CURRICULUM VITAE

Name: **Dr. Boniface Otieno Kwach (Ph.D)**

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CAREER OBJECTIVE

I am committed to being actively involved in research and the dissemination of knowledge, with a focus on contributing to both research excellence and institutional development in the academic environment. My goal is to foster collaboration across departments, enhancing student success and driving impactful research in Applied Mathematics. I am particularly dedicated to mentoring the next generation of researchers, ensuring that they are well-equipped to excel in their academic and professional endeavors. Furthermore, I aim to maintain a dynamic and inclusive department that encourages innovation, diversity, and continuous growth.

RESEARCH INTEREST.

1. Mathematical Modeling (with emphasis on biological systems, fluid dynamics, and environmental modeling)

2. Mathematical Biology (with research on the spread of diseases such as HIV, rotavirus, communicable and non communicable diseases)

3. Systems Biology (with focus on integration of biological data with mathematical models and computational techniques to simulate and predict the behavior of biological networks.)

4. Non-linear Dynamics and chaos (with reference to complex systems in nature and technology,

where interactions between components result in non-linear, unpredictable behaviors, that is, Population growth, Epidemiological and Financial Models)

5. Modeling in Forensic Science (which combines principles of mathematics, physics, and biology to improve the objectivity and precision of forensic analyses, ultimately supporting the legal process by providing scientifically sound interpretations of evidence e.g time-of-death estimation models)

6. Applied Physics and Applied Statistics (with emphasis on the foundation for developing, analysis and interpretation of data to make informed decisions in a wide variety of fields)

COMPETENCY PROFILE

I am a highly motivated and dynamic professional with strong competencies in both academic and administrative leadership. My experience spans over several years in teaching, research, and management attributes within a university setting, making me well-versed in higher education governance and academic excellence. My core competencies include:

1. Team Leadership and Collaboration with Proven ability to lead diverse teams within academic departments, guiding faculty members and students toward achieving their academic and research goals. I promote a collaborative environment, encouraging teamwork and interdisciplinary collaboration to foster innovation.

2. Research and Analytical Skills as demonstrated in extensive experience in developing and executing complex research projects, particularly in mathematical modeling, systems biology and other areas of my research interest including applications that address real-world problems.

3. Mentorship and Supervision as reflected in my strong track record of supervising graduate students (both M.Sc. and Ph.D.) to successful completion of their programs. I take pride in mentoring the next generation of scholars, fostering their professional growth, and guiding them in cutting-edge research methodologies.

4. Organizational and Project Management as demonstrated in the outcomes of my engagements in departmental leadership, steering the accreditation process of seven programs, award of University Charter and facilitating the University ISO certification, development and revision of programs, departmental graduate school committee, Faculty graduate school committee and academic advisory positions. My organizational skills ensure smooth operations, from budget management to academic planning in the department.

5. Communication and Interpersonal Skills as reflected in my strong communication skills that facilitate effective interaction with faculty, department students, and external stakeholders. I foster open communication channels within the department and across the university.

6. Problem-Solving and Decision-Making as demonstrated in my ability to analyze complex issues and make informed decisions that align with the university's mission and goals. I approach challenges with a problem-solving mindset, ensuring that solutions are data-driven and context-specific.

4. Commitment to Quality and Innovation as reflected in my commitment to fostering innovation within the academic sphere, continuously seeking to improve the quality of teaching, research, and service delivery. I believe in creating an environment where academic excellence can thrive alongside practical, impactful research contributions.

These skills underscores my capacity to contribute meaningfully to the advancement of academic institutions, promoting both research excellence and operational efficiency in a dynamic and evolving educational landscape.

EDUCATION BACKGROUND

2014: Doctor of Philosophy (Ph.D) in Applied Mathematics: Jaramogi Oginga Odinga University of Science and Technology.

Thesis: "Mathematical Model for Drug Therapy in Patients with Diabetics Mellitus".

2008: Master of Science (M.Sc) in Applied Mathematics. Maseno University.

Thesis: "Mathematical Model for Detecting Diabetes in the Blood"

1998: Post graduate Diploma in Education (PGDE). Kenyatta University.

Project: "An Investigation into the Reasons for Reading Inabilities among primary school children in Korando Sub-Location, Kisumu District".

1993: Bachelor of Science (B.Sc) in Maths/Physics. Moi University.

Project: "Building materials from Stabilized soils. The use of under-utilized resources for low cost building".

1989: Kenya Advanced Certificate of Education (KACE). Kisumu High School.

1986: Kenya Certificate of Education (KCE). Nyabondo Boys' High school.

1981: Certificate of Primary Education (CPE). Kolal & Arombo Primary School.

PROFESSIONAL EXPERIENCE

2024: Chairman, Faculty Graduate School Committee, Kibabii University, responsible to the Dean School of Graduate Studies for all matters pertaining to graduate studies at the Faculty of Science with strict adherence to rules and regulations of the School of Graduate Studies, Kibabii University.

2024: Chairman, Departmental Graduate School Committee, Kibabii University, responsible to the Faculty Graduate SchooL Committee for all matters pertaining to graduate studies at the Department of Mathematics with strict adherence to rules and regulations of the School of Graduate Studies, Kibabii University.

2021: Senior Lecturer, Department of Mathematics, Kibabii University, discharged the assigned duties, delivered lectures, mentorship, Supervision of multiple Ph.D. and M.Sc. students guiding them through research in Applied Mathematics and Participating in Scholarly publications, collaborations and research projects, securing funding for research initiatives.

2019-2022: Chairman of Mathematics Department, Kibabii University and led the department through a period of significant growth, including the accreditation of seven academic programs that led to the award of charter, Guidance of the department through multiple successful ISO certification audits, ensuring adherence to quality assurance standards, Managed departmental recruitment, departmental budgets, increasing enrollment, transition and turnover.

2018: Appointed a session Chair in the 3rd Kibabii University International Conference where I Chaired the several sessions, Coordinated the presentation of cutting-edge research papers and facilitated discussions between presenters and audience members.

2017: Appointed a Session Chair in the 2rd Kibabii University International Conference where I Chaired the several sessions, Coordinated the presentation of cutting-edge research papers and facilitated discussions between presenters and audience members.

2016: Appointed as Programme Leader for Bachelor of Science (Mathematics), Kibabii University and Provided leadership in curriculum development for the B.Sc. Mathematics program, Working closely with industry stakeholders to ensure the program met current job market demands, increasing graduate employability.

2015: Acting Chairman of Mathematics Department, Kibabii University, where I led the department, overseeing the academic and administrative functions, Coordinated the review of the department's academic policies and updated them to improve student performance and faculty

output.

2015: Career Week Session Organizer, Kibabii University where I organized career week events aimed at connecting students with industry professionals and academic leaders, organized departmental talks and exhibitions through Mathematics Club on the role of mathematics in real life situation.

2014: Lecturer, Department of Mathematics, Kibabii University, discharged the assigned duties, delivered lectures, mentorship, Supervision of postgraduate students guiding them through research in Applied Mathematics and Participating in Scholarly publications, Developed new course materials, including problem sets, lecture notes, and projects to engage students in Applied Mathematics.

2014: Nominated as Faculty Representative to School of Graduate Studies, Kibabii University and Represented the faculty in university-wide discussions on graduate studies policy and program improvement.

2014: Exams Coordinator, Mathematics Department, Kibabii University and Coordinated the setting, moderation, and marking of examinations, ensuring adherence to university examination standards.

2014: University College Wide Electoral Board Member, Kibabii University, Kenya where I served on the university electoral board, organizing and overseeing elections for student and faculty governance positions.

2014: Appointed as Project and Industrial Attachment Coordinator, Kibabii University and Managed industrial attachment placements for undergraduate students, ensuring alignment with their academic focus and career aspirations.

2014: Warden, Non-Resident Students, Kibabii University and supervised non-resident students, providing guidance and support on academic and welfare issues.

2014: Academic Advisor, Bachelor of Science, Mathematics, Kibabii University and advised B.Sc. Mathematics students on academic progression, course selection, and career opportunities.

2013: Patron, Mathematics Club, Kibabii University, Kenya where I Guided the Mathematics Club, organizing events, competitions, and talks to promote interest in mathematics among students in various fora including cultural weeks.

2013: Member, Aids Control Unit (ACU), Kibabii University, Kenya and participated in AIDS awareness and prevention campaigns within the university, advocating for safe practices and health

education.

2013: Assistant Lecturer, Department of Mathematics, Kibabii University, and delivered lectures in various courses and performing the assigned roles.

2011: Assistant Teacher at St. Peter's Nanga Secondary School and Taught mathematics and physics at the secondary school level, preparing students for national examinations.

2010: Part-Time Lecturer, Jaramogi Oginga Odinga University of Science and Technology (JOOUST), Kosele Campus and taught undergraduate courses in mathematics, including calculus, differential equations, and linear algebra.

2010: Part-Time Lecturer, Catholic University of Eastern Africa (CUEA), Kisumu Campus and delivered lectures in undergraduate mathematics courses, focusing on applied mathematics and statistics.

2009: Examiner, Kenya Accountants and Secretaries National Examinations Board (KASNEB) and Participated in the examination and marking process for KASNEB professional qualification exams.

2009: Teacher Representative in the PTA where I acted as the liaison between teachers and the Parent-Teacher Association, facilitating communication and addressing concerns.

2004: Head of Department (HOD) – Science, Sinyolo Girls Secondary School and led the science department, overseeing curriculum implementation and teacher coordination in the Science Department.

2000: Assistant Teacher at Sinyolo Girls Secondary School and taught mathematics and physics to secondary school students, preparing them for national examinations.

1999: Examiner, Kenya National Examination Council (KNEC) and participated in marking and moderating national examinations in mathematics at various centers.

1995: Assistant Teacher at Ting're Mixed Secondary School and taught mathematics and physics, focusing on improving student performance in national exams.

1994: Assistant Teacher at Withur Boys Secondary School and Engaged in teaching mathematics and physics at secondary school level preparing earners for national examinations.

PROFESSIONAL BODIES, AFFILIATIONS, SOCIETIES AND COMMITTEES

2019 to date: A member of SCUDEM (SIMIODE Challenge Using Differential Equations Mod-

eling) and Participates in the international SCUDEM challenge, promoting the use of differential equations in modeling real-world problems mentors. jointmathematicsmeetings - Formatted Paper.
2018: A member of Ad-Hoc Committee for DAAD In-Country/In-Region Scholarship Applications where I Contributed to the preparation of scholarship applications for the DAAD In-Country/In-Region program, supporting the development of academic collaborations and funding opportunities.
2018: Appointed as a member of Board of Privately Sponsored Students Program (PSSP) and Income Generating Unit (IGU) with the view to shaping key programs that directly contribute to the financial and academic success of the institution through policy development, Overseeing the PSSP Programs, Income Generation, Formulating the development & strategic plans and make recommendation to senate.
2015: International Center for Pure and Applied Mathematics (CIMPA) focuses on academic activities organized by CIMPA, aimed at fostering research in pure and applied mathematics across the African continent where some members participate in conferences and workshops.
2015: Kenya National Academy of Sciences (KNAS) and Participates in KNAS initiatives to promote the importance of mathematics and science education in Kenya and to advance the role of scientific research in national development.
2015: African Institute for Mathematical Sciences (AIMS) and Involve in initiatives that promote the development of mathematical sciences in Africa through education and research and mentoring young African scholars in mathematics, guiding them through research projects and offering career development support. Four (4) of our students have so far benefited from their scholarships.
2015: Society for Industrial and Applied Mathematics (SIAM) and engages with SIAM's international community of mathematicians and scientists dedicated to advancing the application of mathematics in industry and research through Contributions to conferences and publications focused the importance of mathematical solutions in addressing practical challenges.
2014: MOU Committee for Collaboration between Sang'alo Institute of Science and Technology and Kibabii University College as serves as a representative in discussions aimed at forming a Memorandum of Understanding (MOU) between Sang'alo Institute and Kibabii University College and assisted in drafting the proposed MOU document, focusing on areas of collaboration such as student exchange, joint research projects, and staff development.
2014: American Mathematical Society (AMS) and actively participates in international confer-

ences and contributing to discussions on contemporary mathematical research through the annual Joint Mathematics Meeting (JMM). www.ams.org - Formatted Paper.

2014: Mathematics Association of Kenya (MAK) and contributes to the advancement of mathematics education in Kenya through involvement with MAK by participating in national conferences and workshops focused on improving mathematics teaching and learning in schools and universities. mathkenya.org - Formatted Paper.

2013: Reviewer, International Journal of Mathematics and Soft Computing and reviewed research manuscripts submitted to the journal, providing detailed feedback to authors to improve the quality and rigor of their work. ipindexing.com - Formatted Paper.

2012: Reviewer, Journal of Mathematical and Computational Science and provided peer reviews for manuscripts in the area of mathematical and computational sciences, assessed the quality, originality, and contribution of submitted papers, ensuring they met the standards for publication. www.scimagojr.com - Formatted Paper.

2013: Editorial Board Member, International Journal of Engineering & Mathematical Science and served on the editorial board, overseeing the peer review process and contributing to the journal's editorial policies and participated in discussions on how to improve the journal's impact and ensure high-quality publications in the fields of engineering and mathematical science, www.ijems.org - Formatted Paper.

WORKSHOPS AND CONFERENCES ATTENDED

2023: Attended and participated in the Kibabii University 6^{th} Biannual International Conference as a session chair on 14th – 15th June, 2023, the Theme; Harnessing Science, Technology and Innovation (STI) to Mitigate Global Challenges for Sustainable Development. kibu - Formatted Paper.

2021: Attended and participated in the Kibabii University 5^{th} Virtual International Conference as a session chair on 15th – 16th June, 2021, the Theme; Mitigating the Post Covid-19 Impact on The Realization of Sustainable Development Goals. kibu - Formatted Paper.

2019: Attended and participated in the Kibabii University 4^{th} International Conference as a session chair on 12th – 14th June, 2019, the Theme; Enhancing Food Security and Universal Health Care for Sustainable Development. kibu - Formatted Paper.

2018: Attended and participated in the Kibabii University 3^{rd} International Conference as a session chair on 12th – 14th June, 2018, the Theme; Creativity and Innovation for Sustainable Development. kibu - Formatted Paper.

2018: Attended and participated in the Two-Day Pedagogical Skills Training Course on 23rd – 24th October, 2018, Kibabii University; the Theme; Towards Enhancing Quality Instruction and Assessment in the Provision of University Education in the 21st Century. kibu - Formatted Paper.

2018. Invited to participate and give a lecture in the fourth edition of the International Conference on Differential & Difference Equations and Applications held on the VIP Zurique Hotel, Lisbon, Portugal, during July 1 - 5, 2019. sites.google.com/site/sandrapinelas - Formatted Paper.

2019: Invited to participate in the 2019 Joint Mathematics Meetings at the Joint Mathematics Meetings (JMM), held on 16th to 19th January, 2019 in Baltimore, Maryland. Title of Paper: Mathematical Model for Nutrient Exchange Across the Placenta by Joel Odongo Olielo, Prof. Omollo N Ongati and Dr. Boniface Otieno Kwach, Reference: 1145-VF-1555. jointmathematicsmeetings - Formatted Paper.

2017: Attended and participated in the training course for ISO 9001:2015 Quality Management System Process Owner at Kibabii University by Maier Consulting Limited. I acquired in-depth knowledge on document control, process monitoring, internal audits, and ensuring compliance with international quality standards to enhance institutional efficiency and service delivery. I equally developed skills to effectively implement, maintain, and improve quality management processes, with a focus on achieving customer satisfaction, ensuring regulatory compliance, and enhancing operational excellence within the University environment.

2017: Attended and participated in the Grant proposal Writing Workshop at Kibabii University from 6^{th} March to 8^{th} March 2017 aimed at enhancing skills in developing competitive research proposals to secure funding from national and international agencies. We engaged in practical sessions focused on identifying funding opportunities, structuring research proposals, and aligning research goals with funding agency priorities. I gained valuable insights into the proposal evaluation process, budget development, and the importance of clear, impactful writing to convey research significance.I collaborated with fellow academics to brainstorm research ideas and develop grant proposals for submission to various funding bodies, furthering the university's research agenda. kibu - Formatted Paper.

2016: Attended Kibabii International Conference on Transformative Leadership for Social Empowerment in the 21st Century and gave a talk on "Lifestyle Diseases and Management: Mathematical Models" under Cross Cutting Issues. kibu - Formatted Paper.

2016: Invited to participate in the 2016 Joint Mathematics Meetings at the Joint Mathematics Meetings (JMM), held on January 6th to 9th in Seattle, Washington. The was abstract number 1116-VM-352, entitled, Mathematical Modeling of Insulin Therapy in Patients with Diabetes Mellitus, accepted for inclusion in an MAA General Contributed Paper Session on Modeling and Applications. jointmathematicsmeetings.org- Formatted Paper.

2015: Invited to Participate and give a lecture in a conference on Differential and Difference Equations and Applications on the campus of the Military Academy, Amadora, Portugal, during May 18-22 2015.

2015: Attended and participated as an Organizer in the 2nd Cultural week held at Kibabii University College on March 12-15 2015. kibu - Formatted Paper.

2015: Invited to participate in the American Mathematical Society (AMS) in 2015 Spring Western Sectional Meeting held in April 18-19, 2015 at the University of Nevada, Las Vegas, in Las Vegas, Nevada. AMS Sectional Meeting - Special Sessions.

2015: Invited to give a talk on "Mathematical Modeling of Insulin Therapy in Patients with Diabetes Mellitus", abstract number 1106-VG-1543, at the Joint Mathematics Meetings (JMM), in San Antonio, TX, January 10-13, 2015. The Joint Mathematics Meetings (JMM) is the largest gathering of mathematicians in the world, attracting participants from diverse fields of mathematical research. 2015 Joint Mathematics Meetings (JMM).

2014: Attended a conference at Strathmore University on Mathematical Modelling in Biology and Medicine organized by CARMS of Strathmore University and presented a paper on Mathematical Model on Non-Communicable diseases. The paper focused on Mathematical Models for Non-Communicable Diseases, particularly focusing on diabetes, hypertension, and cancer, majorly on how these models can inform public health interventions.We Engaged in discussions on how mathematical models can be used to predict the behavior of diseases and optimize healthcare strategies, especially in resource-limited settings.

2014: Invited to give a talk on "Forensic Estimation of Time of Death: A Mathematical Model", at SEOUL ICM 2014 International Congress of Mathematicians August 13-21, 2014 Coex , Seoul

Korea. The International Congress of Mathematicians (ICM) is one of the most prestigious mathematical conferences, providing an international platform to present high-impact research. This paper is based on the practical application of the model in forensic investigations, helping to improve the accuracy of determining time of death in criminal cases. icm2014.

2014: Participated and presented a seminar paper on "Mathematical Model for Drug Therapy in patients with Diabetes Mellitus" in the first Jaramogi Oginga Odinga University for Science and Techology (JOOUST) seminar series from 6^{th} to 7^{th} May 2014. This seminar paper discussed the application of qualitative theory of differential equations to simulate the dynamics of insulin-glucose interaction and predict optimal drug administration schedules. I engaged with participants in discussions on the model's potential to improve diabetes management, particularly in resource-limited settings where precise medical interventions are critical. It contributed to the seminar's broader theme of using mathematical and scientific research to address healthcare challenges, positioning the model as a valuable tool for clinicians and researchers alike.

2014: Presented a paper at Joint Mathematics Meeting (JMM) at Baltimore Convention Center, Baltimore, Maryland, USA on "Mathematical Model for Drug Therapy in patients with Diabetes Mellitus". This paper explores drug therapy management in diabetic patients, focusing on how to achieve optimal drug administration using mathematical approaches. The model was designed to simulate various treatment regimens, helping clinicians make informed decisions regarding dosage schedules to maintain appropriate glucose levels in patients. 2014 Joint Mathematics Meetings (JMM) - Friday Program.

2013: Attended International Mathematics Conference (SIMC) at Strathmore University on Mathematical Modelling, gave a talk on Non-Infectious Diseases with special consideration on Diabetes Mellitus which has become a major global health issue. The talk emphasized the use of mathematical techniques to simulate disease progression and intervention strategies, contributing to better understanding and management of chronic diseases. I had discussions with international researchers and medical practitioners from CREATES at Strathmore University on the future of mathematical modeling in global health.

2013: Attended workshop on "Mathematical Modeling" at Kenyatta University and presented a paper "Mathematical Model for Detecting Diabetes in the Blood" through analysis of blood glucose levels, aiming to improve early diagnosis and prevention strategies. I Engaged with other

mathematicians and healthcare professionals on how mathematical modeling can be used as a diagnostic tool in clinical settings and explored potential applications of the model in large-scale health screenings and personalized medicine.

2013: Attended Workshop on "ISO Training" by Catholic University of Eastern Africa where I Participated in a comprehensive training session focused on ISO (International Organization for Standardization) standards and best practices and gained in-depth knowledge of the quality management systems that ensure consistency and quality in academic institutions. I also learned about the ISO 9001:2015 standards, helping institutions like universities implement processes that lead to continuous improvement and better management.

2012: Attended Workshop on "Open and Distance E-Learning" by Catholic University of Eastern Africa aimed at understanding the methodologies and technologies behind Open and Distance E-Learning (ODEL). The training covered e-learning strategies, online instructional design, and the effective use of digital platforms for remote learning and I acquired skills for integrating e-learning platforms into academic programs, making education more accessible to students in diverse geographical locations.

2008: Attended Workshop on "How to Improve Your Exam Results" by Longman Kenya which provided insights into improving student outcomes in academic assessments, focusing on effective teaching strategies and exam preparation techniques. I engaged with curriculum developers to explore methods of delivering course content that enhances understanding and retention among students. It further focused on practical approaches for teachers to assist students in improving their performance in national and local exams.

2005: Attended SMASSE Cycle 2 Workshop at Ojolla Girls High School where I participated in the Strengthening Mathematics and Science in Secondary Education (SMASSE) Cycle 2, which is a national initiative aimed at improving the teaching and learning of mathematics and science. I gained pedagogical strategies and best practices for teaching mathematics and science subjects, with a focus on Activity-Based Learning. I worked alongside educators to share experiences and develop more engaging methods of teaching STEM subjects.

2004: Attended SMASSE Cycle 1 Workshop at Kisumu Girls High School which focused on building foundational skills in teaching science and mathematics effectively in secondary schools. It introduced to inquiry-based teaching methods and hands-on experimental techniques that make

learning more interactive and engaging for students. I collaborated with other science and mathematics teachers to develop lesson plans that integrate these strategies into the classroom.

2004: Attended Workshop on Officiating Clinic (Theory and Practical) for Football where I participated in a football officiating clinic that provided both theoretical and practical training for managing and officiating football games. I learned the fundamentals of football rules, regulations, and fair play through practical sessions and discussions with experienced referees. These skills help in handling match situations, making accurate judgments, and ensuring player safety and sportsmanship during games.

2002: Attended Workshop for Teachers of Mathematics and Science in Girls' Schools which was a specialized workshop aimed at addressing the unique challenges faced by teachers of mathematics and science in girls' schools. It focused on strategies for encouraging female students to pursue and excel in STEM subjects, breaking down gender barriers in education. We discussed the importance of role models, mentorship, and creating a supportive classroom environment to promote higher performance in mathematics and science among girls.

PUBLICATIONS

1. Boniface O. Kwach (2025). *Numerical Computation for Differential Equations: Comprehensive Lecture Notes with Worked Examples*. Kindle Direct Publishing (Amazon). ISBN:9798252219714. Available at: https://kdp.amazon.com.

2. Boniface O. Kwach (2025). *Partial Differential Equations: A Comprehensive Student's guide*. Kindle Direct Publishing (Amazon). ISBN:9798275209631. Available at: https://kdp.amazon.com.

3. Boniface O. Kwach (2025). *Numerical Analysis II: Theory and Applications of Spectral Techniques in Numerical Analysis*. Kindle Direct Publishing (Amazon). ISBN: 9798267714426. Available at: https://kdp.amazon.com.

4. Boniface O. Kwach (2025). *Drug Therapy in Patients with Diabetes Mellitus: A Differential Equation-Based Approach to Insulin Dynamics and Treatment Modeling*. Kindle Direct Publishing (Amazon). ISBN: 9798271195709. Available at: https://kdp.amazon.com.

5. Marwa Hassan Chacha., Joseph Ouno., **Boniface Kwach** and Cornelius Nyakundi. (2025). A Hybrid GPR-GAM Model for Enhanced Spatio-Temporal Climate Prediction in Kenya. *Asian Journal of Probability and Statistics*. Volume 27, Issue 7, Page 225-234, Article no.AJPAS.140749

ISSN: 2582-0230. Asian Journal of Probability and Statistics.Volume 27, Issue 7.

6. Marwa Hassan Chacha., Joseph Ouno., **Boniface Kwach** and Cornelius Nyakundi. (2025). Modelling Spatial and Non-Linear Trends in Climate Data Using Gaussian Process Regression and Generalized Additive Model. *Asian Journal of Probability and Statistics*. Volume 27, Issue 8, Page 1-16; Article no.AJPAS.140747 *ISSN: 2582-0230*. Asian Journal of Probability and Statistics.Volume 27, Issue 7.

7. Boniface O. Kwach (2025). *Numerical Analysis I: An Elementary Approach*. Kindle Direct Publishing (Amazon). ISBN: 979-8-2896-6278-1. Available at: https://kdp.amazon.com.

8. Boniface O. Kwach. **2025**. Analysis of Glucose-Insulin-Epinephrine Dynamics Using Multidimensional Ostrowski-Type Inequality. *IRE Journals*. Volume 8 Issue 12. ISSN: 2456-8880 IRE 1709346 Iconic Research and Engineering Journals 1297. IRE Journals - Volume 8 Issue 12.

9. **Boniface O. Kwach**. **2025**. Impact of Physical Exercises and Nutrition in Patients with Diabetes Mellitus: A Boolean Algebra and Stability Analysis Approach . *IRE Journals*. Volume 8 Issue 12- ISSN: 2456-8880 IRE 1709346 Iconic Research and Engineering Journals 1297. IRE Journals - Volume 8 Issue 12.

10. Wakwabubi N. Christine., Samuel B. Apima., **Bonface Kwach**. **2024**. A Mathematical Model for Rotavirus Infection Incorporating Time Delay on the Effectiveness of Vaccination with Treatment. *Asian Research Journal of Mathematics*. Volume 20, Issue 8, Page 76-9; Article no.ARJOM.120065ISSN: 2456-477X. ARJOM Journal - Issue 120.

11. Andrew Masibayi., **Bonface Kwach**., Angwenyi David. **2024**. Estimating Minimum Safe Distance Between Rai Paper Mills and Residential Houses. *IRE Journals*. Volume 8 Issue 2. IRE Journals - Volume 8 Issue 2.

12. Andrew Masibayi., **Bonface Kwach**., Angwenyi David. **2024**. Numerical Solution of Transient Three Dimension Advection Diffusion Equations with Randomness. *IRE Journals*. Volume 8 Issue 2. www.irejournals.com.

13. Leonard King'ora Thuo., Joseph Ouno Omondi., **Boniface Kwach**. **2022**. Derivation of Integrated Heckman-Conway-Maxwell-Poisson Model. *IRE Journals*. Volume 6 Issue 2, ISSN: 2456-8880. IRE Journals - Formatted Paper.

14. Leonard King'ora Thuo., Joseph Ouno Omondi., **Boniface Kwach**. **2022**. Application of Heckman - Conway - Maxwell - Poisson Model for Analysing Corruption. *IRE Journals*. Volume

6 Issue 2, ISSN: 2456-8880. IRE Journals - Formatted Paper.

15. Jacinta M. Mutwiwa, Joyce K. Nthiiri, **Boniface O. Kwach**, Barack O. Abonyo **2022**. Within Host Model for Cervical Cancer Incorporating Diffusion. *IOSR Journal of Mathematics (IOSR-JM)*, e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 18, Issue 4 Ser. II (Jul. – Aug. 2022), PP 46-55. IOSR Journals - Volume 18, Issue 4, Series 2.

16. Jacinta M. Mutwiwa, Joyce K. Nthiiri, **Boniface O. Kwach**, Barack O. Abonyo **2022**. A Coupled Mathematical Model for Cervical Cancer Incorporating Diffusion and Diagnosis. *IOSR Journal of Mathematics (IOSR-JM)*, e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 18, Issue 4 Ser. III (Jul. – Aug. 2022), PP 01-09 IOSR Journals - Volume 18, Issue 4, Series 3.

17. Owuor Lucas Otieno, **Boniface O. Kwach**, Frankline Tireito, Linda Ouma. **2022**. Consistency And Stability Analysis of a Mathematical Model of Chlorine Concentration in Contact Tanks Using Numerical Solution of A 1- Dimensional Convection-Diffusion Equation. *IRE journals*, Volume 5 Issue 7, ISSN: 2456-8880. IRE Journals - Formatted Paper.

18. Fatuma Nandaha Nyongesa, **Boniface O. Kwach**, Michael O. Okoya. **2022**. Analysis of an Arterial Pulse Using 1D KdV Model. *IRE Journals*, Volume 5 Issue 7, ISSN: 2456-8880. IRE Journals - Formatted Paper.

19. Sirma C. Purity, **Boniface O. Kwach**, Frankline Tireito, Jane Kabo. **2022**. Modeling Gases, Nutrients and Wastes in The FetoPlacental Circulation. IRE Journals - Formatted Paper.

20. **Boniface Otieno Kwach**. **2021**. Designs of Length 2024 from Mathieu Group M24. *IRE journals*, Volume 4, Issue 9. IRE Journals - Formatted Paper.

21. **Boniface Otieno Kwach**. **2021**. Modeling Gases Transfer between Placenta and Fetus across the Umbilical Cord. *IRE Journals*, Volume 4, Issue 9. IRE Journals - Formatted Paper.

22. Nebert Kituni Wafula., **Boniface Otieno Kwach** and Vincent Nyongesa Marani. **(2021)**. Mathematical Modelling and Optimal Control for Controlling Pneumonia-Hiv Co-Infection. *International Journal of Innovative research & Development (IJIRD)*, ISSN 2278 - 0211 (Online), Volume 10 Issue 1.International Journal Corner - IJIRD Article.

23. Blasio Omulama Amoche., Joseph Omondi Ouno., Barack Otieno Abonyo., **Boniface Otieno Kwach** . **(2021)**. Bayesian Hierarchical Approach to Modelling Risk of Miscarriage during First Trimester of Subsequent Intrauterine Pregnancy in Women. emphInternational Journal of Innovative research & Development (IJIRD), ISSN 2278 - 0211 (Online), Volume 10 Issue 1. International

Journal Corner - IJIRD Article.

24. Andanje Mulambula., D. B. Oduor and **B. O. Kwach**. **(2020)**. Volatility Estimation Using European-Logistic Brownian Motion with Jump Diffusion Process. *Int. J. Math. And Appl (IJMAA)*, 8(2)(2020), 155-163, ISSN: 2347-1557. ijmaa - Formatted Paper.

25. Andanje Mulambula., D. B. Oduor and **B. Kwach** . **(2019)**. Derivation of Black-Scholes-Merton Logistic Brownian Motion Differential Equation with Jump Diffusion Process. *Int. J. Math. And Appl (IJMAA)*, 7(3)(2019), 85-93, ISSN: 2347-1557. ijmaa - Formatted Paper.

26. Zachary Kayiita., **Boniface Kwach**., Shem Aywa., Paul Francis. **(2018)**. On Vector Sequence Spaces and Representation of Compact Operators on BK Spaces. *International Journal of Mathematics Trends and Technology (IJMTT)* , Volume 61 Number 3. ijmtt - Formatted Paper.

27. Jacinta M. Mutwiwa., Joyce K. Nthiiri., **Boniface O. Kwach**. **(2018)**. Mathematical Modelling of the Role of Interference on the Transmission Dynamics and Management of Hiv and Aids. *Journal of Advances in Mathematics and Computer Science*, 28(6): 1-11, ; Article no.JAMCS.42819,ISSN: 2456-9968. journaljamcs - Formatted Paper.

28. Okoth Annette W., Nyongesa kennedy L., **Kwach Bonface O**. **(2017)**. A comparative study between a multi-stage adaptive pool testing model without test errors and the non-adaptive model. *International Journal of Applied Mathematical Research*, 6 (3) (2017) 93-97. www.sciencepubco.com-Formatted Paper.

29. Okoth Annette W., Nyongesa kennedy L., **Kwach Bonface O**. **(2017)**. Multi-Stage Adaptive Pool Testing Model with Test Errors; Improved Efficiency. *IOSR Journal of Mathematics (IOSR-JM)*, e-ISSN: 2278-5728, p-ISSN: 2319-765X. Volume 13, Issue 1 Ver. II, PP 43-55. iosrjournals - Formatted Paper.

30. Joel Ojuok Achieng'a., Omolo Ongati., **Boniface Otieno Kwach (2016)**. Mathematical Model for Drug Therapy in Asthmatics. *International Journal of Engineering & Mathematical Sciences (IJEMS)*, Volume 8, Issue 1, pp.17-27, ISSN (Print) - 2319 - 4537, (Online) - 2319 - 4545.

31. Joel Olielo Odongo., Omolo Ongati., **Boniface Otieno Kwach (2016)**. Mathematical Model for Nutrient Exchange across the Placenta . *International Journal of Engineering & Mathematical Sciences (IJEMS)*, Volume 8, Issue 1, pp.28 - 35, ISSN: ISSN (Print) - 2319 - 4537, (Online) - 2319 - 4545.

32. **Boniface O. Kwach**., Omolo Ongati., M. Oduor Okoya., Amos E. O. Otedo **(2015)**. Math-

ematical Modeling of Insulin Therapy in Patients with Diabetes Mellitus. *International Journal of Engineering, Science and Mathematics (IJESM)*, Volume 6, Issue 6, ISSN: 2045-7057. www.ijmse.org- Formatted Paper.

33. Alphonce O. Kwach., **Boniface O. Kwach**., Isabel A. Ogwan'g **(2013)**. *The Role of Teachers in Implementing Effective Play in Early Childhood and Educational centers*. Lap Lambert Academic Publishing, ISBN 978-3-659-47116-2

34. **Boniface O. Kwach**., Alfred W. Manyonge., David O. Alambo., Titus J. O. Aminer, **(2013)**. Solutions of Second-Order Partial Differential Equations in Two Independent Variables using Method of Characteristics. *International Journal of Multidisciplinary Sciences and Engineering*, Vol. 4, No. 5, June 2013 http://www.ijmse.org/- Formatted Paper.

35. Charles C. Iyaya., Alfred W. Manyonge., **Boniface O. Kwach (2013)**. *Elementary Partial Differential Equations*. Lap Lambert Academic Publishing, ISBN 978-3-659-38790-6

36. **Boniface O. Kwach**., Omolo_Ongati., Nyakinda J. O., Rachael Nyang'inja **(2013)**. Forensic Estimation of Time of Death: A Mathematical Model. *International Journal of Management, IT and Engineering (IJMIE)*, Volume 3, Issue 7, ISSN: 2249-0558.

37. **Boniface O. Kwach**., David O. Alambo., Colleta A. Okaka **(2013)**. Derivation and solution of the heat equation in 1-D. *International Journal of Engineering, Science and Mathematics (IJESM)*, Volume 2, Issue 2, ISSN: 2320-0294.

38. **Kwach, B. O (2012)**. *Mathematical Model for Detecting Diabetes in the Blood*. Lap Lambert Academic Publishing, ISBN 978-3-8443-0460-2

39. **B. Otieno Kwach**., Omolo_Ongati., R. Simwa **(2011)**. Mathematical Model for Detecting Diabetes in the Blood. In *Journal of Applied Mathematical Sciences*, Vol. 5, 2011, no. 6, 279 - 286. https://www.m-hikari.com/ams/ams-2011/ams-5-8-2011/kwachAMS5-8-2011.pdf

EXTERNAL AND INTERNAL EXAMINATION

2026: appointed as External Examiner for 'Mathematical Modelling of Covid-19 and Diabetes Comorbidity Under Vaccination', Thesis for Florence Akinyi Odongo, Ph.D (Applied Mathemaics), Jaramogi Oginga Odinga University of Science and Technology (JOOUST).

2024: appointed as an External Examiner in the School of Biological, Physical, Mathematics and Actuarial Sciences, Jaramogi Oginga Odinga University of Science and Technology (JOOUST).

2025: appointed as External Examiner for 'Modeling the Effects of Vaccination and Incubation on COVID-19 Transmission Dynamics', Thesis for Peter Kibii Cheruiyot, M.Sc (Applied Mathemaics), University of Kabianga.

2025: appointed as External Examiner for 'Mathematical Modelling of Temperature Trends in Response to Climate Change Using Newton's Law of Cooling', Thesis for Benson Macharia Kuria, M.Sc Project (Applied Mathematics), Kirinyaga University.

2025: appointed as Internal Examiner for 'Non-Parametric Estimation of the Posterior Distribution in Monitoring Primary School Enrollment in Mt. Elgon Region, Kenya', Thesis for Elijah Sifuna Wafula, M.Sc (Statistics), Kibabii University.

2025: appointed as Internal Examiner for 'Applications of Pauli Unitary Operators In Quantum Information Theory', Thesis for Clement Wekesa Sirengo, M.Sc (Pure Mathematics), Kibabii University.

2025: appointed as Internal Examiner for 'Volatility Estimation using Mean Reverting European Logistic Type Option with Jump Diffusion Process and Transaction Cost', Thesis for John Werunga Wafula, M.Sc (Statistics), Kibabii University.

2025: appointed as External Examiner for 'Stochastic Modelling of Predator Prey Dynamics in a Three-Patch Ecosystem with Optimal Harvesting', Thesis for Lucian Talu Mayabi, Ph.D (Applied Mathematics), Masinde Muliro University of Science and Technology (MMUST).

2025: appointed as Internal Examiner for 'Mathematical Modeling of the Impact of Climate Change on Water Security: A Case Study of Budalangi in Lake Victoria Basin', Thesis for Fatuma Nandaha Nyongesa, Ph.D (Applied Mathematics), Kibabii University.

2025: appointed as Internal Examiner for 'Fischer Clifford Matrices and Character Table of the Split Extension Group $2^8 : A_{10}$', Thesis for Redempta Namalwa Muchanga, M.Sc (Pure Mathematics), Kibabii University.

2025: appointed as Internal Examiner for 'Solution of the Third Order Advection Water Seepage Equation in Earth Dams Using Finite Difference Method', Thesis for Moses Kalibo Nyongesa, M.Sc (Applied Mathematics), Kibabii University.

2025: appointed as Internal Examiner for 'Modeling HIV and AIDS Transmission Dynamics in Kenya Using an Adaptive Spatial Hierarchical Bayesian Approach', Thesis for Mulati Omukoba Nyukuri, Ph.D (Statistics), Kibabii University.

2024: appointed as Internal Examiner for 'Circularity of Numerical Ranges of Isometrically Bounded Operators on Hilbert Spaces', Thesis for Joel S. Barasa, Ph.D (Pure Mathemaics), Kibabii University.

2024: appointed as Internal Examiner for 'On the Zero Divisor Graphs, Binding Number Bounds, Graph Numbers and Distance Related Parameters of a Class of Unital Finite Rings', Thesis for Mmasi Eliud, Ph.D (Pure Mathemaics), Kibabii University.

2024: appointed as Faculty Graduate School Committee Chair, Faculty of Science, Kibabii University.

2024: appointed as an External Examiner for 'Second Order Extended Ensemble Filter (SOEEF) for non-linear Filtering', Thesis for Kevin Midenyo, M.Sc (Applied Mathematics), Masinde Muliro University of Science and Technology (MMUST).

2024: appointed as an External Examiner in the Department of Physics, Mathematics and Computer Science, School of Science, Technology and Engineering, Alupe University.

2023: appointed as Departmental Graduate School Committee Chair, Department of Mathematics, Kibabii University.

2022: appointed as an External Examiner for 'A Mathematical Model for Effective Fungicide use Initiatives: The Case of Rice Blast Re-Infection', Thesis for Bonface Ouma Obita, M.Sc (Applied Mathematics), Chuka University.

2022: appointed as an External Examiner for 'Mathematical Modeling of Cholera Incorporating Dynamics of the Induced Achlorhydria Condition and Treatment', Thesis for Ngari Charles Wanjohi, M.Sc (Applied Mathematics), Chuka University.

2022: appointed as an External Examiner for 'Differential Inffectivity and Discrete Age Structured Mathematical Model with Application', Thesis for Brenda Achieng Onyango, Ph.D (Applied Mathematics), Masinde Muliro University Of Sciece and Technology, (MMUST).

2022: appointed as an Internal Examiner for 'Solving Nonlinear Ordinary Differential Equation of Power Flow Model Using Lie Symmetry Method', Thesis for Rhoda Machuma Mamuli, M.Sc (Applied Mathematics), Kibabii University (KIBU).

2022: appointed as an Internal Examiner for 'Thermodynamic Phase Transition of a Singlet Superconducting Electron-Hole Pairing of Excitonic-Type in Heavy Fermion System', Thesis for Godwin Posta Wabuyi, M.Sc (Physics), Kibabii University (KIBU).

2022: appointed as an Internal Examiner for 'Analysis of Malaria Coupled Transmission Equation Using Lie Groups Method', Thesis for Dominic Simiyu Opicho, M.Sc (Applied Mathematics), Kibabii University (KIBU).

2021: appointed as an Internal Examiner for 'Statistical Modelling for the Prediction of Football Matches' Results in German Bundesliga', Thesis for Rachel Wangeci Macharia, M.Sc (Statistics), Kibabii University (KIBU).

2021: appointed as an Internal Examiner for 'Estimation of Multiple Trait in a Population using an M-Stage Group Testing Model', Thesis for John L. Sirengo, Ph.D (Statistics), Kibabii University.

2021: appointed as an Internal Examiner for 'Analysis of Generalized Boussinnesq Coupled Equations using Lie Symmetry', Thesis for Sarah Omari, M.Sc (Applied Mathematics), Kibabii University.

2018, appointed as an Internal Examiner for 'Thermodynamic Properties of Yttrium-Based Cuprate using Bogoliubov-Valatin Transformation', Thesis for Wamalwa Abel Mukubwa, M.Sc (Physics), Kibabii University (KIBU).

2018: appointed as an Internal Examiner for 'Effect of Heat Transport on the Transition Temperature of Mercury Doped Cuprate Superconductors', Thesis for Mbiya Enos Adidwa, M.Sc (Physics), Kibabii University (KIBU).

2018: appointed as an Internal Examiner for 'An *AB Initio* Study of the Physical Properties of Beryllium Chalcogenides', Thesis for Vincent Odhiambo Oketch, M.Sc (Physics), Kibabii University (KIBU).

2016, appointed as an Internal Examiner for 'Modeling of the Basic Reproduction Number of HIV and Tuberculosis Co-Infection in the Presence of Treatment', Thesis for Nelson Muhati Lwoyelo, M.Sc (Applied Statistics), Kibabii University (KIBU).

2016: appointed as an Internal Examiner for 'Quantum thermodynamics of a strong interacting Bose-Fermi Mixture in a three dimensional Anharmonic Potential', Thesis for Oliver Wanyama Mumali, M.Sc (Physics), Kibabii University (KIBU).

2016: appointed as an Internal examiner for 'Estimation of Weight of infants at birth based on the Mother's Pre-Natal information', Thesis for Richard Donkor, M.Sc (Applied Statistics), Kibabii University (KIBU).

2015: appointed as an External Examiner for 'Mathematical Modeling of Co-Infection of HIV/AIDS

and Pneumonia with Treatment', Thesis for David Onyinge Odindo, M.Sc (Applied), Jaramogi Oginga Odinga University of Science and Technology (JOOUST).

2014, appointed as an External Examiner, Great Lakes University of Kisumu (GLUK).

SUPERVISION TO COMPLETION

1. Supervised Marwa Hassan Chacha, 'Modelling Spatial and Non-Linear Trends in Climate Data Using Non-Parametric Spatial Models', **Ph.D** (Applied Statistics), Maasai Mara University (MMARAU), to graduate in 2026.

2. Supervised Wakwabubi Christine Nasimiyu, 'Mathematical Model for Rotavirus Infection Incorporating Time Delay on the Effectiveness of Vaccination with Treatment', **M.Sc** (Applied Mathematics), Kibabii University (KIBU), graduated in 2024.kibu.ac.ke- Formatted Paper.

3. Supervised Leonard King'ora Thuo, 'An Integrated 'Heckcompoisson' Model for Analysing Factors Influencing Citizens' Participation in Corruption', **Ph.D** (Statistics), Kibabii University (KIBU), graduated in 2024. kibu.ac.ke- Formatted Paper.

4. Supervised Masibayi Andrew, 'Estimating Minimum Safe Distance between Industries Emitting Sulphur Dioxide Gas and Residential Houses: Application to Rai Paper Mills', **Ph.D** (Applied Mathematics), Kibabii University (KIBU), to graduate in 2025.

5. Supervised Jacinta Mukonyo Mutwiwa, 'Disease Dynamics in a Coupled Cervical Cancer Model Linking Within and Between-Host Model Interactions Incorporating Diffusion Equations and Late Diagnosis', **Ph.D** (Applied Mathematics), Kibabii University (KIBU), graduated in 2023.kibu.ac.ke- Formatted Paper.

6. Supervised Lucas Otieno Owuor, 'A Mathematical Model of Chlorine Concentration in Contact Tanks Using Numerical Solution of a 1-Dimensional Convection-Diffusion Equation', **M.Sc** (Applied Mathematics), Kibabii University (KIBU), graduated in 2022.kibu.ac.ke- Formatted Paper.

7. Supervised Purity Chepkoech Sirma, 'Mathematical Model for Nutrients, Gases and Wastes Exchange in the Fetoplacental Circulation', **M.Sc** (Applied Mathematics), Kibabii University (KIBU), graduated in 2023. kibu.ac.ke- Formatted Paper.

8. Supervised Fatuma Nandaha Nyongesa, 'Analysis of the KdV Equation Using Operator Splitting Method and its Application in Modeling Arterial Pulse Waves', **M.Sc** (Applied Mathematics), Kibabii University (KIBU), graduated in 2022. kibu.ac.ke- Formatted Paper.

9. Supervised Nebert Kituni Wafula, 'Mathematical Modelling and Optimal Control for Determining Cost-Effective Strategy For Minimizing Pneumonia-Hiv Co-Infection', **M.Sc** (Applied Mathematics), Kibabii University (KIBU), graduated in 2021. kibu.ac.ke- Formatted Paper.

10. Supervised Blasio Omulama Amoche, 'Bayesian Hierarchical Approach to Modelling Risk Of Miscarriage During First Trimester of Subsequent Intrauterine Pregnancy in Women', **M.Sc** (Applied Statistics), Kibabii University (KIBU), graduated in 2021. kibu.ac.ke- Formatted Paper.

11. Supervised Mulambula Andanje, 'On the European Logistic-Type Option Pricing with Jump Diffusion', **Ph.D** (Applied Mathematics), Kibabii University (KIBU), graduated in 2021.kibu.ac.ke-Formatted Paper.

12. Supervised Zachary Kaunda Kayiita, 'On Vector Sequence Spaces and Representation of Compact Operators on BK Spaces', **Ph.D** (Pure Mathematics), Kibabii University (KIBU), graduated in 2021. kibu.ac.ke- Formatted Paper.

13. Supervised Mutwiwa Jacinta Mukonyo, 'Mathematical Modelling of the role of Interference on the Dynamics of HIV and Aids Transmission', **M.Sc** (Applied Mathematics), Kibabii University (KIBU), and graduated in 2019. kibu.ac.ke- Formatted Paper.

14. Supervised Annette Wakaanya Okoth, 'Construction and analysis of a Multi-Stage Adaptive Pool Testing Model for estimating prevalence of a Trait in the Presence of Test Errors', **Ph.D** (Statistics), Masinde Muliro University of Science and Technology (MMUST), and graduated in 2018. www.mmust.ac.ke - Formatted Paper.

15. Supervised Joel Achieng'a Ojuok, 'Mathematical Model for Drug Therapy in Asthmatics', **M.Sc** (Applied), Jaramogi Oginga Odinga University of Science and Technology (JOOUST), and graduated in 2016. www.jooust.ac.ke - Formatted Paper.

16. Supervised Joel Odongo Olielo, 'Mathematical Model for Nutrient Exchange across the Placenta', **M.Sc** (Applied), Jaramogi Oginga Odinga University of Science and Technology (JOOUST), and graduated in 2016. www.jooust.ac.ke - Formatted Paper.

17. Supervised Jichonia Otila Obwago, 'A Study on the Effects of Parenting Styles on Adolescent behavior outcome in Barkorwa Zone Kombewa Division in Kisumu West District', B.Ed (Arts), Catholic University (CUEA) Kisumu campus, and graduated in 2014.

ON-GOING SUPERVISION

2023 to Date. Owuor Lucas Otieno, PHD/AM/002/23, 'Mathematical Modeling of Carbon Dioxide Concentration Dynamics using Reaction-Diffusion Advection Equation.', Ph.D (Applied Mathematics), Kibabii University (KIBU).

2023 to Date. Opicho Dominic Simiyu, PHD/AM/001/23, 'Mathematical Modelling of Malaria Vaccine Impact in Children under five years of Age in Bungoma County, Kenya.', Ph.D (Applied Mathematics), Kibabii University (KIBU).

2021 to Date. Wafula Nebert Kituni, PHD/AM/001/21, 'A Heterogeneous Predator Prey Model Incorporating Prey Taxis and Delay in Predators', Ph.D (Applied Mathematics), Kibabii University (KIBU).

2021 to Date. Michael Ochieng' Ohuru, MSC/STA/005/21, 'Non-Parametric Estimation of Excess Mass for $PM_{2.5}$ Spatiotemporal Variations Using Satellite and Ground Sensor Data in Kisumu City.', M.Sc (Statistics), Kibabii University (KIBU).

2019 to Date. Rency Chebet Reg No.PHD/AM/01/2019, 'Modeling Immune Response dynamics and Therapeutic Intervention of Infectious Diseases', Ph.D (Applied Mathematics), Kibabii University (KIBU).

2015 to Date. Namuma Mildred Wawire, PHD/AMT/02/14, 'Mathematical Model For Anti-Viral Treatment of Hepatitis B Virus Using Combination Therapy: Entecavir and Tenofovir', Ph.D (Applied Mathematics), Kibabii University (KIBU).

RESEARCH GRANTS AND AWARDS

Throughout my academic career, I have demonstrated a strong commitment to securing funding for research and mentoring Ph.D. students toward successful grant awards.

1. On **5th June 2014**, I was awarded the prestigious **Science, Technology and Innovation (ST&I) grant**, amounting to **KSh. 800,000**, for my Ph.D. research proposal titled *"Mathematical Model for Drug Therapy in Patients with Diabetes Mellitus."* This funding was instrumental in advancing my research and contributing to the broader field of applied mathematics in healthcare.

2. As a supervisor, I successfully mentored **Namuma Mildred Wawire**, who received the **AMMSI Ph.D. Scholarship** in 2016 for her research on the *"Mathematical Model for Anti-Viral Treatment of Hepatitis B Virus Using Combination Therapy: Entecavir and Tenofovir"*. Addition-

ally, I supervise and mentored **Mulambula Andanje**, whose research on *"European Logistic-Type Option Pricing with Jump Diffusion"* earned him the **National Research Fund (NRF) Ph.D. Research Grant** for the financial year 2018/2019. His successful completion of this research led to his graduation in 2021.

3. Furthermore, I actively participated in the **Call for Proposals on Computational Modelling and Materials Science Grants** for 2022/2023, collaborating with a team from **Kibabii University** to submit a proposal titled *"Modeling the Dynamics of Production, Demand, and Consumption of Biofuels Generated from Sugarcane in Western Kenya,"* with a requested funding of **KSh. 1.5 million**. Although this proposal was not successful, it underscores my dedication to pursuing impactful research opportunities and fostering interdisciplinary collaborations.

PHD AND MSC RESEARCH GRANTS AND AWARDS

As the Chairman of the Mathematics Department, I played a pivotal role in mentoring and guiding Ph.D. and M.Sc students, leading to significant achievements in securing external funding for their research.

Under my mentorship, a total of five Ph.D. students—Cyprian Sakwa, Vincent Marani, Lydia Kananu Rukaria, Mulambula Andanje, Joel Barasa, Abraham Nyongesa, and Cedric Wanjala successfully secured NRF grants amounting to substantial sums ranging from KSh. 234,000 to KSh. 532,000 for their respective research projects. Additionally, one Ph.D. student, Namuma Mildred Wawire, received an AMMSI Scholarship award of KSh. 100,000, cumulatively amounting to Two Million, Seven Hudred and Ninety Seven Thousand, Six Hundred (KSh. 2,797,600).

These accomplishments not only reflect the academic caliber of the students but also underscore my commitment to fostering research excellence and supporting the professional growth of emerging scholars within the department.

COMPUTER SKILLS.

In my line of research, each of these tools contribute significantly to various stages of my research, from mathematical modeling and algorithm development to data management, analysis, and the professional presentation of your results:

1. LaTeX: This is a high-quality typesetting system used for the production of scientific and mathe-

matical documents. LaTeX is essential for preparing research papers, theses, and publications that require precise mathematical notation and structure. It's widely used in academia for presenting complex formulas and ensuring a professional layout.

2. Matlab: This is a powerful tool for numerical computing, simulation, and algorithm development. Matlab is used extensively for solving differential equations, developing mathematical models, and simulating various physical and biological systems. It is particularly helpful in applied mathematics for tasks like ata visualization and numerical analysis.

3. Maple: This is a symbolic computation tool used for solving algebraic and calculus problems. It is used in applied mathematics, Maple aids in deriving and solving complex equations symbolically. It's often used for manipulating and solving differential equations and for performing symbolic integration or differentiation in mathematical models.

4. Mathematica: This is a comprehensive system for algebraic manipulation, numerical computation, and visualization. It is useful for symbolic calculations and performing high-level mathematical programming. It is equally useful in the tasks for mathematical modeling, simulating physical phenomena, and developing algorithms for solving complex systems.

5. Microsoft Word, Excel, and Access: These are Office productivity tools for documentation, data analysis, and database management.

6. SPSS: This is a statistical software package for data analysis. It used in statistical modeling and data analysis. SPSS is equally used for running complex statistical tests, such as regression analysis, hypothesis testing, and data mining. It can also be applied in epidemiological studies and clinical trials where statistical validation is required.

7. Python: This is a versatile programming language with a rich ecosystem of libraries for data science, machine learning, and scientific computing. I used in applied mathematics for data analysis, numerical computation, and building machine learning models. Its libraries, such as NumPy, SciPy, and Matplotlib, are powerful tools for modeling, solving differential equations, and processing large datasets in research.

REFEREES

1. Dr. Martha Muthoni Konje

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2. Prof. Shem Aywa

Mobile Number: 0721204913

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3. Dr. Lucy Chikamai

Mobile Number: 0722763440

Email: chikamail@kibu.ac.ke

4. Dr. Vincent Nyongesa Marani

Mobile Number: 0716211787

Email: vmarani@kibu.ac.ke