

CURRICULUM VITAE

A. GENERAL INFORMATION

1. Name: OGUNNIRAN Muideen Odunayo
2. Gender: Male.
3. E-mail Address: muideen.ogunniran@uniosun.edu.ng
4. Research Gate Link: <https://www.researchgate.net/profile/Ogunniran-Muideen>
5. Goggle Scholar: <https://scholar.google.com/citations?hl=en&user=ls4lAccAAAAJ>
6. Cell Phone Number: +2347039104606.

B. EDUCATIONAL BACKGROUND

1. Educational Institutions Attended with Dates

L. A. Primary School Alusekere Ede, Osun State	1992 – 1998
Ilori International High School Ede, Osun State	1999 – 2001
Agbonran School of Science Ede, Osun State	2002 – 2005
Federal University of Technology Minna, Niger State	2006 – 2011
University of Ilorin, Kwara State	2013 – 2019

2. Academic and Professional Qualifications with Dates

PhD Mathematics, University of Ilorin	2019
M.Sc. Mathematics, University of Ilorin	2015
B. Tech. Mathematics/Computer Science, Federal University of Technology, Minna	
Second Class Hon. (Upper Division)	2011
Senior Secondary School Certificate (WAEC)	2004
First School Leaving Certificate (Osun State Ministry of Education)	1998

C. WORK EXPERIENCE OUTSIDE THE UNIVERSITY SYSTEM

AR-RAHEEM INTERNATIONAL COLLEGE, MADI ILORIN KWARA STATE

Sept. 2018.

Mathematics Teacher.

Responsibility:

Teaching and Research in O' Level Mathematics as well as Tutorials. Examination supervision, scores computation and prompt release of results.

NIGERIAN TULIP INTERNATIONAL COLLEGES, WUSE II ABUJA NIGERIA

Oct. 2014 – Aug. 2015.

Mathematics Teacher.

Responsibility:

Teaching and Research in O' Level Mathematics as well as Tutorials. Examination supervision, scores computation and prompt release of results.

ALFAREED COLLEGE, YIDI ROAD EDE OSUN STATE, NIGERIA

Sept. 2012 – July 2013.

Mathematics Teacher.

Responsibility:

Teaching and Research in O' Level Mathematics as well as Tutorials. Examination supervision, scores computation and prompt release of results.

D. WORK EXPERIENCE IN OTHER UNIVERSITY

KWARA STATE UNIVERSITY MALETE, KWARA STATE NIGERIA 2016

Adjunct Lecturer of Mathematics.

Undergraduate courses taught include: Optimization, Matlab and LaTeX.

Responsibility:

Teaching and Research in Undergraduate Mathematics as well as Tutorials. Examination supervision, Scores computation and prompt release of results.

E. WORK EXPERIENCE IN OSUN STATE UNIVERSITY

Assistant Lecturer

Oct. 2018 – Sept. 2019.

Lecturer II

Sept. 2019 – Sept. 2022.

Lecturer I

Oct. 2022 – Present.

Undergraduate courses taught include: General Mathematics I & II; Linear Algebra I; Set, Logic and Algebra; Elementary Differential Equations; Introduction to Numerical Analysis; Mathematical Methods I and II; Abstract Algebra II; Fluid Mechanics; Operation Research and Optimization.

Postgraduate courses taught include: Foundation Courses on Programming with MATLAB; MATLAB in Numerical Analysis and Optimization; Computer Software Packages; Computational Mathematics; and Mathematical Modeling.

Responsibility:

Teaching and Research in Mathematics as well as Tutorials. Examination supervision, Scores computation and prompt release of results.

F. CO-CURRICULAR PROFESSIONAL EXPERIENCE

June 2018 National Mathematical Center Abuja Workshop on Foundation Postgraduate Course on Computational Mathematics.

October 2020 Advanced Digital Appreciation Programme for Tertiary Institutions Training on SPSS.

G. MEMBER OF PROFESSIONAL BODIES

Member, Mathematical Association of Nigeria.

Member, Nigerian Society of Physical Sciences.

H. SERVICE

a) University

(i) **Coordinator**, UNIOSUN 100 Level Mathematics Courses for 2020/2021 Academic Session.

(ii) **Assistant Examination Officer** UNIOSUN for 2020/2021 Academic Session.

(iii) **Coordinator**, UNIOSUN 100 Level Mathematics Courses for 2021/2022 Academic Session.

(iv) **Assistant Examination Officer** UNIOSUN for 2021/2022 Academic Session.

b) Community

(i) **External Examiner** (West Africa Examination Council): Mathematics and Further Mathematics, Nigeria.

c) National

(i) **Reviewer**, Journal of Nigerian Society of Physical Sciences.

d) International

(i) **Reviewer**, Cumhuriyet Science Journal.

(ii) **Reviewer**, International Journal of Mathematics in Operation Research.

(iii) **Reviewer**, Thai Journal of Mathematics.

I. RESEARCH SUPERVISION

UNDERGRADUATE;

Ayodeji Olamide TAYO (MTH/2016/0016): Convergence and Stability Analysis of Merson's Method Applied to the Riccati Differential Equations (2020).

Abiodun Ayobami OLASUPO (MTH/2017/0012): Generalization of Fibonacci Sequence and their Polynomial using R-Shift Operation (2021).

John Oluwamayowa ORESANYA (MTH/2019/0010): Minimization of Highway Bottlenecks using Section-Based Approach to the Solution of Lighthill-Whitham-Richards Model (2022).

Samuel Amengold EHIZOGIE (2020/32581): Convergence Analysis of Gauss-Jacobi and Gauss – Seidel Method Applied to System of Linear Equations (2024).

Franklyn Oluwadamilola SAMSON (2020/32733): Advances in Neural Networks: Enhancement with Runge-kutta Gill Methods for Ordinary Differential Equations (2024).

POSTGRADUATE;

Rhoda Ifeoma BENSON (2021/37222)- PGD (Financial Mathematics), Computational Analysis of the Effect of COVID-19 on African Stock Markets (2023). Completed

Monsuru Gbolahan GBOLAGADE (2022/44236)-MSc (Applied Mathematics), Numerical solution of space fractional diffusion equations by Gegenbauer polynomial and finite difference scheme (2024). Completed.

Ahmed Idowu AGBELEJOYE (MTH/2016/0005)-MSc (Applied Mathematics), Numerical solutions of generalized pantograph delay differential equation (2024). Completed.

Ridwan O. OJO (2023/52667)-MSc (Applied Mathematics), Hybrid FEM-RBFNN: A Fusion of Finite Element Method and Radial Basis Function Neural Networks for Solving PDEs (2025). Completed.

Tajudeen O. GANIYU (2023/52548)-MSc (Applied Mathematics), JAPA: A Quantitative Model for Exploring Dynamics of Africa's Brain Drain Phenomenon (2025). Completed.

J. PUBLICATIONS

Articles in learned Journals:

1. **Ogunniran, M. O. & Adeniyi, R. B. (2019).** New Basic Rational Approximation Method for Solving Singular Initial Value Problems of Ordinary Differential Equations. *ABACUS (Mathematics Science Series)* 46(1), 119-126.
2. **Ogunniran, M. O. (2019).** A Class of Block Multi-Derivative Numerical Integrator for Singular Advection Equations. *Journal of the Nigerian Society of Physical Sciences*. 1, 62-71.
3. **Ogunniran, M. O., Tayo, O. A., Haruna, Y. & Adebisi, A. F. (2020).** Linear Stability Analysis of Runge-Kutta Methods for Singular Lane-Emden Equations. *Journal of the Nigerian Society of Physical Sciences* 2, 134-140
4. Taiwo, O. A., Etuk, M. O., Nwaeze, E. & **Ogunniran, M. O. (2022).** Enhanced Moving Least Square Method for the Solution of Volterra Integro-differential Equation: An Interpolating Polynomial. *Journal of the Egyptian Mathematical Society*, 30:3, 20 pages. <https://doi.org/10.1186/s42787-022-00135-0>

5. **Ogunniran, M. O.**, Tijani, N. A., Adedokun, K. A., Kareem, K. O. (2022). An Accurate Hybrid Block Technique for Second Order Singular Problems in Ordinary Differential Equations. *African Journal of Pure and Applied Sciences*, 3(1): 145-154.
Publisher: Kenyatta University, Kenya.
6. **Ogunniran M. O**, Olaleye, G. C., Taiwo, O. A., Shokri, A. & Nonlaopon, K. (2023). Generalization of a Class of Uniformly Optimized k-step Hybrid Block Method for Solving Two-point Boundary Value Problem. *Results in Physics*, 44, 106147, 1-12.
7. Kareem, K., Olayiwola, M., & **Ogunniran, M. (2023)**. On the Numerical Solution of Fredholm-type Integro-Differential Equations Using an Efficient Modified Adomian Decomposition Method. *Mathematics and Computational Sciences*, 4(4): 39-52, <https://doi.org/10.30511/mcs.2023.2009757.1137>.
8. Sabastine Emmanuel, Saratha Sathasivam & **Muideen O. Ogunniran (2024)**. Multi-derivative hybrid block methods for singular initial value problems with application. *Scientific African*: 24, e02141, DOI: <https://doi.org/10.1016/j.sciaf.2024.e02141>.
Publisher: Elsevier.
9. Adewale E. Adenipekun, Adeniyi S. Onanaye, Olawale J. Adeleke & **Muideen O. Oguniran (2024)**. Hybrid shifted polynomial scheme for the approximate solution of a class of nonlinear partial differential equations. *Songklanakarin J. Sci. Technol.*, 46(4): 339-346.
10. A. F. Adebisi, G. M. Gbolagade, **M. O. Ogunniran**, E. Olaoluwa Omole, F. E. Amoyedo & K. P. Ajewole (2024). Convergence and Stability Analysis of Finite Difference Methods, Caputo Derivatives, and Collocation Methods Applied to Space Fractional Diffusion Equations, *International Conference on Science, Engineering and Business for Driving Sustainable Development Goals (SEB4SDG)*, Omu-Aran, Nigeria, 1-13, <https://doi.org/10.1109/SEB4SDG60871.2024.10630199>.
11. **M. O. Ogunniran**, A. Aljohani, A. Shokri, K. R. Tijani, Y. Wang (2024). Enhanced rational multi-derivative integrator for singular problems with application to advection equations, *Ain Shams Engineering Journal*, 15(12), 103066, <https://doi.org/10.1016/j.asej.2024.103066>.
12. S. Emmanuel, S. Sathasivam and **M.O. Ogunniran (2024)**. Leveraging feed-forward neural networks to enhance the hybrid block derivative methods for system of second-order ordinary differential equations. *Journal of Computational Mathematics and Data Science* 13, 100101, <https://doi.org/10.1016/j.jcmds.2024.100101>.
13. **M. O. Ogunniran**, K. R. Tijani, L. O. Moshood, R. O. Ojo, N. S. Yakusak, F. Muritala, & M. O. Oluwayemi (2025). Harnessing neural networks in hybrid block integrator for efficient

solution of boundary value problems. *Thermal Advances*, 100022, <https://doi.org/10.1016/j.thradv.2025.100022>.

14. S. Emmanuel, S. Sathasivam, M. Bayram, **M. O. Ogunniran**, R. G. Artes Jr. (2025). A residual-based adaptive deep learning hybrid block algorithm for partial differential equations with singularities. *Ain Shams Engineering Journal*, 16(8), 103066, <https://doi.org/10.1016/j.asej.2025.103486>
15. M. O. Olayiwola, K. R. Tijani, **M. O. Ogunniran**, A. O. Yunus, E. A. Oluwafemi, M. O. Abanikanda, A. I. Alaje, J. A. Adedeji (2025). Modeling the booster vaccine effect on new COVID-19 variant management employs the Atangana-Baleanu-Caputo fractional derivative operator together with the Laplace-Adomian decomposition method. *Vacunas*, 500458. <https://doi.org/10.1016/j.vacun.2025.500458>
16. Ajimot F. Adebisi, Saheed A. Aremu, **M. O. Ogunniran**, Kamiludeen R. Tijani, Adewole M. Ajileye (2025). Enhanced Milne-Simpson's methods for autonomous and singular differential equations. *Math. & Comput. Sci.*, 6(2): 125–140. <https://doi.org/10.30511/mcs.2025.2035400.1205>

K. CURRENT RESEARCH ACTIVITIES

(i) Self-sponsored Research

- Optimized k -step Block Methods for Differential Equations & Refined Backward Differentiation Formula for Differential Equations.
- Neural Network Methods for Singular and Stiff Problems of Differential Equations.
- Orthogonal and Orthonormal Based Polynomial Basis for Development of Hybrid Block Methods in Solving Differential Equations.

(ii) Articles in Review

- **Muideen O. Ogunniran** (2024). Jacobian Based Polynomial Basis: Hybrid Formulation Method Applied to Astrophysics Singular Problems and Degenerating Parabolic PDEs.

L. CONFERENCES ATTENDED

1st Schools of Information and Communication Technology, Natural Sciences and General Studies (SING) Conference at the Federal Polytechnic Bida **2018**.

Paper Presented: Fourth Order Rational One-step Method for Singular Initial Value Problems in Ordinary Differential Equations.

1st International Conference on Engineering and Environmental Sciences (**ICEES**) at the Osun State University, Osogbo **2019**.

Paper Presented: Variational Iteration Method for Solving Higher-Order Integro-differential Equations.

30th Annual Colloquium and Congress of the Nigerian Association of Mathematical Physics (**NAMP**) at Igbinedion University, Okada **2019**.

Paper Presented: Efficient k -Derivative Methods for Lane-Emden Equations and Related Stiff Problems.

1st International of Nigerian Society of Physical Sciences (**NSPS**) at the Federal University of Lafia, Lafia **2021**.

Paper Presented: An Accurate Hybrid Block Technique: Development and Implementation on Second Order Singular Problems in Ordinary Differential Equations.

31st Annual Colloquium and Congress of the Nigerian Association of Mathematical Physics (**NAMP**), Virtually at Osun State University, Osogbo **2021**.

2023 International Conference of Education held at Osun State University, Osogbo **2023**.

2024 IEEE International Conference held at Landmark University Omu-Aran **2024**

Paper Presented: Convergence and Stability Analysis of Finite Difference Methods, Caputo Derivatives, and Collocation Methods Applied to Space Fractional Diffusion Equations.

M. EXTRA-CURRICULAR ACTIVITIES

Exercising and writing computer codes.

N. PREVIOUS GRANTS, FELLOWSHIPS, AWARDS AND SCHOLARSHIPS

- i. PhD research grant under NEEDS Assessment Intervention Fund for Staff Training and Development (GRANT NUMBER: UNIOSUN/NEEDS/2019/001). February 2019.
- ii. TETFUND Institutional Based Research, IBR 2024 (GRANT NUMBER: 2024), July 2025.
- iii. Visting Professor (Data Science Institute) in the Faculty Fellowship of the University of Chicago, USA (January 2026 – June 2026).

O. SUMMARY OF ACADEMIC METRICS

S/N	Database	Number of Documents	Citations	h-index	I10-index
-----	----------	---------------------	-----------	---------	-----------

1	Google Scholar	40	118	6	4
2	ResearchGate	31	75	5	5
3	Scopus	12	34	4	4
4	Web of Science	04	10	-	-

P. SUMMARY OF CONTRIBUTION TO KNOWLEDGE

Many complex real-life and physical phenomena ranging from heat conduction, fluid dynamics, population dynamics, to electromagnetic wave propagation are mathematical models in differential equations. These equations often exhibit challenging properties such as singularity, stiffness, and oscillatory behavior, which render the search for analytical solutions highly impractical or outright impossible in most scenarios. Addressing these challenges requires advanced techniques in numerical analysis, computational mathematics, and optimization theory. With a strong foundation in numerical analysis and optimization, my research has focused on the development of robust numerical schemes that approximate the solutions of such difficult differential equations. I have contributed to the scientific community by formulating and implementing high-accuracy methods tailored to specific characteristics of these problems. I have introduced optimized block and hybrid schemes for stiff and singular problems, ensuring better convergence and stability than many classical approaches. These methods are particularly valuable in engineering, physics, and biological models where traditional solvers either fail or are computationally inefficient. In recent years, my research trajectory has expanded to integrate the principles of data science and machine learning, especially neural networks, into the numerical solution of differential equations. Neural networks offer a data-driven framework that complements traditional numerical methods, particularly in learning the underlying patterns in data-driven systems or estimating unknown parameters in model-based problems. I have explored the use of forward -feed and radial basis neural networks and hybrid data-numerical frameworks to solve partial differential equations arising in real-world applications. These models are capable of approximating solutions in high-dimensional domains, where conventional methods struggle due to the curse of dimensionality. By merging optimization techniques with neural networks, I have further contributed to developing adaptive solvers that not only improve accuracy but also reduce computational cost through intelligent parameter tuning and error estimation. These innovative approaches provide scalable, interpretable, and reliable solutions to real-life problems modeled by differential equations. My contributions have been disseminated through peer-reviewed publications and conference presentations, fostering further research and collaboration in this interdisciplinary domain. Overall, my work enhances the toolkit available to researchers and practitioners addressing complex systems in science and engineering, demonstrating the power of combining traditional numerical analysis with modern computational intelligence and data science.