

MUHAMMAD FAROOQ



Qualification: PhD (Applied Mathematics)
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Present Institution: Assistant Professor of Mathematics, Room No. B1022-B26, Sheikh Taimur Academic Block-II, Department Of Mathematics, University Of Peshawar, 25120, Khyber Pakhtunkhwa, Pakistan.

Professional Summary

I have had the privilege of working as a Mathematics Lecturer at Nisar Shaheed Degree College, Risalpur Cantt, Khyber Pakhtunkhwa, Pakistan, from January 24, 2001, to October 31, 2006. With over 18 years of teaching experience, including 12 years at the University level, I hold a Master of Science in Mathematics from the University of Peshawar, Pakistan, earned in 1999. In March 2001, I completed my PhD in "New Lanczos-Type Algorithms and Its Implementation" from the Department of Mathematical Sciences, University of Essex, Wivenhoe Park, Colchester, CO4 3SQ, United Kingdom. During my doctoral studies, I also served as a Teaching Assistant under the guidance of Professor Abdellah Salhi, instructing foundation courses for Mathematics students.

My instructional roles have spanned diverse educational institutions. At the University of Essex, UK, I taught foundational Mathematics courses, while at Nisar Shaheed Degree College, Risalpur Cantt, Pakistan, I educated FSc and BSc level students in subjects like Trigonometry, Calculus, Numbers theory, mathematical methods, mechanics and vector analysis, among others. My commitment to fostering learning led me to my current position as an Assistant Professor of Mathematics at the University of Peshawar since April 05, 2011. In this role, I have taught various Mathematics courses at different academic levels, including Numerical Analysis, Differential Equations, Linear Algebra, and Mathematics for Economics.

My dedication extends beyond the classroom, as I also mentor students in utilizing technology for educational research and provide guidance to those pursuing degrees in Computer Science, Physics, Archaeology, Geography, Urban & Rural Planning, and Criminology. As a member of the Board of Studies, Academic Council, and Senate at the University of Peshawar, I contribute to academic governance. Furthermore, I have been involved in course planning and enhancement at the Department of Mathematics, University of Peshawar, where I revamped courses like Computer Algebra System, Advanced Differential Equations, and Mathematical Biology.

Passionate about facilitating holistic student development, I approach teaching as a facilitator rather

than a traditional instructor. My teaching interests encompass:

- Linear Algebra
- Group Theory
- Vector Analysis
- Numerical Analysis
- Differential Equations
- Mathematical Biology
- Calculus and Analytic Geometry

Courses Designed

- Computer Algebra System,
- Advanced Differential Equations
- Mathematical Biology

Research Statement

My research interests encompass a diverse range of topics within the field of mathematics. With a background in Lancos-type algorithms and their implementation, I have a keen interest in numerical analysis and optimization techniques. My doctoral work has provided me with a solid foundation in algorithmic development and computational mathematics.

Building upon my expertise, my current research focus centers around the dynamic field of mathematical modeling of infectious diseases. I am deeply intrigued by the application of mathematical concepts to understand the spread, control, and mitigation of infectious diseases within populations. This multidisciplinary research area allows me to combine my mathematical skills with epidemiological insights to develop models that can guide public health interventions and policy decisions. I am also interested in the fluid dynamics and currently one of my PhD students is working in the same area especially radiative nanofluid flow.

I am also enthusiastic about exploring related areas, such as network theory and statistical analysis, to enhance the accuracy and applicability of infectious disease models. As a dedicated educator, I am driven to incorporate my research findings into my teaching, fostering a holistic learning experience for my students. Overall, my research journey reflects a commitment to harnessing the power of mathematics to address real-world challenges and contribute to the betterment of society.

My research interests include the following areas:

- Strong foundation in Lancos-type algorithms and their implementation.
- Proficient in numerical analysis and optimization techniques.
- Algorithm development and computational mathematics.
- Mathematical modeling of infectious diseases, applying mathematical concepts to understand disease spread and control.
- Multidisciplinary approach, combining mathematical skills with epidemiological insights.
- Network theory and statistical analysis to enhance infectious disease models.
- Dedicated educator, integrating research findings into teaching for a comprehensive learning experience.
- Effective communicator, capable of translating complex mathematical concepts to a wider audience.

- Committed to leveraging mathematics for real-world problem-solving and societal impact.
- Fluid Dynamics.

Skills

I possess the ability to create engaging, thought-provoking, and inventive activities that cater to the diverse interests and requirements of students. My exceptional communication and research abilities enable me to present information in diverse formats, underlining the significance of course material in real-world contexts. With a robust teaching philosophy, I am well-versed in employing various techniques to inspire students and foster their expertise in specific domains. As a proactive team member, I excel in collaborative efforts with colleagues and cultivate meaningful connections with students. Throughout my tenure as faculty, I have consistently delivered high-quality work, earning both the respect of my employers and a favorable reputation among students. My aptitude extends to designing, coordinating, and executing research initiatives both independently and as part of a collaborative research team. Moreover, I possess adept leadership skills and the capacity to motivate research groups.

Impact Factor

RG Score: 630.5, Scopus h-index: 21

Citations

Total 1072, *h*-index: 16, *i*10-index 19

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[Google Scholar](#) [ORCID](#)

https://www.researchgate.net/profile/Muhammad_Farooq23/stats

<https://www.webofscience.com/wos/author/record/AAE-3478-2019> [SCOPUS](#)

Teaching Experience

05/04/2011 to Date	Assistant Professor of Mathematics Department of Mathematics, University of Peshawar, Khyber Pakhtunkhwa, Pakistan. Teaching different Mathematics courses to BS, MSc, MPhil & PhD classes.
24/01/2001 to 31/10/2006	Lecturer in Mathematics Nisar Shaheed Degree College Risalpur Cantt; Khyber Pakhtunkhwa, Pakistan. Teaching Mathematics to FSc & BSc classes.
December 2011 till date	Visiting Faculty member Institute of Management Sciences, Hayatabad, Peshawar, Khyber Pakhtunkhwa, Pakistan. Teaching different mathematics courses to undergraduate students of Data Science, Computer Science, Software Engineering, Economics.

National and International Professional Association

Editorial Membership

1. Member Editorial Board of International Journal of Advances in Engineering & Technology.
2. Member Editorial Board of International Journal of Scientific & Engineering Research.

Academics

09/11/2006 to 28/03/2011	PhD (Applied Mathematics), Department of Mathematical Sciences, University of Essex, UK. <i>Thesis title:</i> New Lanczos-type Algorithms and their Implementation
01/06/1996 to 13/9/1998	Master of Science (Mathematics), University of Peshawar, Khyber Pakhtunkhwa, Pakistan. <i>Study emphasis:</i> Group Theory, Linear algebra, Topological Space, Nonlinear Dynamics, Numerical Analysis, Complex analysis, Real analysis, Differential Equations, Mathematical Statistics.
December 1993 to August 1995	Bachelor of Science with Mathematics & Physics, Islamia College, Peshawar, Pakistan.

Research Publications (Journal Articles)

2025

1. Bilal, M. & Maiz, F. & **Farooq, M.** & Ahmad, H. & Nasrat, M. & Ghazwani, H. (2025), "Novel numerical and artificial neural computing with experimental validation towards unsteady micropolar nanofluid flow across a Riga plate", *Scientific Reports*, 15(759), <https://doi.org/10.1038/s41598-024-84480-3> (IF. 3.8).
2. Yu, F. & Khan, MY. & Riaz, MB. & Ullah, S. & **Farooq, M.** (2025), Assessing the global dynamics of Nipah infection under Vaccination and treatment: A novel computational modeling Approach, *PLOS one*, <https://doi.org/10.1371/journal.pone.0309360> (IF. 2.9).

2024

3. MY khan, S Ullah, **M. Farooq** and A. Baseer Saqib, (2024), "Optimal Control Analysis for the Nipah infection with constant and time-varying Vaccination and treatment with real data application", *Scientific Reports*, 14, Article number: 17532. <https://www.nature.com/articles/s41598-024-68091-6> (IF. 3.8).
4. S. Ahmad, T. Hussain, A. Baseer Saqib, JM. Farhan and **M. Farooq**, (2024) "Killing vector fields of locally rotationally symmetric Bianchi type V spacetime", *Sci Rep* 14, 10239 (2024). <https://doi.org/10.1038/s41598-024-58560-3> (IF. 4.6).
5. AH. Ganie; **M. Farooq**; MK. Nasrat; et al, (2024), "Radiative Nanofluid Flow over a Slender Stretching Riga Plate under the Impact of Exponential heat Source/sink", *Open Physics*, 22(20240020) <https://doi.org/10.1515/phys-2024-0020> (IF. 1.9).
6. Bilal, M. & **Farooq, M.** & Ahmad, H. & Ullah, I. & Alam, MM. (2024) "Mathematical Simulation of Tangent Hyperbolic Nanofluid Flow Coupled with Homogenous/heterogeneous Chemical Reaction by using Levenberg-Marquardt back Propagation over a Riga plate" *Journal of Thermal Analysis and Calorimetry*, <https://doi.org/10.1007/s10973-024-13554-1> (IF. 3.0).
7. Muhammad Younas Khan, Saif Ullah, **Muhammad Farooq**, Muhammad Bilal Riaz, "Modeling the dynamics of dengue fever with double susceptibility and optimal control strategies", *Model. Earth Syst. Environ.* (2024). <https://doi.org/10.1007/s40808-024-02152-7> (IF. 2.7).

2023

8. R. Jan, S. Alyobi, M. Inc and **M. Farooq**, (2023), "A robust study of the transmission dynamics of malaria through non-local and non-singular kernel", in *AIMS Mathematics*, 8(4): 7618–7640. (IF. 2.739).

2021

9. MF Khan, H. Alrabaiah, S. Ullah, MA Khan, **M. Farooq**, Mustafa bin Mamat, M. Imran Asjad, (2021), "A new fractional model for vector-host disease with saturated treatment function via singular and non-singular operators", in Alexandria Engineering Journal, 60 (1), 629-645. (IF: 6.626).

2020

10. S. Ullah, MF Khan, SAA Shah, **M. Farooq**, MA Khan & Mustafa Bin Mamat, (2020), "Optimal control analysis of vector-host model with saturated treatment", in The European Physical Journal Plus, 135:839, 1-25. (IF. 3.758)
11. SAA Shah, MA Khan, **M. Farooq**, S. Ullah & E. O. Alzahrani, (2020), "A fractional order model for Hepatitis B virus with treatment via Atangana-Baleanu derivative" in Physica A: Statistical Mechanics and its Applications, 538(122636), 1-17. (IF. 3.778)
12. S. Ullah, M. A. Khan, **M. Farooq**, Z. Hammouch and D. Baleanu , (2020), "A fractional model for the dynamics of Tuberculosis infection using Caputo-Fabrizio derivative" , in Discrete and Continuous Dynamical Systems - Series S , 13(3), 975-993. (IF. 2.425)
13. S. Ullah, MA Khan, **M. Farooq** and E. O. Alzahrani, (2020), "A fractional model for the dynamics of tuberculosis (TB) using Atangana-Baleanu derivative", in Discrete & Continuous Dynamical Systems Series-S, 13(3), 937-956. (IF. 2.425)
14. S. Ullah, MA Khan, **M. Farooq**, T. Gul and F. Hussain, (2020), "A fractional order HBV model with hospitalization", in Discrete & Continuous Dynamical Systems Series-S, 13 (3), 957-974. (IF. 2.425)
15. MA Khan, SAA Shah, S Ullah, KO Okosun and **M Farooq**, (2020), "Optimal control analysis of the effect of treatment, isolation and vaccination on hepatitis B virus", in Journal of Biological Systems, 28(2), 351–376. (IF. 1.909)

2019

16. S. Ullah, MA Khan, **M. Farooq** & Taza Gul, (2019), "Modeling and analysis of Tuberculosis (TB) in Khyber Pakhtunkhwa Pakistan", in Mathematics and Computers in Simulation, 165, 181-199. (IF. 4.6)
17. MA Khan, M Ahmad, S Ullah, **M Farooq** & T Gul, (2019), "Modeling the transmission dynamics of tuberculosis in Khyber Pakhtunkhwa Pakistan", in Advances in Mechanical Engineering, 11 (6), 1-13. (IF. 1.9).

18. S. Ullah, MA Khan & **M. Farooq**, (2019), "Mathematical modelling of Hepatitis B infection with vaccination and optimal control interventions", in Journal of Computational Methods in Sciences and Engineering, 20(1), 331-349 **(IF. 0.5)**
19. S. Ullah, M. A. Khan and **M. Farooq**, (2019), "Mathematical Modelling Approach to Hepatitis B virus with Vaccination and optimal control", in International Journal of Ecology and developments, 34 (3), 69-81. **(IF. 0.493)**

2018

20. S. Ullah, MA Khan & **M. Farooq**, (2018), "A new fractional model for the dynamics of Hepatitis B virus using Caputo-Fabrizio derivative", in European Physical Journal Plus, 133, 1-14. **(IF. 3.758)**
21. S. Ullah, MA Khan & **M. Farooq**, (2018), "A fractional model for the dynamics of TB virus", in Chaos, Solitons & Fractals, 116, 63-71. **(IF. 9.922)**
22. MA Khan, S. Ullah, & **M. Farooq**, (2018), "A new fractional model for tuberculosis with relapse via Atangana-Baleanu derivative", in Chaos, Solitons & Fractals, 116, 227-238. **(IF. 9.922)**
23. S. Ullah, MA Khan, **M. Farooq**, (2018), "Modeling and analysis of fractional HBV model with Atangana-Baleanu derivative", in Eur. Phys. J. Plus, 133, 1-18. **(IF. 3.758)**
24. MSA Khan, S. Abdullah, MY Ali, I. Hussain and **M. Farooq**, (2018), "Extension of TOPSIS method based on Choquet integral under interval-valued Pythagorean fuzzy environment", in Journal of Intelligent and Fuzzy Systems, 34 (1), 267-282. **(IF. 2.0)**

2015-11:

25. Z. Ullah, **M. Farooq** and A. Salhi, (2015)", A19/B6: A new Lanczos-type algorithm and its implementation", in Journal of Prime Research in Mathematics, 10(1), 106 - 122. **(IF. 0.238)**.
26. **M. Farooq** and A. Salhi, (2014), "A Switching Approach to avoid Breakdown in Lanczos-type Algorithms", in Applied Mathematics & Information Sciences, 2014, 8(5), 2161-2169. **(IF. 0.258)**.
27. **M. Farooq** and A. Salhi, (2013), "A Preemptive Restarting Approach to Beating the Inherent Instability of Lanczos-type Algorithms", in Iranian Journal of Science & Technology, Transaction A-Science, 2013, 37(3.1), 349 – 358. **(IF. 1.553)**.
28. S. Ullah, **M. Farooq** and A. Salhi, (2013), "An alternative derivation of a new Lanczos-type algorithm for system of linear equations", in Punjab University Journal of Mathematics, 45, 39-49.

29. M. Farooq and A. Salhi, **(2012)**, "New Recurrence Relationships between Orthogonal Polynomials which Lead to New Lanczos-type Algorithms", in Journal of Prime Research in Mathematics, 8, 61-75. **(IF. 0.238)**.

30. M. Farooq and A. Salhi, **(2011)**, "Improving the Solvability of Ill-conditioned Systems of Linear Equations by Reducing the Condition Number of their Matrices", in J. Korean Math. Soc. 48 (5), 939 – 952. **(IF. 0.531)**.

Awards

Faculty Development Scholarship for PhD at the University of Essex, UK by Higher Education Commission, Islamabad, Pakistan.

International Assignment/Reviewer

- i. Computational and Mathematical Methods, Hindawi
- ii. Computational and Mathematical Methods in Medicine, Hindawi
- iii. Journal of Mathematics, Hindawi
- iv. Neural Computing and Applications, Springer
- v. Computer Methods in Biomechanics and Biomedical Engineering, Taylor & Francis
- vi. Frontiers in Public Health
- vii. Symmetry, MDPI
- viii. Fractal and Fractional, MDPI
- ix. African Journal of Mathematics and Computer Science Research

Internal roles:

Since April 2011, I have undertaken a number of roles within the Department of Mathematics, University of Peshawar, these are briefly summarized as:

1. Looking after the Department in the absence of Head of Department (During official visits abroad or inland)
2. Member Senate, University of Peshawar
3. Member Academic Council, University of Peshawar
4. Focal Person for the University of Peshawar [Green Campus Initiative](#)
5. Coordinator MSc Program
6. Member Departmental Graduate Studies Committee
7. Member of the Departmental Admission Committee

8. In-charge students' affairs
9. Member of Departmental Financial Committee
10. Member of Departmental Board of Studies

External role(s): In addition to editorial, refereeing and assessment duties, I have also undertaken the following roles in different universities:

1. Member Board of Studies, Department of Mathematics, **Khushal Khan Khattak University, Karak, Khyber Pakhtunkhwa, Pakistan.**
2. Member of the Graduate Studies Committee, **Electronics Department, University of Peshawar, Khyber Pakhtunkhwa, Pakistan.**
3. Member Board of Studies, **Department of Mathematics, Abdul Wali Khan University, Mardan, Khyber Pakhtunkhwa, Pakistan.**
4. Member of the Graduate Studies Committee, **Department of Mathematics, Abdul Wali Khan University, Mardan, Khyber Pakhtunkhwa, Pakistan.**
5. Member Advanced Studies & Research Board, **Benazir Shaheed Women University (formerly known as Frontier Women University), Peshawar, Khyber Pakhtunkhwa, Pakistan.**
6. Member of the Graduate Studies Committee, Department of Mathematics, **Khushal Khan Khattak University, Karak, Khyber Pakhtunkhwa, Pakistan.**
7. Member of the Graduate Studies Committee, Department of Mathematics, **University of Swabi, Khyber Pakhtunkhwa, Pakistan.**
8. Member Board of Studies, Department of Mathematics, **University of Swabi, Khyber Pakhtunkhwa, Pakistan.**
9. Member of **National Curriculum Review Committee, Higher Education Commission, Islamabad.**

Technical Skills

No.	Skill Title	Skill Level (Basic/Intermediate/Proficient)	Total Experience (years)	Last used (Year)
1	Mathematica software	Proficient	12 years	2024
2	Latex	Proficient	17 years	2024
3	MATLAB	Intermediate	15 years	2024

Others

- Security Orientation Training
- First AID training
- Training of National Cadet Course (NCC)
- LTV Driving license (Pakistani)

Sports

Cricket and Table Tennis.

Co-curricular activities

Member of the Mathematics Society at the Department of Mathematics, University of Peshawar. I am socially active in my community and strive to make new friends and researchers. I help my colleagues and students with their daily research/academic issues.

Languages

English (Fluent in writing, speaking, and reading), Urdu (Fluent in writing, speaking, and reading), Arabic (Basic), Pashtu (Mother's tongue)

References

1). Dr. Abdellah Salhi

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Chairman/Professor,

Department of Mathematics, University of Peshawar Khyber Pakhtunkhwa, Pakistan.

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3). Dr. Atta Ur Rahman

Joint Director/Professor,

Institute of Management Sciences, Hayatabad, Peshawar, Khyber Pakhtunkhwa, Pakistan.

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