Dr. Hamna Asad

Assistant Professor
Applied Mathematics
Institute of Energy & Environmental Engineering

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Profile:

Dr. Hamna Asad is serving as an Assistant Professor at the Institute of Energy and Environmental Engineering, University of the Punjab, and is dedicated to advancing mathematical research and academic excellence. She earned her Ph.D in Applied Mathematics from the University of the Punjab in 2024, following an M.Phil in Mathematics from the same institution in 2020, where she secured the second position. Before that, she completed her BS in Mathematics from the University of the Punjab in 2018, achieving the third position. As an emerging scholar in the field of General Relativity and Cosmology, she has made substantial contributions through her publication record, having authored/co-authored 17 impact factor research articles in reputable international journals. Her work has focused on Gravastars and Spatially Hyperbolic and Non-Hyperbolic Fluids in Modified Gravity during her Ph.D, addressing fundamental challenges in the respective field. Alongside her research, she has taught multiple subjects at the BS level at different institutions (FAST NUCES, UMT, PU). She is dedicated to fostering an engaging and intellectually stimulating classroom environment. Her ongoing work continues to explore celestial objects with several projects in progress that promise to extend the boundaries of current mathematical understanding. Subsequently, her academic journey and professional experience reflect a deep commitment to both teaching and scholarly growth within the university.

Education:

Ph.D. Mathematics, 2020–2024

- Major: Applied Mathematics
- Department of Mathematics, University of the Punjab, Pakistan
- PhD Course Work: CGPA: 3.73/4.00 (1st Division)
- PhD Comprehensive: CGPA: 3.70/4.00 (1st Division)

PhD Thesis: Gravatars and Spatially Hyperbolic and Non-Hyperbolic Fluids in Modified Gravity

M.Phil. Mathematics, 2018–2020

- Major: Applied Mathematics
- Department of Mathematics, University of the Punjab, Pakistan
- CGPA: 3.94/4.00 (1st Division)

M.Phil. Thesis: Analysis of Self-gravitating Objects with Effective Matter Configuration

B.S Mathematics, 2014–2018

- Department of Mathematics, University of the Punjab, Pakistan
- CGPA: 3.87/4.00 (1st Division)

Intermediate, 2012–2014

- Faculty of Science Major: Pre-Engineering
- Kinnaird College for Women, Lahore
- Marks: 931/1100 (1st Division)

Matriculation, Major: Science, 2010-2012

- Divisional Public School Model Town, Lahore
- Marks: 982/1050 (1st Division)

Practical Exposure:

- Teaching Faculty Member at the University of Management and Technology (UMT), Lahore, Pakistan.
- Teaching Faculty Member at FAST NUCES, Lahore, Pakistan.
- Teaching Faculty Member at the Institute of Business and Information Technology (IBIT), Punjab University Quaid-e-Azam Campus, Lahore.
- Teaching Faculty Member at the Institute of Applied Psychology (IAP), Punjab University Quaid-e-Azam Campus, Lahore.
- Teaching Faculty Member at the College of Statistical Sciences, Punjab University Quaid-e-Azam Campus, Lahore.
- Teaching Faculty Member at the Institute of Social and Cultural Sciences, Department of Public Health, Punjab University Quaid-e-Azam Campus, Lahore.
- Teaching Faculty Member at the Institute of Education and Research, Department of Public Health, Punjab University Quaid-e-Azam Campus, Lahore.
- Teaching Faculty Member at Lahore Leads University Wapda Town, Lahore, Pakistan.

Awards, Scholarships, and Honors:

- Secured 3rd position in BS 2014-2018, University of the Punjab, Pakistan
- Secured 2nd position in M.Phil 2018-2020, University of the Punjab, Pakistan
- DDPC Merit Scholarship in M.Phil 2018-2020, by Department of Mathematics, University of the Punjab, Pakistan
- DDPC Merit Scholarship in BS 2014-2018, by Department of Mathematics, University of the Punjab, Pakistan

Academic and Research Interests:

- Geometry
- Calculus
- Discrete Mathematics
- Linear Algebra

- Differential Equation
- Statistics and Probability
- General Theory of Relativity
- Cosmology

Computer and Software Skills:

- Mathematica
- Maple
- WinEdt
- MS Office (Word, PowerPoint, Excel)
- Photo & Video Editing
- SPSS
- AMOS

Talks Delivered at National/International Level:

1. International Symposium on Extended Theory of Gravity and Stellar Evolution, 2024 at UMT, Lahore, Pakistan.
2. Influence of Charge on Dynamics of Dissipative Fluid Configuration, Department of Mathematics, University of the Punjab, 2022.
3. Analysis of Fluid Distributions through Static Solutions, Department of Mathematics, University of the Punjab, 2022.
4. Construction of Vacuum Compact Objects, Department of Mathematics, University of the Punjab, 2021.
5. 4th PU International Conference on Gravitation and Cosmology, November 2021.
6. Career Development Workshop for Women in Physics, November 2021.
7. Analysis of Self-gravitating Objects with Effective Matter Configuration, M.Phil defense, Department of Mathematics, University of the Punjab, August 2019.
8. 1st PU International Conference on Gravitation and Cosmology, January 2019.

List of Journal Publications (Indexed by ISI-JCR):

- M. Yousaf, **H. Asad(C.A),** A. Rehman, Dynamical Evolution of Self-gravitating Compact Fluid with Hyperbolic Corrections, Physics of the Dark Universe, **48,** 101888(2025), (Elsevier).
- M. Yousaf, **H. Asad(C.A),** Impact of Modified Chaplygin Gas on Electrically Charged Thin-Shell Wormhole Models, Physics of the Dark Universe, **48,** 101841(2025), (Elsevier).
- Z. Yousaf, **H. Asad**, Mansoor Alshehri, T. Suzuki,, and M. Z. Bhatti. Electromagnetic field and spatially hyperbolical spacetime models. International Journal of Geometric Methods in Modern Physics, 2550145 (2025).
- Z. Yousaf, M. Z. Bhatti, **H. Asad**, Y. Hashimoto, K. Bamba. Orthogonal splitting in degenerate higher-order scalar-tensor theories. International Journal of Geometric Methods in Modern Physics, Accepted (2025).

- M. Yousaf, **H. Asad(C.A),** B. Almutairi, S. Hasan, A. S. Khan. Fuzzy black hole models in f(G) Gravity. Physica Scripta, 99, 115270(2024).
- **H. Asad**, M. Yousaf, Bander Almutairi, Laiba Zahid, A. S. Khan. Evolution of Non-Static Fluid for Irreversible Gravitational Radiation in Palatini *F(R*) Gravity. Physics of the Dark Universe, 46, 101666(2024).
- Z. Yousaf, M.Z. Bhatti, **H. Asad,** Analytical models of hyperbolical gravitational sources. International Journal of Modern Physics D, 32, 2350089(2023).
- Z. Yousaf, **H. Asad,** B. Almutairi, A. Malik, Electromagnetic Effects on Anisotropic Expansion-Free Fluid Content. Communications in Theoretical Physics, 75, 105202(2023).
- **H. Asad**, Z. Yousaf, Study of anisotropic fluid distributed hyperbolically in f(R, T, Q) gravity. Universe, 8, 630(2022).
- Z. Yousaf, M.Z. Bhatti, **H. Asad,** Electromagnetic effects on cylindrical gravastar-like strings in
    - f(R, T, $R\sigma\eta T^{\sigma\eta}$) gravity. International Journal of Geometric Methods in Modern Physics, 19, 2250070(2022).
- Z. Yousaf, M.Z. Bhatti, **H. Asad,** Matter–curvature gravity modification and the formation of cylindrical isotropic systems. Pramana, 96, 1(2022).
- Z. Yousaf, M.Z. Bhatti, **H. Asad,** Consequences of electric charge on anisotropic hyperbolically symmetric static spacetime. Physica Scripta, 97, 055304(2022).
- Z. Yousaf, G. G. L. Nashed, M.Z. Bhatti, **H. Asad,** Significance of Charge on the Dynamics of Hyperbolically Distributed Fluids. Universe, 8, 337(2022).
- Z. Yousaf, M.Z. Bhatti, **H. Asad,** Hyperbolically symmetric sources in f(R, T) gravity. Annals of Physics, 437, 168753(2022).
- Z. Yousaf, M.Z. Bhatti, M. Khlopov, **H. Asad,** A comprehensive analysis of hyperbolical fluids in modified gravity. Entropy, 24, 150(2022).
- Z. Yousaf, M. Khlopov, M.Z. Bhatti, **H. Asad,** Hyperbolically symmetric static charged cosmological fluid models. Monthly Notices of the Royal Astronomical Society, 510, 4100(2022).
- Z. Yousaf, M.Z. Bhatti, **H. Asad,** Gravastars in f (R, T, $R\mu\nu T^{\mu\nu}$) gravity Physics of the Dark Universe, 28, 100527(2020).