

# Dr. Muhammad Waqas Yasin

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Residence:Sheikhpura P/O Talwandi Bhindran  
Narowal, Pakistan.

**Research Interest** I have an interest in exploring new techniques for the solutions of physical systems. I have worked for the numerical and analytical solutions of the nonlinear Partial Differential Equations. These problems arise in various fields of engineering and physical sciences. The strong areas of my research are nonlinear heat and wave equation, Epidemiology, the Existence of solutions, Bifurcation theory, Delay Differential Equations, Pattern formation in Prey-Predator interactions, Numerical stability, Stability regions, Nonlinear Stochastic Differential Equations, Stochastic Delay Differential Equations, Stochastic Fractional Differential Equations.

**Education** **The University of Lahore, Lahore, Punjab, Pakistan.** 2018-2023  
Doctor of Philosophy in Applied Mathematics (CGPA 3.83/4.0)  
Title of the Dissertation

**Abstract Optimization and Simulations of Physical Problems for Non-linear Stochastic Partial Differential Equations**

**Technical Skills** MS WORD, LATEX, MALAB, MATHEMATICA, MAPLE.

**Courses Taught** **At Under-Graduate level**

- Calculus
- Vector and Tensor Analysis
- Ordinary Differential Equations
- Mathematical Modeling & Simulations
- Partial Differential Equations
- Group Theory
- Integral Equations

**At Graduate level**

- Advanced Integral Equations
- Numerical Solutions of Partial Differential Equations

**Experience**

## Teaching

**The University of Narowal, Narowal, Punjab, Pakistan.**

- As a Lecturer of Mathematics, 21.10.2016 – till date
- As a Associate Lecturer of Mathematics, 10.02.2016 – 20.10.2016

## Administration

The University of Narowal, Narowal, Punjab, Pakistan.

- As a Secretary Petty Purchase Committee. 09.08.2023 – till date
- As a Deputy Treasurer University of Narowal. 04.01.2023– till date
- As a Coordinator of Mathematics Department. 05.05.2020–16.12.2021

## Publications

1. **Yasin, M. W.**, Gafar, A., Ahmad, H., Baber, M. Z., Radwan, T., Khalifa, A. & Ahmed, K. K.(2026). Multiplicative time noise effect on solitary wave structures in the stochastic reactiondiffusion model. *Open Physics*, vol. 24, no. 1, 2026, pp. 20250294. <https://doi.org/10.1515/phys-2025-0294>
2. **Yasin, M. W.**, Shafee, A., Baber, M. Z., & Ceesay, B. (2026). Bifurcation and Stability of a Spatiotemporal PreyPredator Model: A Computational Perspective. *Computational and Mathematical Methods*, 2026(1), 6634314.
3. Baber, M. Z., **Yasin, M. W.**, Ahmed, N., Arif, K., & Ceesay, B. (2026). Optical wave propagation in magneto-optic waveguides with generalized anti-cubic model. *Science Progress*, 109(1), 00368504251414606.
4. Shahzad, T., Macas, S., Macas-Daz, J. E., Baber, M. Z., Ahmad, M. O., Ahmed, N., & **Yasin, M. W.** (2025). Soliton-Like Solutions and Determination of Unique Physical Problems for the Nonclassical Sobolev-Type Equation in Fluid Dynamics. *Mathematical Methods in the Applied Sciences*.
5. Mohammed, W. W., **Yasin, M. W.**, Waqas, M., Khalifa, A. S., Baber, M. Z., Radwan, T., & Ahmed, K. K. (2025). Stochastic predatorprey interactions with disease dynamics: fixed point and numerical investigations. *Boundary Value Problems*, 2025(1), 174.
6. **Yasin, M. W.**, Akhtar, M., Alazab, M., Inc, M., Baber, Z., Iqbal, M. S., & Rezapour, S. (2026). Spatiotemporal dynamics of a reaction-diffusion nutrient-algae model. *Modeling Earth Systems and Environment*, 12(1), 29.
7. Arshad, A., **Yasin, M. W.**, Saeed, I., Ahmed, N., Bittaye, E., & Baber, M. Z. (2025). Optical closed form soliton structures for the Kuralay-II equation in nonlinear optical complex media. *Scientific Reports*, 15(1), 37938.
8. Birkea, F. M., **Yasin, M. W.**, Ahmed, N., Baber, M. Z., Safdar, R., & Bittaye, E. (2025). Investigating a one-dimensional LengyelEpstein system under the influence of multiplicative time noise. *Discover Applied Sciences*, 7(10), 1169.
9. Hassaballa, A. A., Baber, M. Z., Butt, A., **Yasin, M. W.**, Safdar, R., & Bittaye, E. (2025). Dynamical description and analytical study of traveling wave solutions for generalized Benjamin-Ono equation. *Scientific Reports*, 15(1), 1-16.
10. Ahmed, N., **Yasin, M. W.**, & Akgil, A. (2025). Impact of noise on a spatial prey-predator model with infectious prey. *Modeling Earth Systems and Environment*, 11(6), 1-15.
11. Nawaz, S., Ahmed, M. O., Baber, M. Z., Bittaye, E., & **Yasin, M. W.** (2025). Explicit solitary wave structure for the stochastic resonance nonlinear Schrödinger equation under Brownian motion with dynamical analysis. *Scientific Reports*, 15(1), 31817.

12. Ahmed, N., **Yasin, M. W.**, Iqbal, M. S., Ceesay, B., & Baber, M. Z. (2025). Optimal and Computational Analysis Under the Noisy Environment in Biological Processes: The Stochastic Schnakenberg Model. *Journal of Nonlinear Mathematical Physics*, 32(1), 58.
13. Farooq, S., Dahar, R. H., **Yasin, M. W.**, Hu, M., Rativa, D., Kong, D., & de Araujo, R. E. (2025). Optimizing plasmonic nanostructures array for high-performance sensing applications. *Results in Physics*, 108386.
14. **Yasin, M. W.**, Ahmed, N., Akgl, A., Baber, M. Z., & Yao, F. (2025). Bifurcation analysis and Turing instability of the ecological model having Beddington-DeAngelis-type functional response. *Modeling Earth Systems and Environment*, 11(5), 355.
15. Baber, M. Z., Shahzad, T., Mohammed, W. W., Ahmed, N., Ceesay, B., & **Yasin, M. W.** (2025). Impact of Brownian motion on the optical soliton solutions for the three component nonlinear Schrödinger equation. *Scientific Reports*, 15(1), 25860.
16. Farooq, S., Naseer, U., **Yasin, M. W.**, Yuan, J., & Kong, D. (2025). Rational Design and Optimization of Silica-Core/Platinum-Shell Nanostructures for Efficient Solar Thermal Harvesting. *Plasmonics*, 1-7.
17. Ceesay, B., **Yasin, M. W.**, Ahmed, N., Baber, M. Z., & Bittaye, E. (2025). Revealing homoclinic breather waves, periodic lump waves and other wave forms of an integrable reduced spin Hirota-Maxwell-Bloch system. *Scientific Reports*, 15(1), 1-17.
18. **Yasin, M. W.**, Baber, M. Z., Butt, A., Saeed, I., Sulaiman, T. A., Yusuf, A., & Salahshour, S. (2025). Visualization of the impact of noise of the closed-form solitary wave solutions for the stochastic Zhiber-Shabat model. *Modern Physics Letters A*, 40(23), 2550077.
19. **Yasin, M. W.**, Ahmed, N., Akgl, A., Baber, M. Z., Baleanu, D., & Tintareanu-Mircea, O. (2025). Spatio-temporal patterns and Turing-Hopf bifurcation in a spatially extended prey-predator model with ratio-dependent interactions. *Modeling Earth Systems and Environment*, 11(3), 219.
20. **Yasin, M. W.**, Akhtar, M., Ahmed, N., Akgl, A., & Al-Mdallal, Q. (2025). Exploring the fixed point theory and numerical modeling of fish harvesting system with Allee effect. *Modeling Earth Systems and Environment*, 11(4), 1-18.
21. Baber, M. Z., Ahmed, N., **Yasin, M. W.**, Iqbal, M. S., Akgl, A., Hassani, M. K., & Jawaz, M. (2025). Reliable numerical scheme for coupled nonlinear Schrödinger equation under the influence of the multiplicative time noise. *Scientific Reports*, 15(1), 10707.
22. Ceesay, B., Baber, M. Z., Ahmed, N., **Yasin, M. W.**, & Mohammed, W. W. (2025). Breather, lump and other wave profiles for the nonlinear Rosenau equation arising in physical systems. *Scientific Reports*, 15(1), 3067.
23. Ahmed, N., **Yasin, M. W.**, Akgl, A., Baleanu, D., & Tintareanu-Mircea, O. (2025). Mathematical analysis and pattern formation in diffusive predator-prey system. *Journal of Applied Mathematics and Computing*, 1-22.
24. **Yasin, M. W.**, Shahzad, T., Shoukat, S., Iqbal, M. S., Ahmed, N., & Baber, M. Z. (2024). Mathematical Investigations of Diffusive Prey-Predator Dynamical System. *International Journal of Geometric Methods in Modern Physics*.
25. Baber, M. Z., Shahzad, T., Munir, M., Ahmed, N., & **Yasin, M. W.** (2024). Bifurcation, Chaotic Behavior and Effects of Noise on the Solitons for the

- Stochastic Jaulent-Miodek Hierarchy Model. *International Journal of Theoretical Physics*, 63(11), 287.
26. Ahmed, N., **Yasin, M. W.**, Ali, S. M., Akgl, A., Raza, A., Rafiq, M., & Ali, M. (2024). Investigating the impact of stochasticity on HIV infection dynamics in CD4+T cells using a reaction-diffusion model. *Scientific Reports*, 14(1), 1-16.
  27. Baber, M. Z., Ahmed, N., Iqbal, M. S., & **Yasin, M. W.** (2024). Exact solitary wave solutions and their comparisons under the effect of noise: an allelopathic phytoplankton competition model. *The European Physical Journal Plus*, 139(10), 877.
  28. **Yasin, M. W.**, Ahmed, N., Saeed, J., Raza, A., Rafiq, M., Ahmad, H., & Almohsen, B. (2024). Numerical Study of the Reaction Diffusion PreyPredator Model Having Holling II Increasing Function in the Predator Under Noisy Environment. *Journal of Nonlinear Mathematical Physics*, 31(1), 68.
  29. Zafarullah Baber, M., Malik, S., **Yasin, M. W.**, Ahmed, N., Rezazadeh, H., Ali, S. M., & Hosseinzadeh, M. A. (2024). Breathers, Lump, M-shapes and Other Optical Soliton Interactions for the GRIN Multimode Optical Fiber. *International Journal of Theoretical Physics*, 63(10), 1-20.
  30. Fadhal, E., Al-Shamiri, M. M., **Yasin, M. W.**, Ashfaq, S. M. H., Ahmed, N., Raza, A., & Rafiq, M. (2024). Spatio-temporal dynamics of the vector-born plant disease model. *Modeling Earth Systems and Environment*, 1-14.
  31. Baber, M. Z., **Yasin, M. W.**, Xu, C., Ahmed, N., & Iqbal, M. S. (2024). Numerical and Analytical Study for the Stochastic Spatial Dependent Prey-Predator Dynamical System. *Journal of Computational and Nonlinear Dynamics*, 1-25.
  32. Baber, M. Z., **Yasin, M. W.**, Ahmed, N., Ali, S. M., & Ali, M. (2024). Dynamical analysis and optical soliton wave profiles to GRIN multimode optical fiber under the effect of noise. *Nonlinear Dynamics*, 1-16.
  33. **Yasin, M. W.**, Baber, M. Z., Munir, M., Hassaballa, A. A., Inc, M., Iqbal, M. S., & Rezapour, S. (2024). Modulation instability and optical wave profiles for the conformable Schrödinger-Poisson dynamical system. *Optical and Quantum Electronics*, 56(8), 1-19.
  34. Ahmed, N., **Yasin, M. W.**, Baleanu, D., Tintareanu-Mircea, O., Iqbal, M. S., & Akgl, A. (2024). Pattern Formation and analysis of reaction-diffusion ratio-dependent prey-predator model with harvesting in predator. *Chaos, Solitons & Fractals*, 186, 115164.
  35. **Yasin, M. W.**, Ahmed, N., Saeed, J., Baber, M. Z., Ali, S. M., Akgl, A., & Ali, M. (2024). Numerical study of diffusive fish farm system under time noise. *Scientific Reports*, 14(1), 14711.
  36. **Yasin, M. W.**, Ashfaq, S. M. H., Ahmed, N., Raza, A., Rafiq, M., & Akgl, A. (2024). Numerical modeling of reaction-diffusion e-epidemic dynamics. *The European Physical Journal Plus*, 139(5), 431.
  37. Baber, M. Z., Rezazadeh, H., Iqbal, M. S., Ahmed, N., **Yasin, M. W.**, & Hosseinzadeh, M. A. (2024). Investigation of soliton solutions for the NWHS model with temperature distribution in an infinitely long and thin rod. *Modern Physics Letters B*, 2450392.
  38. Iqbal, M. S., Inc, M., **Yasin, M. W.**, Ahmed, N., Tawfiq, F. M., Bilal, M., & Rezapour, S. (2024). Soliton solutions of nonlinear stochastic Fitz-Hugh Nagumo equation. *Optical and Quantum Electronics*, 56(6), 1047.

39. Baber, M. Z., Ahmed, N., **Yasin, M. W.**, Iqbal, M. S., Akgl, A., Cordero, A., & Torregrosa, J. R. (2024). Comparisons of Numerical and Solitary Wave Solutions for the Stochastic ReactionDiffusion Biofilm Model including Quorum Sensing. *Mathematics*, 12(9), 1293.
40. Ahmed, N., Macas-Daz, J. E., **Yasin, M. W.**, & Iqbal, M. S. (2024). Borel control and efficient numerical techniques to solve the AllenCahn equation governed by temporal multiplicative noise. *International Journal of Computer Mathematics*, 1-16.
41. Shahzad, T., Baber, M. Z., Qasim, M., Sulaiman, T. A., **Yasin, M. W.**, & Ahmed, N. (2024). Explicit solitary wave profiles and stability analysis of biomembranes and nerves. *Modern Physics Letters B*, 2450305.
42. Baber, M. Z., Ahmed, N., **Yasin, M. W.**, Ali, S. M., Ali, M., Akgl, A., & Hassani, M. K. (2024). Abundant soliton solution for the time-fractional stochastic Gray-Scot model under the influence of noise and M-truncated derivative. *Discover Applied Sciences*, 6(3), 119.
43. Shahzad, T., Baber, M. Z., Sulaiman, T. A., Ahmad, M. O., & **Yasin, M. W.** (2024). Optical wave profiles for the higher order cubic-quartic Bragg-gratings with anti-cubic nonlinear form. *Optical and Quantum Electronics*, 56(1), 67.
44. Shahzad, T., Ahmed, M. O., Iqbal, M. S., Baber, M. Z., **Yasin, M. W.**, Alsubaie, A. S. A., & Inc, M. (2024). Explicit solitary wave solutions for the nonlinear equations in semiconductor and magnetic field with their stability analysis. *Optical and Quantum Electronics*, 56(1), 73.
45. Ahmed, N., **Yasin, M. W.**, Ali, S. M., Akgl, A., Raza, A., Rafiq, M., & Shar, M. A. (2023). Computational aspects of an epidemic model involving stochastic partial differential equations. *International Journal of Modern Physics C*, 2350146.
46. Ahmed, N., **Yasin, M. W.**, Iqbal, M. S., Raza, A., Rafiq, M., & Inc, M. (2023). A dynamical study on stochastic reaction diffusion epidemic model with nonlinear incidence rate. *The European Physical Journal Plus*, 138(4), 1-17.
47. Ahmed, N., **Yasin, M. W.**, Iqbal, M. S., Akgl, A., Rafiq, M., Raza, A., & Baber, M. Z. (2023). Numerical investigations of stochastic NewellWhiteheadSegel equation in  $(2+ 1)$  dimensions. *International Journal of Modern Physics B*, 2350261.
48. **Yasin, M. W.**, Ahmed, N., Iqbal, M. S., Raza, A., Rafiq, M., Eldin, E. M. T., & Khan, I. (2023). Spatio-temporal numerical modeling of stochastic predator-prey model. *Scientific Reports*, 13(1), 1990.
49. Baber, M. Z., Seadway, A. R., Ahmed, N., Iqbal, M. S., & **Yasin, M. W.** (2022). Selection of solitons coinciding the numerical solutions for uniquely solvable physical problems: A comparative study for the nonlinear stochastic GrossPitaevskii equation in dispersive media. *International Journal of Modern Physics B*, 2350191.
50. Baber, M. Z., Ahmed, N., **Yasin, M. W.**, Iqbal, M. S., Akgl, A., Riaz, M. B., & Raza, A. (2023). Comparative analysis of numerical with optical soliton solutions of stochastic GrossPitaevskii equation in dispersive media. *Results in Physics*, 44, 106175.
51. Wang, X., **Yasin, M. W.**, Ahmed, N., Rafiq, M., & Abbas, M. (2023). Numerical approximations of stochastic Gray-Scott model with two novel schemes. *AIMS Mathematics*, 8(3), 5124-5147.

52. **Yasin, M. W.**, Ahmed, N., Iqbal, M. S., Rafiq, M., Raza, A., & Akgl, A. (2022). Reliable numerical analysis for stochastic reaction-diffusion system. *Physica Scripta*, 98(1), 015209.
53. Younas, U., Baber, M. Z., **Yasin, M. W.**, Sulaiman, T. A., & Ren, J. (2022). The generalized higher-order nonlinear Schrödinger equation: Optical solitons and other solutions in fiber optics. *International Journal of Modern Physics B*, 2350174.
54. Baber, M. Z., Seadawy, A. R., Iqbal, M. S., Ahmed, N., **Yasin, M. W.**, & Ahmed, M. O. (2022). Comparative analysis of numerical and newly constructed soliton solutions of stochastic Fisher-type equations in a sufficiently long habitat. *International Journal of Modern Physics B*, 2350155.
55. Iqbal, M. S., Seadawy, A. R., Baber, M. Z., Ahmed, N., & **Yasin, M. W.** (2022). Extraction of solitons for time incapable illimitable paraxial wave equation in Kerr-media. *International Journal of Modern Physics B*, 2350122.
56. Iqbal, M. S., Seadawy, A. R., Baber, M. Z., **Yasin, M. W.**, & Ahmed, N. (2022). Solution of stochastic Allen-Cahn equation in the framework of soliton theoretical approach. *International Journal of Modern Physics B*, 2350051.
57. Iqbal, M. S., **Yasin, M. W.**, Ahmed, N., Akgl, A., Rafiq, M., & Raza, A. (2023). Numerical simulations of nonlinear stochastic Newell-Whitehead-Segel equation and its measurable properties. *Journal of Computational and Applied Mathematics*, 418, 114618.
58. Younas, U., Ren, J., Baber, M. Z., **Yasin, M. W.**, & Shahzad, T. (2022). Ion-acoustic wave structures in the fluid ions modeled by higher dimensional generalized Korteweg-de Vries-Zakharov-Kuznetsov equation. *Journal of Ocean Engineering and Science*.
59. **Yasin, M. W.**, Iqbal, M. S., Ahmed, N., Akgl, A., Raza, A., Rafiq, M., & Riaz, M. B. (2022). Numerical scheme and stability analysis of stochastic Fitzhugh-Nagumo model. *Results in Physics*, 32, 105023.
60. **Yasin, M. W.**, Iqbal, M. S., Seadawy, A. R., Baber, M. Z., Younis, M., & Rizvi, S. T. (2021). Numerical scheme and analytical solutions to the stochastic nonlinear advection diffusion dynamical model. *International Journal of Nonlinear Sciences and Numerical Simulation*.
61. Younis, M., Seadawy, A. R., Baber, M. Z., **Yasin, M. W.**, Rizvi, S. T., & Iqbal, M. S. (2021). Abundant solitary wave structures of the higher dimensional Sakovich dynamical model. *Mathematical Methods in the Applied Sciences*.

**Master Students  
Conferences  
Thesis Supervisor**

1. Participated as a Speaker at RAMAA 2023.
2. Participated as a Speaker at 4th International Conference of Sciences, Revamped Scientific Outlook of 21st Century, 2025 Rawalpindi Women University.
3. Chaired a session at 4th International Conference of Sciences, Revamped Scientific Outlook of 21st Century, 2025 Rawalpindi Women University.

1	Saira Ashraf	Qualitative Analysis Of Diffusive Lassa Fever Epidemic System	2024
2	S.M. Hamza Ashfaq	Structure Preserving Analysis Of Disease Dynamical Systems	2024
3	Ayesha Ghafar	Soliton Solutions For The Stochastic Nonlinear Dynamical Systems Under The Effects Of Noise	2024
4	Muskan Munir	Optical Soliton Solutions For The Nonlinear Schrödinger Equation Arising In Optical Fibres	2024
5	Muhammad Waqas	Computational Analysis For Stochastic Reaction Diffusion System	2024
6	Saba Shoukat	Mathematical Investigations Of Reaction-Diffusion Prey-Predator Dynamical System	2024
7	Aleesha Butt	Dynamical Description And Analytical Study Of Travelling Wave Solutions For The Generalized Benjamin-Ono Equation	2025
8	Momna	Abundant Families Of Explicit Form Solutions To The Non-linear Chain Of Atoms	2025
9	Ghazala Ashraf	Exact Solitary Wave Solution To The Non Linear Partial Differential Equation In Plasma Physics	2025
10	Khadeeja Arif	Dynamical Optical Soliton Solutions To The Magneto Optic Waveguide Using Anti Cubic Law Non-Linearity	2025

## Reference

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3. Dr. Nauman Ahmed ,  
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