Dr. Saif Ullah

CONTACT INFORMATION	Department of Mathematics, University of Peshawar KPK, Pakistan. Nationality: Pakistani, Marital Status: Married	*Mob:* +923334924820 *Email:*saifullah.maths@uop.edu.pk *Date of Birth:* 16-08-1986

RESEARCH INTERESTS

Dynamical Systems, Mathematical Biology, Deterministic and Stochastic Modeling, Fractional Differential Equation, Fuzzy differential equations, Numerical solution via Haar Wavelet, Finite difference, radial basis and matrix splitting schemes.

My research includes fractional calculus, chaos theory, optimal control problems, Mathematical modeling of infectious diseases, numerical solution of differential equations via different iterative schemes.
And
using mathematical approaches to provide qualitative and quantitative insight into real-life phenomena associated with the mathematical modeling of real-life phenomena occurring in the natural and engineering sciences, with emphasis on the ecology, epidemiology and population biology of emerging and re-emerging diseases of public health importance.

EDUCATION

Ph.D Applied Mathematics. Department of Mathematics, University of Peshawar, KPK, Pakistan, Session 2014-2019
- Thesis Topic: *Mathematical Modeling of some Infectious Diseases with Integer and Non-Integer Order Derivatives.*

M.Phil in Mathematics. Department of Mathematics, University of Peshawar, KPK, Pakistan, Session 2012-2014
- Thesis Topic: *An alternative derivation of a new Lanczos-type algorithm for system of linear equation.*

M.Sc Mathematics. Department of Mathematics, University of Peshawar, KPK, Pakistan, Session 2006-2008

B.Sc. University of Peshawar, KPK, Pakistan, Session 2004-2006

HSSC Pre-Engineering. Federal Board of Intermediate & Secondary Education Islamabad, Pakistan, Session 2002-2004

SSC Science. Board of Intermediate & Secondary Education, Peshawar, Pakistan, Session 2000-2002

PROFESSIONAL EDUCATION

B. Ed . University of Peshawar, KPK, Pakistan, Session 2011.

PUBLICATION

- **Saif Ullah**. Mohamed Altanji, Muhammad Altaf Khan, Ahmed Alshaheri, and Wojciech Sumelka, "The dynamics of HIV/AIDS model with fractal-fractional caputo derivative" *Fractals*, 31(2) (2023): 2340015.
- Shuo Li, **Saif Ullah**, Salman Alqahtani, Joshua Kiddy K. Asamoah, "Examining Dynamics of Emerging Nipah Viral Infection with Direct and Indirect Transmission Patterns: A Simulation-Based Analysis via Fractional and Fractal-Fractional Derivatives" *Journal of Mathematics*, 2023(4) (2023): Article ID 6643772, 28 pages.
- Ahmed Alshehri, **Saif Ullah**, "Mathematical analysis of monkeypox infection with optimal control analysis: A case study with a new outbreak in the United States"

Mathematical Methods in the Applied Sciences, 125, (2023).

- Changtong Li , Samreen, **Saif Ullah**, Rashid Nawaz, Salman A AlQahtani, and Shuo Li, "Mathematical modeling and analysis of monkeypox 2022 outbreak with the environment effects using a Cpauto fractional derivative" *Physica Scripta*, 98 (2023) 105239.

- Shuo Li, Samreen Fareed, **Saif Ullah**, Salman A. AlQahtani, Sayed M. Tag and Ali Akgul,"Mathematical assessment of Monkeypox with asymptomatic infection: Prediction and optimal control analysis with real data application" *Results in Physcis*, 51 (2023) 106726.

- Samreen , **Saif Ullah**, Rashid Nawaz, Salman A. AlQahtani, Shuo Li, Ahmed M. Hassan,"A mathematical study unfolding the transmission and control of deadly Nipah virus infection under optimized preventive measures: New insights using fractional calculus" *Results in Physcis*, 51 (2023) 106629.

- Ahmed Alshehri, **Saif Ullah**, "Optimal control analysis of Monkeypox disease with the impact of environmental transmission " *AIMS Mathematics*, 8(7), 16926-16960, (2023).

- Yuzhen Wang, Samreen , **Saif Ullah**, Ihsan Ullah Khan, Salman A. AlQahtani, Ahmed M. Hassan,"Numerical assessment of multiple vaccinations to mitigate the transmission of COVID-19 via a new epidemiological modeling approach" *Results in Physcis*, 52 (2023) 106989.

- Arshad A. Khan, **Saif Ullah**, Mohamed Altanji, Rohul Amin, Nadeem Haider, Ahmed Alshehri & Muhammad Bilal Riaz, "A numerical study of spatio-temporal COVID-19 vaccine model via finite-difference operator-splitting and meshless techniques" *Scientific Reports*, 13, 12108 (2023).

- Botao Liu, Samreen Farid, **Saif Ullah**, Mohamed Altanji, Rashid Nawaz & Shewafera Wondimagegnhu Teklu, "Mathematical assessment of monkeypox disease with the impact of vaccination using a fractional epidemiological modeling approach" *Scientific Reports*, 13, 13550 (2023).

- Alia M. Alzubaidi, Hakeem A. Othman, **Saif Ullah**, Nisar Ahmad, Mohammad Mahtab Alam, "Analysis of Monkeypox viral infection with human to animal transmission via a fractional and Fractal-fractional operators with power law kernel" *Mathematical Biosciences and Engineering*, 20(4) (2023): 6666-6690.

- Ahmed Alshaheri, **Saif Ullah**, "A numerical study of COVID-19 epidemic model with vaccination and diffusion" *Mathematical Biosciences and Engineering*, 20(3) (2023): 4643-4672.

- Aatif Ali, **Saif Ullah** and Muhammad Altaf Khan, The impact of vaccination on the modeling of COVID-19 dynamics: a fractional order model, *Nonlinear Dynamics*, 110, (2022), 3921-3940.

- **Saif Ullah** and Muhammad Altaf Khan, "Modeling the impact of non-pharmaceutical interventions on the dynamics of novel coronavirus with optimal control analysis with a case study" *Chaos, Solitons and Fractals*, 139, (2021): 110075.

- **Saif Ullah** and Muhammad Altaf Khan, "Modeling the impact of non-pharmaceutical interventions on the dynamics of novel coronavirus with optimal control analysis with a case study" *Chaos, Solitons and Fractals*, 139, (2021): 110075.

- **Saif Ullah**, Obaid Ullah, Muhammad Altaf Khan and Taza Gul, "Optimal control analysis of tuberculosis (TB) with vaccination and treatment" *The European Physical Journal Plus*, 135 (2020): 602.

- **Saif Ullah**, Muhammad Altaf Khan, Muhammad Farooq and Taza Gul "Modeling and analysis of Tuberculosis (TB) in Khyber Pakhtunkhwa, Pakistan" *Mathematics and Computers in Simulation*, 165, (2019): 181-199.

- **Saif Ullah**, Muhammad Altaf Khan, and J.F. Gmez-Aguilar "Mathematical formulation of hepatitis B virus with optimal control analysis" *Optimal Control methods and Applications*, 40(03) (2019): 529-544.

- **Saif Ullah**, Muhammad Altaf Khan, Muhammad Farooq, Zakia Hammouch, and Dumitru Baleanu, "A fractional model for the dynamics of tuberculosis infection using Caputo-Fabrizio derivative" *Discrete and Continuous Dynamical Systems (AIMS)*, 13(3), (2020), 975-993.
- **Saif Ullah**, Muhammad Altaf Khan, Muhammad Farooq, Taza Gul, Fawad Hussain, "A fractional order HBV model with hospitalization" *Discrete and Continuous Dynamical Systems (AIMS)*, 13(3), (2020), 957-974.
- **Saif Ullah**, Muhammad Farooq Khan, Syed Azhar Ali Shah, Muhammad Farooq Muhammad Altaf Khan and Mustafa bin Mamat , "Optimal control analysis of vector-host model with saturated treatment" *The European Physical Journal Plus*, 135 (2020): 839.
- **Saif Ullah**, , Muhammad Altaf Khan, Muhammad Farooq, Ebraheem O. Alzahrani, "A fractional model for the dynamics of tuberculosis (TB) using Atangana-Baleanu derivative" *Discrete and Continuous Dynamical Systems (AIMS)*, 13(3), (2020), 937-956 .
- **Saif Ullah**, Muhammad Altaf Khan and Muhammad Farooq, "A new fractional model for the dynamics of the hepatitis B virus using the Caputo-Fabrizio derivative" *The European Physical Journal Plus*, 133 (2018): 137.
- **Saif Ullah**, Muhammad Altaf Khan and Muhammad Farooq, "Modeling and analysis of the fractional HBV model with Atangana-Baleanu derivative" *The European Physical Journal Plus*, 133 (2018): 313.
- **Saif Ullah**, Muhammad Altaf Khan and Muhammad Farooq, "A fractional model for the dynamics of TB" *Chaos, Solitons and Fractals*, 116, (2018): 63-71.
- Lei Zhang, **Saif Ullah**, Basem Al Alwan, Ahmed Alshehri, Wojciech Sumelka, Muhammad Altaf Khan, Saeed Islam, "Mathematical assessment of constant and time-dependent control measures on the dynamics of the novel coronavirus: An application of optimal control theory" *Results in Physics*, 31 (2021): 104971.
- Xuan Liu, **Saif Ullah**, Ahmed Alshehri, Mohamed Altanji"Mathematical assessment of the dynamics of novel coronavirus infection with treatment: A fractional study" *Chaos, Solitons and Fractals*, 153, (2021) :111534.
- Muhammad Altaf, **Saif Ullah** Khan and Muhammad Farooq, "A new fractional model for tuberculosis with relapse via AtanganaBaleanu derivative" *Chaos, Solitons and Fractals*, 116, (2018): 227-238.
- Ahmed Boudaoua, Yacine El hadj Moussa, Zakia Hammouch and **Saif Ullah**, "A fractional-order model describing the dynamics of the novel coronavirus (COVID-19) with nonsingular kernel" *Chaos, Solitons and Fractals*, 146, (2021) :110859.
- Fatmawati, Muhammad Altaf Khan, Muftiyatul Azizah, Windarto and **Saif Ullah**, "A fractional model for the dynamics of competition between commercial and rural banks in Indonesia" *Chaos, Solitons and Fractals*, 122, (2019), 32-46.
- Muhammad Altaf Khan , **Saif Ullah** and Sunil Kumar, "A robust study on 2019-nCOV outbreaks through non-singular derivative" *The European Physical Journal Plus*, 136, (2021): 168.
- Muhammad Altaf Khan, Olusola Kolebaje, Ahmet Yildirim, **Saif Ullah**, P. Kumam & P. Thounthong, "Fractional investigations of zoonotic visceral leishmaniasis disease with singular and non-singular kernel" *The European Physical Journal Plus*, 134 (2019): 481.
- Yong-Min Li, **Saif Ullah** , M.A.Khan, M. Y. Alshahrani and T. Muhammad, "Modeling and analysis of the dynamics of HIV/AIDS with non-singular fractional and fractal-fractional operators. " *Physica Scripta* 96(11) (2021): 1-21.
- Yacine El hadj Moussa, Ahmed Boudaoui, **Saif Ullah**, Fatma Bozkurt, Thabet Abdel jawad, Manar A. Alqudahh, "Stability analysis and simulation of the novel Corornavirus mathematical model via the Caputo fractional-order derivative: A case study of Algeria" *Results in Physics*, 26 (2021): 104324.

- Hussam Alrabaiah, Mohammad A.Safi, Mahmoud H. DarAssid, Bashir Al-Hdaibat, **Saif Ullah**, Muhammad Altaf Khan, Syed Azhar Ali Shah, "Optimal control analysis of hepatitis B virus with treatment and vaccination" *Results in Physics*, 19 (2020): 103599.
- Aatif Ali, Fehaid Salem Alshammari, Saeed Islam, Muhammad Altaf Khan, **Saif Ullah**, "Modeling and analysis of the dynamics of novel coronavirus (COVID-19) with Caputo fractional derivative" *Results in Physics*, 20 (2021): 103669.
- Yu-Ming Chu, Aatif Ali, Muhammad Altaf Khan, Saeed Islam, **Saif Ullah**, "Dynamics of fractional order COVID-19 model with a case study of Saudi Arabia" *Results in Physics*, 21 (2021): 103787.
- Muhammad Awais, Fehaid Salem Alshammari, **Saif Ullah**, Muhammad Altaf Khan, Saeed Islam, "Modeling and simulation of the novel coronavirus in Caputo derivative" *Results in Physics*, 19 (2020): 103588.
- Arshad Alam Khan, RohulAmin, **Saif Ullah**, Wojciech Sumelka, Mohamed Altanji, "Numerical simulation of a Caputo fractional epidemic model for the novel coronavirus with the impact of environmental transmission" *Alexandria Engineering Journal*, 61(7): (2022), 5083-5095.
- Muhammad Farooq Khan, Hussam Al rabaiah, **Saif Ullah**, Muhammad Altaf Khan, Muhammad Farooq, Mustafa bin Mamat, Muhammad Imran Asjad, "A new fractional model for vector-host disease with saturated treatment function via singular and non-singular operators" *Alexandria Engineering Journal*, 60 (2021): 629-645.
- Muhammad Altaf Khan, Muhammad Ismail, **Saif Ullah** and Muhammad Farhan, " Fractional order SIR model with generalized incidence rate" *Aims Mathematics*, 5, (2020), 1856-1880.
- Muhammad Altaf Khan, Sajad Ullah, **Saif Ullah** and Muhammad Farhan, "Fractional order SEIR model with generalized incidence rate" *Aims Mathematics*, 5, (2020), 2843-2857.
- Muhammad Altaf Khan, **Saif Ullah** and Muhammad Farhan, "The dynamics of Zika virus with Caputo fractional derivative" *Aims Mathematics*, 4, (2019), 134-146.
- Fatmawati, Rashid Jan, Muhammad Altaf Khan, Yasir Khan and **Saif Ullah**, "A new model of dengue fever in terms of fractional derivative" *Mathematical Biosciences and Engineering*, 17, (2020), 5267-5287.
- Mohammed A. Aba Oud, Aatif Ali, Hussam Alrabaiah, **Saif Ullah**, Muhammad Altaf Khan and Saeed Islam, "A fractional order mathematical model for COVID-19 dynamics with quarantine, isolation, and environmental viral load " *Advances in Difference Equations*, 106, (2021), 2504.
- Syed Azhar Ali Shah, Muhammad Altaf Khan, Muhammad Farooq, **Saif Ullah** and Ebraheem O. Alzahrani, "A fractional order model for Hepatitis B virus with treatment via AtanganaBaleanu derivative" *Physica A: Statistical Mechanics and its Applications*, 538, (2020), 122636.
- Muhammad Altaf Khan, **Saif Ullah**, K. O. Okosun and Kamil Shah "A fractional order pine wilt disease model with CaputoFabrizio derivative" *Advances in Difference Equations*, 410, (2018), 1396.
- Muhammad Altaf Khan, Syed Wasim Shah, **Saif Ullah** and J.F.Gmez-Aguilar, "A dynamical model of asymptomatic carrier zika virus with optimal control strategies"(*Nonlinear Analysis: Real World Applications*, 50, (2019), 144-170.
- Muhammad Altaf Khan, Manzoor Ahmad, **Saif Ullah**, Muhammad Farooq, Taza Gul, "Modeling the transmission dynamics of Tuberculosis in Khyber Pakhtunkhwa Pakistan" *Advances in Mechanical Engineering*, 50, (2019), 144-170.
- Muhammad Altaf Khan, Syed Azhar Ali Shah, **Saif Ullah**, Kazeem Oare Okosun and Muhammad Farooq, "Optimal control analysis of the effect of treatment, isolation and vaccination on hepatitis b virus" *Journal of Biological Systems*, 28, (2020), 351-376.

- Muhammad Altaf Khan, **Saif Ullah**, Yasir Khan and Muhammad Farhan, "Modeling and scientific computing for the transmission dynamics of Avian influenza with half-saturated incidence" *International Journal of Modeling, Simulation, and Scientific Computing*, 11, (2020), 1793-9615.
- **Saif Ullah**, Muhammad Altaf Khan, Muhammad Farooq, "Mathematical Modeling Approach to Hepatitis B virus with Vaccination and optimal control" *International Journal of Ecology & Development*, 34, (2019), 82-104.
- **Saif Ullah**, Muhammad Farooq and Abdellah Salhi "An alternative derivation of a new Lanczos-type algorithm for systems of linear equations " *Punjab University Journal of Mathematics*, 45, (2013), 39-49.

BOOK CHAPTER

- **Saif Ullah**, Muhammad Altaf Khan, "Modeling and Analysis of Fractional Leptospirosis Model Using AtanganaBaleanu Derivative" In (**Gomez J., Torres L., Escobar R. (eds) Fractional Derivatives with Mittag-Leffler Kernel. Studies in Systems, Decision and Control**), vol 194. Springer, Cham., **First Online**. 14 February 2019.

International Conferences

Attend the 4th International Conference On Mathematical Modelling, Applied Analysis And Computation (ICMMAAC-21), (A Virtual Conference) (July 05-07 August 2021).

Attend the 8th International Conference on Recent Advances in Pure and Applied Mathematics Goddess of Bodrum Isis Hotel, Bodrum/Mugla, TURKEY September (24-27, 2021).

Attend the 6th UMT International Conference on Pure and Applied Mathematics (6th UICPAM-2020) (February 21-23, 2020).

National Conferences

Attend the 1thInternational Fluid Mechanics Conference at COMSAT Attock, PAKISTAN (July 22–24, 2012).

Soft Computing and Its Practical Applications, Kohat University of Science Technology, (October 25–26, 2013).

Attend the 13th International Mathematics Conference at COMSAT Abatabad PAKISTAN (2013).

Attend the ALL PAKISTAN MATHEMATICAL CONFERENCE at National centre for physics Islamabad PAKISTAN (3013).

Generalized approximations of solutions of nonlinear heat flow problems (COMSATS Aboutabad).13th May (2014)

Workshops Attended

- Becoming a smarter teacher

- Career guidance for students and teachers

- Falling in love with Mathematics

- Effective lesson planing in Mathematics

- Effective teaching various concepts of Mathematics

- Multiple intelligence in everyday classroom

- Understanding curriculum

- Pythagorean theorem and life

Awards

- Merit Scholarship throughout M.Phil

- 1st Position in PhD At the University of Peshawar, Pakistan,

- 1st Position in M.Phil At the University of Peshawar, Pakistan,

- 3st Position in M.Sc At the University of Peshawar, Pakistan,

- 1st Position (first class first) in B.Sc at GDC Pabbi, Pakistan,

- Many financial awards for HEC.

TEACHING/RESEARCH EXPERIENCE
Lecturer in GDC, Pabbi, Khyber Pakhtunkhwa Pakistan
- September 01, 2010 to August 31, 2011.
Lecturer in the University College for Boys, University of Peshawar, Khyber Pakhtunkhwa Pakistan
- September 05, 2011– to date.
Lecturer in the University College for Boys, University of Peshawar, Khyber Pakhtunkhwa Pakistan
- October 01, 2021 to October 01, 2022.
Adjunct Professor in University Airlangga, Indonesia

MATHEMATICAL EXPERTISE
Mathematical Biology, Wavelet Theory and its Application, Functional Analysis Fundamental Theory and Methods of the Application of Dynamic System, Commutative Algebra, Fundamental of Mathematics, Calculus and Analytical Geometry, Advance Calculus, Numerical Analysis, Nonlinear ODE's, Ordinary Differential Equations, Partial Differential Equations, Fractional Differential Equations, Dynamical systems, Optimization Theory.

REFERENCES AVAILABLE TO CONTACT
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- Institute for Groundwater Studies, Faculty of Natural and Agricultural Sciences, University of the Free State, Bloemfontein, South Africa.

Prof. Dr. Saeed ul Islam (email: saeedislam@awkum.edu.pk); Tel: +92 334 5855248.
- Department of Mathematics, Abdul Wali Khan University, Mardan, Pakistan.

Dr. Muhammad Farooq (email: mfarooq@uop.edu.pk); Tel: +92-333-9004846,
- Department of Mathematics, University of Peshawar, Peshawar, Pakistan.