

## PROFESSOR MAINA MARINGA Ph.D. – CURRICULUM VITAE

65 Years Young Mechanical Engineer/Professor of Mechanical Engineering

PhD, CEng – ECE & MIMechE – UK (2004 – 2014)      MSc in Mechanical Engineering  
Postgraduate Diploma in Hydro Power Development      BSc in Mechanical Engineering  
11-years of experience as a hydropower maintenance/operations trainee, engineer, and manager.

32 years teaching and research experience at university in the areas of Solid and Structural Mechanics, Vibration Engineering, Engineering Drawing, Materials Science, Engineering Mechanics, as well as Additive Manufacturing of Metal, Polymers, and their Composites. Authorship of several tertiary level engineering texts, journal, conference and workshop papers, composer of music, player of the country box guitar and retired rock climbing enthusiast and trainer.

6.5+ years working experience at senior management level in academic institutions of higher learning including:

- 32+ months as founding Vice Principal of the Integrated Polytechnic Regional Centre, Kigali, Rwanda,
- 4+ months as a founding Deputy Director General of the Workforce development Authority, Rwanda,
- 11+ months as a **FOUNDER AND PROJECT ADVISOR** for Bachelor of Business and Information Technology (BBIT) program, at the **Rwanda Tourism University College (RTUC)**, reporting directly to the Vice Chancellor.
- 8+ months as the Head of the School of Engineering Science and Technology at the Technical University of Kenya, Nairobi, Kenya and
- 23+ months as the Acting Executive Dean of the Faculty of Engineering and the Built Environment (presently referred to as the Faculty of Engineering Science and Technology) at the Technical University of Kenya, Nairobi.

Expert in the following areas, based on specialisation, work experience and research:

1. Additive manufacturing of metals, polymers and their composites
2. Fibre reinforced and particulate composite engineering materials,
3. Solids and structural mechanics, stress analysis, materials science, materials selection, engineering mechanics, and theory of machines,
4. Non-contact thermoelastic, non-destructive small amplitude vibration as well as ultrasonic material characterisation,
5. Thermoelastic stress analysis, damage detection and monitoring,
6. Characterisation of dual moduli materials, as well as strain magnification and reduction in aligned fibre reinforced composites
7. Management, establishment, strategic planning and policy as well as curriculum development for technical, vocational, education and training, and
8. Hydropower technology – feasibility, design, operations and maintenance.

### REFEREES

**Dr. JG Van der Walt,**

Senior Researcher,

Director, Centre for Rapid Prototyping and Manufacture (CRPM)

Central University of Technology (CUT), Free State

Private Bag X20539, Bloemfontein, 9300, **South Africa**

Tel: +27515073644, Email: [jgvdwalt@cut.ac.za](mailto:jgvdwalt@cut.ac.za)

**Professor Willie du Preez**

Visiting Professor, Centre for Rapid Prototyping and Manufacture (CRPM)  
Central University of Technology (CUT), Free State  
Private Bag X20539, Bloemfontein, 9300, **South Africa**  
Tel: +27824537266, Email: [wdupreez@cut.ac.za](mailto:wdupreez@cut.ac.za)

**Professor Alfred Ngowi.**

Deputy Vice Chancellor, Research Innovation and Extension  
Central University of Technology (CUT), Free State  
Private Bag X20539, Bloemfontein, 9300, **South Africa**  
Tel: +27824537266, Email: [angowi@cut.ac.za](mailto:angowi@cut.ac.za)

**SELECTED ACHIEVEMENTS IN MY PROFESSIONAL CAREER**

1. Prepared annual reports and submissions for funding for the Metal Additive Manufacturing (MAM) part of the national Collaborative Program for Additive Manufacturing (CPAM), together with the then Director CPAM in the years 2019, 2020 and 2021 inclusive, to the tune of R1,396,250/00, R875,278/00 and R1,074,354, respectively, a total of R3,345,882/00.
2. Prepared annual reports and submissions for funding for the Metal Additive Manufacturing (MAM) part of the national Collaborative Program for Additive Manufacturing (CPAM), in the years 2022 and 2023 inclusive, to the tune of R875,250/00, R875,278/00 and R1,074,354, respectively, a total of R1,949,632/00.
3. Planning discussions on the development of an integrated TVET System for the Government of Rwanda together with 8 colleagues, developed the concept solution for the system alone, wrote up the project document for the developed integrated system together with a colleague from Singapore with a proposed budget of R1.32billion Rwanda Francs (about USD981,551/30) and subsequently prepared a Cabinet White Paper for the project alone, which was approved. Initial establishment of the developed system as a founding Deputy Director general of the Workforce Development Authority in the country. Proposals for funding were prepared and submitted to the World Bank after my departure from the body and the first phase of the project funded to the tune of USD10,238,000/00.
4. 21<sup>st</sup> March 2023. Prepared and submitted a concept note for the setting up of a potato drying industry in Nyandarúa County.
5. 10<sup>th</sup> October 2022. Prepared and submitted a concept note to the South Eastern Kenya University, Kenya, for the setting up of an advanced manufacturing centre in the department of mechanical engineering.
6. 15<sup>th</sup> November 2022. Prepared and submitted a proposal to the South Eastern Kenya University, Kenya, on the integrated use of Tana river waters for the Tana, Garissa, Isiolo, Kitui, Machakos And Makueni semi-arid counties of the country, Kenya.
7. 2019. Prepared and submitted separate proposals to the Ministries of Health and Industry, the Kenya Association of Manufacture (KAM), Nairobi University, University of Eldoret, Moi University and Machakos University of Kenya, University of Dar es Salaam in Tanzania, and Rwanda University and for the setting up of short course on additive manufacturing, and additive manufacturing research and production centres, with a focus on the development of solutions and products for industry and the market.

8. 1<sup>st</sup> August of 2016. Prepared and submitted an outline of a short Pre-MTech course in Materials Science to be offered by the Centre for Rapid Prototyping and Manufacturing (CRPM) at the Central University of Technology, Free State. The course was to be mounted annually or bi-annually for BTech students at the university, wishing to undertake MTech research studies in additive manufacturing. This was done in recognition of the fact that the undergraduate program in the department did not have any course in materials science, which was severely limiting on the incoming MTech students.
9. 2014. Established Sunyale Solar Company in partnership with one Kenyan and three Chinese citizens and established an assembly plant for use in assembly of portable solar lighting systems and on-job training. Established in the plant the only one of a kind state-of-art solar testing and certification centre in the East African region, which was certified by the Kenya Bureau of Standards.
10. 2011 – 2013. Identified several manufacturers in China and negotiated agreements for the production of manufacturing equipment, their assembly, dismantling and re-assembly in Kenya and eventual transfer of the production capacity to Kenya, to support establishment of gasifiers, sealed effluence treatment units, production of iron roofing sheets, nails, chain link and barbed wire, as well as structural insulated panels.
11. 2012- 2013. Developed together with a counterpart an MoU between the Technical University of Kenya and the Vaal University of Technology in South Africa for joint research, postgraduate student supervision, as well as staff and student exchange.
12. 2012. Developed together with a counterpart, an MoU between the Technical University of Kenya, and the Kenya Association of Manufacturers, to link each department of engineering in the university with industries in Kenya, to ensure relevance of curriculum to the needs of industry, access to on-job-training of the universities graduates, as well as failure analysis, design, testing, and research for industry.
13. 2011 – 2012. Developed a template for the overall development of Kírínyaga County touching on all areas of the County economy, to act as a guiding document in the evolution and initial establishment of a County Government.
14. 2011 – 2012. Developed a document for Kírínyaga County to guide the development of the education sector from play school to post university, aimed at making the County an education hub in the country and region as well.
15. 2009 – 2011. Prepared and submitted proposals to the Ministry of Higher Education Science and Technology (MoHEST) in Kenya, for the setting up of a state-of-art automation centre and other centres of excellence in other areas of TIVET, at an estimated costs between USD 3 – 5 million for the former. Prepared and submitted proposal MoHEST for rationalisation, integration, revamping and reorientation of TIVET towards industry in respect of workshops and development of curricula, in order to support the emergence of industry in the country. Part of the proposal included the creation of linkages with institutions and industries in the emerging economies of South, Eastern Asia. Had in anticipation initiated negotiations for possible placements of Kenyan students in the industries located in some of these countries, subject to the project being accepted by Government, with possibilities of gradual transfer of some of these industries to the country on the training of well skilled human resources in areas relevant to the industries. This proposal in part was aimed at making Kenya the source of well-trained technical personnel and technical solutions in Africa South of the Sahara. Presented these same proposals in Power Point to the top 35 players in TIVET in the country in January of 2011,

together with a colleague, at the Directorate of Technical Education offices of the Ministry in Posta Towers.

16. 2009 – 2011. As the Vice President in-charge of Kenya, developed a low-income modular housing solution for the region based on Structural Insulated Panels (SIPs). Based on this and together with colleagues from Kenya, USA and Rwanda, put together a starting business portfolio in excess of USD 12 billion, spanning a number of countries in Africa, including, Rwanda, Burundi, Uganda, Kenya, Zaire, South Sudan, and Angola. Sourced for, inspected and negotiated raw materials and a manufacturing plant for the foregoing technology capable of recycling waste arising out of the process for purposes of installing the same to manufacture the house components in the country, in addition to plants for other components for green housing such as; effluence treatment and recycling, bio-waste biogas generation, fixed and portable solar lighting, rain water harvesting, UPVC window and door frames, steel frame roofing design and manufacturing, pavements, as well as perimeter chain link and general wire accessories. The beauty of the technology and methods adopted was that it allowed the construction and hand over of a complete 3 bedroom house complete with internal finishes, cabinets, floor tiling, electrical, plumbing and all in between 8 – 12 days, translating to completion of 80 houses in under 3 months. The benefit of such a scheme to the country and region is astronomical. It is notable that after introduction of the concept and technology in the country, variants of it have been adopted by NACHU together with Afro Homes, as well as HFCK.
17. 2011 – 2013. Identified equipment for conversion of solid bio-waste to electric energy, process steam and pavement blocks. Visited a manufacturing plant in China to inspect its manufacture and assess its design and costs. While the cost of units of various capacities were seen to range between KES 25 – 175 million, the gross earnings from operation of the largest unit were estimated at KES 434 million per month. This high earning coupled with complete “destruction” of solid bio-waste was seen to be of significant social and economic benefit. Undertook a feasibility study for establishment of this technology locally based on urban bio-solid waste, as well as coffee and rice bio-waste in Kírinyaga County, on commissioning by the Kírinyaga County Council. The project stalled while awaiting further word from the County Government in order to embark on sensitisation seminars for the project in anticipation of, as well as the long term establishment of a manufacturing plant for production of the equipment needed to undertake this conversion, and purchase and installation of the first unit in the county.
18. 1987 – 1988. Turned around Kíndaruma hydro power station, which had been earmarked for scrapping because of low availability and high maintenance and operation costs, into one of the stations with the highest availability in the country, within a period of two years. This was done through identification of the training requirements of the station and personnel, development of training material and the subsequent retraining of staff. The responsibilities related to various all the posts in the station were reviewed and delegation of responsibility for each post effected. In addition to this inspection, service and maintenance procedures were developed and implemented and the welfare of personnel given a higher profile. All this was accomplished without any increase in the budget above previous levels of expenditure.
19. 1984 – 1986. Investigated and resolved consistent shattering of exhaust spring plate valves of both the stabilising air compressor and the spinning reserve mode air injection compressors for turbines 1 and 2 at Gĩtarũ hydro power station in Kenya. Though the equipment had plagued the station for years since their installation, the problems studied were resolved all in a short period of a few months. Investigated and resolved persistent problems of overheating of the Gĩtarũ hydro power station 140 turbine-generator shaft, thrust-guide bearing overheating. The overheating was traced to use of poor paint work

for the thrust-guide bearing internal housing and its subsequent peeling and thereafter, clogging a previously un-identified filters fitted into the oil circulation system of the bearing. Commissioned the faulty governor auto-manual change over scheme for both hydro machines at Kíndaruma hydro power station, which was traced to missing and wrongly dimensioned hydraulic control spool valves. Developed dimensions for faulty hydraulic governor valves for governors that had malfunctioned for year, based on the manufacturer's drawings and onsite measurements of their housings. Over saw their machining and polishing, installed them, and subsequently commissioned the hydraulic governors. Developed service and maintenance schedules for the station for all auxiliaries and oversaw their implementation.

## SELECTED ACHIEVEMENTS IN MY ACADEMIC CAREER

1. Member of editorial board and referee to 32 international refereed journals and conferences.
2. <https://scholar.google.co.za/citations?user=B3yrAe4AAAAJ&hl=en>, h-index-12, i10-index 14, Citations 472.
3. Guest editor for a special issue of Applied Sciences, a peer reviewed international Journal.
4. 1995 – 2024. Published alone and together with others on various subjects ranging for engineering fibre and particulate composites, polymer additive manufacturing and metal additive manufacturing, a total of 122 articles, comprising of 84 peer reviewed journal articles, 38 peer reviewed international conference articles and 1 reviewed technical article, 29 peer reviewed abstracts and related read international conference papers, 3 university workshop presentations, 2 articles in professional journals, 1 undergraduate level textbook and 2 postgraduate level textbooks, 10 chapters in 7 different books, 1 article in a journal special issue book, transcribed edited and published 3 novels, and 1 textbook for tertiary education which was accepted by the client (Manchester College of Arts and Technology – MANCAT in the UK) but not published due to shortfalls in the market for the program it was written for.
5. Maina Maringa, “Randomly Oriented Glass Fibre Reinforced Dough and Sheet Moulding Compounds: Testing for Dispersion and Determination of Average Effective Lengths of Fibre Strands in Transversely and longitudinally Vibrating Beams”, In the book, “Current approaches in Engineering Research Technology”, , BP International, India & United Kingdom, <https://www.bookpi.org/bookstore/product/current-approaches-in-engineering-research-and-technology-vol-1/>.
6. M. I. Chibinyani, T. C. Dzogbewu, M. Maringa and A. M. Muiruri, “Numerical Modelling of DMLS Ti6Al4V(ELI) Polygon Structures”, In the Book, “Chemical and Materials Sciences – Developments and Innovations Vol. 4”, BP International, India & United Kingdom, <https://www.bookpi.org/bookstore/product/chemical-and-materials-sciences-developments-and-innovations-vol-4/>.
7. Mwangi Maringa and Maina Maringa, “A Review of the Physical Infrastructure & Equipment Quality Indicator of Ecole Technique Officiels (ETOs) and Ecole Agroveternaire (EAVS) in the Rwandan TVET System”, pp. 111 – 138, in the book, “Educational Developments: Bridging Past, Present and Future”, Editors, Dr. Anamika Pandey and Dr. Mohd Norazmi Bin Nordin, © Innovare Academic Sciences Pvt Ltd, April 2024, ISBN: 978-81-964888-3-3, India,



8. Mwangi Maringa and Maina Maringa, “Contextual Demographics of Ecole Technique Officiels (ETOs) and Ecole Agroveternaires (EAVEs) in the Rwandan TVET System”, pp. 139 – 156, in the book, “Educational Developments: Bridging Past, Present and Future”, Editors, Dr. Anamika Pandey and Dr. Mohd Norazmi Bin Nordin, © Innovare Academic Sciences Pvt Ltd, April 2024, ISBN: 978-81-964888-3-3, India, [https://www.innovareacademics.in/img/books/Educational\\_Developments\\_Bridging\\_Past\\_Present\\_and\\_Future.pdf](https://www.innovareacademics.in/img/books/Educational_Developments_Bridging_Past_Present_and_Future.pdf).
9. 2024, Published a book chapter entitled, “Limitations of the Predictive Capacity of Newtonian Fluid Theories on the Shear Moduli Ratio ( $G_c/G_m$ ) of Particulate Composites: An Analytical Approach”, in Theory and Applications of Engineering Research Volume 3, pp. 75 – 94, BP International, India & United Kingdom, 1<sup>st</sup> Edition, 2024, ISBN 978-81-969435-4-7 (Print), ISBN 978-81-969435-5-4 (eBook), **Editor: Prof. Giovanni Bucci**, DOI: [10.9734/bpi/taer/v3](https://doi.org/10.9734/bpi/taer/v3), <https://www.bookpi.org/bookstore/product/theory-and-applications-of-engineering-research-vol-3/>.
10. 2024, Published a book chapter entitled, “Analytical Modelling to Improve the Predictive Capacity of Newtonian Fluid Theories on the Elastic Moduli Ratio ( $E_c/E_m$ ) of Particulate Composites”, in Theory and Applications of Engineering Research Volume 3, pp. 95 – 118, BP International, India & United Kingdom, 1<sup>st</sup> Edition, 2024, ISBN 978-81-969435-4-7 (Print), ISBN 978-81-969435-5-4 (eBook), **Editor: Prof. Giovanni Bucci**, DOI: [10.9734/bpi/taer/v3](https://doi.org/10.9734/bpi/taer/v3), <https://www.bookpi.org/bookstore/product/theory-and-applications-of-engineering-research-vol-3/>.
11. 2023. Published a book chapter with *Fredrick M Mwanja, Maina Maringa and Joseph Nsengimana* entitled, “Assessing the Effect of Process Variables for Fusion Level of Two Neighbour Tracks Generated by Fused Deposition Modelling of Acrylonitrile Butadiene Styrene”, Chapter 10 in the eBook entitled, “Contemporary Perspective on Science, Technology and Research Vol. 1, 1<sup>st</sup> Edition, 11th December 2023, B P International, Print ISBN: 978-81-968135-4-3, eBook ISBN 978-81-968135-8-1, **Editor: Prof. Raad Yahya Qassim**, DOI: [10.9734/bpi/cpstr/v1/1626G](https://doi.org/10.9734/bpi/cpstr/v1/1626G).
12. 2023. Published a book chapter with *AM Muiruri, M Maringa and W du Preez* entitled, “A Theoretical Model of the Flow Properties of Postprocessed Direct Metal Laser Sintering Ti6Al4V (ELI)”, in the eBook entitled, “Prime Archives in Material Science: 4<sup>th</sup> Edition, 18<sup>th</sup> April 2023, ISBN 978-93-92117-40-4, Editor: **Esubalew Kasaw Gebeyehu**, <https://videleaf.com/product/prime-archives-in-material-science-4th-edition/>.
13. 2022. Published an article in a book with *Amos Muiruri, Maina Maringa, Willie du Preez and Leonard Masu* entitled, “Effect of Stress-Relieving Heat Treatment on the High Strain Rate Dynamic Compressive Properties of Additively Manufactured Ti6Al4V (ELI)”, in Metals Special issue eBook entitled, “Advanced Characterization and On-Line Process Monitoring of Additively Manufactured Materials and Components”, **Editor: Giovanni Bruno and Christiane Maierhofer**, ISBN 978-3-0365-5813-4 (Hbk) ISBN 978-3-0365-5814-1 (PDF), ISSN 2075-4701, 11th November 2022, © 2023 by the authors, **Editors: Giovanni Bruno and Christiane Maierhofer** [https://mdpi-res.com/bookfiles/book/6684/Advanced\\_Characterization\\_and\\_OnLine\\_Process\\_Monitoring\\_of\\_Additively\\_Manufactured\\_Materials\\_and\\_Components.pdf?v1682850193](https://mdpi-res.com/bookfiles/book/6684/Advanced_Characterization_and_OnLine_Process_Monitoring_of_Additively_Manufactured_Materials_and_Components.pdf?v1682850193), reprint of articles from the Special Issue published online in the open access journal Metals (ISSN 2075-4701) (available at: [https://www.mdpi.com/journal/metals/special\\_issues/characterization\\_monitoring](https://www.mdpi.com/journal/metals/special_issues/characterization_monitoring)).

14. 2021 – 2022. Transcribed, edited, and published three books, one on communications and write up on contemporary issues in society and the other two works of fiction. The last two were obtained handwritten by my recently departed older sister. The first book was published in the month of April 2021 (300 pages), <https://www.amazon.com/dp/B094HVM653>, the second one in the month of September 2022 (189 pages), <https://www.amazon.com/dp/B0BFTMJLT7>, and the third one in month of November 2022 (137 pages), <https://www.amazon.com/dp/B0BQ93KR8T>.
15. 2022. Published a 741 page reprint with revisions of an earlier published textbook entitled, “An Introduction to Solid and Structural Mechanics” in the month of February 2022, originally published in the year 2015 as a 640 textbook, <https://www.amazon.com/dp/9966923756>.
16. 2020. Published a book chapter with *Fredrick M Mwanja, Maina Maringa and Kobus van der Walt* entitled, “A Review of Methods Used to Reduce the Effects of High Temperature Associated with Polyamide 12 and Polypropylene Laser Sintering”, in the eBook entitled, “Prime Archives in Polymer Technology” 1<sup>st</sup> Edition, 10<sup>th</sup> December 2020, ISBN: 978-81-944664-6-8, **Editors: Monica Trif and Alexandru Rusu**, <https://videleaf.com/product/prime-archives-in-polymer-technology/>.
17. 2021 – to 2024. Chair of the Departmental Research and Innovation Committee of the Department of Mechanical and Mechatronics Engineering, at the Central University of Technology, Free State, which is part of the national CPAM program in South Africa.
18. 2019 – to 2021. Assisting the Director of the Centre for Rapid Prototyping and Manufacturing (CRPM) in planning, monitoring and reporting on metal additive manufacturing (MAM) part of the Collaborative Program for Additive Manufacturing (CPAM) at the Central University of Technology, Free State, which is part of the national CPAM program in South Africa.
19. 2022 – 2024. In charge of planning, monitoring and reporting for metal additive manufacturing (MAM) part of the Collaborative Program for Additive Manufacturing (CPAM) at the Central University of Technology, Free State, which is part of the national CPAM program in South Africa.
20. 2018. Elected to serve as a member of the executive committee of The South African Association for Theoretical and Applied Mechanics (SAAM) and also as a member of the executive committee of the South African chapter of the International Union of Theoretical and Applied Mechanics (IUTAM), for a period of 2 years. The appointment was extended till my resignation from the body at the beginning of the year 2022.
21. 2018. Seconded by SAAM to the National Science and Technology Forum (NSTF) of South Africa and participated as an adjudicator in vetting candidates for the 2018/2019 NSTF -South32 Awards.
22. 2016 – 2023. Published alone and together with others on various subjects ranging for engineering fibre and particulate composites, polymer additive manufacturing and metal additive manufacturing, a total of 82 articles comprising of 56 papers in peer reviewed journals, 26 papers published in peer reviewed conferences and 1 reviewed technical article. I have also over the same period published two postgraduate books, eight (7) chapters in six (5) separate books, one (1) article in a journal special issue book, two postgraduate level textbooks in engineering, and 29 peer reviewed abstracts and their accompanying papers have been read at international conferences over the same period. I

have also, over the same period, picked up mentorship of 1 postdoctoral fellow, supervision of 10 Doctorate degree students from Nigeria, Kenya, Uganda, Ethiopia and South Africa (1 has since graduated and 1 is continuing, while the rest have fallen off studies for numerous reasons), 14 Master's degree students (8 have since graduated), examined 3 Master's degree students from South Africa and 1 from Botswana, as well as 2 Doctorate degree students (one from South Africa and the other Zambia).

23. 2016 – 2017. Published two postgraduate text books one on the elastic behaviour of dual modulus materials (292 pages), <https://www.amazon.com/Elastic-Behaviour-Moduli-Materials-Bending/dp/1522852549>, and the other on the effects of matrix transverse strain magnification and fibre transverse strain reduction (318 pages), <https://www.amazon.com/Transverse-Magnification-Reduction-Reinforced-Composites/dp/1534757678>.
24. 2014 – 2016. Developed comprehensive solutions from basic principles for **the effect of matrix strain magnification** in fibre reinforced composites. Discovered that this effect does not occur alone but comes with a **concurrent effect of fibre strain reduction**. **Published seven seminal papers** on the subject in peer reviewed journals and one international conference as an invited guest presenter.
25. 2010 – 2011. Developed general solutions for the elastic behaviour of dual moduli materials. Further developed exact solutions for separating the tensile and compressive elastic moduli of naturally occurring materials based on rectangular and triangular cross-sectional beams, using two contact gauges, and one contact and one non-contact gauges, respectively. Published three seminal papers on the subject in peer reviewed journals.
26. 2009. Developed in the months of June-July of 2009, together with 6 others, a solution for the nation of Rwanda in respect of Technical and Vocational Education Training (TVET) that provides multiple access and exit, single point availability of all levels of TVET. Further developed a National Qualifications Framework for TVET, provision for the creation of TVET Business parks, provisions for developing demand-led and competency based TVET curricula, and developed Standard Training Equipment Lists (STELs) for four selected pilot TVET institutions for equipment in the skill areas of Carpentry, Masonry, Plumbing, Machine shop, welding and fabrication, Domestic and Industrial Electrical Technology, Light and Heavy Automobile Technology, Civil Engineering Laboratories.
27. 2009. Launched the first peer reviewed Journal of TVET in Africa, the African Journal of Technical and Vocational Education Training (AfriTVET) in the month of December of 2009, as the founder and Chief Editor. The Journal operated for 8 years till the year 2016.
28. 2008. Started a College of Technology in the month of February 2008, the Kicukiro College of Technology, now called the Integrated Polytechnic Regional Centre (IPRC), Kigali City, from scratch for the government of Rwanda in May of 2009, as the founding Acting Vice-Principal, initially with responsibility over administration, finance and academics. Developed a 78 – page organogram, complete with job specifications for the expected college structure on maturation and supervised the establishment of administrative as well as academic procedures. Provided a 350-point template of rules and regulations to guide all activities of students in the institution.
29. 2006 – 2008. Developed proof that naturally occurring materials such as limestone and wood exhibited different elastic moduli.
30. 2004. Launched the first peer reviewed journal of Mechanical Engineering in the Eastern African Region in the year 2004, as the founder, financier and Chief Editor. The journal



operated for 13 years till the year 2016. The journal was comprised of an international editorial team and drew referees internationally. Publications in it formed part of the documents submitted by a good number of local and international scholars in obtaining academic promotion to levels of Associate and full Professors. It had a local, continental and international readership.

31. 2002. Developed a Matlab based semi-empirical solution proving the existence of a tensile elastic modulus for limestone filler that is different from its compressive elastic modulus thus, providing for the first time a method for predicting correctly, the elastic modulus of sheet moulding compound (or other particulate reinforced plastics) based on complete empirical tensile and compressive data for the elastic moduli of its constituents.
32. 2002. Presented Scan Electric Microscope (SEM) confirmation of the accuracy of the no-contact Stress Pattern Analysis Thermoelastic Equipment (SPATE) thermoelastic scans, in identifying areas of and intensity of the occurrence and accumulation of damage in fibre reinforced composites.
33. 2002. Developed exact analytical proof that coincidence of neutral and centroidal axes of transversely loaded beams was an exception rather than the rule.
34. 2002. Starting from Einstein's simple solution for Newtonian two phase fluid flow, developed complex solutions for determining the elastic behaviour of particulate reinforced composites.
35. 1998. Presented proof for the first time anywhere of the inversion of the thermoelastic signal arising from heat generated by various failure mechanisms occurring in areas of damage accumulation in composite materials; specifically; Sheet Moulding Compound, SMCR26.
36. 1993 – 1995. Developed a solution for determining the interfacial strength of sisal/epoxy fibre reinforced composites based on the Multiple Matrix Phenomena.
37. 1993 – 1995. Advanced the analytical solutions presented much earlier and separately by Bhaggot and Ghandi, Zweben, and Pinchin, for Multiple Matrix Fracture, then possibly the only analytical solution of its nature being developed in the world.

## ACADEMIC CAREER - DATES AND QUALIFICATIONS

1. **Ph.D.**, at the University of Manchester, UK, 1<sup>st</sup> September 1996 - 30<sup>th</sup> October 1998 and 1<sup>st</sup> April 2000 – 2<sup>nd</sup> December 2002.
3. **Master of Science in Applied Mechanics** at the University of Nairobi, Kenya, 1<sup>st</sup> October 1990 - 30<sup>th</sup> September 1992. The thesis was submitted in May of 1993 and eventually graduated with no recommended corrections to the thesis in 1995.
4. **Post Graduate Diploma in Hydro Power Development** at the Norwegian Technical University, Norway, 1<sup>st</sup> July 1986 – 30<sup>th</sup> June 1987.
5. **Bachelor of Science (Upper 2nd class honours) in Mechanical Engineering** at the University of Nairobi, Kenya, 1979 – 1983.
6. **East African Advanced Certificate of Education – “A Level” (EAACE – 4 principals, 1subsidiary)** at Kagumo Boys' School, Kenya, 1977 – 1978.

7. **East African Certificate of Education - “O Level” (EACE 10 points)** at Alliance Boys’ High School, Kenya, 1973 – 1976.

### **BSC RESEARCH PROJECT**

The project involved the cutting and polishing of aluminium plates, drilling of loading bracket holes onto the plates and the fabrication of a shear loading frame for the plates, without introducing deformation on the plates. Transparent papers with a regular pattern of circles were also prepared. The circles were then superimposed onto the polished plates using a high intensity bulb. The superimposed circles were observed to distort to different extents on the application of shear forces of different magnitudes on the aluminium plates. Photographic images of the distorted circles were obtained, and the principal diagonals of the distorted circles used to identify the principal stress directions on the plate, thus yielding a whole field principal stress pattern of the loaded plates.

### **POSTGRADUATE DIPLOMA PROJECTS**

The first project involved the setting up of a Hydro Power Construction Site, complete with layout that identified the staff camp location and building facilities, as well as the dam site, borrow and damp sites. The construction equipment was specified, and their work cycles developed and costing of the project, including the man-hours and equipment operating costs also done.

The second project involved the development of a pre-feasibility study for a catchment area of about 3000 km<sup>2</sup> given hydrological and geological data as well as relief maps of the catchment area. The project required the location and sizing of reservoirs, dams, spillways and intake structures, intake and tailrace tunnels, surge chambers or tanks, and power houses. The project further required selection of types of dams and power generation equipment and costing as well, in order to identify the most cost-effective project of the many identified.

### **MSC RESEARCH PROJECT**

The project looked at the mechanical properties of sisal and loofah fibres and their composites with laminated epoxy resin. The stress/strain, strength and failure characteristics of the reinforced composites were investigated using the simple uniaxial tensile test. The project was a one-year independent research undertaken in partial fulfilment of the requirements for a master’s degree. In addition to the submission of a thesis, three papers were published in regional refereed journals. The first paper dealt with the interfacial bond stress of the composites, the second paper addressed the Poisson’s ratio effects and the phenomenon of multiple matrix fracture, while the last paper looked at the multi-staged stress/strain curves and failure properties of the composites.

### **PHD RESEARCH PROJECT**

Part of my PhD research project involved study of the accumulation of fatigue damage using the Stress Pattern Analysis by Thermal Emission Equipment, SPATE. Reference was made to the works of Mitrovich and Carman (1996), Machin et al (1987a, 1987b), Varna and Bergund (1994), Zhang and Sandor (1992a, 1992b), Wang et al (1983, 1986 1986b 1987) and many others who have contributed over the years to the development of thermoelastic stress Analysis (TSA) and the assessment of damage in composite materials. While it was found relatively easy to locate centres of damage and to carry out qualitative assessment of its spread and increase in intensity, quantitative analysis of damage was carried out without clearly defined points of

reference. I am looking forward to continuing the preliminary work done on the development of analytical solutions that will account for the effects of non-adiabatic heat transfer and the accumulation of cracks in sites of damage accumulation. Availability of the third generation TSA equipment, Delta Therm, would make it easy to verify any models thus developed.

The PhD project also looked at the use of small amplitude vibration techniques and through thickness ultrasonic testing to characterise the mechanical properties of Sheet moulding compound (SMC). A review of the methods proposed by researchers such as Hayes (1969), Shutilov (1988), Van Bushskirk et al (1986), Khoury et al (1999), Ditri (1994) and Rose et al (1990, 1991), Rose (1999) identified very powerful tools for the determination of some or all of the stiffness coefficients of anisotropic materials. Application of these methods to heterogeneous materials provides an interesting challenge. The phenomenological changes in materials that accompany the accumulation of damage make these methods very useful, for the non-destructive assessment of damage by monitoring the changes in any one or group of the stiffness coefficients thus determined. This is yet another area of interest for further research.

### PEER REVIEWED JOURNAL PAPERS

1. Fredrick M. Mwanja, Maina Maringa, and Jacobus van der Walt, "A Review of Polymer Laser Sintering and Fused Deposition Modelling of Polymers", *Advances in Polymer Technology (Wiley)*, Accepted in December 2024, <https://www.wiley.com/en-gb/journals/Advances+in+Polymer+Technology-p-10982329>.
2. Masenate Thamae, Maina Maringa and Willie du Preez, "Determining the Best Hatch Distances for Selective Laser Melted SiC/Ti6Al4V(ELI) Composites of Different Volume Fractions of SiC", *Results in Materials*, Accepted in December 2024, <https://www.sciencedirect.com/journal/results-in-materials>.
3. Chibinyani, M.I.; Dzogbewu, T.C.; Maringa, M.; Muiruri, A, "Natural Cellular Structures in Engineering Designs Built via Additive Manufacturing", *Multidiscipline Modeling in Materials and Structures*, Accepted in December 2024, <https://www.emeraldgrouppublishing.com/journal/mmms>.
4. Fredrick M. Mwanja, Jacobus van der Walt, Lorinda Wu, Wayne Koen, and Maina Maringa, "Characterisation of High-Density Polyethylene (DiaPow HDPE HX R) Powder for Use in Additive Manufacturing", *Hindawi Journal of Engineering*, <https://doi.org/10.1155/1970/6284961>.
5. Fredrick M. Mwanja, Maina Maringa, Joseph Nsengimana and Jacobus. G. van der Walt, "Investigating Surfaces, Geometry, and Degree of Fusion of Tracks Printed Using Fused Deposition Modelling to Optimise Process Parameters", *Rapid Prototyping Journal*, accepted on 24<sup>th</sup> May 2024, <https://www.emerald.com/insight/publication/issn/1355-2546>.
6. Masenate Thamae, Maina Maringa and Willie du Preez, "A Comparative Analysis of Low and High SiC Volume Fraction Additively Manufactured SiC/Ti6Al4V(ELI) Composites Based on the Best Process Parameters of Laser Power, Scanning Speed and Hatch Distance", *Materials* **2024**, *17*, x. <https://doi.org/10.3390/xxxxx>.
7. Tumelo Moloi, Thywill Cephass Dzogbewu, Maina Maringa, Amos Muiruri, "Quasi-Static Tensile Properties of DMLS Ti6Al4V(ELI) Specimens Exposed to Two Different Heat Treatment Processes and Tested at Different Elevated Temperatures", *Results in Engineering* **22** (2024) 102290, <https://doi.org/10.1016/j.rineng.2024.102290>.

8. Moloi, T.D., Dzogbewu, T.C., Maringa, M., and Muiruri, A.M, “The Effect of Temperature on the Microstructures of Additively Manufactured Ti6Al4V(ELI)”, Iranian Journal of Materials Science and Engineering, <https://ijmse.iust.ac.ir/>.
9. Amos Muiruri, Maina Maringa and Willie du Preez, “Effects of Quasi-Static Strain Rate and Temperature on the Microstructural Features of Post-Processed Microstructures of Laser Powder Bed Fusion Ti6Al4V Alloy”, *Appl. Sci.* 2024, 14, 4261., <https://doi.org/10.3390/app14104261>.
10. Chibinyani, M.I.; Dzogbewu, T.C.; Maringa, M.; Muiruri, A, “Numerical Modelling of Ti6Al4V(ELI) Hierarchical Honeycomb Structures of Order One at the Vertices” *Results in Engineering*, Volume 21, March 2024, 102024 Elsevier, ScienceDirect. <https://doi.org/10.1016/j.rineng.2024.102024>.
11. Fredrick M. Mwanja, Maina Maringa and Jacobus. G. van der Walt, “Determining the Best Exposure Volumetric Energy Density for Diapow PP MF Polypropylene from a Study of its Different Dynamic Mechanical Properties”, *Results in Materials*, accepted on 23<sup>rd</sup> of February 2024, in production, <https://www.sciencedirect.com/journal/results-in-materials/special-issues>.
12. Chibinyani, M.I.; Dzogbewu, T.C.; Maringa, M.; Muiruri, A, “Lattice Structures Built with Different Polygon Hollow Shapes: A Review on Their Analytical Modelling and Engineering Applications”, *Appl. Sci.* 2024, 14, 1582. <https://doi.org/10.3390/app14041582>.
13. M.I. Chibinyani, T.C. Dzogbewu, M. Maringa & A.M. Muiruri, “Numerical modelling of DMLS Ti6Al4V(ELI) polygon structures”, *Results in Materials*, 20 (2023) 100456, <https://www.sciencedirect.com/science/article/pii/S2590048X23000948>, Elsevier B. V. Publishers, <https://doi.org/10.1016/j.rinma.2023.100456>.
14. Amos Muiruri, Maina Maringa and Willie du Preez, “Numerical Simulation of the Taylor Impact Test for Laser Powder Bed Fusion Parts Based on Microstructural Internal State Variables”, Special Issue on, “The Effect of Microstructure and Strain Rates on the Mechanical Properties of Additively Manufactured Metallics”, *Appl. Sci.* 2023, 13(9), 5372; <https://doi.org/10.3390/app13095372>.
15. Fredrick Mulinge Mwanja, Maina Maringa and Joseph Nsengimana, “Investigating the effect of process parameters on the degree of fusion of two adjacent tracks produced through fused deposition modelling of acrylonitrile butadiene styrene”, *Polymer Testing* Volume 121, April 2023, 107981 <https://doi.org/10.1016/j.polymertesting.2023.107981>.
16. Thinus Van Rhijn, Willie Du Preez, Maina Maringa and Dean Kouprianoff, “An Investigation into the Optimization of the Selective Laser Melting Process Parameters for Ti6Al4V Through Numerical Modelling”, *JOM*, Vol. 75, No. 3, 2023, <https://doi.org/10.1007/s11837-022-05608-2>, © 2022 The Minerals, Metals & Materials Society.
17. M.I. Chibinyani, T.C. Dzogbewu, M. Maringa & A.M. Muiruri, “Reduced order topology optimisation of a planar honeycomb defined by a linear elastic Ti6Al4V (ELI) material model”, *South African Journal of Industrial Engineering* Nov 2022 Vol 33(3), pp 299-317, <http://sajie.journals.ac.za/pub/article/view/2808/1183>.
18. Muiruri, A.; Maringa, M.; du Preez, W., “A Theoretical Model of The Flow Properties of Post Processed Direct Metal Laser Sintering Ti6Al4V (ELI)”, *Hindawi Advances in*

19. Mpho Mashabela, Maina Maringa and Thywill Dzogbewu, “Nanoparticulate reinforced composites and their application to additively manufactured Ti6Al4V for use in the aerospace sector”, *Manufacturing Rev.* Vol, No (2022) © M. Mashabela et al., Published by *EDP Sciences* 2022, <https://doi.org/10.1051/mfreview/2022027>.
20. Muiruri, A.; Maringa, M.; du Preez, W., “Quasi-Static Mechanical Properties of Post-Processed Laser Powder Bed Fusion Ti6Al4V(ELI) Parts under Compressive Loading”, *Appl. Sci.* 2022, 12, 9552. <https://doi.org/10.3390/app12199552>.
21. Teboho C. Moleko, Maina Maringa, and Willie B. Du Preez, “Fractography and Microstructural Analysis of As-Built and Stress Relieved DMLS Ti6Al4V (ELI) Plates Subjected to High Velocity Impact”, *Hindawi Advances in Materials Science and Engineering*, Volume 2022, Article ID 9008244, 14 pages, <https://doi.org/10.1155/2022/9008244>.
22. Muiruri, A.; Maringa, M.; du Preez, W., “Statistical Analysis of the Distribution of the Schmid Factor in As-Built and Annealed Parts Produced by Laser Powder Bed Fusion”, *Crystals* 2022, 12, 743. <https://doi.org/10.3390/Cryst12050743>.
23. Muiruri, A.; Maringa, M.; du Preez, W., “Numerical simulation of high strain rate and temperature properties of laser powder bed fusion Ti6Al4V(ELI) determined using a Split Hopkinson Pressure Bar”, *Materials* 2022, 15, 1872. <https://doi.org/10.3390/ma15051872>.
24. Fredrick M. Mwanja, Maina Maringa and Jacobus. G. van der Walt, “Investigating the recyclability of laser PP CP 75 polypropylene powder in laser powder bed fusion (L-PBF)”, *Polymers* 2022, 14, 1011. <https://doi.org/10.3390/polym14051011>.
25. Muiruri, A.; Maringa, M.; du Preez, W., “Development of VUMAT and VUHARD subroutines for simulating the dynamic mechanical properties of Additively Manufactured Parts”. *Materials* 2022, 15, 372. <https://doi.org/10.3390/ma15010372>.
26. Muiruri, A.; Maringa, M.; du Preez, W., “Validation of a Microstructure-Based Model for Predicting the High Strain Rate Flow Properties of Various Forms of Additively Manufactured Ti6Al4V(ELI) Alloy”. *Metals* 2021, 11, 1628. <https://doi.org/10.3390/met11101628>.
27. Muiruri, A.; Maringa, M.; du Preez, W., “High Strain Rate Properties of Various Forms of Ti6Al4V(ELI) Produced by Direct Metal Laser Sintering”. *Appl. Sci.* 2021, 11, 8005. <https://doi.org/10.3390/app11178005>.
28. Van Rhijn, T., Du Preez, W., Maringa, M. and Koupryanoff, D., “Towards Predicting Process Parameters for Selective Laser Melting of Titanium Alloys Through the Modelling of Melt Pool Characteristics”, *South African Journal of Science and Technology* 40 (1), The Conference of the South African Advanced Materials Initiative 2021 (CoSAAMI’21), Vol 40 No 1 (2021), Print ISSN 0254-3486 Online ISSN 2222-4173, <https://doi.org/10.36303/SATNT.2021cosaami.32>, DOI: [doi.org/10.36303/SATNT.2021cosaami.32](https://doi.org/10.36303/SATNT.2021cosaami.32).
29. AM Andezai, LM Masu and M Maringa, “Effectiveness of Several Theoretical Models in Predicting the Mechanical Properties of Coconut Shell Powder/Epoxy Resin Composites”, *International Journal of Engineering Research and Technology (IJERT)* ISSN: 09743154,



30. Fredrick M. Mwanja, Maina Maringa, Kobus van der Walt, “A review of the techniques used to characterize laser sintering of polymeric powders for use and re-use in additive manufacturing”, *Manufacturing Rev.* 8, 14 (2021) © F.M. Mwanja et al., Published by EDP Sciences 2021, <https://mfr.edp-open.org>, <https://doi.org/10.1051/mfreview/2021012>.
31. Fredrick M. Mwanja, Maina Maringa, Kobus van der Walt, "Preliminary Testing to Determine the Best Process Parameters for Polymer Laser Sintering of a New Polypropylene Polymeric Material", *Hindawi, Advances in Polymer Technology*, vol. 2021, Article ID 6674890, 13 pages, 2021. <https://doi.org/10.1155/2021/6674890>.
32. Fredrick M. Mwanja, Maina Maringa, Kobus van der Walt, "Mixing and Reuse of Polymer Laser Sintering Powders to Ensure Homogeneity – A Review”, *International Journal of Engineering Research and Technology (IJERT)* ISSN: 09743154, Volume 13, Number 11, 2020, pp. 3335 – 3341, © International Research Publication House, <http://www.irphouse.com/volume/ijertv13n11.htm>.
33. Fredrick M. Mwanja, Maina Maringa, Kobus van der Walt, " Powder Characterization for a New Selective Laser Sintering Polypropylene Material (Laser PP CP 60) after Single Print Cycle Degradation”, *International Journal of Engineering Research and Technology (IJERT)* ISSN: 09743154, Volume 13, Number 11, 2020, pp. 3342 – 3358, © International Research Publication House, <http://www.irphouse.com/volume/ijertv13n11.htm>.
34. Muiruri, A.; Maringa, M.; du Preez, W., “Evaluation of dislocation densities in various microstructures of additively manufactured Ti6Al4V (ELI) by the method of X-Ray diffraction”, *Materials* 2020, 13(23), 5355; <https://doi.org/10.3390/ma13235355> - 26 Nov 2020, [https://www.mdpi.com/journal/materials/sections/manufacturing\\_process](https://www.mdpi.com/journal/materials/sections/manufacturing_process) and [https://www.mdpi.com/journal/materials/special\\_issues/CPMPAM](https://www.mdpi.com/journal/materials/special_issues/CPMPAM).
35. M. Matsimbi, P. K. Nziu, L. M. Masu, M. Maringa, “Topology Optimization of Automotive Body Structures: A review”, *International Journal of Engineering Research and Technology (IJERT)* ISSN: 09743154, Volume 13 Number 12, 2020, pp. 4282-4296, © International Research Publication House, <http://www.irphouse.com/volume/ijertv13n12.htm>.
36. AM Andezai, LM Masu and M Maringa, “Chemical and Morphological Characterization of Coconut Shell Powder, Epoxy Resin and Coconut Shell Powder/Epoxy Resin Composites”, *International Journal of Engineering Research and Technology (IJERT)* ISSN: 09743154, Volume 13 Number 12, 2020, pp. 4269-4275, © International Research Publication House, <http://www.irphouse.com/volume/ijertv13n12.htm>.
37. M. Matsimbi, P. K. Nziu, L. M. Masu, M. Maringa, “A Review of Methods Used to Determine the Overall Stiffness of Unitary Automotive Body Structures”, *International Journal of Engineering Research and Technology (IJERT)* ISSN: 09743154, Volume 13 Number 12, 2020, pp. 4666-4678, © International Research Publication House, <http://www.irphouse.com/volume/ijertv13n12.htm>.
38. AM Andezai, LM Masu and M Maringa, “Experimental Investigation of Dynamic Elastic Properties of Reinforced Coconut Shell Powder/Epoxy Resin Composites”, *International Journal of Engineering Research and Technology (IJERT)* ISSN: 09743154, Volume 13

39. AM Andezai, LM Masu and M Maringa, “Investigating the Mechanical Properties of Reinforced Coconut Shell Powder/Epoxy Resin Composites”, International Journal of Engineering Research and Technology (IJERT) ISSN: 09743154, Volume 13 Number 10, 2020, pp. 2742-2751, © International Research Publication House, [http://www.irphouse.com/ijert20/ijertv13n10\\_29.pdf](http://www.irphouse.com/ijert20/ijertv13n10_29.pdf).
40. Muiruri, A.; Maringa, M.; du Preez, W. Crystallographic Texture Analysis of As-Built and Heat-Treated Ti6Al4V (ELI) Produced by Direct Metal Laser Sintering. Crystals August 2020, 10, 699, <https://www.mdpi.com/2073-4352/10/8/699>
41. Fredrick M. Mwanja, Maina Maringa, Kobus van der Walt, "A Review of Methods Used to Reduce the Effects of High Temperature Associated with Polyamide 12 and Polypropylene Laser Sintering", Hindawi, Advances in Polymer Technology, vol. 2020, Article ID 9497158, 11 pages, August 2020, <https://doi.org/10.1155/2020/9497158>.
42. Wilson Webo, Leonard M. Masu, Maina Maringa, Patrick K. Nziu, “A Review of the State of Research and Utilization of Biomaterials in the Manufacture of Composite Materials To date”, International Journal of Engineering Research and Technology (IJERT). ISSN 0974-3154, Volume 13, Number 6, 2020, pp. 1065-1075 © International Research Publication House, [http://www.irphouse.com/ijert20/ijertv13n6\\_01.pdf](http://www.irphouse.com/ijert20/ijertv13n6_01.pdf).
43. Wilson Webo, Maina Maringa, Leonard M. Masu, Patrick K. Nziu, “Nanocellulose and their Composites”, International Journal of Mechanical and Production Engineering Research and Development (IJMPERD) ISSN (P): 2249–6890; ISSN (E): 2249–8001 Vol. 10, Issue 3, 28<sup>th</sup> May 2020, 793-800 © TJPRC Pvt. Ltd, <http://www.tjprc.org/publishpapers/2-67-1590732580-IJMPERDJUN202071.pdf>
44. Amos Muiruri, Maina Maringa, Willie du Preez and Leonard Masu, “Effect of Stress-Relieving Heat Treatment on the High Strain Rate Dynamic Compressive Properties of Additively Manufactured Ti6Al4V (ELI)”, Metals May 2020, 10, 653; doi:10.3390/met10050653 [www.mdpi.com/journal/metals](http://www.mdpi.com/journal/metals).
45. Wilson Webo, Leonard Masu and Maina Maringa, “The Morphology and Thermal Behaviours of Treated and Untreated Sisal Fibre-Epoxy Resin Composites”, International Journal of Mechanical and Production Engineering Research and Development (IJMPERD) ISSN(P): 2249–6890; ISSN(E): 2249–8001, Vol. 10, Issue 2, Apr 2020, 1285–1294, Paper Id.: IJMPERDAPR2020123, <https://issuu.com/tjprc/docs/2-67-1587634890-123.ijmperdapr2020123>.
46. Wilson Webo Maina Maringa and Leonard Masu, “The Combined Effect of Mercerisation, Silane Treatment and Acid Hydrolysis on the Mechanical Properties of Sisal Fibre/Epoxy Resin Composites”, MRS Advances @ 2020, Materials Research Society, DOI: 10.1557/adv.2020.122, Published online by Cambridge University Press: 20 February 2020, pp. 1-9, <https://www.cambridge.org/core/journals/mrs-advances/firstview>.
47. Wilson Webo Maina Maringa and Leonard Masu, “The Tensile and Flexural Properties of Treated and Untreated Sisal Fibre-Epoxy Resin Composites”, International Journal of Mechanical & Mechatronics Engineering IJMME-IJENS, ISSN: 2077-124X (Online) 2227-2771 (Print), Volume 19, Issue 6, pp 27 – 40, December 2019, [http://ijens.org/Vol\\_19\\_I\\_06/191006-2727-IJMME-IJENS.pdf](http://ijens.org/Vol_19_I_06/191006-2727-IJMME-IJENS.pdf).

48. Amos Muiruri, Maina Maringa, Willie du Preez & Leonard Masu, “Effects of Stress-Relieving Heat Treatment on Impact Toughness of Direct Metal Laser Sintering (DMLS)-Produced Ti6Al4V (ELI) Parts”, *The Journal of Minerals, Metals & Materials Society (TMS)*, ISSN 1047-4838, DOI 10.1007/s11837-019-03862-5, <https://doi.org/10.1007/s11837-019-03862-5> © 2019 The Minerals, Metals & Materials Society.
49. L. B. Malefane, W. B. du Preez, M. Maringa, “Tensile and High Cycle Fatigue Properties of Annealed Ti6Al4V (ELI) Specimens Produced by Direct Metal Laser Sintering”, *South African Journal of Industrial Engineering* November 2018 Vol 29(3) Special Edition, pp 299-311, DOI: <https://doi.org/10.7166/29-3-2077>, <http://sajie.journals.ac.za/pub/article/view/2077/886>.
50. Amos Mwangi Muiruri, M Maringa, WB du Preez, LM Masu, “Variation of Impact Toughness of As-Built DMLS Ti6Al4V (ELI) Specimens With Temperature”, *South African Journal of Industrial Engineering* November 2018 Vol 29(3) Special Edition, pp 284-298, DOI: <https://doi.org/10.7166/29-3-2077>, <http://sajie.journals.ac.za/pub/article/view/2076/885>.
51. Wilson Webo, Leonard Masu and Maina Maringa, “The Impact Toughness and Hardness of Treated and Untreated Sisal Fibre-Epoxy Resin Composites”, *Advances in Materials Science and Engineering*, Volume 2018, Article ID 8234106, 10 pages, <https://doi.org/10.1155/2018/8234106>.
52. L. B. Malefane, W. B. du Preez, M. Maringa, “High Cycle Fatigue Properties of As-Built Ti6Al4V (ELI) Produced by Direct Metal Laser Sintering”, *South African Journal of Industrial Engineering* November 2017 Vol 28(3) Special Edition, pp 188-199, DOI: <https://doi.org/10.7166/28-3-186>, <http://sajie.journals.ac.za/pub/article/view/1861/813>.
53. Maringa M., “A Semi-Empirical Method for Determining the Averaged Orientation of Reinforcing Fibre in Fibre Reinforced Composites”, *Journal of Sustainable Research in Engineering* Vol. 3 (1) 2016, 16-21, [www.jkuat-sri.com/ojs/index.php/sri/index](http://www.jkuat-sri.com/ojs/index.php/sri/index).
54. Maringa M. and Masu L. M., “Analytical Modelling of Transverse Strain and Stress in a Fibre-Matrix Element Using the Halpin-Tsai Semi-Empirical Equations”, *The Kenya Journal of Mechanical Engineering (KJME)*, Vol. 9. No. 1, April 2016, pp 17–45, <http://www.technoacajournals.com/KJMEhomepage.html>.
55. Maringa M. and Masu L. M., “Analytical Modelling of Transverse Strain and Stress in a Fibre-Matrix Element Using the Reuss Rule”, *The Kenya Journal of Mechanical Engineering*, Vol. 9. No. 1, April 2016, pp 1–16, <http://www.technoacajournals.com/KJMEhomepage.html>.
56. Maringa M. and Masu L. M., “The effects of different fibre geometries on the transverse matrix strain magnification and fibre strain reduction in uniaxially aligned continuous fibre-reinforced composites”, 18<sup>th</sup> February 2016, *Journal of Composite Materials* 0(0) 1-12, DOI: 10.177/0021998316631701 [jcm.sagepub](http://jcm.sagepub).
57. Maringa M. and Maringa P. M., “Quality Assurance Systems of Rwandan TVET: Training Standards Anchors in Ecole Technique Officiels (ETOs) and Agroveternaires (EAVEs)”, *The African Journal of Technical and Vocational Education Training (Afritvet)*, <http://www.technoacajournals.com/AfriTVEThomepage.html>, Vol 2(1) 2015.

58. Maringa M. and Maringa P. M., “Effectiveness of Rwandan TVET: Trainer Competence and Motivation in the Ecole Technique Officiels and Agroveternaire”, The African Journal of Technical and Vocational Education Training (Afritvet), <http://www.technoacajournals.com/AfriTVETHomepage.html>, Vol 2(1) 2015.
59. Maringa M. and Masu L. M., “Matrix and Fibre Stress and Strain magnification Using Strain Energy Equivalence and the Halpin-Tsai Equations”, Journal of Reinforced Plastic and Composites, 2015, Vol 34(13) 1059 – 1074, <http://jrp.sagepub.com/content/early/2015/05/22/0731684415587730> .
60. Maringa M., “Proposed Interventions for the Technical Industrial and Vocational Enterprise Training (TIVET) Sector in Kenya”, Journal of Technical Education and Training, Vol. 6 No. 1, June 2014, <http://penerbit.uthm.edu.my/ojs/index.php/JTET>. Rated 2<sup>nd</sup> amongst the top 12 papers published in JTET in the year 2014. [https://typeset.io/journals/journal-of-technical-education-and-training-wwlahnz8/2014\\_](https://typeset.io/journals/journal-of-technical-education-and-training-wwlahnz8/2014_).
61. Maringa M. and Maringa P. M., “Setting up a Model College of Technology in Kigali City – The Kicukiro College of Technology (KCoT)”, Journal of Inquiry in Design Pedagogy, Volume 1 No. 1 2013, pp 106 – 154, <http://www.fimen.net/UrbanDialectics.html>; <http://www.urbanalgorisms.net>.
62. Maringa M. and Miano P. J., “A Proposed State of Art Automation Training Centre of Excellence for TVET that is Designed to Meet the Needs of Identified Programmes”, Journal of Inquiry in Design Pedagogy, Volume 1 No. 1 2013, pp 70 – 88, <http://www.fimen.net/UrbanDialectics.html>; <http://www.urbanalgorisms.net>.
63. Maringa P. M., and Maringa M., “Quality of TVET in Rwanda With Respect to Gender and Enrolment Factors of Access and Equal Opportunity in Ecole Technique Officiels (ETOs) and Agroveternaies (EAVEs)”, Global Journal of Engineering Education, Volume 15. No. 3, 2013, pp 177 – 185, @ WIETE, 2013.
64. Maringa P. M., and Maringa M., “Quality of TVET in Rwanda in Relation to age, Ownership, Location and Specialisation Factors of Access and Equal Opportunity in Ecole Technique Officiels (ETOs) and Agroveternaies (EAVEs)”, Global Journal of Engineering Education, Volume 15. No. 2, 2013, pp 118 – 125, @ WIETE, 2013.
65. Maringa M., “Developing Analytical Solutions for the Elastic Deformation of Equilateral Triangular Cross-Section Dual Moduli Beams in Bending, for use With Two-Gauge-Point Strain Measurements”, The Zambia Engineer, June 2012, ISSN 1608-6678.
66. Maringa M., “Analytical Solutions and Experimentation for Separating the Elastic Moduli and Bending Moments of Dual Moduli Materials in 4-Point Bending”, accepted for publication in the Kenya Journal of Mechanical Engineering (KJME), ISSN 1815-0284, Vol. 7 No. 2, September 2011, <http://www.technoacajournals.com/KJMEhomepage.html>.
67. Maina Maringa and Mwangi Maringa, “A Quality Indicator Guided Review of TVET in Selected Ecole Technique Officiel (ETOS) and Ecole Agroveternaire (EAVS) in Rwanda”, The African Journal of Technical and Vocational Educational Training, Vol. 1 No. 1, April 2011, pp. 1 – 21, <http://www.technoacajournals.com/AfriTVETHomepage.html>.
68. Maina Maringa and Mwangi Maringa, “Improvement of Technical Education in Public Technical Secondary Schools (Ecole Technique Officiel - ETOs) in RWANDA”, Journal

- of Technical Education and Training (JTET), Vol.2 Issue 1, 2010, pp. 95 – 121, <http://penerbit.uthm.edu.my/ejournal/index.php/journal/jtet/79>.
69. Maringa M. And Injairu Galo, “A Study of the Elastic Behaviour of Some Natural Materials Under Applied Bending Loads”, The Journal of Civil Engineering Research and Practice, Vol. 7 No. 1, April 2010, pp. 13 – 46, ISSN 1729-5769, <http://www.ajol.info/journals/jcerp>.
70. Kuria J. K. and Maringa M. “Developing Simple Procedures for Selecting Sizing, Scheduling of Materials and Costing of Small Bio –Gas Units”, The International Journal for Service Learning, Vol. 3 No. 1, April 2008, pp. 9 – 40, <http://library.queensu.ca/ojs/index.php/ijsle/index>.
71. Maringa M., “A Semi-Empirical Method For Determining the Averaged Effective Orientation of Reinforcing Glass Fibre in SMCR26 Sheets”, The Kenya Journal of Mechanical Engineering (KJME), Vol. 2 No. 1, April 2006, pp. 23 – 46, ISSN 1815-0284, <http://www.technoacajournals.com/KJMEhomepage.html>.
72. Maringa M., “Determination of the Mechanical Properties of SMC Using the Uniaxial Quasi-Static Tensile Test”, The Kenya Journal of Mechanical Engineering (KJME), Vol. 1 No. 1, April 2005, pp. 21 – 36, ISSN 1815 - 0284, <http://www.technoacajournals.com/KJMEhomepage.html>.
73. Maringa M., “The Detection and Monitoring of Fatigue Damage in SMCR26 Specimen Using Spate for Varying Mean Stresses: A Qualitative Approach “The Zambia Engineer, Vol. 38 no. 2 of 2005, ISSN 1608-6678.
74. Maringa M., “Dimensioning of Dog Bone Specimens and Numerical Analysis of the Effects of Different Fillet Radii, Clamp Area and Pinhole Loading on the Stresses in Such Specimens”, African Journal of Science and Technology (AJST), Vol. 5 No. 2, December 2004, pp. 60 – 72, ISSN 1607-9949.
75. Maringa M., “Determination of the Elastic Moduli of SMCR26 Using Small Amplitude Transverse Vibrations”, East African Journal of Engineering, Vol. 7 no. 2, December 2004, pp. 51-62, ISSN 0856-499X.
76. Maringa M., “The Tension-Tension Dynamic Test and its Use in Determining the Complex Elastic Modulus and Complex Poisson’s Ratio of SMCR26 Specimens”, The Zambia Engineer, Vol. 37 No. 2, July / August 2004, pp. 16 – 26, ISSN 1608-6678.
77. Maringa M., “The Tension-Tension Dynamic Test and its Use in Determining the Complex Elastic Modulus and Complex Poisson’s Ratio of SMCR26 Specimens”, The Zambia Engineer, Vol. 37 No. 2, July / August 2004, pp. 16 – 26, ISSN 1608-6678.
78. Maringa M., “Tension-Tension Cyclic Dynamic Testing of SMCR26”, East African Journal of Engineering, Vol. 7 no. 1, July 2004, pp. 93-118, ISSN 0856-499X.
79. Maringa M., “Use Of Thermoelastic Measurements For The Detection Of Damage In SMCR26 Specimens And Monitoring Of Its Accumulation For Applied Constant Mean Stresses And Varying Stress Amplitudes – A Qualitative Approach”, The Journal of Agriculture Science and Technology of Jomo Kenyatta University of Agriculture and Technology, accepted for Publication on 26<sup>th</sup> of May 2004 in Vol. 6 no. 2 of 2004 ISSN 1561-7645.



80. Maringa M., “Use of the Ultrasonic Through Thickness Test in Determining the Out-of-Plane Stiffness For SMCR26 Specimens”, The Journal of Agriculture Science and Technology of Jomo Kenyatta University of Agriculture and Technology, accepted for Publication on 26<sup>th</sup> of May 2004 Vol. 6 No. 1, pp. 80 – 108, ISSN 1561-7645.
81. Maringa M., “Through Thickness Ultrasonic Testing and its Use in Characterising the Mechanical Properties of Various Types of Limestone”, Journal of Civil Engineering, JKUAT, Vol. 8, March 2003, pp. 99-110, ISSN 1562-6121. Abstracted on AJOL: <http://www.ajol.info/journals/jcerp>.
82. Maringa M., Mutuli S. M. and Kavishe F. P. L., "An Investigation of the Mechanical Properties of Sisal Fibre and Loofah Matt and their Composites with Epoxy Resin", The Journal of Agriculture Science and Technology of Jomo Kenyatta University of Agriculture and Technology in their Vol. 1 No. 1 of October 1997, pp.53 - 65, ISSN 1561-7645.
83. Maringa M., "Multiple Matrix Fracture and The Poisson's Ratios effects in Longitudinally Aligned Continuous Sisal Fibre Reinforced Epoxy Resin Composites". The East African Journal of Engineering, Vol. 2 No.1, October 1996, pp. 41-58, ISSN 0856-499X.
84. Maringa M., Mutuli S. M. and Kavishe F. P. L., "Determination of the Interfacial Bond Strength of Sisal Fibre Reinforced Epoxy Composites”, The East African Journal of Engineering, Vol. 2 No.1 October 1996, pp. 30 – 41, ISSN 0856-499X.

#### **PROFESSIONAL JOURNALS**

85. Maringa M., “DACUM/SCID Demand-Led and Competency-Based Curricula Development Tools”, Association of Engineering Students Magazine, The Kenya Polytechnic University College, 2012.
86. Maringa M., “A Concept Note on Investment in Technology for Production to Support the Emergence and Sustenance of Indigenous Manufacture in the Country”, The Kenya Engineer, March/April 2014.
87. Maringa M., “Formation of a University”, The Kenya Engineer, May/June, 2013.

#### **PEER REVIEWED INTERNATIONAL CONFERENCE PAPERS**

88. Maje Phasha, Hein Möller, Joseph Moema, Willie du Preez, and Maringa Maina” Structural and elastic properties of binary FCC Pt-Rh alloys – a first-principles study”, Rapid Product Development Association of South African (RAPDASA)-RobMech-PRASA-AMI) 24<sup>th</sup> Annual International Conference, 30<sup>th</sup> October – 2<sup>nd</sup> November 2023, CSIR International Convention Centre in Pretoria, South Africa, MATEC Web of Conference, Volume 388, 01002 (2023), <https://doi.org/10.1051/mateconf/202338801002>.
89. Munashe Chibinyani, Thywill Cephaz Dzagbewu, Maina Maringa, and Amos Muiruri, “A review of the types and tessellation of lattice structures, their effectiveness and limitations in mimicking natural cellular structures”, Rapid Product Development Association of South African (RAPDASA)-RobMech-PRASA-AMI) 24<sup>th</sup> Annual International Conference, 30<sup>th</sup> October – 2<sup>nd</sup> November 2023, CSIR International Convention Centre in Pretoria, South Africa, MATEC Web of Conferences, Volume 388, 06008 (2023), <https://doi.org/10.1051/mateconf/202338806008>.

90. Amos Muiruri, Maina Maringa, and Willie du Preez, “X-ray diffraction profile analysis of martensitic Ti6Al4V(ELI) parts produced by laser powder bed fusion”, Rapid Product Development Association of South African (RAPDASA)-RobMech-PRASA-AMI) 24<sup>th</sup> Annual International Conference, 30<sup>th</sup> October – 2<sup>nd</sup> November 2023, CSIR International Convention Centre in Pretoria, South Africa, MATEC Web of Conferences, Volume 388, 10003 (2023), <https://doi.org/10.1051/matecconf/202338810003>.
91. Willie du Preez and Maina Maringa, “Accelerating the qualification of laser powder bed fusion Ti6Al4V(ELI) components through modelling and simulation”, 15<sup>th</sup> World Conference on Titanium (Ti-2023), 12<sup>th</sup> – 16<sup>th</sup> of June 2023, accepted and presented, <https://www.iom3.org/static/a4569e6f-d9f3-42f4-aa7a9992489e19af/Ti-2023-Sponsorship-opportunities.pdf>.
92. Fredrick Mwanja, Maina Maringa and Jacobus van der Walt, “Analytical and Numerical Modelling of Laser Powder Bed Fusion (L-PBF) of Polymers – A Review”. Rapid Product Development Association of South African (RAPDASA)-RobMech-PRASA-CoSAAMI) 23<sup>rd</sup> Annual International Conference, 9<sup>th</sup> – 11<sup>th</sup> of November 2022, Lord Charles Hotel, Somerset West, South Africa, <https://site.rapdasa.org/annual-conference/>, 2022 RAPDASA-RobMech-PRASA-CoSAAMI Conference, MATEC Web of Conferences, 370, 06001 (2022), <https://doi.org/10.1051/matecconf/202237006001>, MATEC Web of Conferences.
93. Masenate Thamae, Maina Maringa and Willie du Preez, “Influence of selective laser melting process parameters on the characteristics of SiC/Ti6Al4V(ELI) single tracks”, Rapid Product Development Association of South African (RAPDASA)-RobMech-PRASA-CoSAAMI) 23<sup>rd</sup> Annual International Conference, 9<sup>th</sup> – 11<sup>th</sup> of November 2022, Lord Charles Hotel, Somerset West, South Africa, <https://site.rapdasa.org/annual-conference/>, MATEC Web of Conferences, 370, 01003 (2022), <https://doi.org/10.1051/matecconf/202237006001>, MATEC Web of Conferences.
94. Fredrick M Mwanja, Maina Maringa and Kobus Van der Walt, “Fractography of Polypropylene Laser Sintered Tensile Test Specimens”, Rapid Product Development Association of South African (RAPDASA)-RobMech-PRASA) 22<sup>nd</sup> Annual International Conference, 3<sup>rd</sup> - 5<sup>th</sup> November 2021, CSIR International Convention Centre, Pretoria, South Africa, <https://site.rapdasa.org/annual-conference/>. Accepted for publication in the IEEE Xplore edition of March 2022.
95. Masenate Thamae, Maina Maringa and W. B. du Preez, “Parameters Affecting the Mixing of Powders and the Results of Mixing SiC and Ti6Al4V(ELI) Powders”, Rapid Product Development Association of South African (RAPDASA)-RobMech-PRASA) 22<sup>nd</sup> Annual International Conference, 3<sup>rd</sup> - 5<sup>th</sup> November 2021, CSIR International Convention Centre, Pretoria, South Africa, <https://site.rapdasa.org/annual-conference/>. Accepted for publication in the IEEE Xplore edition of March 2022.
96. T. C. Moleko, M. Maringa and W. B. du Preez, “Comparative Analysis of the High Velocity Impact Behaviour of Wrought Ti6Al4V and As-Built and Stress Relieved DMLS Ti6Al4V (ELI)”, Rapid Product Development Association of South African (RAPDASA)-RobMech-PRASA) 22<sup>nd</sup> Annual International Conference, Pre-Conference Seminar on Design and Additive Manufacturing of Titanium Parts, 02-05 November 2021, Hosted by the Central University of Technology, Free State (CUT), Venue: CSIR International Convention Centre, Pretoria Tuesday 2<sup>nd</sup> November 2021, Jappie van Lill Hall, Central

97. Mpho Mashabela, Maina Maringa and Thywill Dzogbewu, “Examining Various Mixing Techniques and their Effect on the Uniform Dispersion of Carbon Nanotubes within a Ti6Al4V (ELI) Matrix”, Rapid Product Development Association of South African (RAPDASA)-RobMech-PRASA) 22<sup>nd</sup> Annual International Conference, Pre-Conference Seminar on Design and Additive Manufacturing of Titanium Parts, 02-05 November 2021, Hosted by the Central University of Technology, Free State (CUT), Venue: CSIR International Convention Centre, Pretoria Tuesday 2nd November 2021, Jappie van Lill Hall, Central University of Technology, free State, South Africa, <https://site.rapdasa.org/pre-conference-seminar/>. Accepted for publication in the IEEE Xplore edition of March 2022.
98. Thinus van Rhijn, Willie du Preez, Maina Maringa and Dean Kouprianoff, “Towards predicting process parameters for selective laser melting of titanium alloys through the modelling of melt pool characteristics”, The Conference of the South African Advanced Materials Initiative 2021 (CoSAAMI’21), Vol 40 No 1 (2021), Print ISSN 0254-3486 Online ISSN 2222-4173, <https://doi.org/10.36303/SATNT.2021cosaami.32>.
99. T. C. Moleko, M. Maringa and W. B. du Preez, “Justification for High Velocity Impact Testing Using As-Built And Stress Relieved DMLS Ti6AL4V (ELI) Based on Results For Wrought Ti6AL4V ”, Rapid Product Development Association of South African (RAPDASA) 21<sup>st</sup> Annual International Conference, Jappie van Lill Hall, Central Central University of Technology, free State, 4<sup>th</sup> – 6<sup>th</sup> November 2020, South Africa, <https://site.rapdasa.org/annual-conference/>.
100. M. Seleso, M. Maringa and W. B. du Preez, “Designing a Ceramic Particulate Composite to Enhance Selected Mechanical Properties of Ti6AL4V”, Rapid Product Development Association of South African (RAPDASA) 21<sup>st</sup> Annual International Conference, Jappie van Lill Hall, Central University of Technology, free State, 3<sup>rd</sup> November 2020, South Africa, <https://site.rapdasa.org/pre-conference-seminar/>.
101. M. L. Mokhali, M. Maringa and J. Nsengimana, “Effects of Process Parameters on the Mechanical Properties of Fused Deposition Modelling of Polymeric Composites: A Review”, Rapid Product Development Association of South African (RAPDASA) 21<sup>st</sup> Annual International Conference, Jappie van Lill Hall, Central Central University of Technology, free State, 4<sup>th</sup> – 6<sup>th</sup> November 2020, South Africa, <https://site.rapdasa.org/annual-conference/>.
102. T. C. Moleko, M. Maringa and W. B. du Preez, “Wrought Ti-6Al-4V as an Alloy for High Velocity Impact Applications”, Rapid Product Development Association of South African (RAPDASA) 20<sup>th</sup> Annual International Conference, Pre-conference Seminar on Additive Manufacturing and Design of Titanium Parts, CUT, Japie van Lill Auditorium, Bloemfontein, Free State, Central University of Technology, 5<sup>th</sup> November 2019, South Africa, <https://site.rapdasa.org/pre-conference-seminar/>.
103. F. M. Mwanja, M. Maringa and Kobus van der Walt, “Recycling of Polypropylene Powder Used in Laser Sinter Additive Manufacturing – A Literature Review”, Rapid Product Development Association of South African (RAPDASA) 20<sup>th</sup> Annual International Conference, Pre-conference Seminar on Additive Manufacturing and Design of Titanium Parts, CUT, Japie van Lill Auditorium, Bloemfontein, Free State, Central University of Technology, 5<sup>th</sup> November 2019, South Africa, <https://site.rapdasa.org/pre-conference-seminar/>.

104. M. Muiruri, M. Maringa and W. B. du Preez, “Constitutive Numerical Modelling in Additive Manufacturing: Challenges in Predicting the Yield Strength and Flow Properties of Alloys”, Rapid Product Development Association of South African (RAPDASA) 20<sup>th</sup> Annual International Conference, Emoya Estate, Bloemfontein, Free State, Central University of Technology, 6<sup>th</sup> - 8<sup>th</sup> November 2019, South Africa, <https://site.rapdasa.org/pre-conference-seminar/>.
105. Amos Mwangi Muiruri, M Maringa, WB du Preez, LM Masu, “Effects of Stress Relieving Heat Treatment on High Strain Rate Tensile Properties of Direct Metal laser Sintered Ti6Al4V (ELI) Parts”, Proceedings of the International Conference on Competitive Manufacturing (COMA) 2019, 30<sup>th</sup> January 2019 – 1<sup>st</sup> February 2019, Stellenbosch, South Africa, pp 174 – 180, ISBN: 978-0-7972-1779-9.
106. Wilson Webo, Leonard Masu, Maina Maringa, “The Compression and Shear Mechanical Properties of Treated and Untreated Sisal Fibre-Epoxy Resin Composites”, 11<sup>th</sup> South African Conference on Computational and Applied Mechanics, 2018, pp 234 – 245, ISBN Number 978-1-77012-143-0, <http://conferences.academicjournals.org/cat/physical-sciences/11th-south-african-conference-on-computational-and-applied-mechanics>.
107. Maina Maringa, “Theoretical Evaluation of the Limitations of the Predictive Capacity of Newtonian Fluid Theories on the Shear Moduli Ratio ( $G_c/G_m$ ) of Particulate Composites”, 11<sup>th</sup> South African Conference on Computational and Applied Mechanics, 2018, pp 970 – 979, ISBN Number 978-1-77012-143-0, <http://conferences.academicjournals.org/cat/physical-sciences/11th-south-african-conference-on-computational-and-applied-mechanics>.
108. Maina Maringa, “Improving the Predictive Capacity of Newtonian Fluid Theories on the Elastic Moduli Ratio ( $E_c/E_m$ ) of Particulate Composites”, 11<sup>th</sup> South African Conference on Computational and Applied Mechanics, 2018, pp 574 – 587, ISBN Number 978-1-77012-143-0, <http://conferences.academicjournals.org/cat/physical-sciences/11th-south-african-conference-on-computational-and-applied-mechanics>.
109. Maina Maringa and Masu L. M., “Variation of the Transverse Strain Matrix/Fibre Magnification/Reduction and Stress Ratio with the inter-fibre spacing/fibre radius (s/r) ratio”, 11<sup>th</sup> South African Conference on Computational and Applied Mechanics, 2018, pp 887 – 899, ISBN Number 978-1-77012-143-0, <http://conferences.academicjournals.org/cat/physical-sciences/11th-south-african-conference-on-computational-and-applied-mechanics>.
110. A M Muiruri, M Maringa, W B du Preez & LM Masu, “Dynamic behaviour of direct metal laser sintered Ti-6Al-4V (ELI) under high strain rates in compression loading”, 18<sup>th</sup> RAPDSA conference, pre-conference seminar on additive manufacturing of titanium parts, Durban International Convention Centre Durban, Kwazulu Natal, 8 – 10 November 2017, Republic of South Africa, <http://www.rapdasa.org/seminar.aspx>.
111. Maringa M and Masu L. M. “Developing analytical solutions for transverse, matrix strain magnification and fibre strain reduction in uniaxially aligned continuous fibre reinforced composites, based on the principle of conservation of strain energy and the Reuss rule”, 2017 Global Conference on Polymer and Composite Materials (PCM 2017) IOP Publishing, IOP Conf. Series: Materials Science and Engineering 213 (2017) 012004 doi:10.1088/1757-899X/213/1/012004, <http://iopscience.iop.org/article/10.1088/1757-899X/213/1/012004/pdf>

112. L. B. Malefane, W. B. du Preez, M. Maringa, “Testing for homogeneity and orthotropy of Ti6Al4V (ELI) parts built by Direct Metal Laser Sintering”, Rapid Product Development Association of South African (RAPDASA) 17<sup>th</sup> Annual International Conference, Pre-conference Seminar on Additive Manufacturing of Titanium Parts, VUT Southern Gauteng Technology and Science Park, 2-4 November 2016, South Africa, <http://conferences.sun.ac.za/index.php/rapdasa17/rapdasa17>.
113. Maringa M., “A Semi-Empirical Method for Determining the Averaged Orientation of Reinforcing Fibre in Fibre Reinforced Composites”, Proceedings of the 2016 Annual Conference on Sustainable Research and Innovation, 4 - 6 May 2016, <http://sri.jkuat.ac.ke/ojs/index.php/proceedings/issue/view/17>.
114. Maina Maringa and Peter Miano, “A Proposed State-of-Art Automation Training Centre of Excellence for TVET that is Designed to Meet the Needs of Identified Programs”, Commonwealth Association of Polytechnics in African (CAPA) International Conference on “TVET Institutions as a Platform for Industrial Development in Africa”, Mombasa, Kenya, 29<sup>th</sup> April – 4<sup>th</sup> of May 2012.
115. Maina Maringa and Mwangi Maringa, “A 4-Year Strategic Framework For Technical Education In Rwanda”, Commonwealth Association of Polytechnics in African (CAPA) International Conference on “TVET Institutions as a Platform for Industrial Development in Africa”, Mombasa, Kenya, 29<sup>th</sup> April – 4<sup>th</sup> of May 2012.
116. Maina Maringa and Mwangi Maringa, “Setting up A Model College of Technology in Kigali City – The Kicukiro College of Technology (KCoT)”, Commonwealth Association of Polytechnics in African (CAPA) International Conference on “TVET Institutions as a Platform for Industrial Development in Africa”, Mombasa, Kenya, 29<sup>th</sup> April – 4<sup>th</sup> of May 2012.
117. Maringa M., “Raising The Value Of Human Resources In Africa As A Catalyst For The Emergence And Sustenance Of A Culture For Developing Solutions To Perceived and Projected Needs”, Africa Brain Gain Conference, 19<sup>th</sup> – 22<sup>nd</sup> December 2005, Nairobi, KENYA.
118. Maringa M., “Significance Of The Poisson’s Ratio Effect On The Volumetric Strains Of Various Isotropic Engineering Component Shapes”, 16<sup>th</sup> Annual International Conference of the Kenya Society of Agricultural Engineers, 8<sup>th</sup> – 10<sup>th</sup> of December 2004, Nairobi, KENYA.
119. Maringa M. and Injairu C. G., “The 3-Point Bend Test and Its Use in Verifying the Presence or Absence of Dual Moduli Properties in Naturally Occurring Materials”, presented at the Annual WAITRO, international congress in Nairobi, KENYA on the 7<sup>th</sup> of September 2004.
120. Maringa M., “Use of Ultrasonic Waves in the Determination of the Mechanical Properties of Isotropic and Anisotropic Materials”, 15<sup>th</sup> Annual International Conference of the Kenya Society for Agricultural Engineers, 27<sup>th</sup> – 28<sup>th</sup> November 2003, Nairobi, KENYA.
121. Maringa M., “Determination of The Elastic Moduli of Various Types of Limestone Using Ultrasonic Testing”, International Civil Engineering Conference on Sustainable Development in the 21st Century, 12<sup>th</sup> – 16<sup>th</sup> August 2003, Nairobi, KENYA, pp. 89-94.



122. Maringa M., “Developing and Transforming Intellectual Property into Technology – Education and Funding Challenges”, Institution of Engineers of Kenya Conference on Challenges to Industrialisation, 23<sup>rd</sup> – 25<sup>th</sup> April 2003, Nairobi, KENYA, pp. 83-92.
123. Maringa M. and Oyadiji S. O., “Use of Thermoelastic Measurements for the Detection of Damage and its Accumulation”, The 73<sup>rd</sup> Annual Shock and Vibration Symposium, 18<sup>th</sup> - 22<sup>nd</sup> November 2002, Newport, Maryland, USA.
124. Maringa M. and Oyadiji S. O., “Tension-Tension Cyclic Dynamic Testing of SMC Specimens”, The 73<sup>rd</sup> Annual Shock and Vibration Symposium, 18–22 November 2002, Newport, Maryland, USA.
125. Maringa M. and Oyadiji S. O., “Detection of Damage in SMC Using Vibration Induced Thermal Emission”, The 5<sup>th</sup> International Conference on Vibration and Engineering, 18-20 September 2002, Nanjing, China (Accepted for publication on 28<sup>th</sup> June 2002), pp.667-671.

#### **PEER REVIEWED ABSTRACTS READ PAPERS IN INTERNATIONAL CONFERENCES**

126. Tumelo D. Moloi, Thywill C. Dzogbewu, Maina Maringa, and Amos M. Muiruri, “Quasi-Static Tensile Properties of LPBF Ti6Al4V(ELI) Parts Exposed to Two Different Heat Treatment Processes and Tested at Different Elevated Temperatures”, The Sustainable Research and Innovation Conference, College of Engineering and Technology, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Juja, 4<sup>th</sup> – 5<sup>th</sup> October 2023, <https://sri.jkuat.ac.ke/> (accepted and presented).
127. M.I. Chibinyani, T.C. Dzogbewu, M. Maringa, A.M. Muiruri, “A Review of the Types, Occurrence, and Applications of Cellular Structures in Nature”, The Sustainable Research and Innovation Conference, College of Engineering and Technology, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Juja, 4<sup>th</sup> – 5<sup>th</sup> October 2023, <https://sri.jkuat.ac.ke/> (accepted and presented).
128. M. Mashabela, M. Maringa, T.C. Dzogbewu, “Investigating the effect methanol and ethanol have on the dispersion of carbon nanotubes in Ti6Al4V(ELI)”, The Sustainable Research and Innovation Conference, College of Engineering and Technology, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Juja, 4<sup>th</sup> – 5<sup>th</sup> October 2023, <https://sri.jkuat.ac.ke/> (accepted and presented).
129. M. Thamae, M. Maringa, W. B. du Preez, “A Comparative Analysis of Low and High SiC Volume Fraction Additively Manufactured SiC/Ti6Al4V(ELI) Composites Based on the Best Process Parameters of Laser Power, Scanning Speed and Hatch Distance”, The Sustainable Research and Innovation Conference, College of Engineering and Technology, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Juja, 4<sup>th</sup> – 5<sup>th</sup> October 2023, <https://sri.jkuat.ac.ke/> (accepted and presented).
130. F.M. Mwanja, M. Maringa, J. G. van der Walt, “A Review of Polymer Laser Sintering and Fused Deposition Modelling of Polymers”, The Sustainable Research and Innovation Conference, College of Engineering and Technology, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Juja, 4<sup>th</sup> – 5<sup>th</sup> October 2023, <https://sri.jkuat.ac.ke/> (accepted and presented).

131. Muiruri A.M., Maringa M. and du Preez. W.B, “Influence of Macro-Residual Stresses on the Impact and Compressive Behaviour, as well as Failure Characteristics of Parts Produced by Laser Powder Bed Fusion”, The Sustainable Research and Innovation Conference, College of Engineering and Technology, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Juja, 4<sup>th</sup> – 5<sup>th</sup> October 2023, <https://sri.jkuat.ac.ke/> (accepted and presented).
132. T.D. Moloi, T.C. Dzogbewu, M. Maringa & A. Muiruri, “Investigating the fatigue life of high temperature annealed DMLS Ti6Al4V(ELI) at elevated temperatures”, Rapid Product Development Association of South African (RAPDASA)-RobMech-PRASA-AMI) 24<sup>th</sup> Annual International Conference, 30<sup>th</sup> October – 2<sup>nd</sup> November 2023, CSIR International Convention Centre in Pretoria, South Africa, <https://site.rapdasa.org/annual-conference/>.
133. Fredrick Mwanja, Maina Maringa, and Jacobus van der Walt, “Investigating the Impact of Volumetric Laser Energy Density on the Dynamic Mechanical Properties of Diapow PP MF Polypropylene Parts Printed Using Laser-Powder Bed Fusion Additive Manufacturing Technique to Determine the Best Exposure Parameter”, Rapid Product Development Association of South African (RAPDASA)-RobMech-PRASA-AMI) 24<sup>th</sup> Annual International Conference, 30<sup>th</sup> October – 2<sup>nd</sup> November 2023, CSIR International Convention Centre in Pretoria, South Africa, <https://site.rapdasa.org/annual-conference/>.
134. Maina Maringa, “Theoretical Testing For Dispersion In Transversely And Longitudinally Vibrating Beams Of Short, Randomly Oriented Glass Fibre Reinforced Dough And Sheet Moulding Compounds”, The 6th Annual International Virtual Conference under the theme, “Research, Innovation & Technology for Sustainable Development”, held on March 22-23, 2023, Kirinyaga University, Kenya.
135. Tumelo D. Moloi, Thywill C. Dzogbewu, Maina Maringa and Amos M. Muiruri, “The Effect Of Soaking Temperature On The Microstructures Of Additively Manufactured Stress Relieved, As Well As Stress Relieved And High Temperature Annealed Ti6Al4V(ELI)”, The 6th Annual International Virtual Conference under the theme, “Research, Innovation & Technology for Sustainable Development”, held on March 22-23, 2023, Kirinyaga University, Kenya.
136. Maina Maringa, Willie B. du Preez and Amos Muiruri, “Cases of and the Effects of Different Strain Rates on the Deformation-Behaviour and Microstructure of Ti6Al4V and other Metallics”, The 6th Annual International Virtual Conference under the theme, “Research, Innovation & Technology for Sustainable Development”, held on March 22-23, 2023, Kirinyaga University, Kenya.
137. Teboho Moleko, Maina Maringa and Willie du Preez, “Fractography and Microstructural Analysis of Wrought Ti6AL4V Plates Subjected to High Velocity Impact”, Rapid Product Development Association of South African (RAPDASA)-RobMech-PRASA-CoSAAMI) 23<sup>rd</sup> Annual International Conference, 9<sup>th</sup> – 11<sup>th</sup> of November 2022, Lord Charles Hotel, Somerset West, South Africa, <https://site.rapdasa.org/annual-conference/>. Accepted for presentation.
138. Munashe Ignatius Chibinyani, Thywill Cephass Dzogbewu and Maina Maringa, “Reduced order topology optimisation of a planar honeycomb defined by a linear elastic Ti6Al4V (ELI) material model”, Rapid Product Development Association of South African

(RAPDASA)-RobMech-PRASA-CoSAAMI) 23<sup>rd</sup> Annual International Conference, 9th – 11th of November 2022, Lord Charles Hotel, Somerset West, South Africa, <https://site.rapdasa.org/annual-conference/>. Accepted for presentation.

139. A M Muiruri, M Maringa, W B du Preez, “Theoretical model of the flow properties of post processed direct metal laser sintering Ti6Al4V”, 6th World Congress on Computational Materials Engineering (ICME) 2022, April 24 -28, Hyatt Regency Lake Tahoe, Incline Village, Nevada, USA, [www.tms.org/ICME\\_2022](http://www.tms.org/ICME_2022).
140. Van Rhijn, M. S., Du Preez, W. B. and Maringa, M. (2020), “Towards predicting process parameters for selective laser melting of titanium alloys through modelling of melt pool characteristics”, Rapid Product Development Association of South African (RAPDASA) 21<sup>st</sup> Annual International Conference, Jappie van Lill Hall, Central University of Technology, free State, 4<sup>th</sup> – 6<sup>th</sup> November 2020, South Africa, <https://site.rapdasa.org/annual-conference/>.
141. A. M. Muiruri, M. Maringa and W. B. du Preez, “Crystallographic Texture Analysis of As-Built And Heat Treated TI6AL4V Produced by Direct Metal Laser Sintering”, Rapid Product Development Association of South African (RAPDASA) 21<sup>st</sup> Annual International Conference, Jappie van Lill Hall, Central University of Technology, free State, 4<sup>th</sup> – 6<sup>th</sup> November 2020, South Africa, <https://site.rapdasa.org/annual-conference/>.
142. T. C. Moleko, M. Maringa and W. B. du Preez, “Fractography and Microstructural Analysis of Wrought TI6AL4V Plates Subjected to High Velocity Impact”, Rapid Product Development Association of South African (RAPDASA) 21<sup>st</sup> Annual International Conference, Jappie van Lill Hall, Central Central University of Technology, free State, 4<sup>th</sup> – 6<sup>th</sup> November 2020, South Africa, <https://site.rapdasa.org/annual-conference/>.
143. M. Mwania, M. Maringa and Kobus van der Walt, “Preliminary Testing to Determine the Best Process Parameters for Selective Laser Sintering of a New Polypropylene Polymeric Material”, Rapid Product Development Association of South African (RAPDASA) 21<sup>st</sup> Annual International Conference, Jappie van Lill Hall, Central Central University of Technology, free State, 4<sup>th</sup> – 6<sup>th</sup> November 2020, South Africa, <https://site.rapdasa.org/annual-conference/>.
144. M. Seleso, M. Maringa and W. B. du Preez, “Parameters Affecting the Suitability of Powder Mixtures for Additive Manufacturing of Composites”, Rapid Product Development Association of South African (RAPDASA) 21<sup>st</sup> Annual International Conference, Jappie van Lill Hall, Central Central University of Technology, free State, 3<sup>rd</sup> November 2020, South Africa, <https://site.rapdasa.org/pre-conference-seminar/>.
145. M. Mashabela, M. Maringa and T. Dzogbewu, “Nano Particulate Reinforcement of TI6AL4V For Use in The Aerospace Sector: an Overview”, Rapid Product Development Association of South African (RAPDASA) 21<sup>st</sup> Annual International Conference, Jappie van Lill Hall, Central Central University of Technology, free State, 4<sup>th</sup> – 6<sup>th</sup> November 2020, South Africa, <https://site.rapdasa.org/annual-conference/>.
146. M. Mashabela, M. Maringa and T. Dzogbewu, “Developing Process Parameters for Direct Metal Laser Sintering of TI6AL4V Matrix, Carbon and Titanium Diboride Nano Particulate Composites”, Rapid Product Development Association of South African (RAPDASA) 21<sup>st</sup> Annual International Conference, Jappie van Lill Hall, Central Central University of Technology, free State, 4<sup>th</sup> – 6<sup>th</sup> November 2020, South Africa, <https://site.rapdasa.org/annual-conference/>.

147. M. L. Mokhali, M. Maringa and J. Nsengimana, “Effect of Carbon Fibres on the Physical and Mechanical Characteristics of Polyamide 12 Fused Deposition Modelling Printed Parts”, Rapid Product Development Association of South African (RAPDASA) 21st Annual International Conference, Jappie van Lill Hall, Central Central University of Technology, free State, 4<sup>th</sup> – 6<sup>th</sup> November 2020, South Africa, <https://site.rapdasa.org/annual-conference/>.
148. M.S. van Rhijn, W.B. du Preez, M. Maringa & D. Kouprianoff, “Towards Predicting Process Parameters for Selective Laser Melting of Titanium Alloys Through Modelling of Melt Pool Characteristics”, Rapid Product Development Association of South African (RAPDASA) 21st Annual International Conference, Jappie van Lill Hall, Central Central University of Technology, free State, 3<sup>rd</sup> November 2020, South Africa, <https://site.rapdasa.org/pre-conference-seminar/>.
149. F. M. Mwanja, M. Maringa and Kobus van der Walt, “How 3D and 4D Manufacturing Technologies are Driving Societal Transformation Towards Improved Productivity And Efficiency”, 1<sup>st</sup> Free State Joint Provincial Summit on the Industry 4.0 on the theme, Leveraging the Youth Dividend for the Social-Economic Advancement of the Free State, Free State Provincial Government and the Central University of Technology Bloemfontein, Free State, 28<sup>th</sup> – 29<sup>th</sup> November 2019, <https://freestate4irsumm>.
150. Wilson Webo, Maina Maringa and Leonard Masu, “The Combined Effect of Mercerisation, Silane Treatment and Acid Hydrolysis on the Mechanical Properties of Sisal Fibre/Epoxy Resin Composites”, 10th International Conference of the African Materials Research Society, Arusha City, Tanzania, 10<sup>th</sup> – 13<sup>th</sup> December 2019, <https://africanmrs.net/tanzania-2019/>.
151. A. M. Muiruri, M. Maringa and W. B. du Preez, “Application of Phenomenological Modelling in the Development of a Database for Additively Manufactured Ti6Al4V (ELI): A Review”, 10<sup>th</sup> International Conference of the African Materials Research Society, Arusha City, Tanzania, 10<sup>th</sup> – 13<sup>th</sup> December 2019, <https://africanmrs.net/tanzania-2019/>.
152. M. Mwanja, M. Maringa and Kobus van der Walt, “A review of Methods to Ameliorate the Effects of High Temperature on Polymers and in Particular Polypropylene in laser Sinter Additive Manufacturing”, 10<sup>th</sup> International Conference of the African Materials Research Society, Arusha City, Tanzania, 10<sup>th</sup> – 13<sup>th</sup> December 2019, <https://africanmrs.net/tanzania-2019/>.
153. L. B. Malefane, W. B. du Preez, M. Maringa, “Tensile and High Cycle Fatigue Properties of Annealed Ti6Al4V (ELI) Specimens Produced by Direct Metal Laser Sintering”, 19<sup>th</sup> Annual Conference, Additive manufacturing as a key driver of the 4<sup>th</sup> industrial revolution, 06-09 November 2018, Protea Parktown, Braamfontein, Johannesburg, <https://site.rapdasa.org/past-proceedings-2018/>.
154. L. B. Malefane, W. B. du Preez, M. Maringa, “High Cycle Fatigue Properties of As-Built Ti6Al4V (ELI) Produced by Direct Metal Laser Sintering”, 18<sup>th</sup> RAPDSA conference, pre-conference seminar on additive manufacturing of titanium parts, Durban International Convention Centre Durban, Kwazulu Natal, 8 – 10 November 2017, Republic of South Africa, <http://www.rapdasa.org/seminar.aspx>.

## KEYNOTE SPEAKER AT INTERNATIONAL CONFERENCES

155. Maina Maringa, “Composite Theory- and Energy-Based Analytical Prediction of the Optimum Process Parameters for SiC/Ti6Al4V(ELI) and CNT/Ti6Al4V(ELI) Composites”, The Sustainable Research and Innovation Conference, College of Engineering and Technology, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Juja, Kenya, 4 – 5th October 2023, <https://sri.jkuat.ac.ke/> (presented).

## REVIEWED PUBLISHED TECHNICAL PAPERS

156. Mwangi Maringa and Maina Maringa, “Employability & Industrial Links for Rwandan TVET in Ecole Technique Officiels (ETOs) and Agroveternaires (EAVES)”, TVET JOURNAL- 2023-09-21 by Guestpost, <https://tvetjournal.com/tvet-systems/employability-industrial-links-for-rwandan-tvet-in-ecole-technique-officiels-etos-and-agroveternaires-eaves/>.

## SEMINAR AND WORKSHOP PAPER PRESENTATIONS

157. Maringa M., “Theoretical Modelling of Damage Accumulation In Composite Materials – A Second Approach”, Presented at workshop in the Department of Mechanical Engineering of the Jomo Kenyatta University of Agriculture and Technology, in the month of August 2006.
158. Maringa M., “Theoretical Modelling of Damage Accumulation In Composite Materials – A First Approach”, Presented at workshop in the Department of Mechanical Engineering of the Jomo Kenyatta University of Agriculture and Technology, on the 27<sup>th</sup> of August 2003.
159. Maringa M., “Characterisation of the Mechanical Properties of Natural material – a Case Study of Different Types of Limestone”, Seminar delivered in the Department of Geology of the University of Nairobi on the 4<sup>th</sup> of February 2003.

## PAPERS UNDER REVISION PRIOR TO SUBMISSION FOR PUBLICATION

1. Maringa M., “The Effect of the Poisson’s ratio Correction and that of dual Moduli properties of Constituent Components of Particulate Composites on the Predicted Elastic Properties of Particulate Composites”.
2. Maringa M., “Dispersion Effects and Frequency Dependence of the Elastic Moduli in Transversely Vibrating SMCR26 Cantilever Beams”.
3. Maringa M., “Damping effects in Transversely Vibrating SMCR26 Cantilever Beams”.

## PUBLISHED BOOKS AND BOOK CHAPTERS

160. M Maina Maringa, “Randomly Oriented Glass Fibre Reinforced Dough and Sheet Moulding Compounds: Testing for Dispersion and Determination of Average Effective Lengths of Fibre Strands in Transversely and longitudinally Vibrating Beams”, In the book, “Current approaches in Engineering Research Technology”, , BP International, India & United Kingdom, <https://www.bookpi.org/bookstore/product/current-approaches-in-engineering-research-and-technology-vol-6/>.



161. M. I. Chibinyani, T. C. Dzogbewu, M. Maringa and A. M. Muiruri, “Numerical Modelling of DMLS Ti6Al4V(ELI) Polygon Structures”, In the Book, “Chemical and Materials Sciences – Developments and Innovations Vol. 4”, BP International, India & United Kingdom, <https://www.bookpi.org/bookstore/product/chemical-and-materials-sciences-developments-and-innovations-vol-4/>.
162. Mwangi Maringa and Maina Maringa, “A Review of the Physical Infrastructure & Equipment Quality Indicator of Ecole Technique Officiels (ETOs) and Ecole Agroveternaire (EAVS) in the Rwandan TVET System”, pp. 111 – 138, in the book, “Educational Developments: Bridging Past, Present and Future”, **Editors: Dr. Anamika Pandey and Dr. Mohd Norazmi Bin Nordin**, © Innovare Academic Sciences Pvt Ltd, April 2024, ISBN: 978-81-964888-3-3, India, [https://www.innovareacademics.in/img/books/Educational\\_Developments\\_Bridging\\_Past\\_Present\\_and\\_Future.pdf](https://www.innovareacademics.in/img/books/Educational_Developments_Bridging_Past_Present_and_Future.pdf).
163. Mwangi Maringa and Maina Maringa, “Contextual Demographics of Ecole Technique Officiels (ETOs) and Ecole Agroveternaire (EAVEs) in the Rwandan TVET System”, pp. 139 – 156, in the book, “Educational Developments: Bridging Past, Present and Future”, **Editors: Dr. Anamika Pandey and Dr. Mohd Norazmi Bin Nordin**, © Innovare Academic Sciences Pvt Ltd, April 2024, ISBN: 978-81-964888-3-3, India, [https://www.innovareacademics.in/img/books/Educational\\_Developments\\_Bridging\\_Past\\_Present\\_and\\_Future.pdf](https://www.innovareacademics.in/img/books/Educational_Developments_Bridging_Past_Present_and_Future.pdf).
164. Maringa M., “Limitations of the Predictive Capacity of Newtonian Fluid Theories on the Shear Moduli Ratio ( $G_c/G_m$ ) of Particulate Composites: An Analytical Approach”, in Theory and Applications of Engineering Research Volume 3, pp. 75 – 94, **Editor: Prof. Giovanni Bucci**, pp. BP International, India & United Kingdom, 1<sup>st</sup> Edition, 2024, ISBN 978-81-969435-4-7 (Print), ISBN 978-81-969435-5-4 (eBook), DOI: [10.9734/bpi/taer/v3](https://www.bookpi.org/bookstore/product/theory-and-applications-of-engineering-research-vol-3/), <https://www.bookpi.org/bookstore/product/theory-and-applications-of-engineering-research-vol-3/>.
165. Maringa M., “Analytical Modelling to Improve the Predictive Capacity of Newtonian Fluid Theories on the Elastic Moduli Ratio ( $E_c/E_m$ ) of Particulate Composites”, in Theory and Applications of Engineering Research Volume 3, pp. 95 – 118, **Editor: Prof. Giovanni Bucci**, pp. BP International, India & United Kingdom, 1<sup>st</sup> Edition, 2024, ISBN 978-81-969435-4-7 (Print), ISBN 978-81-969435-5-4 (eBook), DOI: [10.9734/bpi/taer/v3](https://www.bookpi.org/bookstore/product/theory-and-applications-of-engineering-research-vol-3/), <https://www.bookpi.org/bookstore/product/theory-and-applications-of-engineering-research-vol-3/>.
166. Fredrick M Mwanja, Maina Maringa and Joseph Nsengimana, “Assessing the Effect of Process Variables for Fusion Level of Two Neighbour Tracks Generated by Fused Deposition Modelling of Acrylonitrile Butadiene Styrene”, Chapter 10 in the eBook entitled, “Contemporary Perspective on Science, Technology and Research Vol. 1, 1<sup>st</sup> Edition, 11th December 2023, B P International, Print ISBN: 978-81-968135-4-3, eBook ISBN: 978-81-968135-8-1, **Editor: Prof. Raad Yahya Qassim**, DOI: [10.9734/bpi/cpstr/v1/1626G](https://www.bookpi.org/bookstore/product/theory-and-applications-of-engineering-research-vol-3/).
167. AM Muiruri, M Maringa and W du Preez, “A Theoretical Model of the Flow Properties of Postprocessed Direct Metal Laser Sintering Ti6Al4V (ELI)”, in the eBook entitled, “Prime Archives in Material Science: 4<sup>th</sup> Edition, 18<sup>th</sup> April 2023, ISBN: 978-93-92117-40-4, **Editor: Esubalew Kasaw Gebeyehu**, <https://videleaf.com/product/prime-archives-in-material-science-4th-edition/>.

168. Amos Muiruri, Maina Maringa, Willie du Preez and Leonard Masu, “Effect of Stress-Relieving Heat Treatment on the High Strain Rate Dynamic Compressive Properties of Additively Manufactured Ti6Al4V (ELI)”, in Metals Special issue eBook entitled, “Advanced Characterization and On-Line Process Monitoring of Additively Manufactured Materials and Components”, **Editor: Giovanni Bruno and Christiane Maierhofer**, ISBN 978-3-0365-5813-4 (Hbk) ISBN 978-3-0365-5814-1 (PDF), ISSN 2075-4701, 11th November 2022, © 2023 by the authors, [https://mdpi-res.com/bookfiles/book/6684/Advanced\\_Characterization\\_and\\_OnLine\\_Process\\_Monitoring\\_of\\_Additively\\_Manufactured\\_Materials\\_and\\_Components.pdf?v1682850193](https://mdpi-res.com/bookfiles/book/6684/Advanced_Characterization_and_OnLine_Process_Monitoring_of_Additively_Manufactured_Materials_and_Components.pdf?v1682850193), reprint of articles from the Special Issue published online in the open access journal Metals (ISSN 2075-4701) (available at: [https://www.mdpi.com/journal/metals/special\\_issues/characterization\\_monitoring](https://www.mdpi.com/journal/metals/special_issues/characterization_monitoring)).
169. Fredrick M Mwanja, Maina Maringa and Kobus van der Walt, “A Review of Methods Used to Reduce the Effects of High Temperature Associated with Polyamide 12 and Polypropylene Laser Sintering”, in the eBook entitled, “Prime Archives in Polymer Technology” 1<sup>st</sup> Edition, 10<sup>th</sup> December 2020, **ISBN: 978-81-944664-6-8**, **Editors: Monica Trif and Alexandru Rusu**, <https://videleaf.com/product/prime-archives-in-polymer-technology/>.
170. Margaret Wamúyú Maringa, “Wandíng'a Memoirs - Exodus, transcribed, edited and published by Maina Maringa, December 2022 (135 pages), Bloemfontein, South Africa, <https://www.amazon.com/dp/B0BFTMJLT7>.
171. Margaret Wamúyú Maringa, Wandíng'a Memoirs - Humble Platforms and Other Stories, transcribed, edited and published by Maina Maringa, September 2022 (189 pages), Bloemfontein, South Africa, <https://www.amazon.com/dp/B0BFTMJLT7>.
172. Margaret Wamúyú Maringa, Wandíng'a Memoirs - Communications from Villa Magome, transcribed, edited and published by Maina Maringa, May 2021 (300 pages), Bloemfontein, South African, <https://www.amazon.com/dp/B094HVM653>.
173. Maringa M., “The Elastic Behaviour of Dual Moduli Materials”, ISBN-10: 1522852549, ISBN-13: 978-1522852544, Publisher: CreateSpace Independent Publishing Platform; 1<sup>st</sup> edition, January 2016 (292 pages), <https://www.amazon.com/Elastic-Behaviour-Moduli-Materials-Bending/dp/1522852549>. The text is intended for postgraduate students studying dual moduli materials.
174. Maringa M. and Masu L. M., “Transverse Strain and Stress Magnification and Reduction in Fibre Reinforced Composites”, ISBN-10: 1534757678, ISBN-13: 978-1534757677, Publisher: CreateSpace Independent Publishing Platform; 1<sup>st</sup> edition, July 2017 (318 pages), <https://www.amazon.com/Transverse-Magnification-Reduction-Reinforced-Composites/dp/1534757678>. The text is intended for postgraduate students studying composite materials.
175. Maringa M., “An Introduction to Solid and Structural Mechanics – Volume 1”, 1<sup>st</sup> Edition, Fimen Publishers, December 2005 (640 pages), Nairobi, Kenya. Reprinted with changes in April 2022 (741 pages), Bloemfontein, South Africa, <https://www.amazon.com/dp/9966923756>. The text is intended for undergraduate degree students studying Solid and Structural Mechanics.
176. Maringa M., “Complex Loading systems”, a 150-page detailed open learning teaching book, for the Open learning HNC program, Mechanical principles module, run by the Department of Mechanical Engineering at the Manchester College of Arts and

## **BOOKS PARTLY WRITTEN AND PENDING COMPLETION**

1. Maringa M., “An introduction to Engineering Drawing”. 11 chapters completed so far. The text is intended for students of engineering desiring to understand the basic principles of engineering drawing.
2. Maringa M., “An introduction to Engineering Materials”. 1 chapter completed so far. The text is intended for students of material science with an intention of picking up the basics on engineering materials.
3. Maringa M., “An introduction to Engineering Mechanics”. 6 chapters completed so far. The text is intended to serve as a prelude to detailed studies in engineering mechanics.
4. Maringa M., “An Introduction to Engineering Composites”. The text is at the conceptualisation stage and is intended for final year undergraduate and postgraduate students, specialising on engineering composite materials.
5. Maringa M., “Natural Fibre reinforced Composite Engineering Materials”. The text is at the conceptualisation stage and is intended for final year undergraduate and postgraduate students, specialising on engineering composite materials.
6. Maringa M., “Power Generation Hydraulic structures and Pressure Conduits”. The text is intended for postgraduate students, specialising in hydropower generation and practicing hydropower engineers.

## **JOURNAL AND CONFERENCE EDITORIAL AND REFEREEING SERVICES**

1. Chief Editor and founder of the Kenya Journal of Mechanical Engineering (KJME), <http://www.technoacajournals.com/KJMEhomepage.html>.
2. Editor-in-Chief, the Don, a quarterly newsletter of the Jomo Kenyatta University of Agriculture and Technology (JKUAT) Chapter of the University Academic Staff Union (UASU).
3. Chief Editor and founder of the African Journal of Technical and Vocational Education Training (AfriTVET), <http://www.technoacajournals.com/AfriTVETHomepage.html>.
4. Editor for the Africa Brain Gain Conference book of abstracts, background papers and conference proceedings, 19<sup>th</sup> – 22<sup>nd</sup> December 2004, Nairobi, KENYA.
5. Plenary chair for the Africa Brain Gain Conference, 19<sup>th</sup> – 22<sup>nd</sup> December 2004, Nairobi, KENYA.
6. Member of the editorial committee of the Journal of Mechanical Engineering Research (JMER), [www.academicjournals.org/JMER](http://www.academicjournals.org/JMER).
7. Member of the editorial committee of the Journal of Wood Engineering (JWE), [www.academicjournals.org/JMER](http://www.academicjournals.org/JMER).

8. Referee for the Journal of Agriculture Science and Technology of the Jomo Kenyatta University of Science and Technology (ISSN 1561-7645), KENYA, since 1997.
9. Referee for the online International Journal for Service Learning in Engineering (IJSLE) of the Penn State University, USA., whose details are available of the website: <http://www.engr.psu.edu/IJSLE/index.htm>
10. Referee for the Zambian Engineer, [http://eiz.org.zm/index.php?option=com\\_docman&task=cat\\_view&gid=20&Itemid=83](http://eiz.org.zm/index.php?option=com_docman&task=cat_view&gid=20&Itemid=83). Referee for the Zimbabwean Academic Journal, of the Midlands State University Zimbabwe, [chiromoa@msu.ac.zw](mailto:chiromoa@msu.ac.zw).
11. Referee for the Journal of Civil Engineering Construction Technology (JCECT), [www.academicjournals.org/JCECT](http://www.academicjournals.org/JCECT).
12. Referee for the International Journal of Physical Sciences (IJPS), [www.academicjournals.org/IJPS](http://www.academicjournals.org/IJPS).
13. Member of the editorial board of the International Greener Journals, [www.gjournals.org](http://www.gjournals.org).
14. International Board Member of the International Journal of Green Computing" (IJGC), IGI Global Publications, <http://www.igi-global.com/journal/international-journal-green-computing-ijgc/1175>.
15. Referee for the West Indian Journal of Engineering (WIJE), <http://sta.uwi.edu/eng/wije/index.asp>.
16. Referee for the University of Zambia Journal of Science and Technology, [https://www.chatbots.org/journal/journal\\_of\\_science\\_and\\_technology/](https://www.chatbots.org/journal/journal_of_science_and_technology/).
17. Referee for the 11<sup>th</sup> Southern African Conference on Computation and Applied Mechanics (SACAM) of the 17<sup>th</sup> – 19<sup>th</sup> of September 2018, at the Vaal University of Technology, Vanderbijlpark, South Africa, <https://www.vut.ac.za/sacam2018/>.
18. Referee for the Industrial & Commercial Use of Energy (ICUE) international conference – towards sustainable energy solutions for the developing world, CPUT, Cape Town, 13<sup>th</sup> to 15<sup>th</sup> August 2018, <http://energyuse.org.za/icue/>.
19. Referee for 19<sup>th</sup> RAPDSA conference, pre-conference seminar on additive manufacturing of titanium parts, 7 to 9 November 2018, Protea Parktonian in Braamfontein, Johannesburg, Republic of South Africa, <http://www.rapdasa.org/seminar.aspx>.
20. Member of the Editorial Board and Advisory Board of the East African Nature & Science Organisation Journals (EANSO), <https://journals.eanso.org/index.php/index>. From the month of January of the year 2020.
21. Referee for the Rapid Product Development Association of South African (RAPDASA) 20<sup>th</sup> Annual International Conference, Emoya Estate, Bloemfontein, Free State, Central University of Technology, 6<sup>th</sup> - 8<sup>th</sup> November 2019, South Africa, <https://site.rapdasa.org/annual-conference/>.
22. Referee for Rapid Product Development Association of South African (RAPDASA) 21<sup>st</sup> Annual International Conference, 4<sup>th</sup> – 6<sup>th</sup> November 2020, Various venues in South Africa, <https://site.rapdasa.org/annual-conference/>.

23. Referee for the Conference of the South African Advanced Materials Initiative 2021 (CoSAAMI'21), 18-22 October 2021, Interactive Virtual Conference, <https://cosaami.co.za/>.
24. Referee for the Rapid Product Development Association of South African (RAPDASA)-RobMech-PRASA) 22<sup>nd</sup> Annual International Conference, 3<sup>rd</sup> - 5<sup>th</sup> November 2021, CSIR International Convention Centre, Pretoria, South Africa, <https://site.rapdasa.org/annual-conference/>.
25. Referee for the Rapid Product Development Association of South African (RAPDASA)-RobMech-PRASA. CoSAAMI) 23<sup>rd</sup> Annual International Conference, 9<sup>th</sup> – 11<sup>th</sup> November 2021, CSIR International Convention Centre, Pretoria, South Africa, <https://site.rapdasa.org/annual-conference/>.
26. Referee 2022 The 24<sup>th</sup> RAPDASA-RobMech-PRASA-CoSAAMI Annual International Conference, <https://doi.org/10.1051/mateconf/202237001003>.
27. Referee 2023, The 25<sup>th</sup> RAPDASA-RobMech-PRASA-CoSAAMI Annual International Conference, <https://doi.org/10.1051/mateconf/202237001003>.
28. 23<sup>rd</sup> Annual Conference, Rapid Product Development Association of South Africa – Robotics and Mechatronics – Pattern Recognition Association of South Africa – Conference of the South African Advanced Materials Initiative – Conference, Digital technology in production development, 09-11 November 2022, Lord Charles in Somerset West, <https://site.rapdasa.org/past-proceedings-2022/>.
29. Referee for Applied Sciences, MDPI, 2023, <https://www.mdpi.com/journal/applsci>.
30. Referee for Metals, MDPI, 2023 -2023, <https://www.mdpi.com/journal/metals>.
31. Referee for Materials, MDPI, 2022-2023, <https://www.mdpi.com/journal/materials>.
32. Guest Editor for the special issue of Applied Sciences, MDPI, entitled, “The Effect of Microstructure and Strain Rates on the Mechanical Properties of Additively Manufactured Metallics”, [https://www.mdpi.com/journal/applsci/special\\_issues/PC2731NKGR](https://www.mdpi.com/journal/applsci/special_issues/PC2731NKGR).
33. Track Chair – Pre-conference Seminar, 24<sup>th</sup> Annual International RAPDASA Conference joined by RobMech, PRASA and AMI, Advanced manufacturing beyond borders 30 October – 2 November 2023, CSIR International Convention Centre, Pretoria, South Africa, [https://easychair.org/cfp/2024\\_RAPDASA-RobMech-PRASA-AMI\\_Conference](https://easychair.org/cfp/2024_RAPDASA-RobMech-PRASA-AMI_Conference).
34. Track Chair- Process Development, 25<sup>th</sup> Rapid Product Development Association of South Africa Conference, joined by RobMech, PRASA and AMI, Boardwalk Hotel and Conference Venue, Gqeberha (Port Elizabeth), South Africa, October 28-31, 2024, [https://easychair.org/cfp/2024\\_RAPDASA-RobMech-PRASA-AMI\\_Conference](https://easychair.org/cfp/2024_RAPDASA-RobMech-PRASA-AMI_Conference).

**SUPERVISED 4<sup>th</sup> YEAR BTECH RESEARCH PROJECTS - 2012 / 2013 ACADEMIC YEAR (AT THE TECHNICAL UNIVERSITY OF KENYA)**

1. Design of a Biogas Upgrading and Bottling System for Use by a Forklift. One final year project student in Department of Mechanical and Mechatronic Engineering, The Technical University of Kenya, 2013. Completed



2. Pressurized Liquid Biogas Storage and Application. One final year project student in Department of Mechanical and Mechatronic Engineering, The Technical University of Kenya, 2013. Pending completion.

**COMPLETED, SUPERVISED 2<sup>ND</sup> YEAR BPHIL RESEARCH PROJECTS - 2011 / 2012 ACADEMIC YEAR (AT THE KENYA POLYTECHNIC UNIVERSITY COLLEGE)**

1. Optimisation of Flour Mills. Two final and 2<sup>nd</sup> year Bachelor of Philosophy in Technology students of the Department of Mechanical and Mechatronic Engineering, Kenya Polytechnic University College, 2011.
2. Structural Failures in Buildings. One final and 2<sup>nd</sup> year Bachelor of Philosophy in Technology students of the Department of Mechanical and Mechatronic Engineering, Kenya Polytechnic University College, 2011.

**COMPLETED, SUPERVISED 5<sup>TH</sup> YEAR BSc RESEARCH PROJECTS - 2006 / 2007 ACADEMIC YEAR (AT THE KIGALI INSTITUTE OF SCIENCE AND TECHNOLOGY)**

1. Design of Biogas Storage and Charging System. One student, Kigali Institute of Science and Technology, Kigali, RWANDA, 2007 academic year.
2. Development of a Banana, Polyester Resin Composite Material. One student, Kigali Institute of Science and Technology, Kigali, RWANDA, 2007 academic year.
3. Design of a Local Positive Displacement Water Pump. One student, Kigali Institute of Science and Technology, Kigali, RWANDA, 2007 academic year.

**COMPLETED SUPERVISED 5<sup>TH</sup> YEAR BSc RESEARCH PROJECTS - 2003 / 2004 ACADEMIC YEAR (AT THE JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY – JKUAT)**

1. Market survey, to determine the character of the plastics and composite engineering components and materials produced in the country both in types of products produced and their respective volume. One student
2. Design and Manufacture of a production line for domestic refrigerators. One student.
3. Extending existing solutions for domestic production of biogas for a single homestead to institutional provisions, the case study of JKUAT. Two students.
4. Experimental study of dual Moduli Materials such as Ceramics and other naturally occurring earth materials (published). One student.
5. Theoretical and experimental validation of a novel method for determining the predominant orientation of reinforcing fibre in a fibre reinforced composite. One student.
6. Design and Manufacture of a production line for fishing boats based on composite materials. Two students.

## **EXAMINED PHD, MSc and BSc THESIS**

### **Doctorate Degree Thesis**

1. Chizyuka Gungubwe Chizyuka, “Modelling the Effect of Environmental Effects on Fracture Damage of Natural Fibre- Reinforced Composites”, Department of Mechanical Engineering, University of Zambia, 2016.
2. Patrick Kiola Nziu, “Optimal location of a cross bore in thick walled pressure vessels”, Department of Mechanical Engineering, Vaal University of Technology in South African 2017.

### **Master’s Degree Thesis**

1. Maritim, Nelson Kipkemboi, “The Flexural Behaviour of Large-Scale Concrete Elements Reinforced with Bamboo”, Department of Civil Engineering, Jomo Kenyatta University of Agriculture and Technology (KUAT), July 2004.
2. Mathews Kaonga, “Simulation and Optimisation of a Full Deep Drawing Process”, Department of Mechanical Engineering, University of Zambia, April 2010
3. Abesach Moshalagae Motlatle, “Anticorrosive properties of nanocomposite Epoxy resin coatings containing conducting PANI and nanostructures”, Department of Applied Chemistry, University of Johannesburg, August of 2017.
4. Neil Britz, “Development of a design cycle for an additively manufactured aircraft rudder bracket”, Faculty of Engineering, North-West University, February 2020.
5. Londiwe Poita Motibane, “A Study on the Effects of Increased Heat Input on Residual Stress, Microstructural Evolution and Mechanical Properties in Ti6AL4V Selective Laser Melting”, University of Cape Town, June 2021.
6. Divine Kudakwashe Maodzeka “Optimisation of critical laser powder bed fusion process parameters based on selected microstructural and mechanical properties of maraging steel 1.2709”, Botswana International University of Science and Technology, January 2023.

### **Bachelor’s Degree Thesis**

1. Cooling of fuel, Gasoline and Kerosene Storage Tanks in Kigali Using Appropriate Methods, Department of Mechanical Engineering, Kigali Institute of Science and Technology (KIST), March 2008.
2. The Study of Water Wastage in Higher Institutions of Learning in Order to Determine the Monetary Losses and to Suggest Measures to Reduce the Related Costs – a Case Study of KIST, Department of Mechanical Engineering, Kigali Institute of Science and Technology (KIST), March 2008.
3. A Study of Wind Energy for Power Generation in Rwanda, Department of Mechanical Engineering, Kigali Institute of Science and Technology (KIST), March 2008.
4. Improvement of the Coefficient of Performance (COP) for Domestic Refrigerators, Department of Mechanical Engineering, Kigali Institute of Science and Technology (KIST), March 2008.

5. A Review of the Theory Behind the Design of a Steam Generation Boiler, Department of Mechanical Engineering, Kigali Institute of Science and Technology (KIST), April / May 2007.
6. Design of Laboratory Apparatus for Measuring Values of Coefficients of Friction, Department of Mechanical Engineering, Kigali Institute of Science and Technology (KIST), April / May 2007.
7. Review of Refrigeration Systems for use in Preserving Perishable Foodstuff in Rwanda, Department of Mechanical Engineering, Kigali Institute of Science and Technology (KIST), April / May 2007.
8. Anaerobic Digestion of Different Types of Organic raw Materials Available in Rwanda, Department of Mechanical Engineering, Kigali Institute of Science and Technology (KIST), April / May 2007.
9. Study of the Performance and Efficiency of the KIST Solar Crop Drier, Department of Mechanical Engineering, Kigali Institute of Science and Technology (KIST), April / May 2007.
10. Design of a Machine for Squeezing Pineapple, Mango and Citrus Juice in the Rural Areas of Rwanda, Department of Mechanical Engineering, Kigali Institute of Science and Technology (KIST), April / May 2007.
11. Design, Manufacture and Testing of a Life Jacket Using Local Materials, Department of Mechanical Engineering, Kigali Institute of Science and Technology (KIST), April / May 2007.

## **MENTORSHIP OF POSTDOCTORAL FELLOWS**

1. Amos Mwangi Muiruri, “Additive manufacturing of lightweight Ti6Al4V(ELI) alloys: a focus on qualification of demanding structural applications”, Department of Mechanical and Mechatronic Engineering at the Central University of Technology in South Africa July 2022 – 2024 (terminated in the month of June 2023 to pick up employment in Kenya).

## **SUPERVISION OF DTECH/DENG STUDENTS**

1. Leonard Odhiambo Onyango, “Influence of Machining on Subsurface Residual Stresses in Rheo-High Pressure Die Cast AA6xxx Al-Mg-Si Alloys and its Impact on Stress Corrosion Cracking”, Departments of Mechanical and Mechatronic Engineering of the Technical University in Kenya and the Department of Mechanical Engineering at the Vaal University of Technology in South African, 2016. Approved protocol – Submitted two chapters of the draft thesis and undertaking experimentation and modelling. Withdrew from the supervision team (Dec’ 2020) due to non-payment of dues over number of years.
2. Mr. Ayodele Abraham Ajayi, “Production and characterisation of short fibre reinforced additive manufacture polymer matrix/glass and carbon fibre reinforced composites”, 2017. Terminated studies due to consistent failure by the student to implement recommended work, 2017.
3. Wilson Wachuli Weibo, “Formulation of Nanocellulosic Fibres and Particle Fillers, and Their Mono and Hybrid Reinforcement Together with Selected fibres of Polymer

Composites”, Department of Mechanical Engineering at the Vaal University of Technology in South African 2018. Approved protocol – submitted 2 chapters of draft thesis, locked out of the country during Covid19 lockdown. Withdrew from the supervision team (Dec’ 2020) due to non-payment of dues over a number of year.

4. Amos Mwangi Muiruri, “Developing Microstructure- and Dislocation-Based Constitutive Numerical Models for Predicting the Mechanical Behaviour of DMLS Ti6Al4V(ELI) at Various Strain Rates”, Department of Mechanical and Mechatronic Engineering at the Central University of Technology in South Africa 2019. Completed and graduated in October of 2021.
5. Samrawit Abubeker, “Rolling Contact Fatigue Failure Analysis of Railway Wheels Under Cyclic Loading”, Institute of Technology, Addis Ababa University, Institute Technology, African Railway Education and Research Institute, Ethiopia. Accepted Protocol. Appointed co-supervisor in March 2021. Undertaking analytical and numerical modelling. Withdrew from supervision due to unavailability and non-performance of the student, December of 2022.
6. Fredrick M. Mulinge, “Numerical Modelling, Simulation, and Experimental Validation of Laser Sintering of Polypropylene Powder (Laser DiaPow PP MF)”, Department of Mechanical and Mechatronic Engineering at the Central University of Technology in South Africa 2019. Accepted Protocol, 2022. Student has submitted draft chapters 1 – 7 of his thesis, 2022 and is presently compiling the final draft thesis for internal vetting.
7. Teboho Chris Moleko, “Development of cost-effective Pt-Rh advanced alloys for optimal powder atomisation and additive manufacturing processing”. Pre-protocol background reading, 2022. The student withdrew for the program due to administrative problems in the department, July 2023.
8. Eliakim Niva Akhusana, “Numerical modelling of hyper and high velocity impact of Ti6Al4V(ELI)”. Terminated studies due to non-performance of the student over a number of months, December of 2022.
9. Polline Mwambe, “Fused Deposition Modelling of Hybrid Polymer Matrices and Reinforcing Fibres”. The student received a full bursary to study at Stellenbosch University and opted to go there, March of 2022.
10. Zamzu Ouko, “Additive Manufacturing of Pt-Rh ++ Alloys”. The student terminated his studies in early 2023 and obtained an admission in a university in Texas, USA

## **SUPERVISION OF MTECH/MENG STUDENTS**

1. Victor Mawela Tendani, “Theoretical models for predicting the effect of size of particulate fillers on the quasi-static properties of particulate composites”, Department of Mechanical Engineering at the Vaal University of Technology in South African 2015. The student absconded from his studies in 2014.
2. Andekuba M. Andezai, “Experimental Investigation of the Dynamic Elastic Properties of Particulate Composites”, Department of Mechanical Engineering at the Vaal University of Technology in South African 2017. Completed and graduated in, 2020.

3. Wilson Wachuli Weibo, “Quasi-Static Mechanical Properties of Treated and Untreated Sisal Fibre Reinforced Epoxy Resin Composites”, Department of Mechanical Engineering at the Vaal University of Technology in South African 2016. Completed and graduated in 2017.
4. Lerata Botsane Malefane, “Determination of the Fatigue Properties of Ti6Al4V (ELI) Parts Built by the EOS M280 DMLS System with Standard Process Parameters, Followed by Post-Processing Heat Treatments”, Department of Mechanical and Mechatronic Engineering at the Central University of Technology in South African 2016. Completed and graduated in 2019.
5. Amos Mwangi Muiruri, “Investigation of the high strain rate behaviour and impact toughness of Ti6Al4V (ELI) parts built by the EOS M280 DMLS system with standard process parameters; as built, heat relieved, and post process heat treated.”, Department of Mechanical and Mechatronic Engineering at the Central University of Technology in South African 2017. Completed, and graduated in 2019.
6. Teboho Moleko, “Investigating the high velocity impact properties of Ti6Al4V (ELI) parts built by the EOS M280 DMLS system with standard process parameters; as built, heat relieved, and post-processing treatments.”, Department of Mechanical and Mechatronic Engineering at the Central University of Technology in South African 2017. Completed 2022 and graduated in 2023.
7. Fredrick M. Mulinge, “Investigating the re-usability characteristics and limits of polypropylene powder in laser sintered additive manufacturing”, Department of Mechanical and Mechatronic Engineering at the Central University of Technology in South Africa 2019. Completed and graduated in 2022.
8. Manuel Matshimbi. “Topology Optimization of a Unitary Automotive Chassis: Chassis Design Through Simple Structural Surfaces and Finite Element Analysis Methods”, Department of Mechanical Engineering at the Vaal University of Technology in South African 2019. Completed and graduated in 2020.
9. Mamphutlane Seleso, “Additive Manufactured Ti6Al4V (ELI) Particulate Composites with Enhanced Mechanical Properties”, Department of Mechanical and Mechatronic Engineering at the Central University of Technology in South Africa 2019. Approved protocol in 2020. Submitted for examination in the month of July 2024.
10. Lydia Motlalepule Mokhali, “Production and Characterisation of DMLS Manufactured Carbon and Glass Fibre Reinforced Polyamide Composites”, Department of Mechanical and Mechatronic Engineering at the Central University of Technology in South Africa 2019. Approved protocol in 2020. Undertaking experimentation. Discontinued for non-performance and exceeding the grant period of her studies, 2022.
11. Mpho Mashabela, “Ti6Al4V (ELI) Nano Particulate Composites for use in the Aerospace Industry, Department of Mechanical and Mechatronic Engineering at the Central University of Technology in South Africa 2019. Approved protocol in 2020. Undertaking final revision of her dissertation. Submitted for Examination in the month of November 2024.
12. Thinus van Rhijn, “Modelling melt pool characteristics to predict process parameters for the selective laser melting of titanium alloys”, Department of Mechanical and Mechatronic Engineering at the Central University of Technology in South Africa 2019. Completed and graduated in 2023.



13. Ignatius Munashe Chibinyani, “Topology Optimization of Hierarchical Honeycomb Structures to Reduce Stress Concentration, Deformation, And Deflection”, Accepted Protocol, June of 2021. Submitted the first draft of his dissertation. Submitted for examination in the month of November 2024.
14. Daniel Tumelo Moloi, “Elevated temperature- and temperature-dependence of the fatigue behaviour of the additively manufactured titanium Ti6Al4V and TC18.”, Approved protocol in 2021. Submitted for examination in December of 2024.

## **DETAILS OF MY ACADEMIC CAREER**

I Joined Murang’a University of Technology as a Full Professor of Mechanical Engineering on the 14<sup>th</sup> of November 2024.

I retired from the Central University of Technology, Free State in South Africa on the 30<sup>th</sup> of June 2024.

I joined the Department of Mechanical and Mechatronic Engineering of the **Central University of Technology, Free State (CUT)**, in South Africa, on the 11<sup>th</sup> of January 2016. I am presently collaborating with 1 visiting research fellow and supervising 1 doctorate and 4 MEng students at the University. I have over the last seven years supervised to completion, 3 master’s degree students at the Vaal University of Technology, 5 master’s degree students and 1 doctorate student at the Central University of Technology. I have over the last seven years offered lectures and examined BEng Tech Honours, final year BTech and BEng Tech students on Materials Science, Stress Analysis, and coordinated the project. I have also offered lectures on Strength of Materials IV, Engineering Strength of Materials III, Stress Analysis and Engineering Structural Analysis, as well final year Diploma students on Strength of Materials III and Theory of Machines III.

I have served in various capacities in the department including, chair of the departmental research and innovation committee since June of 2021, member of the teaching and learning committee, liaison officer on library books, convenor for the annual summer school for students of CUT/Aalen University (Germany) on digital design and manufacture for the years 2018 and 2019, member of committees for accreditation of programs by the Engineering Council of South Africa, session chair of several annual students RAPDASA preconference seminars for design and additive manufacture titanium.

I was appointed a **full Professor of Mechanical Engineering** at the **Technical University of Kenya (TUK)** on the 7th of January 2016 and served in this capacity at the university until March of 2017.

I worked as a Visiting Research Professor at the Vaal University of Technology from the 25<sup>th</sup> of September 2014 till the 4<sup>th</sup> of March 2015. My terms of reference there was to undertake research and publish, assist in postgraduate supervision, develop research themes for the host department, and create international research linkages. My output during this period was 7 papers submitted for publication to various international refereed journals and conferences. All which were published by end of the year 2018. I further read 2 DTech proposals and 2 MTech thesis and gave feedback to the respective supervisors. I also developed 11 MTech proposals for uptake by students in the Department of Mechanical Engineering.

I was appointed an **Associate Professor of Mechanical Engineering**, and an **Associate Dean & Head of The School of Engineering Science And Technology (SEST)**, at the **Kenya Polytechnic University College on the 1<sup>st</sup> of September 2011 Till the Month Of August**

**2012.** The School was comprised of the six departments of Aeronautical and Aviation Engineering, Civil and Environmental Engineering, Chemical and Process Engineering, Electrical and Electronic Engineering, Geospatial Science and Engineering, and Mechanical and Mechatronic Engineering. The School was then the largest in the College with just under 3,000 students (approximately 1/3 of the entire student population of the University College), almost 200 full time teaching members of staff and typically handled about 700 examination papers per semester (just over 50% of all papers done in the University College). In addition to the routine administration duties that come with the office of a Head of School, I guided several degree programs through the process of curriculum development, stakeholders meetings and defence at various levels in the College and up to the Senate of the University of Nairobi, in addition to initiating a process for registering MSc and Postgraduate students within the School, an initiative that was immediately adopted by the parent faculty, the Faculty of Engineering and the Built Environment (FEBE).

While at this station, I introduced a matrix to assist in manpower, space, and equipment planning in order to clearly identify the needs in all these categories against the student teaching load. The matrix is expected to be of a lot of value in planning for future expansion of programs and increase in the intake of students. The matrix developed is generic and is presently being adapted by respective departments in order to make it applicable to each one of them.

During the same period, I initiated, negotiated and part wrote a Memorandum of Cooperation with the Kenya Association of Manufacturers (KAM) in order to bring industry closer to the college, in respect of curricula validation, student and staff attachment, availing of industrial trainers to the college, investment by industry in the college, joint research, product development and production and much more. The MoC, was broad but was accompanied with an addendum that identified specifics and deliverables in order to facilitate monitoring. It also covered e-curricula development, joint research, joint supervision of postgraduate students, student and staff exchange, industrial attachment, and much more.

I, initiated, negotiated and part wrote an MoU with the United Kingdom Telecommunications Academy (UKTA), making The Technical University of Kenya the focal point for their MSc programs in the country.

I also negotiated and wrote an MOU together with a counterpart from the Vaal University of Technology, between the Technical University of Technology and the Vaal University of Technology for cater for staff and student exchange as well as joint research.

Moreover, I further co-wrote with a counterpart from the Kenya Association of Manufacturers, an MoU linking all departments of engineering in the university with relevant industries in the country for purpose of ensuring relevance of syllabus taught in the university to the needs of needs of industry, support of the laboratories in the university by industry, as well as access to the university research capacity by industry.

Since joining the institution, I served as the **Acting Executive Dean of The Faculty of Engineering and the Built Environment (FEBE)**, over the periods:

- 17<sup>th</sup> – 19<sup>th</sup> November 2011,
- 5<sup>th</sup> December 2011 – 3<sup>rd</sup> February 2012,
- 15<sup>th</sup> – 22<sup>nd</sup> April 2012,
- 16<sup>th</sup> – 19<sup>th</sup> July 2012,
- 1<sup>st</sup> August 2012 – May 2014 (21 months continuously).

The Faculty was comprised of; the School of Engineering Science and Technology (SEST), the School of Communication and Information Technology (SICT), and the School of Architecture and the Built Environment (SABE); and is one of three faculties constituting the university. The faculty carried over 50% of the student population in the university and handled more than 50% of all examinations offered in the institution at any one time.

I served in the following committees and boards in the university:

- The College Tender Committee from the 25<sup>th</sup> of October 2011 – 31<sup>st</sup> of August 2012, 7<sup>th</sup> July 2012 to date – March of 2014
- The College Student's Bursaries Awards Committee from 1<sup>st</sup> March 2012.
- College Staff Disciplinary Review Committee.
- Management Board, Executive Management Board, Faculty Boards and Senate.

I offered lectures and examined students, in addition to discharging the foregoing academic administrative duties, on the subjects of Engineering Mechanics and Solid and Structural Engineering, to BTech and BEng students in the Departments of Mechanical and Mechatronics Engineering and Geospatial Science.

Between the 25<sup>th</sup> of May 2009 and 12<sup>th</sup> January of 2011, I served as the **Acting Vice-Principal**, at the **Integrated Regional Polytechnic Centre (IPRC), Kigali City**. Having developed and established standards and procedures for the docket of finance and administration previously, I was thereafter, charged to **oversee the docket of academics**.

February – December 2009, **Founder and Project Advisor** for Bachelor of Business and Information Technology (BBIT) program, at the **Rwanda Tourism University College (RTUC)**. Amongst the work undertaken in this respect was preparation of accreditation documents for the British National Computing Centre (NCC) Diploma and Advanced Diploma graduates of KIST and other local tertiary institutions into the RTUC BBIT course, developing a Program outline for the fourth and final year of this program, and assisting in marketing the course, recruitment of teaching staff, development of requirements of equipment, reading resources and space, setting up, implementing procedures and routines for running the department, including procedures for examination, all for the 4<sup>th</sup> and final year students, and also stabilizing the 1<sup>st</sup> year program. The program started with an initial batch of 70 students, 64 of whom stayed on until the end of the program. 38 of these students finally met the requirements for graduation and graduated on the 20<sup>th</sup> of August at the Thika Campus of the **Mount Kenya University of Kenya**. Presently the program is full, with a total compliment of 200 students in all four years. This work was done on the basis of philanthropy without pay, with the only return being two scholarships which were passed on to students studying at the college.

I served as the **First and Founding Acting Deputy Director General** of the **Rwanda Workforce Development Authority (WDA)** between 1<sup>st</sup> of February 2009 and 25<sup>th</sup> May 2009. Given mandate on appointment to assist the Director General get the body off the ground, with particular focus on 6 pilot institutions, and implementation of an Integrated TVET Concept paper for the country prepared by nine other colleagues and I. The broad terms of reference included putting in place a industry driven competency-based curriculum development and execution program, establish up to five Integrated regional Polytechnic Centres, and bring up to standard 28 vocational training centres. This entailed assessing present and required physical infrastructure, equipment, and human resources needs, and further prescribing solutions.

I also served as the **First and Founding Acting Vice-Principal** of Kicukiro College of Technology (KCT), which is now referred to as, the Integrated Polytechnic Regional Centre (IPRC) – Kigali City, from the 23<sup>rd</sup> of February 2008 till 1<sup>st</sup> of February 2009. While in this office I was charged with responsibility over academics, finance, and administration. During this period, I developed a college organogram complete with terms of reference and job specifications for all positions in the organogram which I also developed, including those of the Director of Administration and Finance, Director of Student Affairs, Director of Academics Services, Accountant. This was done in order to guide future recruitment and operations of the college. I simultaneously guided the development of syllabi and setting of examination standards in addition to carrying out other administrative duties, such as the setting up and putting in place procedures and standards for the college housing committee, as well as the procurement committee.

**Associate Professor of Mechanical Engineering**, in the Department of Mechanical Engineering at Kigali Institute of Science and Technology, Kigali, Rwanda from January of 2007 to the 23<sup>rd</sup> of February 2008.

- Offering lectures and examining degree students in Engineering Drawing, Material Science, Solid and Structural Mechanics and Engineering Mechanics.
- Co-ordinator of Engineering Mechanics, an Engineering Faculty wide course.
  
- Final year project supervision
  - Production of a Local Positive Displacement Water Pump
  - Recycling and / or Alternative Uses of Paper Plastic
  - Design of a Biogas Storage and Charging System
  
- Senate Member at KIST
  
- Member of the Senate Committee on revision of students Regulations
  
- 19<sup>th</sup> February 2007 – Preparation of a preliminary proposal for the setting up of a consultancy unit within the Faculty of Technology at the Kigali Institute of Science and Technology.
  
- Departmental Board appointment to increase visibility of the Department by posting final year project details on the University website.
  
- Developed and published the first university magazine and trained staff on how to get this done, including sourcing for material, as well as editing and type setting it.

**Senior Lecturer** in the Department of Mechanical Engineering of Jomo Kenyatta University of Agriculture and Technology between 22/06/2003 and 31/12/2006.

- Set and marked examination papers, lectured, as well as offered tutorials and laboratories for 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 5<sup>th</sup> year degree students of Mechatronic, Mechanical and Biomechanical Engineering, in the fields of Material Science, Solid and Structural Mechanics and Experimental Stress Analysis. Supervised 8, 5<sup>th</sup> and final year students in 6 different projects during the 2003/2004 academic year.

- Departmental Examination Officer and class advisor for the 1<sup>st</sup> year Mechatronic Engineering class during the 2003/2004 academic year.
- Class advisor for the 2<sup>nd</sup> year Mechatronic Engineering class during the 2004/2005 academic year.
- Convener of the Research, Seminars and Journal committee, within which I have organised one Departmental workshop and put into place a schedule for monthly presentations of research findings by the members of the Department. I also hold the responsibility of a class advisor for the 2<sup>nd</sup> year Mechatronic Engineering class, in addition to being a member of the Departmental Postgraduate committee.

**Doctorate Student** over the period 1<sup>st</sup> September 1996 to 30<sup>th</sup> October 1998, 1<sup>st</sup> April 2000 to 02<sup>nd</sup> December 2002, at the University of Manchester, U.K.

- Submitted a 13-chapter PhD. thesis, with a 46-page addendum, for examination on the 4<sup>th</sup> of September 2002. Defended the thesis on 15<sup>th</sup> of October 2002, submitted the corrected version of the thesis on 22<sup>nd</sup> of October 2002 and obtained the certificate of award on the 2<sup>nd</sup> of December 2002.
- Student demonstration between 1996 – 1998 in Mechanical Engineering Solids years 1, 2, and 3 and Aeronautical Engineering Solids year 1, involving strain gauging, photoelasticity and finite element modelling.
- Assisted two students with their third and final year degree projects in 2001, involving the use of PZTs and shaker/accelerometer actuator/sensors as well as ultrasonic through thickness transducers to characterize the elastic properties of various elastomers, basalt wood, and different types of limestone.
- I served as a lecturer for the open learning program of Manchester College of Arts and Technology (MANCAT), where I offered lectures on telecommunications and mathematics to industrial personnel in a process where I travelled together with a team of about 4 lecturers from industry to industry in the country staging two-day lectures to staff, to assist them upgrade themselves and increase their knowledge. I also wrote a teaching textbook for the program on complex stress system.

**Assistant Lecturer** within the Department of Mechanical Engineering at the Jomo Kenyatta University of Agriculture and Technology, KENYA, between 30<sup>th</sup> August 1992 and 31<sup>st</sup> May 1995. I later went on to serve as a **Lecturer** in the same Department, between the months of 31<sup>st</sup> May 1995 and 31<sup>st</sup> August 1996.

- Moderated examination papers, set and marked examination papers, lectured, as well as offered tutorials and laboratories for 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 5<sup>th</sup> year degree students of Mechatronic, Mechanical and Biomechanical Engineering, in the fields of Material Science, Solid and Structural Mechanics, Experimental Stress Analysis, Material Science, Material Testing, Vibration Engineering and Mechanics of Machines. In the academic year 2003/2004, I supervised 8, 5<sup>th</sup> and final year students in 6 different projects.
- Responsible for the running of the departmental library and the short-listing of journals and books for staff members, as well as equipment for students in the field of Mechanical Engineering, for purchase by the department.
- Administrative responsibility for the departmental computing facilities.



- Prepared a report together with a colleague on the rationalisation of Diploma and Degree courses in the Department of Mechanical Engineering, during the transition from Diploma to Degree courses.
- Initiated a project in 1996, whose purpose was to identify the technical requirements of the composite engineering sector in the country, with the long-term aim of setting up a data bank, within the University, that would offer technical solutions to the composite engineering Industry. Implementation of this project was overtaken by admission for a PhD degree.
- Completed several “do-it-yourself” Biogas designs for use in the rural areas in 1995, by rationalizing the material present in literature such that a layperson could easily identify their requirements in terms of materials for construction and consumables and then easily convert this into cow-dung/water slurry and cows.

**Master’s Degree Student** over the period 1<sup>st</sup> October 1990 – 30<sup>th</sup> September 1992 at the University of Nairobi, Kenya.

- Undertook a one-year taught course followed by a one-year full time research course. Published three papers in peer-reviewed journals, based on the MSc research work and submitted a thesis.
  - During the first year the following subjects were covered; 90-hour Full courses in Continuum Mechanics, Engineering Plasticity and Engineering Mathematics, as well as 45-hour half courses in Vibration Engineering, Engineering Metallurgy, Materials Selection and Experimental Stress Analysis.
  - The title of my master’s degree thesis is, “Investigating the Mechanical Properties of Sisal and Loofah Natural Fibres and Their Reinforce Composites with Epoxy Resin”.

**Post Graduate Diploma Student** over the period July 1986 – June 1987 in **Hydro Power Development** at the Trondheim Institute of Technology, Norway.

- Undertook a one-year taught course with two major design projects, one on the setting up of and operating a construction site and the other on carry out of a pre-feasibility study of a Hydro Power scheme. The program was split into units under the topics, Hydropower theory, hydropower construction and hydropower design and included the subjects:
  - Techno-Economic Analysis, Project Management, Construction Site Management, Soil Mechanics, Sediment Transport, Hydrology, Hydraulics, Tunnel Boring, and Rock Mechanics, Mechanical and Electrical Equipment, Transmission Lines.
  - In addition to submitting a report on scheduling at a dam construction site, a prefeasibility report was submitted identifying possible locations and sizes of reservoirs, dams, water conduits, power stations and the specification of electrical as well as mechanical machines for a catchment area of 3000 km<sup>2</sup> based on provided topographical and hydrological data on the catchment.

**Undergraduate Degree Student** over the period September 1979 – March 2003 at the University of Nairobi, Kenya.

- Undertook a three year taught course, terminating in honours courses and a project during the third and final year. Took an honours course in Experimental Stress Analysis

and completed a project on the development of a non-contact method for determining the whole field pattern of principal stresses in a stressed field.

- The subjects covered during the first year of this program included, Solid and Structural Mechanics, Materials and Production Engineering, Mechanics of Machines, Mechanics of Fluids, Thermodynamics, Engineering Drawing, Mathematics, and Electrical Engineering.
- The subjects covered during the second year of the program included, included Solid and Structural Mechanics, Materials Science, Mechanics of Machines, Fluids Mechanics, Thermodynamics, Engineering Drawing, Mathematics, and Electrical Engineering, Computer Programming, Management for Engineers, and Engineering Design.
- The subjects covered during the third year of the program included, Solid Mechanics, Mechanics of Machines and Automatic Control, Thermodynamics, Fluid Mechanics, Factory Management, Theory of Production Processes, Experimental Stress Analysis, and Engineering Project

### **PROFESSIONAL CAREER – DATES AND QUALIFICATIONS**

1. Chartered Engineer of the Engineering Council of England (ECE), and Member of the Institute of Mechanical Engineers (UK), the 4<sup>th</sup> of April 2004 to 2014.
2. Station Superintendent (2nd Assistant Engineer) at Kíndaruma Hydro Power Station (2 X 20 MW), over the period January 1988 - September 1990.
3. Station Superintendent (3rd Assistant Engineer) at Kíndaruma Power Station (2 X 20 MW) over the period July 1987 - January 1988.
4. 3rd Assistant Engineer at Gítarũ Hydro Power Station (2 X 72 Mw) over the period June 1985 - July 1986.
5. 4th Assistant Engineer at Gítarũ Hydro Power Station (2 X 72 Mw) over the period July 1984 - June 1985.

### **DETAILS OF PROFESSIONAL ENGAGEMENTS**

1. June 2012 – February 2013, feasibility study for the disposal of solid waste and effluence in Kírínýaga County and conversion of the former into electricity, process steam and pavement blocks
2. December of 2011 – February 2012, prepared document entitled, “Proposals for the Establishment and development of a Robust and Relevant Education Sector in The County of Kírínýaga”, in anticipation of the establishment of a County Government in Kírínýaga County.
3. March – June 2011, prepared a 50-page document entitled, “Kírínýaga County, where do we go and how do we get there?”, as a baseline report to guide preparation of practical development plans in anticipation of the establishment of a County Government in Kírínýaga County.
4. April 2011, invited to and presented the three items immediately below to the Board of Governors of the Kírínýaga Institute of Technology. Agreement reached on the value of the

proposals and resolution reached for the institute to examine the proposals presented further for possible implementation.

5. 30<sup>th</sup> of March 2011, prepared a document entitled, “The Kirinyaga Cultural Centre”, for the establishment of a cultural centre in the County of Kírínýaga. Attempts to present the same to the Kerugoya-Kutus urban Council proved elusive.
6. 28<sup>th</sup> of March 2011, submitted proposals to the Kírínýaga Institute of Technology seeking consultancy to assist the institute establishment a Competence-Based, Demand-Led curriculum development unit based on the DACUM-SCID approach.
7. 28<sup>th</sup> of March 2011, submitted proposals to the Kírínýaga Institute of Technology seeking consultancy to assist the institute development Standard Training Equipment Lists (STELs) for all subjects of engineering, arising from DACUM-SCID, Competence-Based and Demand-Led curricula.
8. 28<sup>th</sup> of March 2011, submitted proposals to the Kírínýaga Institute of Technology seeking consultancy to assist the institute establishment of a State of Art Automation Laboratory, to serve the country and Sub-Saharan Africa.
9. 25<sup>th</sup> of March 2011, submitted proposals to the Kenya University Polytechnic University College seeking consultancy to assist the college in the establishment of a Competence-Based, Demand-Led curriculum development unit based on the DACUM-SCID approach, to serve the needs of the college and for extension to Technical Training Institutes and Institutes of Technology in the country.
10. 25<sup>th</sup> of March 2011, submitted proposals to the Kenya University Polytechnic University College seeking consultancy to assist the college in the development of Standard Training Equipment Lists (STELs) for all subjects of engineering, arising from DACUM-SCID, Competence-Based and Demand-Led curricula.
11. 25<sup>th</sup> of March 2011, submitted proposals to the Kenya University Polytechnic University College seeking consultancy to assist the college in the establishment of a State of Art Automation Laboratory, to serve the country and Sub-Saharan Africa.
12. 17<sup>th</sup> of February 2011, prepared a document for stakeholders in Kírínýaga County entitle, “The University - A University for the Kírínýaga County”, to provide guidance on the establishment of a University for the County. The document was circulated to perceived key players in the County, for their perusal and possible implementation.
13. 27<sup>th</sup> of January 2011, proposal to the Ministry of Higher Education Science and Technology (MoHEST) arising from the below mentioned seminar entitled, “Proposals for Intervention in Kenyan TIVET”, that addressed issues of Competence-Based and Demand-Led curriculum development, setting up of a coordinating authority for TIVET in the country, preparation of Standard Training Equipment Lists (STELs) for all TIVET institutions in the country, and creation of linkages with recently industrialised nations for Industry Based Training (IBL), amongst other issues.
14. 6<sup>th</sup> of January 2011, a half day presentation together with one other TVET consultant to 34 MoHEST, TIVET policy developers on ways of improving TIVET in Kenya, in respect of; governing structures, Standard Training Equipment Lists (STELs), DACUM and SCID based curriculum development, and Labour Market Information Systems (LMIS).

15. April of 2010, proposal to the Ministry of Higher Education Science and Technology (MoHEST) entitled, “The Establishment of a Kenyan TIVET State-of-Art Automation Training Centre of Excellence”.
16. April 2010, proposal to the Ministry of Higher Education Science and Technology (MoHEST) entitled, “Proposal to The Ministry of Higher Education Science and Technology of The Government of Kenya, on Interventions for the Technical Industrial and Vocational Enterprise Training (TIVET) Sector of The Country”. The proposal addressed issues of Competence-Based and Demand-Led curriculum development, setting up of a coordinating authority for TIVET in the country, preparation of Standard Training Equipment Lists (STELs) for all TIVET institutions in the country, and creation of linkages with recently industrialised nations for Industry Based Training (IBL), amongst other issues.
17. Assessment and valuation of a De Smet Rosedown Ltd Mini 200 oil screw press and its auxiliaries for a client.
18. Resource person in the development of an implementation plan for the 9-year basic education plan for Rwanda.
19. From November of 2008 – Member of the Rwanda Bureau Standard committee on Mechanical Engineering and Materials.
20. April 2008 - November 2008 – preparation and submission of a Technical Education Strategic Plan for Rwanda, together with 4 other colleagues.
21. 19<sup>th</sup> – 20<sup>th</sup> of September 2008 – preparation and submission to the Rwandan Ministry of Education (MINEDUC), together with 6 other colleagues, of a quick start strategy for the implementation of the integrated TVET system, focusing on the six cost centres of, initial establishment of the Workforce Development Authority (WDA), Kicukiro integrated Polytechnic Regional Campus (IPRC), Gacuriro ETO, Vocational Training Centres at Remera, Kavumu and Nyanza, based on the available resources.
22. July 2008 – Further development of an Integrated Technical and Vocational Education Training System for Rwanda, together with 7 other colleagues, leading to the preparation and submission of a final concept paper to the Rwandan Ministry of Education (MINEDUC) entitled, “Development and Implementation of an Integrated Technical and Vocational Education Training (TVET) System”, Presbyterian Guest House, Kibuye and RWoDA Offices, Kigali, RWANDA.
23. July 2008 – Further development of an Integrated Technical and Vocational Education Training System for Rwanda, together with 8 other colleagues, leading to the preparation and submission of a concept paper to the Rwandan Ministry of Education (MINEDUC) entitled, “Development and Implementation of an Integrated Technical and Vocational Education Training (TVET) System”, Presbyterian Guest House, Kibuye, RWANDA.
24. 16<sup>th</sup> – 17<sup>th</sup> of June 2008 – Further development of an Integrated Technical and Vocational Education Training System for Rwanda, together with 4 other colleagues, leading to the preparation and submission of a concept paper to the Rwandan Ministry of Education (MINEDUC) entitled, “An Integrated Technical and Vocational Education Training (TVET) System - Rwanda Polytechnic (RPT) Pilot Project”, HIDA Boardroom, Kigali, RWANDA.

25. 11<sup>th</sup> – 15<sup>th</sup> of June 2008 – Further development of an Integrated Technical and Vocational Education Training System for Rwanda, together with 9 other colleagues, leading to the preparation and submission of a concept paper to the Rwandan Ministry of Education (MINEDUC) entitled, “An Integrated Technical and Vocational Education Training (TVET) System - Rwanda Polytechnic of Technology (RPT) Pilot Project”, Nyandungu Hotel, Kigali, RWANDA.
26. 4<sup>th</sup> - 8<sup>th</sup> of June 2008 - Development of an Integrated Technical and Vocational Education Training System for Rwanda, together with 8 other colleagues, leading to the preparation and submission of a concept paper to the Rwandan Ministry of Education (MINEDUC) entitled, “An Integrated Technical and Vocational Education Training (TVET) System – Kicukiro Polytechnic Of Technology (KPT) Pilot Project”, Obumwe Hotel, Gisenyi, RWANDA.
27. 11<sup>th</sup> of November 2007 – preparation and submission to the Rwandan Ministry of Education (MINEDUC), together with two colleagues, of a project report entitled, “Implementation Strategy for Setting up 1<sup>st</sup> Year Courses at the Proposed Kicukiro College of Technology (KCOT), in the Year 2008” , Kigali, RWANDA.
28. 28<sup>th</sup> of October 2007 - preparation and submission to the Rwandan Ministry of Education (MINEDUC), together with two colleagues, of a revised project report on a 5-year strategy entitled, “A Short Term Project for the Improvement of Technical Education in Technical Secondary Schools (ETOs) and Colleges of Technology (COTs), in Rwanda”, Kigali, RWANDA.
29. 23<sup>rd</sup> of October 2007 - submission to the Rwandan Ministry of Education (MINEDUC), together with two colleagues, of a project report entitled, “Converting Former ETO Kicukiro into a College of Technology (COT)” , Kigali, RWANDA.
30. 17<sup>th</sup> of September 2007 - preparation and submission to the Rwandan Ministry of Education (MINEDUC), together with two colleagues, of a project report on a 3-year strategy that is part of a 5-year strategy entitled, “A Short Term Project for the improvement of Technical Education in Technical Secondary Schools (ETOs) and Colleges of Technology (COTs), in Rwanda” , Kigali, RWANDA.
31. 17<sup>th</sup> of September 2007 - preparation and submission to the Rwandan Ministry of Education (MINEDUC), together with two colleagues, of a project report on a 3-year short term strategy entitled, “Proposed Kicukiro College of Technology (COT)”, Kigali, RWANDA.
32. 7<sup>th</sup> of September 2007 – preparation and submission to the Rwandan Ministry of Education (MINEDUC), together with two colleagues, of a 5-year Project Report entitled, “A Short Term Project for the Improvement of Technical Education in Technical Secondary Schools (ETOs) and Colleges of Technology (COTs), in Rwanda”, Kigali, RWANDA.
33. 3<sup>rd</sup> of September 2007 – preparation and submission to the Rwandan Ministry of Education (MINEDUC), together with to colleague, of a project report on a 3-year strategy that is part of a 5-year strategy entitled, “A Short Term Project for the Improvement of Technical Education in Technical Secondary Schools (ETOs) and Colleges of Technology, in Rwanda”, Kigali, RWANDA.
34. 20<sup>th</sup> of August 2007 – preparation and submission to the Rwandan Ministry of Education (MINEDUC), together with to colleague, of a project report on a 4-year strategy entitled, “A Short-Term Strategy for the Improvement of Public Technical Schools (ETOs) in Rwanda”, Kigali, RWANDA.



35. 7<sup>th</sup> of August 2007 – preparation and submission to the Rwandan Ministry of Education (MINEDUC), together with two colleagues, of a project report entitled, “Exploratory Planning and Budgetary Estimates for Technical Secondary Education in Rwanda, 2008 – 2010”, Kigali, RWANDA.
36. 30<sup>th</sup> July 2007 - preparation and Submission to the Rwandan Ministry of Education (MINEDUC), together with two colleagues, of a technical report on a 3-year strategy entitled, “A Short-Term Strategy for Improvement of Technical and Vocational Education and Training (TVET) in Rwanda”, Kigali, RWANDA.
37. 30<sup>th</sup> of July 2007 – preparation and submission, together with two colleagues, of a revised proposal for the provision of consultancy services to the Rwandan Ministry of Education (MINEDUC) to develop a 3-year short-term strategy for improvement of technical and vocational education and training (TVET) in Rwanda, Kigali, RWANDA.
38. 13<sup>th</sup> of July 2007 – preparation and submission, together with two colleagues, of a proposal for the provision of consultancy services to the Rwandan Ministry of Education (MINEDUC) to develop a 3-year short-term strategy for improvement of technical and vocational education and training (TVET) in Rwanda, Kigali, RWANDA.
39. 1<sup>st</sup> of March 2007 – Chairman MINADEF / KIST Consultative Workshop for the preparation of syllabi for the proposed MINADEF Technical school in Butare.
40. Preparation and submission of a preliminary report, and as a part author, the final report on the consultative workshop, Kigali, RWANDA.
41. 2007 – Preparation and submission of a quotation, together with a colleague, for privatisation disposal of IMPRISCO – the Rwandan Government Printing Press in Kigali – for the Rwandan Ministry of Finance. A university project, the project proposal accepted but implementation unilaterally transferred by the university to two other members of academic staff for reasons unknown.
42. 2006 - Assessment of serviceability of all mechanical plant and equipment in Africana Sea Lodge, Jadini Beach Hotel and Safari Beach Hotel, all parts of the Alliance Group of Hotels in Kenya, and drawing up proposal of service, maintenance, as well as replacement schedule and equipment list. The total budget proposal of Kshs 75,625,000/00 (US\$ 1,112,132.35) was submitted to and accepted by the client for use in sourcing for funds prior to commissioning. The project was however, overtaken by a foreign takeover of the company.
43. 1996 - Preparation and submission to client of a feasibility for the establishment of a private primary school
44. 1985 - Prepared schedules to be met for the design of the mechanical plant and its operations together with controls for the Turkwell Gorge Hydroelectric power project, to be submitted to the appointed consulting engineering company, for the client the Kerio Valley Development Authority (KVDA) of the Kenya Government, as an employee of the Kenya Power and Lighting Company Ltd.
45. 1985 – Assessment and vetting of all proposed mechanical plant and controls for Kíambere Power Station after design by the appointed consultant, on behalf of the client, the Tana and Athi River Development Authority (TARDA) of the Kenya Government, as an employee of the Kenya Power and Lighting Company Ltd.

**Station Superintendent (2<sup>nd</sup> Assistant Engineer)** at Kíndaruma Hydro Power Station (2 X 20 MW), over the period January 1988 - September 1990.

**Station Superintendent (3<sup>rd</sup> Assistant Engineer)** at Kíndaruma Power Station (2 X 20 MW) over the period July 1987 - January 1988

The **routine duties** that were carried out while at this station are listed below.

- Oversaw the running of the spares-stores.
- Worked out the layout of parts.
- Drew up and implemented purchase schedules for tools and spares.
- Drew up training programs for the technical personnel.
- Responded to breakdowns.
- Supervised annual inspections of the plant.
- Undertook general administration duties.
- Responded to any emergencies that arose at Kíndaruma Power Station and at any other station within the Seven Forks Hydro Complex, carrying 68% of the installed capacity in the country then.

Several **special projects** were undertaken while at this station as shown in the following list:

- Carried out an analysis of the Turbine Oil Head and Governor oil Schemes with an aim of stemming existing chronic Hydraulic oil leakages.

Carried out an analysis of the Governor Auto-Manual Changeover Scheme, which was non-functional.

- Reviewed the operation and design of the Friction Clutch Ring Feder system with an aim of correcting the frequent clutch slippage during both normal and high-pressure transient operating conditions.
- Carried out a comparative analysis of the alternatives of purchasing either the completely assembled generator air coolers or the complete complement of air cooler tubes.
- Carried out Machine Index Testing for one of the running units.
- Drew up standards and procedures for the equipment in the entire station.
- Carried out a 10-year inspection for the entire station.
- Compiled a training syllabus for Operators, Artisans and Technicians.

Compiled and delivered lectures to engineering staff on hydropower Development.

**3<sup>RD</sup> ASSISTANT ENGINEER** at Gítarú Hydro Power Station (2 X 72 Mw) over the period June 1985 - July 1986. The **routine duties** here were as at Kíndaruma Power Station but this time reporting to the Station Superintendent. The **special projects** undertaken in the station are listed below.

- Developed and implemented maintenance and service schedules for the station auxiliary equipment.

Presented an analysis of the consistent shear of the turbine wearing ring retaining screws.

- Analysed and corrected the persistent shattering of the exhaust spring plate valves of both the Stabilising Air Compressor and the Air Injection Compressors.
- Analysed and corrected the persistent over heating of the Combined Thrust and Guide Bearing.
- Commissioned the Governor Auto-Manual Changeover Scheme.
- Involved in the breakdown repair of the stator following a flashover.
- Carried out water and load dispatching for the Seven Forks Hydro Complex.

**4<sup>TH</sup> ASSISTANT ENGINEER** at Gítarú Hydro Power Station (2 X 72 Mw) over the period July 1984 - June 1985, with same routine duties as above.

**4<sup>TH</sup> ASSISTANT ENGINEER** at Tana mini Hydro Power Station (2 X 4 Mw, 3 X 1 Mw, 2 X 0.5 Mw) Wanjí mini Hydro Power Station (2 X 0.5 Mw, 2 X 1 Mw) and at Ndula and Mesco micro hydro power stations over the period April 1984 - July 1984.

- The **routine duties** here included assisting the Station Superintendent with the planning of plant outages, materials scheduling, responding to breakdowns and general station-administration. Involved in the Overhaul of one 10 MW vertical Francis, turbine generator unit.

**Graduate Trainee Apprentice** with the Kenya Power and Lighting Company Ltd. and as a Trainee Apprentice during University holidays between 1983 and 1984 inclusive. The work was done over this period of training is listed below.

- Carried out hands-on service and maintenance of oil fired thermal power plants, geothermal power plants, diesel power plants and hydro power plants, as well as their respective ancillary plants.
- Spent periods of three weeks each at the National central control, metering section, distribution central stores and electrical plant central maintenance workshop and store.
- Learnt load dispatching both for normal and emergency conditions at the national system control centre.
- Undertook basic electrical metering repair, stores management, repair and maintenance as well as testing of transformers, A.V.R.'s, A.Y.T.'s and C.B.'s.

## **WRITTEN MATERIAL WHILE WORKING IN INDUSTRY**

1. Maringa M., “Gítarú Power Station – Performance study”, (1986), Station report, Technical Report.
2. Maringa M., “Gítarú Power Station – Machine 2 remedial works”, (1986), Station report, Technical Report.

3. Maringa M., “Hydro Power Development”, (1987), Public lecture at Seven Forks Hydro Complex, Technical Report.
4. Maringa M., “Hydraulic design – Turbine Selection and Conduit design”, (1987), Public lecture at Seven Forks Hydro Complex, Technical Report.
5. Maringa M., “Kíndaruma Power Station – Governor Unloading Valve Safety Valve”, (1987), Station report, Technical Report.
6. Maringa M., “Hydro Machines, Their Main Components and Auxiliaries”, (1988), Training lectures for Control Assistants at the Seven Forks Hydro Complex, Technical Report.
7. Maringa M., “Kíndaruma Power Station – Analysis of Machine 2 Governor Manual Control”, (1988), Station report, Technical Report.
8. Maringa M., “Kíndaruma Power Station – Analysis of Machine 1 Governor Auto Control”, (1988), Station report, Technical Report.
9. Maringa M., “Kíndaruma Power Station – A comparative analysis of the option of Purchasing completely assembled Generator Air Coolers and the option of purchasing a complete set of unassembled Generator Air Cooler tubes”, (1988), Station report, Technical Report.
10. Maringa M., “Kíndaruma Power Station – Machine 1 Breakdown maintenance”, (1989), Station report, Technical Report.
11. Maringa M. and Njírainí G., “Kíndaruma Power Station – A review of the design Load for the Guide Vane Friction Clutch Ring Feder tensioning Screws”, (1989), Station report, Technical Report.
12. Maringa M. and Kínûthia, “Kíndaruma Power Station – Machine 2 Index Testing”, (1990), Station report, Technical Report.
13. Maringa M., “Reservoirs/Dams and Water Regulation”, (1989), Teaching manuals for Engineers and Technicians at the Seven Forks Hydro Complex 1990, Technical Report.
14. Maringa M., “Pressure Conduits, Spillways and Intakes”, (1990), Teaching manuals for Engineers and Technicians at the Seven Forks Hydro Complex 1990, Technical Report.

## **CONSULTANCY SERVICES**

I am the proprietor of Future Technologies International Ltd, and one of three proprietors of Isis Development Ltd, both limited liability companies with interests in, publishing, TVET, novel building technologies, and other engineering solutions. In engineering we offer consultancy services in the following areas:

**Composite Engineering Materials** - Starting from specified service needs, we review design requirements in lieu of the various possible types of composite constituent components and their various ways of combination, all with reference to the acceptable stress and strain levels.

This way we are able to advice manufacturers on the right combination and form of inputs, in order to optimise material usage.

We also undertake mechanical testing of sampled product parts in order to verify their ability to meet design specifications. This way the manufacturer is able to give performance guarantees to customers. In the event of failure of a component, we do undertake failure analysis in order to determine the causes and to offer solutions.

Our services in this area are backed by over 15 years of experience in academia and research in the field of composite engineering materials.

**Hydro Power Design, Operations and Maintenance** - We offer design services on the mechanical and civil engineering aspects of hydropower design, as a company, and together with other consultants cover the entire spectrum of disciplines involved in hydropower design. This involves pre-feasibility and feasibility studies of possible hydropower schemes, including geological and hydrological surveys, embankment design, hydraulic design, sediment transport and siltation analysis, design of water retaining structures (both earth and concrete dams), intake and water regulation structures, design of water conduits, design and specification of mechanical equipment, as well as specification of electrical plant.

Our expertise also includes operation and maintenance of hydropower generating stations, for all mechanical, civil and electrical structures, as well as equipment. In addition to this we also offer consultancy services on the assessment of hydropower generating main plants and their auxiliaries in order to evaluate existing inspection, service, maintenance and overhaul schedules, or to develop them in accordance with the needs of our clients.

Our services in this area are backed by over 10 years of experience in the electric power industry.

**Material Characterisation and Testing** - We undertake material characterisation in order to ensure that materials are optimally utilised, and also in the event of failure, to identify possible causes and remedies. This involves review of material properties in lieu of their intended use, as well as actual testing. Testing may be non-destructive, as in vibration and ultrasonic testing, or destructive, as in uniaxial quasi static tensile, bend, impact, fatigue and hardness tests.

Our services in this area are backed by over 30 years of experience in industry, as well as academia and research.

**Stress Analysis and Failure Analysis** – we undertake stress analysis of components based on a dimensional (1-D), two-dimensional (2-D) or three-dimensional (3-D) analysis, depending on the design requirements. In carrying out stress analysis we refer to existing exact analytical solutions and / or numerical modelling packages. We also carry out failure analysis in lieu of impact, fatigue, thermal, compressive, tensile, torsion, abrasion and corrosion loading, for instance, in combination or individually. Our stress and failure analysis, takes due cognizance of the fact that failure is not simply fracture and separation of a component but the inability of a component to meet set design criteria, be they stress limits, strain limits, or allowed changes of elasticity.

Our services in this area are backed by over 20 years of experience in academia and research.

**Ultrasonic and Vibration Testing** – We undertake crack detection and mapping in materials as well as characterization of the mechanical properties of materials based on ultrasonic and vibration testing. Both methods are simple and quick to use and generate large amounts of data in short periods, which is very useful for analysis. Ultrasonic testing is non-destructive and easily amendable to field use. Vibration testing on the other hand requires preparation of test



specimens and is non-destructive only in that, the small amplitudes involved allow for re-use of tested specimens.

Our services in this area are backed by over 7 years of experience in academia and research in these two fields.

**Education consultancy on Technical Education at Craft, Technician and University undergraduate, as well as at Post graduate level** – We undertake curricula development and specification of staffing equipment and space. We also offer services to review existing educational facilities with an aim of optimising the utilisation of equipment, staff and space and also for purposes of ensuring relevance of curricula to the needs of clients. We have made several proposals to the Kenyan Ministry of Higher Education Science and Technology (MOHEST) following a presentation to 34 of their top policy makers in TVET, and one also to the Ministry of Industrialisation, all addressing numerous aspects of TVET.

**Novel building solutions** – We search for and study various building solutions and in particular, those addressing the provision of low-cost housing and recommend these to clients in the emerging economies of the world. We have for a while now, been advocating the introduction of modular technologies into the country that are able to cut down building time of a typical 3 b/d house down to 8 – 12 days complete with all finishes, cabinets, electrical, plumbing and sanitary facilities. We have as part of our building solutions menu, effluent recycling and treatment solutions, renewable energy solar and biomass solutions, as well as solid waste gasifier solutions for generation of electricity and building materials and components.

**General engineering consultants** – We undertake general engineering consultancy in respect specification of equipment, as well as inspection. We also develop on request from our clients, service, maintenance and overhaul schedules and procedures for mechanical equipment in order to guarantee optimal operation and durability.

## LEISURE INTERESTS AND OTHER ACTIVITIES

Squash, swimming, technical rock-climbing, hiking, box guitar playing, singing, scriptural reading and biking. Started a privately funded outdoors “club” offering training in various activities such as outdoor survival and rock-climbing skills, eventually forming three permanent groups of 20, 20 and 40 in 1994. The “club” was started to address an identified lack of awareness amongst the local people and was targeted to young persons at the tertiary education level. Together with the Technical Manager of a local tyre manufacturing firm, developed a locally manufactured rubber and using local cobblers made the first prototypes of locally designed and manufactured cheap rock-climbing shoes. I have so far composed 11 songs and produced an 8 song CD in 2011.



**Maina Maringa, Ph.D. (Manchester – UK), MSc. Mech. Eng. (UoN - Kenya), PGD Hydro Power (NTH - Norway), BSc. Mech Eng. (UoN – Kenya), MIMechE (UK) & CEng (ECE) (2004 – 2014).**

**Professor of Mechanical Engineering, specialised in the deformation behaviour of composite materials, thermoelasticity, dual moduli materials, deformation, and microstructural analysis of additively manufactured metallics and their particulate as**

**well as nano composites, and additively manufactured polymers and their particulate composites.**