026
- *MPS Conference on Universal Statistics in Number Theory*, Simons Foundation, New York, September 2025
- *Midwest Arithmetic Geometry and Number Theory Series* (MAGNTS), Ohio State University, March 2025
- *The Legacy of John Tate, and Beyond*, Harvard University, March 2025

Supervision

- Varnika Yadav, Kestian Apollos Orsetti, Directed Reading Project on Prime Number Theorem, Penn State University, Spring 2026

Professional Duties and Outreach

- Organizer, Number Theory Student Seminar, Penn State University, Fall 2025 & Spring 2026
- Facilitator, Bootcamp session on abstract algebra qualifying exam, Penn State University, August 2025
- Organizer, Salam Sessions for LUMS Students' Mathematical Society, 2023
- Instructor, Math Circles - LUMS STEM Bootcamp, Government Boys High School (Sukamaidan) Skardu, Gilgit Baltistan, Summer 2023

Miscellaneous

- Mentioned in the preface of fourth editions of texts "Analysis I" and "Analysis II" by Terence Tao
- Accepted and offered full funding for IAS/PCMI Graduate Summer School, July 2024 (did not attend)
- Accepted and offered full funding for Duke Number Theory School, May 2026 (did not attend)