

CURRICULUM VITAE

DR. ZACHARIAH MBUGUA MBURU

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EXECUTIVE SUMMARY

I am an experienced, industrious, and honest mathematics lecturer and researcher at the University of Embu and formerly in the University of KwaZulu- Natal in South Africa. I am an expert in MATLAB coding, Python, R-Programming, and Modeling in various fluid mechanics engineering applications. With over six years of experience teaching Calculus I, II, III, and differential equations, among other modules, I have trained over 10,000 students to achieve high grades in mathematics. I have extensive experience with fluid flow modeling, numerical analysis, and machine learning. In 2019, I was ranked one of the best researchers at a computational mathematics conference held at the University of Cape Town in South Africa. Besides excelling so well in academics and research, I held the office of the vice president of the International Student Association in the University of KwaZulu-Natal, Pietermaritzburg campus in South Africa. I am also a motivational speaker and a caring individual who can work with little supervision. I believe that a classroom should be a safe, caring environment where children can express themselves and blossom and grow.

CAREER OBJECTIVE

- To advance my knowledge and professionalism, thus acquiring career satisfaction.
- To create a good working environment by treating my students as I would want them to treat me.
- To continually honor my God-given skills and competencies; to remain honest, trustworthy, respectful, and flexible.

PERSONAL ATTRIBUTES

- Robust research experience in mathematical modeling and numerical analysis.
- Strong teaching and analytical skills.
- Extensive experience in machine learning.
- Excellent communication and interpersonal skills.
- Good team player and helping others progress.
- Experience in MATLAB, Mathematica and R studio.
- A person of integrity: I uphold diligence and honesty.

EDUCATION BACKGROUND

2018-2021: University of KwaZulu-Natal, Pietermaritzburg campus in South Africa -**Ph.D. Applied Mathematics**

2014-2016: Jomo Kenyatta University of Agriculture and Technology, Kenya. -**Msc. Applied Mathematics**

2010-2014: Jomo Kenyatta University of Agriculture and Technology -**Bsc. Mathematics and Computer Science (2nd Upper)**

2011-2014: Reward Institute of Professionals –**CPA K (Certified Public Accountant)**

2005-2007: Discover Bible School- **Diploma in Bible speaks**

2004-2008: Thika High School -Kenya Certificate of Secondary Education (K.C.S.E)- **(B +)**

1996-2003: Jacaranda Primary School-Kenya Certificate of Primary Education (K.C.P.E) -**(403/500)**

WORKING EXPERIENCE

2022-Present: Lecturer - University of Embu, Kenya.

Duties

- Teaching mathematics modules including Calculus I, II, III, Differential Equations and Numerical analysis.
- The setting, moderating, administering, processing and marking examinations.
- Taking part in departmental meetings.
- Academic advising and mentoring undergraduate and postgraduate students.
- Development of teaching and learning materials.
- Developing research proposals for funding.
- Participate in meetings and conferences related to research and building inter-disciplinary collaboration.
- Participating in preparation of department and faculty strategic plans.
- Attending and participating in seminars, workshops, conferences.

2018-2021: Lecturer - University of KwaZulu-Natal, Pietermaritzburg campus in South Africa.

Duties

- Teaching mathematics modules including Calculus I, II, III, Differential Equations and Numerical analysis.
- The setting, moderating, administering, processing and marking examinations.
- Taking part in departmental meetings.
- Academic advising and mentoring undergraduate and postgraduate students.
- Development of teaching and learning materials.
- Developing research proposals for funding.
- Participate in meetings and conferences related to research and building inter-disciplinary collaboration.
- Participating in preparation of department and faculty strategic plans.
- Attending and participating in seminars, workshops, conferences.

2019 - Present: Vice President, International Students Association- University of KwaZulu-Natal, Pietermaritzburg campus in South Africa

Duties

- Assist international students with visa related issues
- Hold annual general meetings.
- Facilitate cultural and diversity events

2018 - Present: Tutorial Fellow- University of Kwa-Zulu Natal, Pietermaritzburg campus in South Africa

Duties

- Tutoring applied mathematics units including Fluid Mechanics, Calculus I, II, III, Statistics, and Numerical Analysis.

- Arrangement of tutorial and class teaching for each student in each term.
- Monitoring students' progress through termly written reports, collections of regular tests of performance.

2016-2018: Part-Time Lecturer- Jomo Kenyatta University of Agriculture and Technology

Duties

- Teaching mathematics modules including Calculus I, II, III, Dynamical systems, Differential Equations and Numerical Analysis.
- The setting, moderating, administering, processing and marking examinations.
- Taking part in departmental meetings.
- Academic advising and mentoring undergraduate and postgraduate students.
- Development of teaching and learning materials.
- Participating in preparation of department and faculty strategic plans.

2016- Present: Member of Management Committee-Kurahia Primary School

Duties

- To act as a liaison between management team and teaching staff.
- To provide independent advice and counsel to the headteacher.
- To keep abreast generally of the activities of the school.

2015-2016: Part-Time Lecturer- Mount Kenya University

Duties

- Teaching mathematics modules including Algebra, Geometry, Calculus I, II, III and Numerical Analysis.
- The setting, moderating, administering, processing and marking examinations.
- Taking part in departmental meetings.
- Academic advising and mentoring undergraduate and postgraduate students.
- Development of teaching and learning materials.
- Participating in preparation of department and faculty strategic plans.
- Attending and participating in seminars, workshops, conferences.

2016, August- October: Adjudicator- Oshwal Academy, Nairobi

Duties

- Examining projects and awarding presents to best students
- Advising students on academic performance

2011-2015: Manager- WIKIKA SACCO

Duties

- Reviewed and formulated policies, procedures and practices for WIKIKA SACCO operations.
- Directing and supervising the administration and processing of loans.
- Ensuring effective management and use of Sacco financial resources and assets.

Preparation and reporting of timely and accurate financial reports.

2010-Present: Youth leader- TWEMA Youth Group

- Organize regular social, educational, and spiritual-oriented events with parents and volunteers to maintain a vibrant program.
- They establish support and appropriate relationships with youth members and their families.

2011-2013: Chairman –JKUSDAWA welfare association

- Reviewed and formulated policies, procedures and practices for JKUSDAWA operations.
- Directing and supervising the administration and processing of loans.
- Ensuring effective management and use of Sacco financial resources and assets.
- Preparation and reporting of timely and accurate financial reports.

2012- Genaral elections: Clerk-IEBC Juja

2008, January- May: Eye and E.N.T. volunteer- Shree Jain Youth League

IT PROFICIENCY

- MATLAB
- Mathematica
- Python
- C programming
- C++
- Html, CSS, JAVA script
- Ms Word, Excel, Sage, Powerpoint, and Internet
- SPSS, R studio,
- Latex

PROFESSIONAL TRAINING AND CERTIFICATION

- South Africa Mathematics Society (SAMS) Conference in the University of Cape Town, South Africa, December 2019.
- 13th annual workshop on computational mathematics and modelling, University of Kwazulu-Natal, Pietermaritzburg campus, South Africa, from 5th – 9th july, 2021.
- Digital Marketting 2nd -3rd August 2021 by Google.
- Mental Health Masterclass -2021 by Lifewithtv

HOBBIES

- Playing football
- Socializing
- Travelling

PUBLICATIONS

- **Z. M. Mburu**, S. Mondal, P. Sibanda, R.P. Sharma. A Numerical Study of Entropy Generation on an Oldroyd-B Nanofluid flow Past a Riga Plate. *Journal of Thermal Engineering*, 7 (4): 845-866, 2021, <https://doi.org/10.18186/thermal.930653>.
- **Z. M. Mburu**, S. Mondal, and P. Sibanda. Numerical study on combined thermal radiation and magnetic field effects on entropy generation in unsteady fluid flow past an inclined cylinder. *Journal of Computational Design and Engineering*, 8(1):149–169, 2021, <https://doi.org/10.1093/jcde/qwaa068>.
- **Z. M. Mburu**, M.K.Nayak, S. Mondal, P. Sibanda. Impact of irreversibility ratio and entropy generation on three-dimensional oldroyd-b fluid flow with relaxation–retardation viscous dissipation. *Indian Journal of Physics*, 2(1):1–17, 2021, <https://doi.org/10.201007/s12648-020-01950-w> .
- **Z. M. Mburu**, S. Mondal, P. Sibanda, R.P. Sharma. The Overlapping Grid Spectral Collocation Method for Solving Entropy Generation in Casson Nanofluid Flow Past a Stretching Plate. *American Scientific Publishers*, <https://doi.org/10.1166/jon.2021.1766>.
- **Z. M. Mburu**, M. N. Kinyanjui, K. Giterere, P. R. Kiogora, (2015). Hydro-magnetic fluid flow between parallel plates where the upper plate is porous in the presence of variable transverse magnetic fields. *International Journal of Engineering Science and Innovative Technology*, 4 (5), 14-22. http://www.ijesit.com/Volume%204/Issue%205/IJESIT201505_03.pdf.
- M. Almakki, H. Mondal, **Z. M. Mburu**, P. Sibanda. Entropy generation in double diffusive convective magnetic nanofluid flow in the stagnation region of a rotating sphere with viscous dissipation. *Theoretical and Computational Fluid Dynamics*, TCFD-D-20- 00065, under review.
- **Z. M. Mburu**, S. Mondal, P. Sibanda. The numerical study on velocity, heat and mass transfer of unsteady nanofluid flow past parallel porous plates. *International Journal of Heat and Technology*, IJHT-2020-0116, Accepted.
- **Z. M. Mburu** , F.M. Samuel and P. Sibanda. The Overlapping Grid Spectral Collocation Method for Solving Entropy Production in Unsteady MHD Double Diffusive and Chemically Reactive Nanofluid Flow Past a Rotating Porous Plate -Under review.
- **Z.M. Mburu**, S. Mondal, H.Sithole, P.Sibanda. Numerical Solution of Entropy Generation in Micropolar Liquid Near a Stagnation Point On a Perpendicular Hot Sheet. -Work in progress (70% complete).
- **Z.M. Mburu** , S. Ibukun. Numerical study of non-linear thermal radiation effects on free convection currents and mass transfer flow -Work in progress (50% complete).
- **Z.M. Mburu**, M. Almaki, and P.Sibanda. A numerical study of nonlinear aspect of thermal radiation in flow towards convectively heated surface of variable thickness. Work in progress (90% complete).

Professor. Precious Sibanda

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