
Dr. Eng. Amos M Muiruri. PhD, PE, MIEK

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Research Areas of Interest

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|--------------------------------------|---|
| - Applied Mechanics | - Fracture Mechanics |
| - Production and Material processing | - Dynamic Behaviour of Materials |
| - Materials Science and Engineering | - Modeling and Simulation- development of |
| - Additive Manufacturing | materials subroutines. |

Education and Professional Qualifications

- PhD in Mechanical Engineering - Central University of Technology, Free state South Africa (CUT)- April 2019 to October 2021.
- MEng. in Mechanical Engineering - Central University of Technology, Free state South Africa (CUT) - *cum laude*- June 2017 to April 2019.
- Bachelor of Engineering in Mechanical Engineering -The Technical University of Kenya, (TUK)- *First Class Honors* - January 2011 – May 2015.
- Kenya Certificate of Secondary Education, Leshau High School, Nyandarua: -*Mean Grade A- : 2005 – 2008*
- Kenya Certificate of Primary Education, Milimani School, Laikipia– *Mean Grade B+ 2004.*

Professional Affiliations

- Corporate Member, Institution of Engineers of Kenya (IEK)
- Registered Professional Engineer- Engineers Board of Kenya (EBK)

Selected Publications

Conference Papers

- [1] A. M. Muiruri, M. Maringa, W. B. du. Preez, L. M. Masu, "Dynamic behaviour of direct metal laser sintered Ti-6Al-4V (ELI) under high strain rates in compression loading", *Rapdasa International Conference Proceedings Durban, South Africa*, pp.165-180: ISBN: 978-0-620-77329-4.
- [2] A. M. Muiruri, M Maringa, W B du Preez & LM Masu, "Effect of Stress Relieving Heat Treatment on High Strain Rate Tensile Properties of Direct Melting Laser Sintered (DMLS) Parts", *7th International Conference on Competitive Manufacturing (COMA-19)*, January 30 - February 1, 2019, Wallenberg Centre (STIAS), Stellenbosch, South Africa. ISBN No: 978-0-7972-1779-9.
- [3] A. M. Muiruri, M Maringa & W B du Preez, "Constitutive Numerical Modelling in Additive Manufacturing: Challenges in Predicting the Yield Strength and Flow Properties of Alloys", *Rapdasa International Conference Proceedings*, 06 – 08 November 2019, Emoya Estate, Bloemfontein, South Africa, pp. 190-203. ISBN 978-0-6398390-0-4.
- [4] A.M. Muiruri, M. Maringa & W.B.du, Preez, "Application of Phenomenological Modelling in the Development of a Database for Additively Manufactured Ti6Al4V (ELI): A Review" *10th International Conference of the African Materials Research Society (AMRS2019)*, 10 – 13 December 2019 Arusha, Tanzania.

- [5] Amos Muiruri; Maina Maringa; Willie du Preez. 'Theoretical model of the flow properties of post processed direct metal laser sintering Ti6Al4V' 6th World Congress on Integrated Computational Materials Engineering (ICME 2022): On-Demand Oral Presentations, Hyatt Regency Lake Tahoe, Nevada, USA, April 24- 25, 2022
<http://www.programmaster.org/PM/PM.nsf/ViewSessionSheets?OpenAgent&ParentUNID=75AB275E59AC7CE9852587C100531136>
- [6] **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, Proceedings of the Sustainable Research and Innovation Conference, 2023, Jomo Kenyatta University of Agriculture and Technology, Juja Kenya, 4th – 5th October 2023.
- [7] M.I. Chibinyani, T.C. Dzogbewu, M. Maringa, **A.M. Muiruri**. A Review of the Types, Occurrence, and Applications of Cellular Structures in Nature, Proceedings of the Sustainable Research and Innovation Conference, 2023, Jomo Kenyatta University of Agriculture and Technology, Juja Kenya, 4th – 5th October 2023.
- [8] Tumelo D. Moloi, Thywill C. Dzogbewu, Maina Maringa, **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, Proceedings of the Sustainable Research and Innovation Conference, 2023, Jomo Kenyatta University of Agriculture and Technology, Juja Kenya, 4th – 5th October 2023.
- [9] Munashe Chibinyani, Thywill Dzogbewu, Maina Maringa, **Amos Muiruri**. A review of the types and tessellation of lattice structures, their effectiveness and limitations in mimicking natural cellular structures. 2023 RAPDASA-RobMech-PRASA-AMI Conference. MATEC Web Conf. , vol. 388, 06008, 2023. <https://doi.org/10.1051/mateconf/202338806008>

Journal papers

- [1] A M Muiruri, M Maringa, W B du Preez, L M 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. ISSN 224-7890.
- [2] A M Muiruri, M Maringa, W B du Preez & LM Masu, "Effects of Stress-Relieving Heat Treatment on Impact Toughness of Direct Metal Laser Sintering (DMLS)-Produced Ti6Al4V (ELI) Parts", *JOM* (2019) doi:10.1007/s11837-019-03862-5
- [3] Amos Muiruri, Maina Maringa, Wille du Preez and Leonard Masu, "Effect of stress-relieving heat treatment on the high strain rate dynamic compressive properties of Additively Manufactured Ti6Al4V(ELI)", *Metal*, 2020, 10(5), 653. doi.org/10.3390/met10050653.
- [4] **Amos Muiruri**, Maina Maringa, Willie du Preez, "Crystallographic texture analysis of as- built and heat-treated Ti6Al4V (ELI) produced by Direct Metal Laser Sintering", *Crystals* 2020, 10, 699; doi:10.3390/cryst10080699
- [5] **Amos Muiruri**, Maina Maringa, Willie du Preez, "Evaluation of dislocation densities in various microstructures of additively manufactured Ti6Al4V(ELI) by the method of X-ray diffraction", *Materials* 2020, 13, 5355; doi:10.3390/ma13235355
- [6] **Muiruri, A.**, Maringa, M., du Preez, W. High strain rate properties of various forms of Ti6Al4V(ELI) produced by direct metal laser sintering. *Applied Sciences* 2021, 11(17), 8005; doi.org/10.3390/app11178005
- [7] **Muiruri, A.**; Maringa, M.; Preez, W.d. 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>
- [8] 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>

- [9] Muiruri, A.; Maringa, M.; Preez, W.d. 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/ma1505187>
- [10] 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>
- [11] 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>
- [12] **A. M. Muiruri**, M. Maringa, W. du Preez, "A Theoretical Model of the Flow Properties of Postprocessed Direct Metal Laser Sintering Ti6Al4V (ELI)", *Advances in Materials Science and Engineering*, vol. 2022, Article ID 4048913, 12 pages, 2022. <https://doi.org/10.1155/2022/4048913>
- [13] M.I. Chibinyani^{1,*}; T.C. Dzogbewu¹; M. Maringa¹; A.M. Muiruri¹, Reduced order topology optimisation of a planar honeycomb defined by a linear elastic Ti6Al4V (ELI) material model, *SAJIE*, vol.33, no.3, 2022 <http://dx.doi.org/10.7166/33-3-2808>
- [14] Muiruri, A.; Maringa, M.; du Preez, W. Numerical Simulation of the Taylor Impact Test for Laser Powder Bed Fusion Parts Based on Microstructural Internal State Variables. *Appl. Sci.* **2023**, *13*, 5372. <https://doi.org/10.3390/app13095372>
- [15] M.I. Chibinyani, T.C Dzogbewu, M. Maringa, **A.M. Muiruri**. Numerical modelling of DMLS Ti6Al4V(ELI) polygon structures, *Results in Materials*, vol.20, 100456, 2023. <https://doi.org/10.1016/j.rinma.2023.100456>
- [16] M.I. Chibinyani, T.C Dzogbewu, M. Maringa, **A.M. Muiruri**. Numerical modelling of Ti6Al4V(ELI) hierarchical honeycomb structures of order one at the vertices. *Results in Engineering*, vol. 21, 102024 (2024). <https://doi.org/10.1016/j.rineng.2024.102024>
- [17] Tumelo Moloi, Thywill Cephas 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*, vol.22, 102290, 2024. <https://doi.org/10.1016/j.rineng.2024.102290>
- [18] **Muiruri, A.**; Maringa, M.; du Preez, W. 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>
- [19] 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>
- [20] **Amos Muiruri**, Maina Maringa, Willie du Preez, X-ray diffraction profile analysis of martensitic Ti6Al4V (ELI) parts produced by laser powder bed fusion. *MATEC Web of Conferences* 388, 10003(2023), <https://doi.org/10.1051/mateconf/202338810003>
- [21] Munashe Chibinyani, Thywill Cephas Dzogbewu, Maina Maringa, **Amos Muiruri**, A review of the types and tessellation of lattice structures, their effectiveness and limitations in mimicking natural cellular structures. *MATEC Web of Conferences* 388, 06008(2023), <https://doi.org/10.1051/mateconf/202338806008>