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Google Scholar: <https://scholar.google.com/citations?user=EJYuQzoAAAAJhl=en>

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Current Address [🌐]: King Mongkut's University of Technology North Bangkok 1518 Pracharat 1 Road, Wongsawang, Bangsue, Bangkok 10800 Thailand.

Permanent Address [🌐]: Mohallah IslamPura Street No.6 Gondlanwala Road Gujranwala, Punjab, 52250, Pakistan.

OBJECTIVE

A dedicated mathematician specializing in applied mathematics, with expertise in soliton theory and the qualitative analysis of complex nonlinear systems. Possesses a strong research background and a proven record of impactful scientific contributions. Committed to advancing the field of mathematical physics through innovative research, analytical problem-solving, and interdisciplinary collaboration. Additionally, actively engaged in the analysis of exact soliton solutions for a class of nonlinear problems using Neural Network-Based Symbolic Methods, with a focus on combining data-driven architectures and analytical frameworks. This approach enhances the precision, efficiency, and generalization of soliton solution construction, enabling deeper insights into nonlinear wave dynamics.

WORK EXPERIENCE

- **King Mongkut's University of Technology North Bangkok Thailand [🌐]** Sep 2025 - Present
Postdoctoral Fellow Bangkok, Thailand
 - Submitted Project: Dynamical Analysis and fractional effects on the soliton solutions for some nonlinear problems
- **Grand Asian University Sialkot [🌐]** July 2024 - September 2025 / April 2022 - June 2024
Assistant Professor/Lecturer Sialkot, Pakistan
- **Superior Group of Colleges [🌐]** October 2015 - October 2018
Lecturer Gujranwala, Pakistan
- **Government Post Graduate Islamia College Gujranwala [🌐]** September 2011 - May 2012
College Teacher Internee Gujranwala, Pakistan
- **Government Post Graduate College Gujranwala [🌐]** November 2010 - May 2011
College Teacher Internee Gujranwala, Pakistan
- **Swedish Institute of Technology [🌐]** January 2010 - June 2010
Lecturer Gujranwala, Pakistan

EDUCATION

- **University of Gujrat [🌐]** 2020 - 2023
PhD in Mathematics Gujrat, Pakistan
 - Thesis: *Dynamics of Soliton Solutions for Some Dynamical Models in Nonlinear Optics*
Supervisor: Dr. Jamshad Ahmad
- **Minhaj University [🌐]** 2015 - 2017
M.Phil. Mathematics (18 years) Lahore, Pakistan
 - Thesis: *On the Complex and Hyperbolic structures of some nonlinear equations in Ocean Engineering*
Supervisor: Dr. Muhammad Younis (Late)
- **Allama Iqbal Open University [🌐]** 2010 - 2012
B.Ed. Science (Professional) Gujranwala, Pakistan
- **University of the Punjab [🌐]** 2007 - 2009
M.Sc. Mathematics (16 years) Gujranwala, Pakistan

• Allama Iqbal Open University [🌐] M.Ed. Science (Professional)	2013 - 2014 Gujranwala, Pakistan
• University of the Punjab [🌐] B.Sc. Mathematics, Physics (14 years)	2005 - 2007 Gujranwala, Pakistan
• BISE Gujranwala [🌐] F.Sc. Pre-Engineering (12 years)	2003 - 2005 Gujranwala, Pakistan
• BISE Gujranwala [🌐] Matric Sciences (10 years)	2001 - 2003 Gujranwala, Pakistan

RESEARCH INTERESTS

• Soliton Theory • Nonlinear Wave Phenomena • Applied Mathematics • Qualitative Analysis of NLPDEs • Neural Network–Based Symbolic Methods

PUBLICATIONS

First Author Publications

1. Rehman, S.U.; Bilal, M.; Ahmad, J. **New exact solitary wave solutions for the 3D-FWBBM model in arising shallow water waves by two analytical methods.** *Results Phys.* 25, 104230. (2021).
2. Rehman, S.U.; Ahmad, J. **Modulation instability analysis and optical solitons in birefringent fibers to RKL equation without four wave mixing.** *Alex. Eng. J.* 60 (1), 1339-1354 (2021).
3. Rehman, S.U.; Seadawy, A.R.; Younis, M.; Rizvi, S.T.; Sulaiman, T.A.; Yusuf, A. **Modulation instability analysis and optical solitons of the generalized model for description of propagation pulses in optical fiber with four non-linear terms.** *Mod. Phys. Lett. B.* 35 (06) 2150112 (2021).
4. Rehman, S.U.; Seadawy, A.R.; Younis, M.; Rizvi, S.T.R. **On study of modulation instability and optical soliton solutions: the chiral nonlinear Schrödinger dynamical equation.** *Opt. Quantum Electron.* 53, 411 (2021).
5. Rehman, S.U.; Bilal, M.; Ahmad, J. **Dynamics of soliton solutions in saturated ferromagnetic materials by a novel mathematical method.** *J. Magn. Magn. Mater.* 538, 168245 (2021).
6. Rehman, S.U.; Ahmad, J. **Dispersive multiple lump solutions and soliton's interaction to the nonlinear dynamical model and its stability analysis.** *Eur. Phys. J. D.* 76 (14) (2022).
7. Rehman, S.U.; Seadawy, A.R.; Rizvi, S.T.R.; Ahmad, S.; Althobaiti, S. **Investigation of double dispersive waves in nonlinear elastic inhomogeneous Murnaghan's rod.** *Mod. Phys. Lett. B.* 36 (08), 362150628 (2022).
8. Rehman, S.U.; Bilal, M.; Ahmad, J. **The study of solitary wave solutions to the time conformable Schrödinger system by a powerful computational technique.** *Opt. Quant. Electron.* 54, 228 (2022).
9. Rehman, S.U.; Ahmad, J. **Investigation of exact soliton solutions to Chen–Lee–Liu equation in birefringent fibers and stability analysis.** *J. Ocean Eng. Sci.* (2022).
10. Rehman, S.U.; Bilal, M.; Inc, M.; Younas, U.; Rezazadeh, H.; Younis, M.; Mirhosseini-Alizamini, S.M. **Investigation of pure cubic optical solitons in nonlinear optics.** *Opt. Quantum Electron.* 54:400 (2022).
11. Rehman, S.U.; Ahmad, J. **Dynamics of optical and multiple lump solutions to the fractional coupled nonlinear Schrödinger equation.** *Opt. Quantum Electron.* 54:640 (2022).
12. Rehman, S.U.; Bilal, M.; Ahmad, J. **Highly dispersive optical and other soliton solutions to fiber Bragg gratings with the application of different mechanisms.** *Int. J. Mod. Phys. B.* 36 (28), 2250193 (2022).
13. Rehman, S.U.; Ahmad, J. **Dynamics of optical and other soliton solutions in fiber Bragg gratings with Kerr law and stability analysis.** *Arab. J. Sci. Eng.* 48, 803–819 (2023).
14. Rehman, S.U.; Ahmad, J. **Diverse optical solitons to nonlinear perturbed Schrödinger equation with quadratic-cubic nonlinearity via two efficient approaches.** *Phys. Scr.* 98 035216 (2023).
15. Rehman, S.U.; Ahmad, J.; Muhammad, T. **Dynamics of novel exact soliton solutions to Stochastic Chiral Nonlinear Schrödinger Equation.** *Alex. Eng. J.* 79, 568-580 (2023).

16. **Rehman, S.U.**; Ahmad, J.; Nisar, K.S.; Abdel-Aty, A.H. **Stability analysis, lump and exact solutions to Sharma–Tasso–Olver–Burgers equation.** *Opt. Quant. Electron* 56 (7), 1227 (2024).
17. **Rehman, S.U.**; Ahmad, J. **Stability analysis and novel optical pulses to Kundu–Mukherjee–Naskar model in birefringent fibers.** *J. Mod. Phys. B*, 38 (15), 2450192 (2024).
18. **Rehman, S. U.**; Bilal, M.; Ren, J.; Bayram, M.; Inc, M. **Sensitivity analysis and dynamics of optical dromions in conformable generalized nonlinear Schrödinger systems.** *Phys. Lett. A*, 531, 130168 (2025).

Co-Author Publications

1. Younis, M.; Younas, U.; **Rehman, S.U.**; Bilal, M.; Waheed, A. **Optical bright–dark and Gaussian soliton with third order dispersion.** *Optik*, 134, 233–238 (2017).
2. Younis, M.; Bilal, M.; **Rehman, S.U.**; Younas, U.; Rizvi, S.T.R. **Investigation of optical solitons in birefringent polarization preserving fibers with four-wave mixing effect.** *Int. J. Mod. Phys. B*, 34(11), 2050113 (2020).
3. Bilal, M.; **Rehman, S.U.**; Younas, U.; Baskonus, H.M.; Younis, M. **Investigation of shallow water waves and solitary waves to the conformable 3D-WBBM model by an analytical method.** *Phys. Lett. A*, 403, 127388 (2021).
4. Bilal, M.; **Rehman, S.U.**; Ahmad, J. **Investigation of optical solitons and modulation instability analysis to the Kundu-Mukherjee-Naskar model.** *Opt. Quantum Electron.* 53:283 (2021).
5. Rezazadeh, H.; Younis, M.; Eslami, M.; **Rehman, S.U.**; Bilal, M.; Younas, U. **New exact traveling wave solutions to the (2+1)-dimensional Chiral nonlinear Schrödinger equation.** *Math. Model. Nat. Phenom.* 16:38 (2021).
6. Seadawy, A. R.; **Rehman, S.U.**; Younis, M.; Rizvi, S.T.R.; Althobaiti, S.; Makhlof, M.M. **Modulation instability analysis and longitudinal wave propagation in an elastic cylindrical rod modeled with Pochhammer-Chree equation.** *Phys. Scr.* 96 (4), 045202 (2021).
7. Younis, M.; Seadawy, A.R.; Bilal, M.; **Rehman, S.U.**; Latif, S.; Rizvi, S.T.R. **Kinetics of phase separation in Fe–Cr– (X=Mo, Cu) ternary alloys — a dynamical wave study.** *Int. J. Mod. Phys. B*, 35(21), 2150220 (2021).
8. Raddadi, M.H.; Younis, M.; Seadawy, A.R.; **Rehman, S.U.**; Bilal, M.; Rizvi, S.T.R.; Althobaiti, A. **Dynamical behaviour of shallow water waves and solitary wave solutions of the Dullin-Gottwald-Holm dynamical system.** *J. King Saud Univ. Sci.* 33, 101627 (2021).
9. Bilal, M.; Younis, M.; **Rehman, S.U.**; Ahmad, J.; Younas, U. **Investigation of new solitons and other solutions to the modified nonlinear Schrödinger equation in ocean engineering.** *J. Ocean Eng. Sci.* (2022).
10. Bilal, M.; **Rehman, S.U.**; Ahmad, J. **Analysis in fiber Bragg gratings with Kerr law non-linearity for diverse optical soliton solutions by reliable analytical techniques.** *Mod. Phys. Lett. B*, 36(23), 2250122 (2022).
11. Bilal, M.; **Rehman, S.U.**; Ahmad, J. **Dispersive solitary wave solutions for the dynamical soliton model by three versatile analytical mathematical methods.** *Eur. Phys. J. Plus*, 137:674 (2022).
12. Bilal, M.; **Rehman, S.U.**; Ahmad, J. **Dynamical nonlinear wave structures of the predator-prey model using conformable derivative and its stability analysis.** *Pramana - J. Phys.* 96:149 (2022).
13. Bilal, M.; **Rehman, S.U.**; Ahmad, J. **Lump-periodic, some interaction phenomena and breather wave solutions to the (2+1)-rth dispersionless Dym equation.** *Mod. Phys. Lett. B*, 36(02), 2150547 (2022).
14. Bilal, M.; **Rehman, S.U.**; Ahmad, J. **Stability analysis and diverse nonlinear optical pluses of dynamical model in birefringent fibers without four-wave mixing.** *Opt. Quantum Electron.* 54:277 (2022).
15. Bilal, M.; **Rehman, S.U.**; Ahmad, J. **The study of new optical soliton solutions to the time-space fractional nonlinear dynamical model with novel mechanisms.** *J. Ocean Eng. Sci.* (2022).
16. Sulaiman, T.A.; Younas, U.; Younis, M.; Ahmad, J.; **Rehman, S.U.**; Bilal, M.; Yusuf, A. **Modulation instability analysis, optical solitons and other solutions to the (2+1)-dimensional hyperbolic nonlinear Schrödinger's equation.** *Comput. Methods Differ. Equ.* 10(1), 179-190 (2022).
17. Seadawy, A.R.; **Rehman, S.U.**; Younis, M.; Rizvi, S.T.R.; Althobaiti, A. **On solitons: Propagation of shallow water waves for the fifth-order KdV hierarchy integrable equation.** *Open Physics* 19 (1), 828-842 (2022).
18. Younis, M.; Bilal, M.; **Rehman, S.U.**; Seadawy, A.R.; Rizvi, S.T.R. **Perturbed optical solitons with conformable time-space fractional Gerdjikov–Ivanov equation.** *Math. Sci.* 16, 431–443 (2022).

19. Younis, M.; Younas, U.; Bilal, M.; **Rehman, S.U.**; Rizvi, S.T.R. **Investigation of optical solitons with Chen–Lee–Liu equation of monomode fibers by five free parameters.** *Indian J. Phys.* 96(5), 1539–1546 (2022).
20. Younas, U.; Yusuf, A.; Sulaiman, T.A.; Bilal, M.; Younis, M.; **Rehman, S.U.** **New solitons and other solutions in saturated ferromagnetic materials modeled by Kraenkel–Manna–Merle system.** *Indian J. Phys.* 96, 181–191 (2022).
21. Akram, S.; Ahmad, J.; **Rehman, S.U.**; Sarwar, S.; Ali, A. **Dynamics of soliton solutions in optical fibers modelled by perturbed nonlinear Schrödinger equation and stability analysis.** *Opt Quant Electron* 55, 450 (2023).
22. Ahmad, J.; Mustafa, Z.; **Rehman, S.U.** **Dynamics of exact solutions of nonlinear resonant Schrödinger equation utilizing conformable derivatives and stability analysis.** *Eur. Phys. J. D* 77, 123 (2023).
23. Ali, A.; Ahmad, J.; Javed, S.; **Rehman, S.U.** **Analysis of chaotic structures, bifurcation and soliton solutions to fractional Boussinesq model.** *Phys. Scr.* 98, 075217 (2023).
24. Ahmad, J.; Mustafa, Z.; **Rehman, S.U.**; Zulfiqar, A. **Solitonic solutions of two variants of nonlinear Schrödinger model by using exponential function method.** *Opt Quant Electron* 55, 633 (2023).
25. Ahmad, J.; Akram, S.; **Rehman, S.U.**; Turki, N.B.; Shah, N.A. **Description of soliton and lump solutions to M-truncated stochastic Biswas–Arshed model in optical communication.** *Results Phys.* 51, 106719 (2023).
26. Akram, S.; Ahmad, J.; **Rehman, S.U.**; Younas, T. **Stability analysis and dispersive optical solitons of fractional Schrödinger–Hirota equation.** *Opt Quant Electron* 55, 664 (2023).
27. Akram, S.; Ahmad, J.; **Rehman, S.U.** **Stability analysis and dynamical behavior of solitons in nonlinear optics modelled by Lakshmanan–Porsezian–Daniel equation.** *Opt Quant Electron* 55, 685 (2023).
28. Ali, A.; Ahmad, J.; Javed, S.; **Rehman, S.U.** **Exact soliton solutions and stability analysis to (3 + 1)-dimensional nonlinear Schrödinger model.** *Alex. Eng. J.* 76, 747–756 (2023).
29. Ahmad, J.; Mustafa, Z.; **Rehman, S.U.**; Turki, N.B.; Shah, N.A. **Solitary wave structures for the stochastic Nizhnik–Novikov–Veselov system via modified generalized rational exponential function method.** *Results Phys.* 52, 106776 (2023).
30. Akram, S.; Ahmad, J.; **Rehman, S.U.**; Alkarni, S.; Shah, N.A. **Analysis of lump solutions and modulation instability to fractional complex Ginzburg–Landau equation arise in optical fibers.** *Results Phys.* 53, 106991 (2023).
31. Akram, S.; Ahmad, J.; **Rehman, S.U.**; Alkarni, S.; Shah, N.A. **Exploration of solitary wave solutions of highly nonlinear KDV–KP equation arise in water wave and stability analysis.** *Results Phys.* 54, 107054 (2023).
32. Akram, S.; Ahmad, J.; **Rehman, S.U.**; Ali, A. **Analysis of new soliton type solutions to generalized extended (2 + 1)-dimensional Kadomtsev–Petviashvili equation via two techniques.** *Ain Shams Eng. J.* 15, 102302 (2024).
33. Ahmad, J.; Rani, S.; Muhammad, T.; **Rehman, S.U.** **Dispersive soliton solutions to the (4+1)-dimensional Boiti–Leon–Manna–Pempinelli equation via an analytical method.** *Opt Quant Electron* 56, 904 (2024).
34. Muhammad, J.; Bilal, M.; **Rehman, S.U.**; Nasreen, N.; Younas, U. **Analyzing the decoupled nonlinear Schrödinger equation: fractional optical wave patterns in the dual-core fibers.** *J Opt.* 1-12 (2024).
35. Naz, S.; Rani, A.; Ul Hassan, Q.M.; Ahmad, J.; **Rehman, S.U.**; Shakeel, M. **Dynamic study of new soliton solutions of time-fractional longitudinal wave equation using an analytical approach.** *Int. J. Mod. Phys. B* 38 (31), 2450420 (2024).
36. Ahmad, J.; Hameed, M.; Mustafa, Z.; **Rehman, S.U.** **Soliton patterns in the truncated M-fractional resonant nonlinear Schrödinger equation via modified Sardar sub-equation method.** *J Opt* 54, 1118–1139 (2025).
37. Muhammad, J.; **Rehman, S.U.**; Nasreen, N.; Bilal, M.; Younas, U. **Exploring the fractional effect to the optical wave propagation for the extended Kairat-II equation.** *Nonlinear Dyn.* 113(2), 1501–1512 (2025).
38. Bilal, M.; Alawaideh, Y.M.; **Rehman, S.U.**; Yousif, M.A.; Younas, U.; Baleanu, D.; Mohammed, P.O. **Gross-Pitaevskii systems of fractional order with respect to multicomponent solitary wave dynamics.** *Sci. Rep.* 15, 24337 (2025).

39. Bilal, M.; **Rehman, S.U.**; Alawaideh, Y.M.; Popa, I.L.; Al-Khamiseh, B.M. **On the study of multiple wave profiles and hybrid phenomena to the newly developed multi-component Gross-Pitaevskii system and stability analysis.** *Ain Shams Eng. J.* (2025).
40. Ilhan, E.; **Rehman, S.U.**; Bilal, M.; Baskonus, H. M.; Alawaideh, Y. M. **Some novel optical pulses in hydrodynamical nonlinear complex equation using M -truncated fractional derivative.** *Sci Rep* 15, 32139 (2025).
41. Bilal, M.; Abdullah, A.R.; **Rehman, S.U.**; Younas, U. **Analytical Study of Soliton Solutions and Modulation Instability Analysis in the M -Truncated Fractional Coupled Ivancevic Option-Pricing Model.** *Fractal Fract.* 9(10), 630 (2025).
42. Kamel, A.; Tedjani, A.H.; **Rehman, S.U.**; Bilal, M.; Adam, A.; Aldwoah, K.; Messaoudi, M. **Dispersive Soliton Solutions and Dynamical Analyses of a Nonlinear Model in Plasma Physics.** *Axioms*, 14(10), 763 (2025).
43. Bilal, M.; **Rehman, S.U.**; Younas, U.; Mohammad, A.; Rezapour, S.; Inc, M. **Dynamical analyses and dispersive soliton solutions to the nonlinear fractional model in stratified fluids.** *Open Physics*, 23 (1), 20250218.
44. Bilal, M.; Alawaideh, Y. M.; **Rehman, S.U.**; Yousif, M. A.; Baleanu, D.; Mohammed, P.O.; Abdeljawad, T. **Propagation of solitary waves for hydrodynamical nonlinear complex model in a fractional derivative setting.** *Sci Rep* (2025).
45. Li, F.; Balibey, M.; **Rehman, S.U.**; Bilal, M. **On the Dispersive Optical Pulses in Fiber Optics of the Conformable $(2 + 1)$ -Dimensional Hirota–Maccari System.** *Journal of Mathematics*, 2026(1), 5598378.
46. Aldwoah, K.; Abdalgadir, L. M.; **Rehman, S.U.**; Bilal, M.; Alqarni, F.A.; Egami, R.; Rashed, M. **Soliton Genesis in a Novel Gross–Pitaevskii System: Analytical Construction and Dynamical Control.** *Symmetry*, 18(2), 375.

SKILLS

- **Languages:** English (Fluent), Urdu (Native), Chinese (Basic)
- **Programming Languages:** Mathematica, LaTeX, Overleaf, MS Office
- **Research technical Skills:** Mathematical Physics, Exact Soliton solutions, Sensitivity Analysis, Bifurcation Analysis, Stability Analysis, Chaotic Analysis, Neural Network–Based Symbolic Methods

PROFESSIONAL SKILLS

- **Mentorship & Supervision:** Guided and supported students and early-career researchers in mathematical physics, aiding in their academic growth and research development.
- **Project & Research Management:** Actively developing skills in leading and coordinating research projects on precise soliton solutions to enhance collaboration and ensure timely completion of objectives.
- **Scientific Communication & Collaboration:** Engaged in research discussions and collaborations with experts in theoretical physics, contributing to knowledge exchange and interdisciplinary studies.

CONFERENCE

- **1st International Alumni's Mathematics Conference**
University of Engineering and Technology Lahore, Pakistan.

2016

REVIEWER OF INTERNATIONAL JOURNALS

- Optical and Quantum Electronics.
- The European Physical Journal Plus.
- International Journal of Modern Physics Letters B.
- Waves in Random and Complex Media.
- Physica Scripta.
- Computational Methods for Differential Equations.
- Journal of Physics Communication.

- Classical and Quantum Gravity.
- Journal of Applied Science and Engineering.
- Nonlinear Dynamics.
- Scientific Reports.
- High Energy Density Physics.
- Ain Shams Engineering Journal.

REFERENCES

1. **Dr. Sekson Sirisubtawee**
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KMUTNB, Bangkok, Thailand.
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2. **Dr. Jamshad Ahmad**
Assoc. Professor, Department of Physical and
Numerical Sciences, Faculty of Science
University of Rasul, Rasul 50370, Pakistan.
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Relationship: PhD Supervisor
3. **Dr. Muhammad Younis (Late)**
Assistant Professor, College of Information Technology
Punjab University, Pakistan.
Email: younis.pu@gmail.com
Relationship: M.Phil. Supervisor
4. **Dr. Hacı Mehamet Baskonus**
Professor, Faculty of Education
Harran University, Turkey.
Email: hmbaskonus@gmail.com
Relationship: Co Author