# Curriculum Vitae

# Samia Saleem Ahmad Bushnaq

Full Professor, Applied Mathematics

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## Objectives

Seeking for a position that requires a hardworking, quality oriented, fast learning and excellent communication skills that will enhance both my professional and personal skills.

## Educational Qualifications

**2012:** PhD — Doctoral degree in Applied Mathematics at University of Jordan in Jordanwith an average (3.63 out of 4), Rating: Very Good.
**Thesis Title:** The Reproducing Kernel Hilbert Space Method: Application to Integro-Differential Equations of Fractional Order.
**Supervisor:** Dr. Shaher Al-Momani, Prof.

**2007:** MA — Master degree in Applied Functional Mathematics at University of Jordan in Jordan with an average (3.35 out of 4), Rating: Very Good.
**Thesis Title:** Identification Problem for Abstract Ordinary Differential Equations.
**Supervisor:** Dr. Mohammad Al-Horani.

**1996:** BA — Degree of Bachelor of Science with a major in Mathematics and a minor in Finance with an average 70.6%, Rating: Good.

## Work Experiences

**2011 – till now:** Teaching at Princes Sumaya University for Technology.

**2008 – 2010:** Teaching at the World Islamic Sciences and Education University

**2007 – 2008:** Teaching at Princes Sumaya University for Technology as Part-time Lecturer.

**1999 – 2007:** Teaching at Ministry of Education in Jordan.

## Publications

1. **Bushnaq S.**, Momani S. and Zhou Y., *A Reproducing Kernel Hilbert Space Method for Solving Integro-Differential Equations of Fractional Order*, Journal of Optimization Theory and Applications, Vol. 156, Issue 1, 2013, pages 96-105.
2. **Bushnaq S.**, Maayah B., Momani S. and Alsaedi A., *A Reproducing Kernel Hilbert Space Method for Solving Systems of Fractional Integrodifferential Equations*, Abstract and Applied Analysis, Vol. 2014, Article ID 103016, 2014, pages 1-6.
3. Maayah B., **Bushnaq S**., Momani S. and Abu Arqub O., *Iterative Multistep Reproducing Kernel Hilbert Space Method for Solving Strongly Nonlinear Oscillators*, Advances in Mathematical Physics, Vol. 2014, Article ID 758195, 2014, pages 1-7.
4. **Bushnaq S.**, Maayah B. and Ahmad M., *Reproducing Kernel Hilbert Space Method for Solving Fredholm Integro-Differential Equations of Fractional Order*, Italian Journal of Pure and Applied Mathematics, Vol. 36, 2016, pages 307-318.
5. Maayah B., **Bushnaq S.**, Ahmad M. and Momani S., *Computational Method for Solving Nonlinear Voltera Integro-Differential Equations*, Journal of Computational and Theoretical Nanoscience, Vol. 13, 2016, pages 7802–7806.
6. **Bushnaq S.**, Maayah B., Momani S., Abu Arqub O., Al-Smadi M. and Alsaedi A., *Analytical Simulation of Singular Second-Order, Three Points BVPs for Fredholm Operator using Computational Kernel Algorithm*, Journal of Computational and Theoretical Nanoscience, Vol. 13, 2016, pages 7816–7824.
7. **Bushnaq S.**, Maayah B. and AlHabees A., *Application of Multistep Reproducing kernel Hilbert Space Method for Solving Giving Up Smoking Model*, International Journal of Pure and Applied Mathematics IJPAM, Vol. 109, Issue 2, 2016, pages 311-324.
8. AlHabees A., Maayah B. and **Bushnaq S.**, *Solving Fractional Proportional Delay Integro Differential Equations of First Order by Reproducing Kernel Hilbert Space Method*, Global Journal of Pure and Applied Mathematics, Vol. 12, Issue 4, 2016, pages 2499-3516.
9. Shah K. and **Bushnaq S.**, *Numerical Treatment of Fractional Endemic Disease Model via Laplace Adomian Decomposition Method*, Journal of Science and Arts, Vol. 39, Issue 2, 2017, pages 357-268.
10. Ali S., **Bushnaq S.**, Shah K. and Arif M., *Numerical Treatment of Fractional Order Cauchy Reaction Diffusion Equations*, Chaos, Solitons & Fractals, Vol. 103, 2017, pages 578- 587.
11. **Bushnaq S.**, Hussain W. and Shah K., *On Nonlinear Implicit Fractional Differential Equations without Compactness*, Journal of Nonlinear Sciences and Applications (JNSA), Vol. 10, 2017,

pages 5528-5539.

12. Maayah B., **Bushnaq S.**, Hasan S. and Momani S., *Numerical Solution of Fractional Fredholm Integro-Differential Equations Using Fuzzy Transform Method*, International Journal of Pure and Applied Mathematics, accepted, 2017.

13. Maayah B., **Bushnaq S.**, Alsaedi A. and Momani S., *An Efficient Numerical Method for Solving Chaotic and Non-Chaotic Systems*, Journal of Ramanujan Mathematical Society, Vol. 33, Issue 3, 2018, pages 219-231.

14. **Bushnaq S.**, Khan S.A, Shah K. and Zaman G., *Existence Theory of HIV-1 Infection Model by Using Arbitrary Order Derivative of Without Singular Kernel Type*, Journal of Mathematical Analysis, Vol. 9, Issue 1, 2018, pages 16-28.

15. Khan H., Arif M., Mohyud-Din S.T and **Bushnaq S.**, *Numerical Solutions to Systems of Fractional Volterra Integro Differential Equations*, Using Chebyshev Wavelet Method, Journal of Taibah University for Science, https://doi.org/10.1080/16583655.2018.1510149, Vol. 12, Issue 5, 2018, pages 584-591.

16. **Bushnaq S**., Ali S., Shah K. and Arif M., *Exact Solution to Nonlinear Biological Population Model with Fractional Order*, Thermal Science, https://doi.org/10.2298/TSCI171127035B, Vol. 22, Issue Supp. 1, 2018, pages S317-S327.

17. **Bushnaq S.**, Khan S.A., Shah K. and Gul Zaman G., *Mathematical Analysis of HIV/AIDS Infection Model with Caputo-Fabrizio Fractional Derivative*, Cogent Mathematics, Vol. 5, 2018, pages 1-12.

18. Shah K., Ali A. and **Bushnaq S.**, *Hyers-Ulam stability Analysis to Implicit Cauchy Problem of Fractional Differential Equations with Impulsive Condition*, Mathematical Methods in Applied Sciences, doi.org/10.1002/mma.5292, Vol. 41, Issue 17, 2018, pages 8329-8343.

19. Alsaedi A., Yousef F., **Bushnaq S.** and Momani S., *New Styles of Periodic Solutions of the Classical Six-Body Problem*, Mathematics and Computers in Simulation, Vol. 159, 2019, pages 183-196.

20. **Bushnaq S.**, Ali S., Shah K. and Arif M., *Approximate solutions to nonlinear factional order partial differential equations arising in ion-acoustic waves*, AIMS Mathematics, Vol. 4, Issue 3, 2019, pages 721-739.

21. Fiza M., Chohan F., Ullaha H., Islam S. and **Bushnaq S.**, *An extension of the optimal homotopy asymptotic method with applications to nonlinear coupled partial differential equations*, Journal of Mathematics and Computer Science, Vol. 19, Issue 4, 2019, pages 218-229.

22. Ali A., Ahmad S., Haq F.I., Hussain I., Khan H. and **Bushnaq S.**, *Numerical simulation of nonlinear parabolic type Volterra partial integro-differential equations using quartic B-spline*

*collocation method*, Nonlinear Studies, Vo. 27, Issue 3, 2020, pages 621-636.

23. **Bushnaq S.**, Ullah A., Ullah Z. and Shah K., *Solution of fuzzy singular integral equation with Abel's type kernel using a novel hybrid method*, Advances in Difference Equations, Vol. 2020, Issue 1, Article number 156, 2020, https://doi.org/10.1186/s13662-020-02623-y.

24. **Bushnaq S.**, Shah K. and Alrabaiah H., *On modeling of coronavirus-19 disease under Mittag-Leffler power law*, Advances in Difference Equations, Vol. 2020, Issue 1, Article number 487, 2020, https://doi.org/10.1186/s13662-020-02623-y.

25. Zada L., Nawaz R. and **Bushnaq S.**, *An efficient Approach for Solution of Fractional Order Differential-Difference Equations Arising in Nanotechnology*, Applied Mathematics E-Notes, Vol. 20, 2020, pages 297-307.

26. Khan H., Shah R., Arif M. and **Bushnaq S.**, The *Chebyshev Wavelet Method (CWM) for the Numerical Solution of Fractional HIV Infection of CD4+ T Cells Model*, International Journal of Applied and Computational Mathematics, Vol. 6, Issue 2, 2020, https://doi.org/10.1007/s40819-020-0786-9.

27. **Bushnaq S.**, Saeed T., Delfim F. M. T. and Zeb A., *Control of COVID-19 dynamics through a fractional-order model*, Alexandria Engineering Journal, Vol. 60, Issue 4, 2021, pages 3587-3592.

28. Mohyud-Din S.T., Khan H., Arif M. and **Bushnaq S**., *Chebyshev Wavelet Method (CWM) for the Numerical Solutions of Fractional Boundary Value Problems*, Italian Journal of Pure and Applied Mathematics, Vol. 43, 2020, pages 242-255.

29. **Bushnaq S.**, Nawaz R. and Zada L., *Optimum solution of time fractional coupled system of partial differential equations*, Italian Journal of Pure and Applied Mathematics, Vol. 47, 2022, pages 382-401.

30. Nawaz R., Farid S. and **Bushnaq S.**, *Applications of New Iterative Method to Fractional Non Linear Coupled ITO System*, Boletim da Sociedade Paranaense de Matematica (BSPM), Vol. 40, 2022, pages 1-16, http://dx.doi.org/10.5269/bspm.47787.

31. Alrabaiah H., Rahman M.U., Mahariq I., **Bushnaq S.** and Arfan M., *Fractional Order Analysis of HBV and HCV CO-Infection Under ABC Derivative,* Fractals, Vol. 30, Issue 1, 2022, https://doi.org/10.1142/S0218348X22400369.

32. **Bushnaq S**., Khan H. and Arif M., *Numerical Method Based on Wavelets, for the Solution of Multi Order Fractional Differential Equations*, Thai Journal of Mathematics, Vol. 20, Issue 4, 2022, pages 1549-1562.

33. Beghami W., Maayah B., **Bushnaq S.** and Abu Arqub O., *The Laplace Optimized Decomposition Method for Solving Systems of Partial Differential Equations of Fractional Order*, International Journal of Applied and Computational Mathematics, Vol. 8, 2022, https://doi.org/10.1007/s40819-

022-01256-x.

34. **Bushnaq S.**, Shah K, Tahir S., Sarwar M., Ansari K.J. and Abdeljawad T., *Computation of numerical solutions to variable order fractional differential equations by using non-orthogonal basis*, AIMS Mathematics, Vol. 7, Issue 6, 2022, pages 10917-10938, http://dx.doi.org/10.3934/math.2022610.

35. Maayah B., Moussaoui A., **Bushnaq S.** and Abu Arqub O., *The Multistep Laplace optimized decomposition methods for solving fractional-order coronavirus disease model (COVID-19) via the Caputo fractional approach*, Demonstratio Mathematica, Vol. 55, Issue 1, 2022, pages 963-977, https://doi.org/10.1515/dema-2022-0183.

36. Beghami W., Maayah B., Abu Arqub O. and **Bushnaq S.**, *Fractional approximate solutions of 2-D reaction-diffusion Brusselator model using the novel Laplace-optimized decomposition approach*, International Journal of Modern Physics C, Vol. 34, Issue 7, 2023, https://doi.org/10.1142/S0129183123500869.

37. Hasan S., Maayah B., **Bushnaq S.** and Momani S., *A Modified Reproducing Kernel Hilbert Space Method for Solving Fuzzy Fractional Integro-differential Equations*, Boletim da Sociedade Paranaense de Matematica (BSPM), Vol. 41, 2023, pages 1-16.

38. **Bushnaq S.**, Hayat A.U and Khan H., *Numerical Simulation of Time-Dependent Viscous Fluid Flow with Upward and Downward Fluctuation of Spinning Disk*, Boletim da Sociedade Paranaense de Matematica (BSPM), Vol. 42, 2024.

39. **Bushnaq S.**, Shafiullah, Sarwar M. and Alrabaiah H., *Existence theory and numerical simulations of variable order model of infectious disease*, Results in Applied Mathematics, Vol. 19, 2023, 100395, https://doi.org/10.1016/j.rinam.2023.100395

40. Maayah B., **Bushnaq S.** and Moussaoui, *Numerical solution of fractional order SIR model of dengue fever disease via Laplace optimized decomposition method*, Journal of Mathematics and Computer Science, Vol. 32, Issue 1, 2024, http://dx.doi.org/10.22436/jmcs.032.01.08

41. **Bushnaq S.**, Ali A. and Abdullah, *Numerical investigation of fractional Fisher partial differential equation via natural transform decomposition method*, Partial Differential Equations in Applied Mathematics, Vol. 9, 2024, 100642, https://doi.org/10.1016/j.padiff.2024.100642

42. Farid S., Nawaz R., Shah I.A and **Bushnaq S.**, *Application of q-Homotopy analysis method via fractional complex transformation for time fractional coupled Jaulent-Miodek equation*, Nonlinear Studies, Vol. 31, Issue 2, 2024.

43. **Bushnaq S.**, Ullah A. and Alrabaiah H., *On Computation of Solution for (2 + 1) Dimensional Fractional Order General Wave Equation*, Partial Differential Equations in Applied Mathematics, Vol. 11, 2024, https://doi.org/10.1016/j.padiff.2024.100847

44. Arshad M., **Bushnaq S.**, Khan H., Khan Q. and HINCAL E., *A new and efficient numerical algorithm to solve fractional boundary value problems*, Boletim da Sociedade Paranaense de Matematica (BSPM), Vol. 43, 2025.

45. **Bushnaq S.**, Bano S. and Zeb A., *Analysis of a Smoking Dynamics Model with Age-Dependent Incidence Function*, EUROPEAN JOURNAL OF PURE AND APPLIED MATHEMATICS, Vol. 18, Issue 3, Article Number 6447, 2025.

46. **Bushnaq S.**, Zeb A., Iqbal S., Djilali S. and Ansari K.J., *A MATHEMATICAL MODEL FOR CONTROLLING THE ALCOHOL ADDICTION: STABILITY AND NUMERICAL ANALYSIS*, Fractals, Volume (2025), 2025, DOI: 10.1142/S0218348X25400663

47. Abdeljawad T., Kamal Shah K., **Bushnaq S**., Pongsopa J. and Sitthiwirattham T., *Using machine learning techniques to investigate a discreet type mathematical model of psychological mental disease*, Alexandria Engineering Journal, Vol. 133, 2025.

## Conferences

1. Graduate Thesis Conference 5, University of Jordan, Jordan, April 16, 2014.
2. International Congress on Fundamental and Applied Sciences (ICFSA), Turkey, August 26, 2016.
3. The 7th International Arab Conference on Mathematics and Computations (IACMC2022), Zarqa University, Jordan, May 10-12, 2022.
4. 11th International Eurasian Conference on Mathematical Sciences and Applications (IECMSA-2022), Yildiz Technical University, Turkey, August 29-September 1, 2022.
5. International Conference on Fractional Differentiation and Its Applications ICFDA'23, UAE, March 14-16, 2023.

## Honor and Awards

Prince Subah Alahmad Alsubah Award/ Graduate Thesis Conference5, 2014, University of Jordan, Amman, Jordan.

## Membership in Scientific Societies and Associations

Nonlinear Dynamics Research Center (NDRC).

## International Committees

1. Editorial Board of Journal of Fractional Calculus and Nonlinear Systems.
2. Editorial Board of Journal of Mathematical Analysis and Modeling.

## Taught Courses

1. Calculus I.
2. Calculus II
3. Calculus III
4. Linear Algebra.
5. Statistical Methods.
6. Numerical Analysis.
7. Engineering Mathematics I.
8. Engineering Mathematics II.
9. Operation Research.
10. Math for Business.
11.

## Skills and Software Programs

1. ICDL (International Computer Driving License)/ 2004include the following seven modules:
   a) Concepts of IT. b) MS Windows (Managing Files). c) MS Word (Word Processing). d) MS Excel (Spreadsheets). e) MS Access (Databases). f) MS PowerPoint (Presentation Tools).
   g) Internet and E-mail (Information and Communication).
2. Mathematica.
3. Python.

## Languages Proficiency

1. Arabic (Mother tongue).
2. English (very good).