

Personal information

Date of Birth: February 28, 1990,
Nationality: Pakistan.

Gender: Male,
Marital Status: Married.

Education

- Sep 2014 – **PhD (Doctor of Philosophy) in Physics,**
Jan 2019 Thesis: Darboux transformation and discrete integrable systems: Approach to soliton solutions,
Supervisor: Dr. Mahmood ul Hassan,
Department of Physics, University of the Punjab, Lahore.
- Sep 2012 – **Mphil (Master of Philosophy) in Physics,**
Sep 2014 Thesis: Magnetic solitons in anisotropic ferromagnet,
Supervisor: Dr. Mahmood ul Hassan,
Department of Physics, University of the Punjab, Lahore.
- Sep 2009 – **MSc (Master of Science) in Physics,**
Dec 2011 Specialization: Particle Physics,
Graduated in first class,
Department of Physics, University of the Punjab, Lahore.
- Aug 2007 – **BSc (Bachelor of Science) in Physics and Mathematics,**
July 2009 Graduated in first class,
University of the Punjab, Lahore.

Experience

- Sep 2023 – **Post-Doctoral Fellowship,** DEPARTMENT OF PHYSICS, ZHEJIANG NORMAL UNIVERSITY, JINHUA, PR CHINA.
August 2025
- Sep 2019 – **Post-Doctoral Fellowship,** SCHOOL OF SCIENCE, CHINE UNIVERSITY OF MINING AND TECHNOLOGY, BEIJING, PR CHINA.
May 2021
- Oct 2014 – **Visiting faculty member,** PUNJAB UNIVERSITY COLLEGE OF INFORMATION AND TECHNOLOGY.
July 2019
- BS courses taught ELECTRICITY AND MAGNETISM, BASIC ELECTRONICS.
 - Duties included Problem solving, Office hours for students, Homework grading.
- Sep 2018 – **Visiting faculty member,** DEPARTMENT OF PHYSICS, UNIVERSITY OF THE PUNJAB.
March 2019
- MSc course taught STATISTICAL MECHANICS.
 - Duties included Problem solving, Office hours for students.

Oct 2013 – **College teaching internee in Physics**, GOVT. COLLEGE FOR BOYS, GUJRANWALA.
May 2014

- BS course taught STATISTICAL MECHANICS.
- Intermediate course taught: GENERAL PHYSICS.
- Duties included Problem solving, Office hours for students, Homework grading.

Paper Setter and Examiner, UNIVERSITY OF THE PUNJAB.

- BS COMPUTER SCIENCE Examination 2016, 2018, 2019.
- BS IT Examination 2017, 2018, 2019.

Awards

- Secured 3rd position in MPhil with CGPA 3.87/4.00.
- DPCC scholarship in PhD.
- DPCC scholarship in Mphil.
- Merit scholarship in MSc.

Computer Skills

- Matlab, Maple, Mathematica, Python.
- Latex, Scientific workplace, MS word.

Research interests

- Classical and quantum field theories.
- Nonlinear dynamical systems.
- Integrable systems, Soliton theory.
- Bose-Einstein condensate.
- Deep Learning.
- Planar dynamical system theory

Publications

Publication Summary:

- Total peer-reviewed journal papers: 38
- Papers in journals (JCR: Q1): 12
- Papers in journals (JCR: Q2): 18
- Papers in journals (JCR: Q3): 7
- Papers in SCI-indexed journal; (JCR status: under review): 1

* *Corresponding author*

1. A. JAMIL, H.W.A. RIAZ* and A. FAROOQ, Effects of non-commutativity on soliton behavior in the AB System with time-dependent coefficients in fluid dynamics, International Journal of Geometric Methods in Modern Physics, <https://doi.org/10.1142/S0219887826501379>. JCR: Q2

2. G. H. Tipu, H. W. A. Riaz*, F. Yao, S. Iskandarov, A. Seytov, *Semi Discrete Konno–Oono System: Integrable Lattice Formulations, Bäcklund Transformation, and Liouville Type Reduction*, *Modern Physics Letters B* (accepted) [JCR: Q2](#).
3. H.W.A. RIAZ, A. FAROOQ, and J. LIN, PT-Symmetry in Nonlocal Spatial Discrete Complex Coupled Dispersionless System: Analytical and Computational Insights, *Nonlinear Dynamics*, **113** (2025) 21667. [JCR: Q1](#)
4. H.W.A. RIAZ and A. FAROOQ, Exact solutions and nonlinear wave interactions in a non-commutative coupled dispersionless system with variable coefficients, *Nonlinear Dynamics*, (2025), <https://doi.org/10.1007/s11071-025-11833-6>. [JCR: Q1](#)
5. H. W. A. RIAZ and A. FAROOQ, A (2+1) Modified KdV Equation with Time-Dependent Coefficients: Exploring Soliton Solution via Darboux transformation and Artificial Neural Network Approach, *Nonlinear Dynamics*, **112** (2025) 3695. [JCR: Q1](#)
6. A. FAROOQ, H.W.A. RIAZ and W.X. MA, On symmetry solutions of nonlocal complex coupled dispersionless system using Darboux transformation and artificial neural networks, *Chinese Journal of Physics*, **97** (2025) 933. [JCR: Q1](#)
7. H.W.A. RIAZ and A. FAROOQ, Hybrid analytical and data-driven approaches to the non-local short pulse equation, *European Physical Journal C*, **85** (2025) 895. [JCR: Q1](#)
8. H. W. A. RIAZ, Quasi-Wronskian solitons in the non-commutative kuralay-IIA equation: analysis and simulations, *Physica Scripta*, **100** (2025) 025239. [JCR: Q2](#)
9. H.W.A. RIAZ and J. LIN, A novel (2+1)-dimensional complex coupled dispersionless system: Darboux transformation and multisolitons, *Chinese Physics B*, 2025, 10.1088/1674-1056/adceff [JCR: Q2](#)
10. Y. MENG, H.W.A. RIAZ and J. LIN, Variable Separation Approach and New types of Non-degenerate Solitons for a (2+1)-Dimensional Coupled System, *Communications in theoretical Physics*, **77** (2025) 095001. [JCR: Q2](#)
11. S. REHMAN, A. FAROOQ H.W.A. RIAZ*, and et al. Analyzing the Double-Chain Deoxyribonucleic Acid Model: bifurcation, chaos, and sensitivity insights through Advanced analytical Techniques, *Theory in Biosciences* (accepted) [JCR: Q3](#)
12. M. I. KHAN, H.W.A. RIAZ, and et. al. Modulation Instability and Nonlinear Dynamics in the (2+1)- Dimensional Complex mKdV System: Innovative Solutions via Jacobi Elliptic Function Method, *Pramana-Journal of Physics* (accepted) [JCR: Q2](#)
13. H. W. A. RIAZ and J. LIN, Darboux transformation for a semi-discrete matrix coupled dispersionless system, *Applied Mathematics Letters*, **158** (2024) 109217. [JCR: Q1](#)
14. H. W. A. RIAZ, J. LIN and J. WANG, On an extended semi-discrete matrix coupled dispersionless system: Darboux transformation and explicit solutions, *Physics Letters A*, **528** (2024) 130060. [JCR: Q2](#)
15. H. W. A. RIAZ and J. LIN, Quasi-Gramian Solution of a Non-commutative Extension of the Higher-Order Nonlinear Schrödinger Equation, *Communications in Theoretical Physics*, **76** (2024) 035005. [JCR: Q2](#)

16. H. W. A. RIAZ and A. FAROOQ, Solitonic solutions for the reduced Maxwell-Bloch equations via the Darboux transformation and artificial neural network in nonlinear wave dynamics, *Physica Scripta*, **99** (2024) 126010. [JCR: Q2](#)
17. H. W. A. RIAZ and A. FAROOQ, Analytical solutions and instability analysis of truncated M-fractional coupled dispersionless equations, *Physica Scripta*, **99** (2024) 125230. [JCR: Q2](#)
18. H. W. A. RIAZ and A. FAROOQ, Exploring Soliton Solutions of Coupled Dispersionless Equations with New Insights into Bifurcation, Chaos, and Sensitivity through Advanced Analytical Techniques, *Optical and Quantum Electronics*, **56** (2024) 1784.
19. E. ASADI, H. W. A. RIAZ and M. GHANJKHANLOO, Generalized Darboux transformation for nonlinear Schrödinger system on general Hermitian symmetric spaces and rogue wave solutions, *International Journal of Geometric Methods in Modern Physics*, **20** (2023) 2350127. [JCR: Q2](#)
20. H. W. A. RIAZ, Non-commutative generalization and quasi-Gramian solutions of Hirota equation, *Theoretical and Mathematical Physics*, **214** (2023) 194. [JCR: Q3](#)
21. H. W. A. RIAZ, Exact multisolitons of noncommutative and commutative Lakshmanan- Porsezian- Daniel equation, *The European Physical Journal Plus*, **135** (2020) 508. [JCR: Q2](#)
22. H. W. A. RIAZ, Darboux transformation and exact multisolitons for a matrix coupled dispersionless system, *Communications in Theoretical Physics*, **72** (2020) 075001. [JCR: Q2](#)
23. H. W. A. RIAZ and M. HASSAN, Quasi-Gramian solutions of a multi-component short pulse equation, *Journal of Geometry and Physics*, **155** (2020) 103766. [JCR: Q1](#)
24. H. W. A. RIAZ, Noncommutative coupled complex modified Korteweg-de Vries equation: Darboux and binary Darboux transformations, *Modern Physics Letters A*, **34** (2019) 1950054. [JCR: Q2](#)
25. H. W. A. RIAZ, Multicomponent nonlinear Schrödinger equation in 2+1 dimensions, its Darboux transformation and soliton solutions, *The European Physical Journal Plus*, **134** (2019) 222. [JCR: Q2](#)
26. H. W. A. RIAZ, Darboux transformation for a negative order AKNS equation, *Communications in Theoretical Physics*, **71** (2019) 912. [JCR: Q2](#)
27. H. W. A. RIAZ and M. HASSAN, Dressing method for the multicomponent short pulse equation, *Theoretical and Mathematical Physics*, **199** (2019) 709. [JCR: Q3](#)
28. H. W. A. RIAZ and M. HASSAN, An integrable noncommutative generalization of the AB system and its multisoliton solutions, *Communications in Nonlinear Science and Numerical Simulation*, **79** (2019) 104936. [JCR: Q1](#)
29. H. W. A. RIAZ and M. HASSAN, Multisoliton solutions of discrete and semi-discrete principal chiral equations, *Communications in Nonlinear Science and Numerical Simulation*, **54** (2018) 416. [JCR: Q1](#)
30. H. W. A. RIAZ and M. HASSAN, Multi-component semi-discrete coupled dispersionless integrable system, its Lax pair and Darboux transformation, *Communications in Nonlinear Science and Numerical Simulation*, **61** (2018) 71. [JCR: Q1](#)

31. H. W. A. RIAZ and M. HASSAN, A discrete generalized coupled dispersionless integrable system and its multisoliton solutions, *Journal of Mathematical Analysis and Applications*, **458** (2018) 1639. [JCR: Q1](#)
32. H. W. A. RIAZ and M. HASSAN, Multi-component noncommutative coupled dispersionless system and its quasideterminant solutions, *Modern Physics Letters A*, **33** (2018) 1850086. [JCR: Q2](#)
33. H. W. A. RIAZ and M. HASSAN, On soliton solutions of the multi-component semi-discrete short pulse equation, *Journal of Physics Communications*, **2** (2018) 025005. [JCR: Q3](#)
34. H. W. A. RIAZ and M. HASSAN, Darboux transformation for a semi-discrete shortpulse equation, *Theoretical and Mathematical Physics*, **194** (2018) 360. [JCR: Q3](#)
35. H. W. A. RIAZ and M. HASSAN, Generalized lattice Heisenberg magnet model and its quasideterminant soliton solutions, *Theoretical and Mathematical Physics*, **195** (2018) 665. [JCR: Q3](#)
36. H. W. A. RIAZ and M. HASSAN, On the integrability of a multi-component coupled dispersionless integrable system, *Theoretical and Mathematical Physics*, **197** (2018) 1714. [JCR: Q3](#)
37. H. W. A. RIAZ and M. HASSAN, Noncommutative negative order AKNS equation and its soliton solutions, *Modern Physics Letters A*, **33** (2018) 1850209. [JCR: Q2](#)
38. H. W. A. RIAZ and M. HASSAN, Darboux transformation of a semi-discrete coupled dispersionless integrable system, *Communications in Nonlinear Science and Numerical Simulation*, **48** (2017) 387. [JCR: Q1](#)

Preprints

1. H. W. A. RIAZ and M. HASSAN, Integrable semi-discretization of complex and multi-component coupled dispersionless systems and their solutions, [arXiv:1901.05185](#)
2. H. W. A. RIAZ and M. HASSAN, On soliton solutions of the time-discrete generalized lattice Heisenberg magnet model, [arXiv:1901.04671](#)
3. H.W.A. RIAZ, M.I. KHAN and A. FAROOQ, Data-Driven Soliton Modeling in Conformable Coupled Dispersionless Systems Using Jacobi Elliptic Functions and Bayesian-Regularized Neural Networks, *submitted in Physica Scripta (Under Review)*
4. H.W.A. RIAZ and A. FAROOQ, Darboux transformation and neural network modeling of nonlinear wave interactions in a generalized coupled dispersionless system, *submitted in European Physical Journal Plus (Under Review)*
5. A. FAROOQ and H.W.A. RIAZ, Bayesian Regularization-Backpropagation Neural Networks for Soliton Solutions of the Shynaray-IIA Equation, *submitted in Mathematical Methods in Applied Sciences (Revision-Under Review)*
6. H.W.A. RIAZ and A. FAROOQ, Hybrid analysis of a (2+1)-dimensional complex coupled dispersionless system with variable coefficients using Darboux transformation and artificial neural networks, *submitted in Engineering Applications of Artificial intelligence (With Editor)*
7. S. C. ANCO, E. ASADI, H. W. A. RIAZ and M. GHANJKHANLOO, Sine-Gordon system on Affine Hermitian symmetric spaces and quasideterminantal form of its Darboux transformation, to be submitted

8. H. W. A. RIAZ, On Painlevé analysis and traveling wave solutions of a negative order AKNS equation , to be submitted
9. H. W. A. RIAZ, A fully discrete matrix coupled dispersionless equations and their explicit solutions, in preparation
10. H.W.A. RIAZ and J. LIN, Exploring dynamics to the nonlocal complex short pulse equation in optical media, in preparation
11. H. W. A. RIAZ and S. FANG, Darboux transformation of Reduced Maxwell-Bloch Equations and Its Generalization to Hyperbolic Case, in preparation
12. H. W. A. RIAZ and LI NA, Exact multisolitons of an N -component discrete coupled system, in preparation
13. H. W. A. RIAZ and M. HASSAN, Peakon dynamics for the negative order AKNS system, in preparation
14. H. W. A. RIAZ, E. ASADI, Integrable discretization of sine-Gordon system, in preparation

Workshops, Conferences, Seminars

- April 2024 The 10th International Conference on Nonlinear Mathematical Physics and the 17th National Workshop on Solitons and Integrable Systems, Lishui, China China.
- .
- April 2024 Symposium on New Progress in Nonlinear Mathematical Physics, Jinhua, China China.
- .
- Sep 2019 – Attended various seminars, CUMT, CAS and Peking University, Beijing, China. China.
- May 2021 .
- March 2020 – Virtual Seminar Series –Integrable Systems, International Centre for Mathematical Sciences (ICMS).
- April 2022 .
- March 2021 Integrable systems in Newcastle: Integrability and Applications (Virtual Meeting).
- .
- Oct-Nov 2020 LMS Introduction to Integrability Lecture Series, University of Glasgow (Virtual Lectures).
- .
- Oct 2020 Geometric Structures in Integrable Systems 2020, University of Salento, Lecce, Italy (Virtual Conference).
- .
- Nov 2018 Symmetries and Integrability of Difference Equations, Fukuoka, Japan.
- .
- Dec 2018 International Physics Conference on Innovation in Material Science and Nanotechnology, LGU, Lahore.
- .
- June 2018 Scientific Research Training Workshop, Centre of Excellence in Solid State Physics, University of Punjab, Lahore.
- .
- Feb 2015 International Conference on Relativistic Astrophysics, Department of Mathematics, University of the Punjab, Lahore.
- .

Oct 2014 – Departmental Seminar Series in Department of Physics, University of the Punjab, Lahore.
Jan 2019 .
May 2012 Teacher training workshop, Gift University, Gujranwala.
.

Reviewer of international journals

- Wave Motion
- Modern Physics Letters B
- The European Physical Journal Plus
- Optical and Quantum Electronics
- Complexity
- International Journal of Theoretical Physics
- Scientific Reports
- Arabian Journal of Mathematics
- Theory in Biosciences
- Quantum Information Science
- AIMS Mathematics
- Mathematical Methods in Applied Sciences
- Proceedings of the Royal Society of A
- Contemporary Mathematics

References

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Professor,

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Professor,

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