Dr. Muhammad Asif
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EDUCATION:

Degree Obtained	*Institution*
PhD in Mathematics	**Department of Mathematics, University of Peshawar**
MPhil Mathematics	**Department of Mathematics, University of Peshawar**
M.Sc Mathematics	**Department of Mathematics, University of Peshawar**
B.Sc (MathA &Maths B)	**University of Peshawar**
F.Sc (Pre-Eng)	**BISE Peshawar**
SSC (Science)	**BISE Peshawar**

EXPERIENCE (Teaching and Research):

(i) (19-11-2025 to till date) **Associate Professor (BPS-20)**
Department of Mathematics,
University of Peshawar, Pakistan

(ii) (01-09-2014 to 18-11-2025) **Assistant Professor (BPS-19)**
Department of Mathematics,
University of Peshawar, Pakistan

(iii) (26-10-2009 to 31-08-2014) **Lecturer (BPS-18)**
Department of Mathematics,
University of Peshawar, Pakistan

(iv)

- 17 years of Teaching and Research Experience at University Level.
- 4 Years' Experience as Staff Proctor, University of Peshawar.
- 2 Years' Experience as BS- Program Coordinator, Department of Mathematics, University of Peshawar.
- Worked as Departmental Focal person for BS, MPhil and PhD SAR (2021-24).
- Worked as Focal Person for Prime Minister Laptop Scheme.
- Working as Secretary for the Committee on Curriculum Revision.
- Working as Co-opted member of Departmental Board of Studies.
- Working as member of the Admission Committee, Semester Examination Committee, Discipline Committee, Purchase committee.
- Working as member of the Advanced Studies and Research Board Sub-Committee for the Faculty of Numerical and Physical Sciences.

Research Interest

- **Qualitative Analysis of Differential Equations**
  Investigating the theoretical aspects such as existence, uniqueness, and stability of solutions to various types of differential equations.
- **Numerical Solutions of Classical and Fractional Differential and Integral Equations**
  Developing and implementing computational techniques such as Meshless and Haar wavelets collocation methods to solve both integer- and fractional-order differential and integral equations.
- **Numerical Simulation of Classical and Fractional Interface Problems**
  Solving elliptic, parabolic, and hyperbolic interface problems in both lower and higher dimensions, with special attention to discontinuities and singularities using Meshless and Haar wavelets collocation methods.
- **Numerical Modeling and Analysis of Infectious Disease Models**
  Formulating, simulating, and analyzing mathematical models of infectious disease transmission using deterministic and numerical approaches.
- **Application of Neural Networks (PINNs & ANNs)**
  Utilizing Physics-Informed Neural Networks (PINNs) and Artificial Neural Networks (ANNs) for solving ordinary and partial differential equations, as well as infectious disease models and interface problems.

(A) **Research Grants:**

1. Higher education commission of Pakistan

   (NRPU: reference # HEC/R&D/RGA/NRPU/2025/86526) (Submitted).

   .
2. Pakistan Science Foundation Islamabad, Competitive research Programme (CRP)
   (Ref:: PSF/CRP/8/ 1263/ CP-3-2025-2001-ZNN4) (Submitted).

(B) Supervisory Experience:

MPhil Scholar Supervision:

1. Rabia Bibi (completed)
2. Samiah Anam(completed)
3. Muhammad Adil(completed)
4. Faisal Bilal (completed)
5. Umer Farooq (completed)
6. Naveed Akhter (completed)
7. Shabnam (completed)
8. Fatima (completed)
9. Tabassum (completed)
10. Farhan (completed)
11. Maria Yousaf (completed)
12. Haider Zaman (completed)
13. Ruqia Bibi (completed)
14. Jawairia Bibi (completed)
15. Afsha Haleem (completed)
16. Sadaf Gul (completed)
17. Amjad Ali (completed)
18. Akhonzada Muhammad Saad (in progress)
19. Haleem ullah (in progress)
20. Syda Khush Bakht (in progress)
21. Habibullah (in progress)
22. Fazli Azeem (in progress)
23. Safia (in progress)
24. Hina (in progress)
25. Osama
26. Abid Sohail
27. Uzair Ahmad

PhD Scholar Supervision

1. Gul e Rana (completed)
2. Muhammad Faheem (completed)
3. Khwaja Shamsul Haq (completed)
4. Faisal Bilal (completed)
5. Naveed Khan (completed)
6. Faheemullah (in progress)
7. Mehran Khan (in progress)
8. Dawood Shah (in progress)

Thesis Reviewed:

1. Title: Development and analysis of a multidimensional chaotic map based secure image encryption algorithm, by Farzana Yousaf, University of Karachi, Pakistan.
2. Title: Analysis of Convex-type Coupled Hadamard q-Fractional Differential Equations with Convex-type Integral Boundary Conditions, by Laiba Nawaz, Qurtuba University Peshawar.
3. Title: Global dynamics and Impact of Gaussian noise intensity on the stochastic epidemic model with local fractional derivative, By Areeba Azam, University of Karachi.
4. Ttle: A hybrid method for nonlinear differential equations involving tempered fractional derivatives, By Wajeeha Farooq, University of Karachi.
5. Title: Nonlinear dynamical system for economic growth: stability analysis and simulations, By Noor-ul-Ain, University of Karachi.
6. Title: Distance Properties of Commuting Graphs over Finite Non-abelian Groups, By Husna, Kohat University of Science and Technology, Kohat.
7. Title: Non-associative semihypergroups characterized by and their neutrosophic ideals, By Hamid Ayub, by Sabir Nawaz, Kohat University of Science and Technology, Kohat.
8. Title: A Haar wavelet collocation method for black-scholes option model, By Muhammad Riaz, University of Swabi.
9. A Haar wavelet collocation method for linear and nonlinear Schordinger equation, By Muhammad Ubaid Khan, University of Swabi.
10. Title: A novel unit logistic exponential distribution with properties and applications, By Rabia Mumtaz, by Sabir Nawaz, Kohat University of Science and Technology, Kohat.
11. Title: Investigation of perista
12. ltic flow of a Sutterby fluid in a curved channel considering the effect of heat generation and chemical reaction under slip conditions, By Warda Maham, Shaheed Benazir Bhutto, Women University, Peshawar.
13. Title: The solution of Bending of Beams problems by fuzzy Laplace Transform method using Hukuhara-differentiability with fuzzy boundary conditions, By Ms. Rabia Naheed, Shaheed Benazir Bhutto, Women University Peshawar.

14. Title: Hybrid Teaching Learning Based Optimization Method with Multi Search Operators for Global Optimization, by Sabir Nawaz, Kohat University of Science and Technology, Kohat.
15. Title: Thin film flow of the Oldroyed-B Fluid with bio-convection and activation energy, By Farhad Ahmad, City University of Science and Technology, Peshawar.
16. Title: A hybrid implementation of differential Evolution strategies for global optimization, By EID Nawaz, Kohat University of Science and Technology Kohat.

List of Publications:

1. Naveed Khan, **Muhammad Asif**, Muhamamd Ahsan, Muhammad Nisar, High-Order Haar Wavelet Collocation Method for Singularly Perturbed Delay Differential Equations with Fast-Slow Dynamics, Journal of Applied Mathematics and Informatics, 2026, 44, https://doi.org/10.14317/jami.2026.xxx .
2. Nadeem Haider, **Muhammad Asif**, Naveed Ullah, Muhammad Adil, Zeeshan Ali, Ioan-Lucian Popa, Numerical Simulation of Hyperbolic Problems with Interface Discontinuities via Multi-Resolution Collocation Method, Math. Comput. Appl., 2026, 31, 197, https://doi.org/10.3390/mca31050197.
3. Naveed Khan, **Muhammad Asif**, Muhammad Ahsan, Naveed Ullah, Ioan-Lucian Popa, A Robust High-Order Haar Wavelet Collocation Method for Linear and Nonlinear Delay Differential Equations: Theoretical Analysis and Numerical Validation, Math. Comput. Appl., 2026, 31, 162, https://doi.org/10.3390/mca31040162.
4. **Muhammad Asif**, Ruqia Khan, Mehnaz Shakeel, Ioan-Lucian Popa: Accurate Treatment of Solution and Flux Discontinuities in 2D Time-Dependent Interface Problems via Meshless Method, Math. Comput. Appl., 2026, 31, 156, https://doi.org/10.3390/mca31040156.
5. Faisal Bilal, **Muhammad Asif**, Mehnaz Shakeel, Ioan- Lucian Popa; Complex Double Interface Dynamics in Time-Fractional Models: Computational Analysis of Meshless and Multi-Resolution Techniques, Math. Comput. Appl. **2026**, 31, 44, https://doi.org/10.3390/mca31020044.

6. **Muhammad Asif**, Fatima, Muhammad Bilal Riaz, Faisal Bilal; A hybrid meshless collocation approach for capturing solution and gradient jumps in 1D telegraph double-interface model with highly discontinuous coefficients, Results in Applied Mathematics (Elsevier), 29(2026), https://doi.org/10.1016/j.rinam.2026.100685.

7. **Muhammad Asif**; Javairia Gul; Mehnaz Shakeel; Ioan- Lucian Popa, A Hybrid Numerical Framework Based on Radial Basis Functions and Finite Difference Method for Solving Advection–Diffusion–Reaction-Type Interface Models, Math. Comput. Appl. **2026**, 31, 1. https://doi.org/10.3390/mca31010001.

8. Faisal Bilal; **Muhammad Asif**; Mehnaz Shakeel; Ioan- Lucian Popa, RBF-Based Meshless Collocation Method for Time-Fractional Interface Problems with Highly Discontinuous Coefficients, Math. Comput. Appl. **2025**, 30, 133. https://doi.org/10.3390/mca30060133.

9. **Muhammad Asif;** Naveed Akhter; Farhan Khan; Faisal Bilal; Ioan- Lucian Popa**,** Numerical Treatment of Hyperbolic-Type Problems with Single and Double Interfaces via Meshless Method, AXIOMS **2025**, 14, 621. https://doi.org/10.3390/axioms14080621.

10. Muhammad Faheem**, Muhammad Asif,** Rohul Amin, Nadeem Haider, Fahd Jarad, An Investigation of Discontinuities in Time Dependent 2D and 3D Parabolic Partial Differential Equations Utilizing Collocation Methods: A Comparative Analysis of Complex Interface Problems, Computational and Applied Mathematics, 45:121, (2025) https://doi.org/10.1007/s40314-025-03539-7.

11. Khwaja Shamsul Haq; **Muhammad Asif;** Muhammad Faheem; Ioan- Lucian Popa, Capturing of Discontinuities with Precision: A Numerical Exploration of 3D Telegraph Interface Models via Multi-Resolution Technique, Mathematics, **13(2391), 2025**, https://doi.org/10.3390/ math13152391.

12. Khawaja Shams Ul Haq, **Muhammad Asif**, Muhammad Faheem, Muhammad Ahsan, Salah Boulaaras, Qasem Al Mdallal, A computational algorithm for the numerical solution of two-dimensional telegraph interface problems, **Fractals**, 33 (2025). **(I.F 2.9).**

13. **Muhammad Asif**, Faisal Bilal, Nadeem Haider, Fahd Jarad, Robust numerical techniques for modeling telegraph equations in multi-scale and heterogeneous environments, **Journal of Applied Mathematics and Computing (Springer)**, **71(2025**), https://doi.org/10.1007/s12190-025-02551-8. **(I.F 2.7).**

14. **Muhammad Asif**, Tabassum Gul, Muhamamd Bilal Riaz, Faisal Bilal, Solution of nonlinear telegraph equation with discontinuities along the transmission line using meshless collocation method, Partial Differential Equations in Applied Mathematics (Elsevier), 14(2025), 101219, https://doi.org/10.1016/j.padiff.2025.101219.

15. M. Waleed Ahmad Khan, Imad Khan**, Muhammad Asif,** Applications of neural networking in Eyring-Powell nanofluid dynamics on a rotating surface in a porous medium, **Alexandria Engineering Journal** (Elsevier)**,** 108(2024), 568-582, https://doi.org/10.1016/j.aej.2024.07.083. **(I.F 6.8).**

16. Muhammad Faheem, **Muhammad Asif,** Nadeem Haider, Rohul Amin, Qasem Al Mdallal**,** Hybrid Haar wavelet and meshfree methods for hyperbolic double interface problems: Numerical implementations and comparative performance Analysis, **Partial Differential Equations in Applied Mathematics (Elsevier)**, 11(2024), 100773, https://doi.org/10.1016/j.padiff.2024.100773.

17. **Muhammad Asif**, Muhammad Umar Farooq, Muhammad Bilal Riaz, Faisal Bilal,Nadeem Hiader, Numerical assessment of hyperbolic type double interface problems via Haar wavelets, **Partial Differential Equations in Applied Mathematics (Elsevier),** 10 (2024) 100665, https://doi.org/10.1016/j.padiff.2024.100665.

18. **Muhammad Asif**, Faisal Bilal, Mehnaz, Imran Khan, Qasem-Al-Mdallal, Extension of Haar wavelet technique for numerical solution of three-dimensional linear and nonlinear telegraph equations, **Partial Differential Equations in Applied Mathematics (Elsevier), 9(2024), 100618, https://doi.org/10.1016/j.padiff.2024.100618.**

19. **Muhammad Asif,** Faisal Bilal, Mehnaz, Rubi Bilal, Nadeem Haider, Shaimaa A. M. Abdelmohsenc, Sayed M Eldind. An efficient algorithm for the numerical solution of telegraph interface model with discontinuous coefficients via Haar wavelets, **Alexandria Engineering Journal, 72(2023), 275-285. https://doi.org/10.1016/j.aej.2023.03.074. (I.F 6.**626**)**

20. **Muhammad Asif,** Rohul Amin, Nadeem Haider, Imran Khan, Qasem-Al-Mdallal, Saleem Bib Said, A Hybrid Numerical Technique For Solving Three-Dimensional Second-Order Parabolic Partial Differential Equations, **Fractals, 31(2023), 2340018 (16 pages), DOI: 10.1142/S0218348X23400182. (I.F 4.555).**

21. Gul e Rana, **Muhammad Asif,** Rubi Bilal, Nadeem Haider, Qasem-Al-Mdallal. Haar wavelet collocation technique for advection-diffusion-reaction type interface models, **Journal of Function Spaces, Vol. 2022, Article ID 1541486, 15 pages,** https://doi.org/10.1155/2022/1541486. **(I.F 1.281).**

22. Imran Khan, **Muhammad Asif**, Rohul Amin, Qasem Al Mdallal , Fahd Jarad, On a new method for finding numerical solutions to integro-differential equations based on Legendre multi-wavelets collocation, **Alexandria Engineering Journal, (2021), (I.F 6.626).**

23. **Muhammad Asif**, Saeed Ullah Jan, Nadeem Haider, Qasem-Al-Mdallal, Thebet Abdeljawad, Numerical modeling of NPZ and SIR models with and without diffusion. **Result in Physics, Vol. (19), (2020) 103512, https://doi.org/10.1016/j.rinp.2020.103512. (I.F 4.565).**

24. **Muhammad Asif**, Zar Ali Khan, Nadeem Haider, Qasem-Al-Mdallal, Numerical simulation for solution of SEIR models by meshless and finite difference methods, **Chaos, Soliton and Fractals, 141 (2020) 110340, (I.F 9.922).**

25. **Muhammad Asif**, Imran Khan, Nadeem Haider, Qasem-Al-Mdallal, Legendre multi-wavelets collocation method for numerical solution of linear and nonlinear integral equations, **Alexandria Engineering Journal, (2020), (I.F 6.626).**

26. Imran Aziz, Siraj-ul-Islam, **Muhammad Asif**, Haar wavelet collocation method for three-dimensional elliptic partial differential equations, **Computer and Mathematics with Application (Elsevier), 73(2017) 2023-2034. http://dx.doi.org/10.1016/j.camwa.2017.02.034. (I.F 3.218).**

27. Rohul Amin, Kamal Shah, **Muhammad Asif**, Imran Khan, Efficient numerical technique for solution of delay Volterra-Fredholm integral equations using Haar wavelet, **Heliyon 6 (2020) e05108, https://doi.org/10.1016/j.heliyon.2020.e05108. (I.F 3.776).**

28. Rohul Amin, Kamal Shah, **Muhammad Asif**, Imran Khan, A computational algorithm for the numerical solution of fractional order delay differential equations, Applied Mathematics and Computation (Elsevier), 402(2021), https://doi.org/10.1016/j.amc.2020.125863. **(I.F 3.4).**

29. Rohul Amin, Kamal Shah, **Muhammad Asif**, Imran Khan, Faheem Ullah. An efficient algorithm for numerical solution of fractional integro-differential equations via Haar wavelet, **Journal of Computational and Applied Mathematics (Elsevier), Vol. (381), pp. 1-17, 2021. (I.F 2.872).**

30. **Muhammad Asif,** Nadeem Haider, Qasem-Al-Mdallal, Imran Khan, A Haar wavelet collocation approach for solving one and two-dimensional second-order linear and nonlinear hyperbolic telegraph equations, **Numerical Methods for Partial Differential Equations**, Vol. (36), (2020), pp. 1-20, DOI: 10.1002/num.22512. (I.F 3.568)

31. Rohul Amin, Şuayip Yüzbaş Liping Gao, **Muhammad Asif**, Imran Khan, Algorithm for the Numerical Solutions of Volterra Population Growth Model with Fractional Order via Haar Wavelet, **Contemporary Mathematics**, Volume 1, Issue 2 (2020), 54-111. **(I.F 3.568)**

32. Rohul Amin, Kamal Shah, Imran khan, **Muhammad Asif**, Efficient numerical scheme for the solution of twelfth-order boundary value problems by Haar wavelet method, **Open Physics, (2020), (I.F 1.361).**

33. Rohul Amin, Kamal Shah, Imran khan, **Muhammad Asif,** Mehdi Salimi, Ali Ahmadian, Efficient numerical scheme for the solution of tenth order boundary value problems by Haar wavelet method, **MDPI Mathematics, Vol. 8, (2020) pp-1-19,** https://www.mdpi.com/2227-7390/8/11/1874/pdf. **(I.F 2.592).**

34. Rohul Amin, Kamal Shah, **Muhammad Asif**, Imran Khan, Qasem-Al-Mdallal, Efficient Numerical Algorithm for the Solution of Eight Order Boundary Value Problems by Haar Wavelet Method, **International Journal of Applied and Computational Mathematics, 7(34), (2021),** https://doi.org/10.1007/s40819-021-00975-x**.**

35. A. Zada, G. A. Khan, **Muhammad Asif** and R. Amin, On dichotomy of autonomous Systems and boundedness of some Cauchy Problems, **International Journal of Research and Reviews in Applied Sciences, 14(3), (2013), 533-538.**

36. A. Zada, R. Amin, G. A. Khan, and **Muhammad Asif**, A characterization of dichotomy for autonomous discrete systems, Journal of Advanced Research in Dynamical and Control Systems, Vol. 6, Issue 1, 2014, 48-55.

37. Zada, R. Amin, T. Hussain and **Muhammad Asif**, Discrete characterization of stability and dichotomy of evolution family over finite dimensional spaces, World Applied Sciences Journal, 27 (12): 1630-1636, 2013 (I.F 0.218).

Refereeing (articles refereed for the following journals

1. Discrete Dynamics in Nature and Society
2. Applied Numerical Mathematics
3. Computer and Mathematics with Applications
4. Journal of Computational Applied Mathematics
5. Jordanian Journal of Mathematics and Statistics
6. European Journal of Pure and Applied Mathematics

7. Iranian Journal of Numerical Analysis and Optimization
8. Journal of Applied Mathematics and Computing
9. Communication in Nonlinear Science and Numerical Simulation
10. Mathematics and Computer in Simulation
11. Journal of Mathematics
12. Journal of Applied Mathematics and Informatics
13. Integration (Very Large-Scale Integration)
14. Franklin Open

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- **Open Researcher and Contributor IDentifier** (**ORCID**) : https://orcid.org/0000-0002-7635-621X
- **Scopus**: **Scopus ID: 59986827500**
- **SciProfiles**: https://sciprofiles.com/profile/790438

References:

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