CURRICULUM VITAE
DR. VINCENT NYONGESA MARANI

Senior Lecturer | Chairman of Department — Pure Mathematics

Department of Mathematics, Faculty of Science
Kibabii University
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PERSONAL INFORMATION

Date of Birth: 27th July 1965
Nationality: Kenyan
Languages: English, Kiswahili
Marital Status: Married

RESEARCH INTERESTS

Group Theory • Coding Theory • Representation Theory • Algebraic Structures • Combinatorial Designs • Cryptographic Applications of Algebra • Quantum Information Theory • Mathematical Modelling

EDUCATION

2019 — **Doctor of Philosophy (PhD) in Pure Mathematics**
Kibabii University, Kenya
Thesis: Modular Representation of Mathieu Group M_{24} as Linear Codes
Defended: 9th May, 2019

2009 — **Master of Science (MSc) in Pure Mathematics**
Masinde Muliro University of Science and Technology (MMUST), Kenya

1990 — **Bachelor of Education (Science) — Mathematics**
Kenyatta University (KU), Kenya

PROFESSIONAL EXPERIENCE

2023 – Present — **Senior Lecturer (Grade 13)**
Department of Mathematics, Faculty of Science
Kibabii University, Kenya

2022 – Present — **Chairman of Department (COD)**
Department of Mathematics, Faculty of Science
Kibabii University, Kenya

2010 – Present — **External/Part-Time Supervisor**
MA in Project Planning and Management
University of Nairobi, Kenya

2020 – 2023 — **Lecturer (Grade 12)**
Department of Mathematics, Faculty of Science
Kibabii University, Kenya

2015 – 2020 — **Tutorial Fellow**
Department of Mathematics, Faculty of Science
Kibabii University, Kenya

ADMINISTRATIVE RESPONSIBILITIES

- Chairman of Department (COD), Department of Mathematics, Kibabii University (2022–Present)
- Pure Mathematics Coordinator (2016)

- Mathematics Project Coordinator (2016)
- SMA Class Advisor (2017)
- Postgraduate thesis supervision and examination
- External examiner/supervisor — University of Nairobi
- Curriculum development and review
- Quality assurance and academic standards

PUBLICATIONS

Google Scholar Citations: 10+ | Research Areas: Group Theory, Coding Theory, Representation Theory

2025

[1] Maina, J.L., & **Marani, V.** (2025). Enumeration of Binary Linear Codes from the Orthogonal Extension Group $O^{+}_{8}(2):2$ Using Modular Representation Theory. *Iconic Research and Engineering Journals*, 9(3), 1025-1029.

[2] Masinde, B.B., **Marani, V.**, & Okoya, M.O. (2025). Restructuring Coupled Nonlinear Klein-Gordon Equations to Advection-Coupled Systems for Oceanographic Applications. *Iconic Research and Engineering Journals*, 9(2), 1108-1113.

[3] Nyongesa, M.K., **Marani, V.**, & Okoya, M.O. (2025). Finite Difference Discretization of Third-Order Advection Water Seepage Equation in Earth Dams. *Iconic Research and Engineering Journals*, 9(2), 1-5.

[4] Muhati, N.L., **Marani, V.**, & Simwa, R. (2025). Comparative Performance Analysis of Bayesian Hierarchical Models Versus Classical Statistical Approaches in Predicting Breast Cancer Treatment Outcomes: Evidence from Kenyan Healthcare Settings. *Iconic Research and Engineering Journals*, 9(1).

[5] Muhati, N.L., Simwa, R., & **Marani, V.** (2025). Bayesian Hierarchical Modeling Framework for Breast Cancer Treatment Outcome Prediction: Integrating Clinical, Pathological, and Treatment Variables. *Iconic Research and Engineering Journals*, 9(1), 237-242.

[6] Barasa, J., Anjetsa, A.M., & **Marani, V.** (2025). Budget Reduction Strategies and Firm Profitability: Evidence from Private Sugar Manufacturing Firms in Western Kenya. *Iconic Research and Engineering Journals*, 9(1), 1099-1103.

[7] Okombo, M.I., Ojiema, M.O., Kivunge, B., & **Marani, V.** (2025). A Characterization of Classes of Linear Ternary Codes over the Galois Field GF(3). *African Scientific Annual Review*, 2(1), 63-83.

[8] Okombo, M.I., Ojiema, M.O., Kivunge, B., & **Marani, V.** (2025). Designs and Lattices from Classes of Cyclic Linear Ternary Codes over GF(3). *SCIENCE MUNDI*, 5(1), 115-136.

2024

[1] Sikolia, M.J., Chikamai, L., & **Marani, V.** (2024). Conjugacy Classes of the Group Extension 2^{7}: $G_{2}(2)$. *Iconic Research and Engineering Journals*, 8(2), 12-17.

[2] Satia, W.A., **Marani, V.N.**, & Aywa, S. (2024). Nonstandard Analysis of the Koch Snowflake Fractal Curve: Insights into Self-Similarity and Scaling Properties. *Iconic Research and Engineering Journals*, 8(2), 155-161.

[3] Sirengo, C.W., **Marani, V.N.**, & Matuya, J. (2024). Mathematical Properties and Characteristics of Pauli Unitary Operators in Quantum Information Theory. *Iconic Research and Engineering Journals*, 8(2), 311-316.

[4] Khaemba, S.W., Chikamai, L.W., & **Marani, V.N.** (2024). Conjugacy Classes of the Maximal Subgroup 2^{8}: $G_{2}(2)$ in $O^{+}_{10}(2)$. *Iconic Research and Engineering Journals*, 8(2), 406-411.

[5] Wafula, W.C., Chikamai, L.W., & **Marani, V.N.** (2024). Conjugacy Classes of the Split Extension 2^{8}: $U_{4}(2)$. *Iconic Research and Engineering Journals*, 8(2), 736-741.

[6] Masiga, E., Chikamai, L., & **Marani, V.N.** (2024). Binary Linear Codes and Designs from the Orthogonal Group $O^{-}_{8}(2)$. *Iconic Research and Engineering Journals*, 8(1), 268-272.

[7] Mmasi, E., Ojiema, M.O., & **Marani, V.** (2024). Graph Numbers and Distance Related Parameters of Zero Divisor Graphs. *SCIENCE MUNDI*, 4(2), 81-95.

[8] Mmasi, E., Ojiema, M.O., & **Marani, V.** (2024). Binding Number Bounds of Zero Divisor Graphs of Classes of Completely Primary Finite Rings. *African Scientific Annual Review*, 1(Mathematics 1), 127-153.

2023

[1] Wanjala, V., Matuya, J.W., Njuguna, E., & **Marani, V.** (2023). On Skew Quasi-P-Class (Q) Operators. *Iconic Research and Engineering Journals*.

[2] Wanjala, P.M., & **Marani, V.N.** (2023). Investigating the Effect of Representing the Mathieu Group M_{24} on Its Subgroup and Applications. *Iconic Research and Engineering Journals*, 6(12), 428-431.

[3] Maina, J.L., Matuya, J.W., Njuguna, E., & **Marani, V.N.** (2023). Classification of Some Internal Structures of Degree 120 Related to a Group of Extension $O^{+}_{8}(2):2$. *Iconic Research and Engineering Journals*, 7(2), 626-629.

2022

[1] Machuma, R.M., **Marani, V.N.**, & Oduor, M.O. (2022). Solving Nonlinear Ordinary Differential Equation of Electric Power Flow Model Using Lie Symmetry Method. *Iconic Research and Engineering Journals*, 6(4), 23-27.

[2] **Marani, V.N.**, Simiyu, D.O., Abonyo, B., & Oduor, M.O. (2022). Analysis of Malaria Coupled Transmission Equation Using Lie Groups Method. *Iconic Research and Engineering Journals*, 5(7), 317-328.

2021

[1] **Marani, V.N.** (2021). A Self-Dual and Doubly Even Code Related to Mathieu Group M_{24}. *Iconic Research and Engineering Journals*, 4(9), 46-47.

[2] **Marani, V.N.** (2021). An Irreducible and Doubly Even Code of Degree 23 Related to Mathieu Group M_{23}. *Iconic Research and Engineering Journals*.

[3] Omari, S., **Marani, V.**, & Oduor, M. (2021). Analysis of Generalised Boussinesq Coupled Equations Using Lie Symmetry. *Iconic Research and Engineering Journals*.

[4] Wafula, N.K., Kwach, B.O., & **Marani, V.N.** (2021). Mathematical Modelling and Optimal Controls for Controlling Pneumonia-HIV Co-Infection. *The International Journal of Innovative Research and Development*, 10(1), 138-...

[5] Wanjala, V., **Marani, V.N.**, & Mulambula, A. (2021). On N Quasi (p+k)-D-Operator Operators. *Iconic Research and Engineering Journals*, 5(3), 168-169.

[6] Wanjala, V., Mulambula, A., & **Marani, V.N.** (2021). On (n+k, m)-D-Operator Operators. *Iconic Research and Engineering Journals*, 5(3), 159-161.

2019

[1] **Marani, V.** (2019). Some Linear Codes, Graphs and Designs from Mathieu Groups M_{24} and M_{23}. *PhD Thesis*, Kibabii University.

2016

[1] Cedric, N.W., **Marani, V.N.**, Chikamai, L.W., & Mulambula, A. (2016). Suborbital Graphs and their Properties for Ordered Triples in A_n (n = 5, 6, 7) Through Rank and Subdegree Determination. *International Journal of Engineering and Mathematics*, 9(1), 18-23.

GRADUATE SUPERVISION

PhD Supervision

- **Dr. Janet Lilian Maina** — PhD in Pure Mathematics, Maasai Mara University

Thesis: Enumeration of Binary Linear Codes from Some Groups of Extensions Using Modular Representation Theory Method — **Completed**

- **Dr. Victor Wanjala** — PhD in Pure Mathematics, Maasai Mara University
  Thesis: On Skew Quasi-P-Class(Q), Posimetrically Equivalent and Mutually Class (Q) Operators — **Completed**
- **Dr. Eliud Mmasi** — PhD in Pure Mathematics, Kibabii University
  Thesis: A Classification of Zero Divisor Graphs, Indices and Distance Related Parameters of a Class of Unital Finite Rings — **Completed (2024)**
- **Dr. Nelson Muhati** — PhD in Statistics, Kibabii University
  Thesis: Bayesian Hierarchical Modeling for Predicting Treatment Outcomes in Breast Cancer Patients — **Completed**

MSc Supervision — Kibabii University

- Sikolia Murunga Jacinta — Character Table of the Maximal Subgroup 2^7: G_2 (2) of the Affine Subgroup Sp_8 (2) by Fischer-Clifford Matrices — Completed (2024)
- Rhodah Mamuli Machuma — Solving Nonlinear Ordinary Differential Equation of Electric Power Flow Model Using Lie Symmetry Method — Completed (2023)
- Rachel Wangeci Macharia — Statistical Modelling for the Prediction of Football Matches Results in German Bundesliga — Completed (2022)
- Dominic Simiyu Opicho — Lie Symmetry Analysis of Malaria Coupled Transmission Equation — Completed (2022)
- Nebert Kituni Wafula — Mathematical Modelling and Optimal Control for Determining Cost Effective Strategy for Minimizing Pneumonia-HIV Coinfection — Completed (2021)
- Clement Wekesa Sirengo — Quantum Information Theory — Completed
- Khaemba Samuel Wafula — Conjugacy Classes in Orthogonal Groups — Completed
- Wekesa Caroly Wafula — Split Extensions — Completed
- Elizabeth Masiga — Binary Linear Codes — Completed
- Satia W. Arnest — Fractal Geometry and Nonstandard Analysis — Completed

TEACHING EXPERIENCE

Undergraduate Courses

- Abstract Algebra
- Linear Algebra
- Number Theory
- Discrete Mathematics
- Calculus I, II, III

Graduate Courses

- Group Theory
- Representation Theory
- Coding Theory
- Algebraic Structures

RESEARCH INNOVATION

Developed an enhanced algorithm for generating G-Invariant Codes (submodules of a permutation module), improving computational efficiency for coding theory research applications.

PROFESSIONAL MEMBERSHIPS

- International Association of Engineers (IAENG) — Member No. 335484, since 2023

CONFERENCE PROCEEDINGS

- Presented a paper during the 2nd Interdisciplinary International Scientific Conference, 14th–15th June 2017

RESEARCH GRANTS

- National Research Fund (NRF) — PhD Research Grant, Kenya

COMMUNITY SERVICE

- Member, Board of Management — Siaka Secondary School (2016)
- Member, Board of Management — Bungoma High School (2016)
- Coordinated Extra-Mural Programmes — University of Nairobi, Bungoma Sub-Centre (2010)

PEER REVIEW & EDITORIAL SERVICES

- **Peer Reviewer** — Iconic Research and Engineering Journals (IRE Journals), October 2025 – Present

TECHNICAL SKILLS

- **Mathematical Software:** GAP (Groups, Algorithms, Programming), Magma, SageMath, MATLAB, Mathematica
- **Statistical Software:** SPSS, R, Python
- **Document Preparation:** LaTeX, Microsoft Office Suite
- **Programming:** Python, C++

REFERENCES

Prof. Shem Omukunda Aywa
Professor of Mathematics
Kibabii University
Email: saywa@kibu.ac.ke

Dr. Lucy Walingo Chikamai
Senior Lecturer
Kibabii University
Email: lchikamai@kibu.ac.ke

Dr. Bonface Kwach
Senior Lecturer
Kibabii University
Email: bkwach@kibu.ac.ke

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