Mogtaba Mohammed

Curriculum Vitae

Faculty of Science
Department of Mathematics
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Education

2002–2006 **B.Sc in Mathematics**, *Sudan University of Science and Technology*, Khartoum, Sudan, *First class*.

2007–2008 **M.Sc in Mathematics**, *Sudan University of Science and Technology*, Khartoum, Sudan, *Distinction*.

2010–2011 **Postgraduate master's level diploma in Applied Mathematics**, *University of Cape Town and African Institute for Mathematical Sciences (AIMS)*, Cape Town, South Africa, *Distinction in the final project*.

2012–2015 **Ph.D in Mathematical Science**, *University of Pretoria*, Pretoria, South Africa.

B.Sc Research Project

Title *Developments on Rings Theory*

Supervisors Dr. Hajo Ahmed

M.Sc Thesis

Title *Adomain Decomposition Method and Modified Decomposition for solving Boundary Value Problems*

Supervisors Dr. Lajimi Amor Lajimi

AIMS Research Project

Title *Eigenvalues of the Laplacian Operator on Bounded Domains*

Supervisors Dr. Jesse Ratzkin

Ph.D Thesis

Title *Homogenization of linear hyperbolic stochastic partial differential equations with rapidly oscillating coefficients*

Supervisors Professor Mamadou Sango

Experience

Administrative Positions

2021–up to now **Head of mathematics program tracks committee**, *Mathematics Department, Majmaah University, KSA*.

2021–up to now **Head of study plans committee**, *Mathematics Department, Majmaah University, KSA*.

2019–up to now **Member of research projects committee**, *Mathematics Department, Majmaah University, KSA*.

2019–up to now **Head of courses portfolio committee**, *Mathematics Department, Majmaah University, KSA*.

2019–2020 **Member of quality insurance committee**, *Faculty of science, Majmaah University, KSA*.

2017–2019 **Head of Postgraduate committee**, *Faculty of mathematical and computer sciences, University of Gezira, Sudan*.

2016–2019 **Head of Mathematics Department**, *Faculty of mathematical and computer sciences, University of Gezira, Sudan*.

Academic Work Experience

2023–up to now **Associate Professor**, *Faculty of science, Mathematics Department, Majamaah University, KSA*.

2019–2023 **Assistant Professor**, *Faculty of science, Mathematics Department, Majamaah University, KSA*.

2016–2019 **Assistant Professor**, *Faculty of mathematical and computer sciences, University of Gezira, Sudan*.

2016–2019 **Assistant Professor (Part-timer)**, *Faculty of mathematical sciences, University of Khartoum, Sudan*.

15 June– 30 July 2015 **Visiting Researcher**, *African Institute for Mathematical Science, Cape Town, South Africa*.

2015–2016 **Postdoctoral Fellow** , *Department of Mathematics and Applied mathematics, University of Pretoria, South Africa*.

2015–2016 **Assistant Professor**, *Department of Mathematics, Sudan University of Science and Technology, Sudan*.

2013–2015 **Assistant Lecturer**, *Department of Mathematics and Applied mathematics, University of Pretoria, South Africa*.

2008–2015 **Lecturer**, *Department of Mathematics, Sudan University of Science and Technology, Sudan*.

2007–2008 **Teaching Assistant**, *Department of Mathematics, Sudan University of Science and Technology, Sudan*.

Supervision of MSc and PhD students

May 2016–2020 **PhD : Nooralhoda Abd Alrazeg Mohammed**, *Thesis Title: The Unfolding Periodic Method for Homogenization of Nonlinear Stochastic PDEs, University of Khartoum*.

May 2016–December 2016 **MSc: Tajalsir Salah Jafar**, *Thesis Title: On the Homogenization of Elliptic Partial Differential equations via The Two-scale Convergence Method, Sudan University of Science and Technology*.

June 2016–January 2017 **MSc: Alnour Altoum Abdallh Adam**, *Thesis Title: Existence and Uniqueness for Nonlinear Hyperbolic PDEs, University of Khartoum*.

June 2016–January 2017 **MSc: Maha Abdalrahem Mohmed Ali**, *Thesis Title: Monotonicity Methods For Nonlinear Partial Differential Equations, University of Khartoum*.

Membership with Professional Societies:

November, 2017- August, 2018 **Organizing committee member**, *International Conference on Computer, Control, Electrical and Electronics Engineering (ICCCEEE18), Khartoum*.

12-14 August, 2018 **Chair of computational and applied mathematics track**, *International Conference on Computer, Control, Electrical and Electronics Engineering (ICCCEEE18), Khartoum*.

2016–up to now **University of Gezira Senate member**, *Sudan*.

Fields of Interest

- Partial Differential Equations
- Stochastic Analysis

Research Interests

- Homogenization Theory
- Analysis of SPDEs
- Mathematical analysis for problems in stochastic models of fluids

Invited talks on international conferences

- Effective Macroscopic Stochastic Models for Chemical Reactive flows in Porous Media , 5th Conference on Mathematical Sciences and Applications by by the Saudi Association for Mathematical Science (SAMS) in collaboration with King Abdullah University of Science and Technology (KAUST), during the 17th and 18th of November 2021.
- Homogenization and Correctors for Linear Stochastic Equations with Nonlinear Robin Boundary Condition, Multi-scale Analysis: Thematic Lectures and Meeting (MATHLEC-2021).
- Homogenization and correctors for linear stochastic equations via the periodic unfolding method,Workshop Homogenization Theory and Applications, Berlin at the Weierstrass Institute for Applied Analysis and Stochastics, 2017.

- Homogenization of linear hyperbolic SPDEs with periodically oscillating coefficients: The two scale convergence method, SAMS conference, UNISA, Oct 2014.
- Macroscopic behaviour of a microscopic system obtained by hyperbolic stochastic PDE, CIMPA research school, African Institute for Mathematical Sciences AIMSSouth Africa, Aug 2013.
- Eigenvalues of the Laplacian operator on Bounded Domains, AIMS-South Africa, May 2011.
- Finding n-soliton solutions for Boussinesq Equations, African Institute for Mathematical Sciences (AIMS),Dec, 2010.

Publications

Eddahbi, M., **Mohammed, M.**, El-Otmany, H., Well-posedness of a nonlinear stochastic model for a chemical reaction in porous media and applications, accepted.

J Alebraheem, **M Mohammed,** IM Tayel, MHN Aziz, Stochastic prey-predator model with small random immigration AIMS Mathematics 9 (6), 14982-14996, 2024.

M. Mohammed, Homogenization of a nonlinear stochastic model with nonlinear random forces for chemical reactive flows in porous media. Discrete and Continuous Dynamical Systems-Series B , Vol. 28 Issue 8, p1-27. 27p. Aug2023.

IM Tayel, J Alebraheem, **M Mohammed,** K Lotfy, AA El-Bary Volumetric absorption illumination induced by laser radiation in a 2D thermoelastic microelongated semiconductor body with temperature-dependent properties, Frontiers in Physics 11, 1213440 2023.

IM Tayel, K Lotfy, AA El-Bary, J Alebraheem, **MAY Mohammed** Microelongated thermo-elastodiffusive waves of excited semiconductor material under laser pulses impact, Mathematics 11 (7), 1627,2023.

M Mohammed Homogenization of nonlinear hyperbolic problem with a dynamical boundary condition, AIMS Mathematics 8 (5), 12093-12108, 2023.

OOO Yousif, **MAY Mohammed,** MA Saleh, MK Elbashir A criterion for the global convergence of conjugate gradient methods under strong Wolfe line search Journal of King Saud University-Science 34 (8), 102281 , 2022.

M. Mohammed, AC, Chigoziem, Homogenization of a stochastic model of a single phase flow in partially fissured media,Asymptotic Analysis, vol. 129, no. 3-4, pp. 413-450, 2022.

Mohammed, M.A.Y., Tayel, I.M. Photothermal influences in semiconductors with temperature-dependent properties generated by laser radiation using strainâĂŞtemperature rate-dependent theory, Eur. Phys. J. Plus 137, 703 (2022). https://doi.org/10.1140/epjp/s13360-022-02910-5.

I. M. Tayel and **M. Mohammed** Surface absorption illumination in a generalized thermoelastic layer under temperature–dependent properties using MGL model, Waves in Random and Complex Media

M. Mohammed Well-Posedness for Nonlinear Parabolic Stochastic Differential Equations with Nonlinear Robin Conditions, Symmetry 2022, 14(8), 1722; https://doi.org/10.3390/sym14081722.

M. Mohammed et al., Numerical and Theoretical Investigation to Estimate Darcy Friction Factor in Water Network Problem Based on Modified Chun-Hui HeâĂŹs Algorithm and Applications, Mathematical Problems in Engineering, Volume 2022 https://doi.org/10.1155/2022/8116282

M. Mohammed et al., Optimizing Approach of Water Allocation to Off-Takes During Reduced Flows, Water Resources Management volume 36, pages 891âĂŞ913, 2022.https://doi.org/10.1007/s11269-021-03054-4.

M. Mohammed et al., Topological Sustainability of Crop Water Requirements and Irrigation Scheduling of Some Main Crops Based on the Penman-Monteith Method, Journal of Chemistry Volume 2021, Article ID 8552547, 12 pages https://doi.org/10.1155/2021/8552547.

M. Mohammed et al., Significance of Nonsimilar Numerical Simulations in Forced Convection from Stretching Cylinder Subjected to External Magnetized Flow of Sisko Fluid, Journal of Mathematics Volume 2021, Article ID 9540195, 11 pages https://doi.org/10.1155/2021/9540195.

M. Mohammed and W. Khan, Homogenization and Correctors for Stochastic Hyperbolic Equations in Domains with Periodically Distributed Holes, Journal of Multiscale Modelling Vol. 12, No. 3 (2021) 2150008 (27 pages).

M. Mohammed etc., Deterministic Sudden Changes and Stochastic Fluctuation Effects on Stability and Persistence Dynamics of Two-Predator One-Prey Model, Journal of Mathematics 2021 https://doi.org/10.1155/2021/6611970.

M.Mohammed, N. Ahmed, Homogenization and correctors of Robin problem for linear stochastic equations in periodically perforated domains. Asymptot. Anal. 120 (2020), no. 1–2, 123–149.

M. Mohammed, M. Sango, Homogenization of nonlinear hyperbolic stochastic partial differential equations with nonlinear damping and forcing. Netw. Heterog. Media 14 (2019), no. 2, 341–369.

M. Mohammed, Homogenization and correctors for linear stochastic equations via the periodic unfolding methods. Stoch. Dyn. 19 (2019), no. 5, 1950040, 26 pp.

M. Mohammed, M.Sango, Homogenization of stochastic parabolic equations. in varying domains, Shape Optimization, Homogenization and Optimal Control, 19-40, 2018.

M. Mohammed, Homogenization of nonlinear hyperbolic stochastic equation via Tartar's method, J. Hyper. Differential Equations, 14:02, 323-340 (2017).

M. Mohammed, M.Sango, A Tartar approach to periodic homogenization of linear hyperbolic stochastic partial differential equation, Int. J. Mod. Phys. B 30(28 and 29)(2016), 1640020-1640029.

M. Mohammed, M.Sango, Homogenization of Neumann problem for hyperbolic stochastic partial differential equations in perforated domains. Asymptotic Analysis 97(3-4):301-327 (2016).

M. Mohammed and M. Sango, Homogenization of linear hyperbolic stochastic partial differential equation with rapidly oscillating coefficients: The two scale convergence method. Asymptotic Analysis 91(3-4), 341-371, (2015).

Scholarships and Awards

2021 **Deanship of scientific research**, *Majmaah University KSA research gran number R-2021-208*.

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2021 **Deputy-ship for Research and Innovation**, *Ministry of Education in Saudi Arabia, research project number (IFP-202-20)*.

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2020 **Deanship of scientific research**, *Majmaah University KSA research gran number R-1441-4*.

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2015 **Postdoctoral fellowship**, *Department of Research and Innovation Support, University of Pretoria, South Africa*.

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2012 **Pilot Doctoral Programme bursary**, *The Department of Mathematics and Applied Mathematics at the University of Pretoria*, South Africa.

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2012 **Half Bursary for Ph.D study at South African Universities**, *African Institute for Mathematical Sciences (AIMS) in Muizenberg, , Cape Town, South Africa*.

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2010 **Postgraduate Diploma in Mathematical Sciences scholarship** , *African Institute for Mathematical Sciences (AIMS) in Muizenberg, Cape Town,*, South Africa.

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Courses Presented at Undergraduate level

- Linear Algebra
- Calculus
- Ordinary Differential Equations
- Partial Differential Equations
- Mathematical Methods
- Real Analysis
- Complex Analysis
- Fourier Analysis
- Functional Analysis I
- Functional Analysis II

- Integral Equations
- Measure Theory
- Vector Analysis

Courses Presented at Postgraduate level

- Advanced Partial Differential Equations
- Advanced Mathematical Methods
- Advanced Complex Analysis
- Advanced Functional Analysis