

# DR. HIRA TARIQ

**HEC Approved Ph.D. Supervisor**

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## Academic Qualification

Sr no.	Education	Year	Institute
1	Ph.D. (Mathematics)	2017	Department of Mathematics, Punjab University, Lahore
2	M.Phil (Mathematics)	2012	Department of Mathematics, GC University, Lahore
3	BS (Mathematics)	2010	Department of Mathematics, LCWU, Lahore

**Title of Ph.D. Thesis:** Efficacious Algorithms for the Solutions of Fractional Differential Equations.

**Title of M.Phil. Thesis:** Some Studies on Regularization of Greens Function on 3D structure and Its Applications.

## Professional Services/Activities at GCWUS

1. Incharge, Department of Mathematics, GC Women University, Sialkot.
2. Member of BOS (2023)
3. Focal Person for Departmental Annual Report (2023)
4. Incharge of the Department (2023)
5. Member of DRPC (2023)
6. Convener of MS Admission Entry test Committee (2023)
7. Member of Visiting/ CTIs Appointment Committee (2023)
8. Member of Departmental Research Program Committee (2022)
9. Convener of Committee for Departmental Annual Report (2022)
10. Convener of Committee for Prepare/Conduct the Test for Admission in MS Mathematics (2022)
11. Member of Sub-Committee for Construction/Preparation and Making of Admission Test for BS Program (2022)
12. Member of Procession and Robe Committee (2022)

13. Member CTIs and Visiting Appointment committee for the Semester Fall-2022 and Spring 2022
14. Convener of Pre-ISAC Committee of the Mathematics Department (2022)
15. Focal Person for Departmental Annual Report (2021)
16. Convener of Committee for Prepare/Conduct the Test for Admission in MS Mathematics (2021-2023)
17. Convener of Departmental Team for QEC (2021)
18. Member of BOS (2021)
19. Member of Central Admission Committee (2021)
20. Member of Sub-Committee for Construction/Preparation and Making of Admission Test for BS Program (2021)
21. Member CTIs and Visiting Appointment committee for the Semester Fall-2021
22. Member of Advisory committee of establishing psychosocial well-being center at GCWUS (2020)
23. Member of career counselling committee (2019)

### **Fields of Interests**

- Calculus
- Ordinary Differential Equations
- Fractional Calculus
- Partial Differential Equations
- Topology and Functional analysis
- Linear Algebra
- Numerical Analysis

### **Research Interests**

- Fractional Calculus
- Solutions of Differential Equations
- Theory of Spline Functions

### **Personal Skills**

- Installation and operation of all general softwares and drivers

- MS office, Latex
- MATLAB, Mathematica, Maple

### Practical Exposure

- 2013, **Lecturer**, Queen Mary College, Lahore.
- April 2017-December 2017, **Visiting Lecturer**, University of Education, Lahore.
- 04 Jan 2018- 27 March 2018, **Assistant Professor**, University of Education, Attock Campus.
- 28 March 2018- present, **Assistant Professor**, GC Women University, Sialkot.

### Achievements/Awards

- DPCC Merit Scholarship in Ph.D., Department of Mathematics, University of the Punjab, Pakistan.
- Roll of Honour in BS (Hons) Mathematics.
- Obtained highest CGPA in M.Phil. examinations held at Department of Mathematics, GC University, Lahore.

### Research Publications

1. Ghazala Akram, **Hira Tariq**, An Exponential Spline Technique for Solving Fractional Boundary Value Problem, *Calcolo*, **53(4)**, (2016), 545–558. (**IF/HEC Category=2.157/W**)
2. Ghazala Akram, **Hira Tariq**, Cubic polynomial Spline Scheme for Fractional Boundary Value Problems with Left and Right Fractional Operators, *International Journal of Applied and Computational Mathematics*, **3(2)** (2017), 937–946. (**IF/HEC Category=1.77/Y**)
3. Ghazala Akram, **Hira Tariq**, Quintic Spline Collocation Method for Fractional Boundary Value Problems, *Journal of the Association of Arab Universities for Basic and Applied Sciences*, **23** (2017), 57–65 .
4. **Hira Tariq**, Ghazala Akram, Quintic Spline Technique for Time Fractional Fourth-Order Partial Differential Equation, *Numerical Methods for Partial Differential Equations*, **33(2)** (2017), 445–466. (**IF/HEC Category=3.009/W**)
5. **Hira Tariq**, Ghazala Akram, Residual Power Series Method for Solving Time-Space-Fractional Benney-Lin Equation Arising in Falling Film Problems, *Journal of Applied Mathematics and Computing*, **55** (2017), 683–708 (**IF/HEC Category=1.417/X**)
6. **Hira Tariq**, Ghazala Akram, New Traveling Wave Exact and Approximate Solutions For the Nonlinear Cahn-Allen Equation: Evolution of a Nonconserved Quantity, *Nonlinear Dynamics*, **88(1)** (2017), 581–594. (**IF/HEC Category=5.741/W**)

7. **Hira Tariq**, Ghazala Akram, New Approach for Exact Solutions of Time Fractional Cahn-Allen Equation and Time Fractional Phi-4 Equation, *Physica A: Statistical Mechanics and its Applications*, **473** (2018), 352–362. **(IF/HEC Category=3.263/W)**
8. Hadi Rezazadeh, **Hira Tariq**, Mustafa Eslami, Mohammad Mirzazadeh, Qin Zhou, New exact solutions of nonlinear conformable time-fractional Phi-4 equation, *Chinese Journal of Physics, Taipei*, **56(6)** (2018), 2805–2816. **(IF/HEC Category=3.327/W)**
9. **Hira Tariq**, Ghazala Akram, Spline Solutions of Linear Fractional BVPs using Two Approaches, *TWMS Journal of Applied and Engineering Mathematics*, **8(2)** (2018), 399–410.
10. Jamilu Sabiu, Hadi Rezazadeh, **Hira Tariq**, Amet Bekir, Optical solitons for the two forms of Biswas-Arshed equation, *Modern Physics Letters B*, **33(25)** (2019), 1950308. (World Scientific) **(IF/HEC Category=1.224/Y)**
11. **Hira Tariq**, Hatira Gunerhan, Hadi Rezazadeh, Waleed adel, A numerical approach for the nonlinear temporal conformable fractional foam drainage equation, *Asian-European Journal of Mathematics*, <https://doi.org/10.1142/S1793557121500893> (2020). **(IF/HEC Category=4.476/Y)**
12. **Hira Tariq**, Hajaz Ahmed, Hadi Rezazadeh, Shumalia Javeed, Khuraam Saleem Alimgeer, Kamsing Nonlaopon, Jamel Bailih, Khaled Mohammad Khedherj, New travelling wave analytic and residual power series solutions of conformable Caudrey-Dodd-Gibbon-Sawada-Kotera equation, *Results in Physics*, **29** (2021), 104591. (Elsevier) **(IF/HEC Category=4.476/W)**
13. **Hira Tariq**, Ghazala Akram, Masoomah Sadaf, H. Rezazadeh, Jamel Bailih, Yu-Pei Lv, Hajaz Ahmad, Computational study for the conformable nonlinear Schrödinger equation with cubic-quintic-septic nonlinearities, *Results in Physics*, **30** (2021), 104839. (Elsevier) **(IF/HEC Category=4.476/W)**
14. Ghazala Akram, Muhammad Abbas, **Hira Tariq**, Masoomah Sadaf, Tahbet Abdeljawad, Manar A. Alqudah, Numerical Approximations for the Solutions of Fourth Order Time Fractional Evolution Problems Using a Novel Spline Technique, *Fractal and Fractional*, **6** (2022), 170. **(IF/HEC Category=3.557/W)**
15. **Hira Tariq**, Hadi Rezazadeh, Mehmet Senol, Orkun Tasbozan, Ali Kurt, Approximate Solutions for A Fractional Shallow Water Flow Model, *Ikonion Journal of Mathematics*, **5** (2023), 65-75.
16. Wardat us Salam, **Hira Tariq**, Robina Rafeeq, Hijaz Ahmad, Khaled Mohamed Khedher, New solitary wave solutions to Biswas-Milovic and resonant nonlinear Schrödinger equations, *Optical and Quantum Electronics*, **56** (2024), 744.
17. **Hira Tariq**, Hira Ashraf, Hadi Rezazadeh Ulviye Demirbilek, Travelling wave solutions of nonlinear conformable Bogoyavlenskii equations via two powerful analytical approaches, *Applied Mathematics-A Journal of Chinese Universities*, **39** (2024), 502-518.

18. **Hira Tariq**, G. Akram, Quadratic Spline Solution for Local Fractional Nonlinear Initial Value Problem. (Submitted)
19. **Hira Tariq**, G. Akram, Hyperbolic Spline Technique for Fractional Initial and Boundary Value Problems. (Submitted)
20. **Hira Tariq**, G. Akram, Sextic Spline Method for Time-Fractional Partial Differential Equation. (Submitted)
21. **Musava**, G. Akram, Cubic and Quartic Spline Solutions for Nonlinear Second Order Differential Equations. (Submitted)
22. **Hira Tariq**, G. Akram, Quintic and Sextic Spline Techniques-Quasilinearization for Nonlinear Boundary Value Problems. (Submitted)

### **Supervision of MS Theses**

**Completed in 2023**

**Hira Ashraf** ANALYTICAL SOLUTIONS OF COUPLED KONNOOONO EQUATION USING MODIFIED AUXILIARY EQUATION METHOD AND GENERALIZED PROJECTIVE RICCATI EQUATION METHOD

**Maria Iftikhar** SOLUTIONS OF THE COUPLED NONLINEAR SCHROODINGER EQUATIONS IN FIBER BRAGG GRATINGS USING RESIDUAL POWER SERIES METHOD

**Completed in 2024**

**Kanwal Shahzadi** NUMERICAL INVESTIGATION OF CONFORMABLE DIFFERENTIAL EQUATION WITH POLYNOMIAL SPLINE FUNCTION

**Sadia Ijaz** CONSTRUCTION OF NEW TRAVELING WAVE SOLUTIONS FOR THE NON-LINEAR FRACTIONAL ORDER EVOLUTION EQUATIONS THROUGH  $(G'/G, 1/G)$ -EXPANSION METHOD

### **Conferences and Seminars**

**As a Participant**

**April 13th, 2019** International Conference on **International Conference on Quality of Life, Education and Health** organized by “Quality and Productivity Society of Pakistan, Foundation for healthcare Improvement, Lahore school of Management, Pakistan Institute of Quality Control, Skills Development Center-PU, University of Central Punjab and Ejaz Foundation”, at Auditorium, University of Central Punjab, Lahore.

**March 29th-31st, 2019** 5th UMT International Conference on **Pure and Applied Mathematics (5th UICPAM-2019)** organized by Centre for Mathematics and its Applications (CMAP) UMT, at UMT, Lahore.

**February 20th-22nd, 2019** International conference on **Recent Advances in Applied Mathematics (ICRAAM 2019)** organized by Department of Mathematics, COMSATS University Islamabad, Lahore Campus at COMSATS University Islamabad, Lahore Campus.

**March 2nd, 2018** 3rd one day symposium on **Algebra, Analysis and its Applications** organized by Department of Mathematics, University of Management and Technology, Sialkot Campus at University of Management and Technology, Sialkot Campus.

**2013–2017, Weekly Departmental Seminar Series** at Department of Mathematics, University of the Punjab, Lahore.

**Feb., 2015, International Conference on Relativistic Astrophysics** at Department of Mathematics, University of the Punjab, Lahore.

**March, 2015, 1st UMT National Conference on Pure and Applied Mathematics** at Department of Mathematics, UMT, Lahore.

**November, 2016, One Day Conference on Gravitation and Cosmology** at Department of Mathematics, Punjab University, Lahore.

#### **As a speaker**

1. **Numerical Solutions of Conformable Fractional Differential Equations** Webinar; Department of Mathematics, University of Education, Bank Road Campus, Lahore ; June 25, 2021.
2. **Effective CV Writing Skills** at G.C. Women University Sialkot; 18th–21st March 2019.
3. **Solving Fractional BVPS with Spline Technique** at Department of Mathematics, University of the Punjab, Lahore; December 17, 2014.
4. **Solutions of Fractional Boundary Value Problem** at Department of Mathematics, University of the Punjab, Lahore; November 18, 2015.
5. **An Exponential Spline Collocation Method for Boundary Value Problem of Fractional Order** at International Conference on Recent Advances in Applied Mathematics, COMSATS Institute of Information technology; December 17, 2015.
6. **A Spline Collocation Method for Fractional Boundary Value Problem** at 1st UMT International Conference on Pure and Applied Sciences (1st UICPAS-2016), Dept. of Mathematics, UMT, Lahore; March 7, 2016.
7. **Quintic Spline Technique for Fractional Differential Equation** at Department of Mathematics, University of the Punjab, Lahore; August 24, 2016.