TSHILIDZI MARWALA CURRICULUM VITAE

Tshilidzi Marwala is the Vice-Chancellor and Principal (equivalent to President in the USA system) of the University of Johannesburg (UJ) with 50,000 students and 5,000 staff members. He is a trustee of the Nelson Mandela Foundation and serves on the Nedbank Board. He is a member of the American Academy of Arts and Sciences, The World Academy of Sciences and the African Academy of Sciences. He has supervised 37 doctoral students (from more than 20 countries in Africa, Asia, Europe, Middle East and Americas) to completion. He holds a Bachelor of Science in Mechanical Engineering (magna cum laude) from Case Western Reserve University and a PhD in Artificial Intelligence from the University of Cambridge. He has published 24 books in artificial intelligence, one of these has been translated into Chinese, over 500 articles in journals, proceedings, and book chapters and newspapers, and holds five patents.

He was a Deputy Vice-Chancellor for Research and Dean of Engineering at UJ. Before UJ, he was the Carl and Emily Fuchs Chair of Systems Engineering, and the SARChI Chair of Artificial Intelligence at the University of the Witwatersrand. He was a post-doctoral research associate at the Imperial College (London). His research interests are multi-disciplinary, and they include the theory and application of artificial intelligence to engineering, computer science, finance, social science, and medicine. He has been a visiting scholar at Harvard University, University of California at Berkeley, University of Cambridge and Nanjing Tech University. His writings and opinions have featured in media such as the New Scientist, The Economist, Time, CNN, BBC, Royal Society, Cambridge Union and Oxford Union.

As Vice-Chancellor, he positioned UJ to drive the fourth industrial revolution (4IR) in South Africa to accelerate the United Nations' Sustainable Development Goals (SGDs). UJ ranked first in Africa in the 2021 Times Higher Education (THE) University Impact Rankings on Sustainable Development Goals, 1st position globally for Decent Work and Economic Growth (SDG 8). UJ featured in the top 100 globally in various SGDs: 4th for SDG 1; 24th for SDG 4; 43rd for SDG 5; 60th for SDG 10; 79th for SDG 12 and 91st for SDG 7. UJ increased research output from position 6 to position 2 in South Africa and is poised to become the largest producer of research in Africa. He is a formidable fundraiser, and under his leadership, UJ increased endowment from US$61 million to US$164 million in the last three years. We purchased and financed two additional campuses, Devland Campus (US$10million) and Media 24 Park (US$20 million), and completed the Soweto Residence Complex (US$30million). UJ increased electricity consumption from solar energy from 0% to 13%.

PERSONAL INFORMATION

Professor Tshilidzi Marwala
University of Johannesburg, PO Box 524 Auckland Park 2006 Johannesburg, South Africa
E-mail: tmarwala@acm.org; tmarwala@gmail.com.
Place of Birth: South Africa **Date of Birth**: 28 July 1971 **Citizenship**: South African
Spouse: Dr Jabulile Vuyiswa Manana **Children**: Khathutshelo, Thendo, Mbali.

EDUCATION BACKGROUND

- **Doctor of Philosophy in Engineering (1997-2000):** University of Cambridge (St. John's College), Cambridge, U.K. Submitted in 2000, Examined in 2001 and Graduated in 2002. **Thesis**: Fault identification using neural network and vibration data.
- **Master of Engineering in Mechanical Engineering (1996-1997):** University of Pretoria, Pretoria, South Africa. **Submitted** in 1997, Completed in 1997, Graduated in 1998 **Thesis**: A multiple criterion updating method for damage detection on structures
- **Bachelor of Science in Mechanical Engineering, *magna cum laude* (1991-1995):** Case Western Reserve University, Cleveland, Ohio, USA. Graduated in 1995

LEADERSHIP TRAINING

- Advanced Management Program (2017): Columbia Business School, New York, USA.
- Accounting & Finance for Non-Financial Managers (2015): National University of Singapore.
- Programme for Leadership Development (2007): Harvard Business School, MA, USA.

PROFESSIONAL EXPERIENCE

Vice-Chancellor and Principal University of Johannesburg, South Africa (2018 – Present)

As Vice-Chancellor, we positioned UJ to drive the fourth industrial revolution (4IR) in South Africa to accelerate the United Nations' Sustainable Development Goals (SGDs). UJ ranked first in Africa in the 2021 Times Higher Education (THE) University Impact Rankings on Sustainable Development Goals, 1st position globally for Decent Work and Economic Growth (SDG 8). UJ featured in the top 100 globally in various SGDs: 4th for SDG 1; 24th for SDG 4; 43rd for SDG 5; 60th for SDG 10; 79th for SDG 12 and 91st for SDG 7. UJ increased research output from position 6 to position 2 in South Africa and is poised to become the largest producer of research in Africa. I am a formidable fundraiser, and under my leadership, UJ increased endowment from US$61 million to US$164 million in the last three years. We purchased and financed two additional campuses, Devland Campus (US$10million) and Media 24 Park (US$20 million), and completed the Soweto Residence Complex (US$30million). We increased electricity consumption from solar energy from 0% to 13%. I appeared in numerous national and international TV and Radio: eNCA, SABC, CNN, and BBC. My social engagement urged me to become a columnist for *Forbes Africa* and the *Ubuntu* Magazine of the Department of International Relations and Cooperation. I wrote op-eds in major national newspapers around the theme of the 4IR (*Sunday Times, City Press, Mail & Guardian, Sunday Independent, Sunday Tribune, Daily Maverick, Cape Times, Weekend Argus; Daily News and Cape Argus*). I introduced the *Vice Chancellor's Reading Club* for staff and students. I published a book, *Leadership Lessons From Books I Have Read*, with a foreword by former President Thabo Mbeki from this initiative. We introduced the Master of Business Administration at the Johannesburg Business School and the Bachelor of Arts in Politics, Economics and Technology, the compulsory *Introduction to Artificial Intelligence* and *Africa Incites* courses for all undergraduate students. We created the Institute of Future Studies, the UJ Press and the Institute of Intelligent Systems (IIS). The IIS has become an essential pillar of the digitalization of the Gauteng Province and UJ.

Vice-Chancellor Designate, University of Johannesburg, South Africa (2017)

As part of the handover, I studied for the Advanced Management Programme at Columbia University and shadowed the outgoing Vice-Chancellor, Professor Ihron Rensburg.

Deputy Vice-Chancellor: Research and Internationalization, University of Johannesburg, South Africa (2013–2017)

We increased external research funding from R83.7 million (US$6 million) to R229.5 million (US$16.4 million). Furthermore, we increased the UJ high impact research output from 897 papers to 1280 papers. We increased UJ NRF rated researchers from 115 to 171. We managed the application that resulted in the University of Johannesburg receiving the highest number of tier South Africa Research Chairs of any university in South Africa. We increased the number of staff members with doctorates from 294 to 539. During my tenure, UJ obtained the Centre of Excellence for Integrated Mineral and Energy Resource Analysis funded by the Department of Science and Technology. I led the establishment of the following institutions at UJ: Confucius Institute with Nanjing Tech University, the Joint Institute of Advanced Study with the Nanyang Technological University in Singapore, the Pan African Institute for Political Thought and Conversation, and the Intelligent System Institute.

Executive Dean Faculty of Engineering and Built Environment, University of Johannesburg, South Africa (01/01/2009 – 31/03/2013)

I developed the Faculty of Engineering and the Built Environment's long-term vision and strategy. Furthermore, I restructured the Faculty of Engineering into 4 Schools (Electrical Engineering, Civil Engineering and the Built Environment, Mechanical and Industrial Engineering, and Mining, Metallurgy and Chemical Engineering). I introduced the Faculty Industrial Advisory Board and increased research papers from 28 to 221. I successfully managed a US$ 5 million laboratory upgrade project. I increased the number of post-doctoral fellows from 0 in 2008 to 12. I increased the number of Master's and Doctoral Students from 250 to 524. I incorporated the Department of Quality and Operations Management from the Faculty of Management into the Faculty of Engineering and the Built Environment. I created the Process Engineering and Environmental Technology Station, which is fully funded by the Technology Innovation Agency (TIA) to advance the use of clean energy.

South Africa Research Chair of Systems Engineering; Carl and Emily Fuchs Chair of Control and Systems Engineering; Head of Control and Systems Group, Full Professor; Associate Professor at the University of Witwatersrand, South Africa (2003-2008)

I authored refereed journal papers, proceedings and book chapters, as well as registered patents. I supervised doctoral and master theses. Some of these graduates have proceeded to universities such as Harvard, Oxford, Cambridge, Rutgers, British Columbia, Purdue, Chiba, Makerere and Concordia to further their research careers. I hosted visiting professors from Japan, U.S.A., India, Brazil, Poland and UK. I consulted for the following companies: Grintek on Information Security, CSIR on multi-agent systems, Kentron for medical imaging and ESKOM for fault detection in the electrical cable transmission lines. I raised over R10 million (US$714 000) worth of research grants.

Executive Assistant: Technical Director, SAB, South Africa (2001–2003)

I assisted the Executive Director of South African Breweries on technological matters, including strategy and implementation. I developed an artificial beer taster.

Post-Doctoral Research Associate, Imperial College (London), UK (2000–2001)

- I studied the ontology, stability and scalability of intelligent systems for the European Union project. Furthermore, I managed collaboration amongst researchers at Eindhoven Technological University, Imperial College (London) and the New University of Lisbon. ***Collaborators***: Dr Philippe de Wilde (Imperial College); L. Correia, P. Mariano and R. Ribiero (New University of Lisbon); V. Abramov, N. Szirbik and J. Goossenaerts (Eindhoven University of Technology)

Project Engineer Mining Technology Division Council for Scientific and Industrial Research (CSIR), South Africa (1995–1995)

I worked on a project for reducing the noise levels in underground hydraulic drillers.

VISITING APPOINTMENTS

Honorary Professor, Central South University, China; Visiting Professor, Nanjing Tech University, China; Visiting Fellow, Stellenbosch Institute of Advanced Study, South Africa; Visiting Scholar, University of California, Berkeley, USA; Visiting Fellow, Wolfson College, University of Cambridge; Harvard South Africa Fellow, Harvard University USA.

SELECTED AWARDS / HONOURS / ACHIEVEMENTS

MIT Sloan Management Review Responsible AI Panelist; IT Personality of the Year Award; Order of Mapungubwe–President of South Africa; ASSAf Science-for-Society Gold Medal Award; Case Western Reserve University Alumni Professional Achievement Award; NRF Award: Champion of Research Capacity Development; Judge of the YouTube/Google Spacelab Completion; Paper featured in the MIT Technology Review; TWAS-AAS-Microsoft Award; Bradlow Foundation Scholarship; Institute of Internation Education (IIE): South African Education Programme.

RATING AS A SCIENTIST: GOOGLE SCHOLAR

Google Scholar: Citations (8883); h-index(46); i10-index(201)
National Research Foundation Internationally Acclaimed Researcher (01/01/2020 to 31/12/2025).

RESEARCH INTERESTS

Artificial Intelligence; Machine Learning; Missing Data Estimation; Decision Sciences; Economics, Econometrics, Finance and International Relations, Finite Element Models.

SELECTED DEPUTY/CHAIR ROLES

Chairman: International Scientific Advisory Board for the African Center of Excellence in Internet of Things. Rwanda (2020); African Academy of Science Membership Advisory Committee (2014–2018); City-Region Observatory (GCRO) (2014–2018); Group Risk Governance Committee of the City of Johannesburg (2017-2018); International Committee of Assessment and Development of Traffic and Transportation Engineering, Central South University (2019); Engineering Dean's Committee of Engineering Faculties of South Africa (2010); PIKITUP Johannesburg (Pty) Ltd. (2012 – 2013); Education Committee, Council and Executive Committee Member: Engineering Council of South Africa (2012); South Africa's Department of Higher Education and Training Research Output Committee (2010–2017); Local Loop Unbundling Committee (2006 – 2007).
Deputy Chair: Presidential Commission on the Fourth Industrial Revolution; Limpopo Business Support Agency (2006–2009).

MEMBERSHIP/FELLOWSHIP

Fellowship: American Academy of Arts and Sciences, TWAS, The World Academy of Sciences (2010); African Academy of Science (2013); South African Academy of Engineering (2007); Cambridge Philosophical Society (1998); Cambridge Commonwealth Trust (1997).
Member: Namibian 4IR Task Team; Distinguished Scientist of the Association for Computing Machinery (ACM) (2010); Honorary Cambridge Malaysian Scholar (1997); Honorary Cambridge Mandela Scholar (1997); World Health Organisation (WHO) Expert Group on Ethics and Governance of Artificial Intelligence (2019); Committee that developed an international accord of ICSU) on: Open Data in a Big Data World (2015); International Visiting Committee Member of Case Western Reserve University, USA (2019).

SELECTED BOARD ROLES

Trustee: Nelson Mandela Foundation (2020-); Carl and Emily Fuchs Foundation (2006–2019); The Bradlow Foundation (2006 – 31/12/2018).

Non-Executive Director, Nedbank Group (Pty) Ltd. (2019-); Resolution Circle (Pty) Ltd (2012-2018); City Power Johannesburg (Pty) Ltd. (2005–2012); State Information Technology Agency (2005–2007); Universities South Africa (2018-); Denel (2011-2014); Johannesburg Centre for Software Engineering (2008); South African National Council of Scientific Professions (2006): South African Statistics Council (2005–2007); National Advisory Council on Innovation (2005–2007)

Deputy Chair: Presidential Commission on the Fourth Industrial Revolution

SELECTED DISTINGUISHED TALKS

Panel: Cambridge Union; *Keynote*: Royal Society - 2021 Commonwealth Science Conference: Science for a resilient future; *Panel*: Is AI a Threat? Cambridge Union, Cambridge University (2021); *Chair*: "Digital Skills for an Inclusive Future" for the United Nations Industrial Development Organization (2021). *Panel: "Global Forum on AI for Children", for the United Nations Children's Fund.* (2021); *Lecture*: "Artificial Intelligence" Rhodes Trust, Oxford University 2019; "The Fourth Industrial Revolution" Silesian Technological University, Poland 2018. Lecture: "AI in 21st Century" London Business School, 2019. "Creating an Innovation Ecosystem" Rhodes House, Oxford, 2019. "Fourth Industrial Revolution" The University of Rwanda, (2019); "The Fourth Industrial Revolution and Society" The John Orr Memorial Lecture (2019); *Panel*: Symposium on Memory. Collège de France (2018); Artificial Intelligence: Artificial Intelligence: An inhumane future. Oxford Union, Oxford University 28 2019. "Fourth Industrial Revolution and Society" 65th Bernard Price Memorial Lecture, (2016); "The Fourth Industrial Revolution and its Implications for Africa" St Anthony College, Oxford, 2019; "The Fourth Industrial Revolution and Society", Nanjing Tech University, China (2018); Annual Orenstein Lecture: The University of the Witwatersrand, "Artificial Intelligence and Health Sciences" 5 (2018); Nanyang Technological University, Singapore "The Fourth Industrial Revolution and Society" (2018); Roundtable in South African Parliament: The 4th Industrial Revolution: Opportunities and Threats" (2018); Royal Society: Commonwealth Science Conference: Science for a resilient future (2021)

INTERNATIONAL COLLABORATIONS

Akira Mita, Keio University, Japan; *Rosalyn Hobson*, Virginia Commonwealth University, USA; *Fola Soares*, Contek Research, USA; *Snehashish Chakraverty*, Central Building Research Institute, India; *Sondipon Adhikari*, Swansea University, UK; *Pawel Sowa*, Silesian University of Technology, Poland; *Fernando Buarque de Neto*, University of Pernambuco (Brazil); *Michael Friswell*, Swansea University, UK; *Alioune Ngom*, University of Windsor Canada; *John Burken*, NASA Dryden Flight Research Center, USA; *Monica Lagazio*, University of Kent, U.K

SELECTED JOURNAL/GRANT REVIEW

I have reviewed for more than 40 prominent international journals in the USA, Europe, Asia and Africa, and grants in Canada, Czech, UK and USA. I have reviewed for the Schmidt Science Fellows program.

PUBLICATIONS[1]

I have published **23** books, **63** book chapters, **74** journal papers, **165** conference papers and **241** newspaper articles and **five** patents. Details are below:

Books, Monograms and Edited Proceedings

Books on Artificial Intelligence and International Relations

1. Bhaso Ndzendze and **Marwala, T.** (2021) *Artificial Intelligence and International Relations Theories.* Australia: Palgrave Macmillan. (in press), ISBN: 978-9811948763

[1] These reflect only the papers where I was part of the execution of research and agreed with contents of the papers. There are more than 30 others that are not included here where my name was included without my consent.

2. Bhaso Ndzendze and **Marwala, T.** (2021) *AI and Emerging Technologies in International Relations.* Singapore: World Scientific. ISBN: 978-981-123-454-5.
3. **Marwala, T.** and Lagazio, M. (2011). *Militarized Conflict Modeling Using Computational Intelligence*. London: Springer. ISBN 978-0-85729-789-1. ***Translated into Chinese by the National Defence Industry Press.***

Books on Artificial Intelligence and Economics

4. Daniel Muller, Fernando Buarque and **Tshilidzi Marwala**. (2022) On rationality, artificial intelligence and economics. World Scientific Press ISBN: 978-981-125-511-3 (in press)
5. Moloi, T. and **Marwala, T.** (2021) *Artificial Intelligence and the Changing Nature of a Firm.* Heidelberg: Springer International Publishing, 978-3-030-76312-1.
6. Moloi, T. and **Marwala**, T. (2020) *Artificial Intelligence in Economics and Finance Theories.* Heidelberg: *Springer*, ISBN 978-3-030-42961-4*.*
7. Xing, B. and **Marwala, T.** (2018). *Smart Computing in Crowdfunding*. London: CRC Press (Taylor and Francis). ISBN 978-1-138-57771-8.
8. **Marwala, T.** and Hurwitz, E. (2017) *Artificial Intelligence and Economic Theory: Skynet in the Market*. London: Springer. ISBN: 978-3-319-66103-2.
9. **Marwala, T.** (2013). *Economic Modeling Using Artificial Intelligence Methods*. London: Springer. ISBN 978-1-84996-323-7 (Paperback republication on 19 May 2015).

Books on Artificial Intelligence in Engineering, Medicine and Infrastructure

10. **T. Marwala**, R. Mbuvha and WT Mongwe. *Hamiltonian Monte Carlo Methods in Machine Learning*. Elsevier (in press).
11. **Tshilidzi Marwala**. (2021). *Machine Rationality and Artificial Intelligence.* Academic Press (Imprint of Elsevier), ISBN: 9780128206768.
12. **Marwala, T.** and Leke, C.A. (2019). *Handbook of Machine Learning: Optimization and Decision Making Vol. 2*. World Scientific Publication. ISBN: 978-981-120-566-8.
13. Leke, C.A. and **Marwala, T.** (2019). *Deep Learning and Missing Data in Engineering Systems.* London: *Springer*. ISBN: 978-3030011796.
14. **Marwala, T.** (2018). *Handbook of Machine Learning: Foundation of artificial intelligence, Volume 1*. Singapore: World Scientific Publication. ISBN 978-981327122-7.
15. Xing, B. and **Marwala, T.** (2018). *Smart Maintenance for Human-Robot Interaction: An Intelligent Search Algorithmic Perspective*. London: Springer. ISBN 978-3-319-67480-3.
16. **Marwala, T.,** Boulkaibet, I, and Adhikari S. (2017) *Probabilistic Finite Element Model Updating Using Bayesian Statistics: Applications to Aeronautical and Mechanical Engineering*. New York: Wiley, ISBN: 978-1-119-15303-0.
17. **Marwala, T.** (2015). *Causality, Correlation, and Artificial Intelligence for Rational Decision Making*. Singapore: World Scientific. ISBN 978-9-814-63086-3.
18. **Marwala, T.** (2014). *Artificial Intelligence Techniques for Rational Decision Making*. London: Springer. ISBN 978-3-319-11423-1.
19. **Marwala, T.** (2012). *Condition Monitoring Using Computational Intelligence Methods*. London: Springer. ISBN 978-1-4471-2380-4.
20. **Marwala, T.** (2010). *Finite Element Model Updating Using Computational Intelligence Techniques: Applications to Structural Dynamics*. London: Springer. ISBN 978-1-84996-322-0.
21. **Marwala, T.** (2009). *Computational Intelligence for Missing Data Imputation, Estimation, and Management: Knowledge Optimization Techniques*. Pennsylvania: IGI Global. ISBN 978-1-60566-336-4.

Books on the Fourth Industrial Revolution

22. **Tshilidzi Marwala**. (2020) *Closing the Gap: The Fourth Industrial Revolution in Africa*. Pan Macmillan, ISBN 978-1-77010-786-1.

23. Wesley Doorsamy, Babu Paul and **Tshilidzi Marwala** (Editors) (2020) *The Disruptive Fourth Industrial Revolution – Technology, Society and Beyond.* Springer Nature Switzerland AG, ISBN: 978-3-030-48230-5 (Foreword by the Executive Chairman of the World Economic Forum *Klaus Schwab*).

Leadership Books

24. **Tshilidzi Marwala. (**2022). *Heal Our World: Securing Sustainable Future.* Tracey McDonald Publishers. Foreword by former *South African Deputy President Phumzile Mlambo-Ngcuka*.
25. **Tshilidzi Marwala. (**2021). *Leadership Lessons from the Books I Read.* Tracey McDonald Publishers. ISBN: 978-1-77626-092-8, Foreword by former *South African President Thabo Mbeki*.
26. **Tshilidzi Marwala. (**2021). *Leading in the 21st Century*. Tracey McDonald Publishers. ISBN 978-1-77626-083-6.
27. Buarque de Lima Neto, F., Roberts, N., **Marwala**, **T.**, Nemasetoni, M (Illustrator) (2019) *MY FIRST A.I. BOOK – Artificial Intelligence and Learning*. *Amazon Digital Services* LLC, ISBNAgency.com, ISBN: 978-1513654249.

Peer-Reviewed Journal Publications

1. **T. Marwala** and P.S. Heyns. A multiple criterion method for detecting damage on structures. *American Institute of Aeronautics and Astronautics Journal*, 195, 1998, pp. 1494-1501. https://doi.org/10.2514/2.543
2. **T. Marwala** and H.E.M. Hunt. Fault identification using finite element models and neural networks. *Mechanical Systems and Signal Processing*, 13, 1999, pp. 475-490. https://doi.org/10.1006/mssp.1998.1218
3. **T. Marwala**. On damage identification using a committee of neural networks. *American Society of Civil Engineers, Journal of Engineering Mechanics*, 126, 2000, pp. 43-50. https://doi.org/10.1061/(ASCE)0733-9399(2000)126:1(43)
4. **T. Marwala** and H.E.M. Hunt. Is damage identification using vibration data in a population of cylinders feasible? *Journal of Sound and Vibration*, 237, 2000, pp. 727-732. https://doi.org/10.1006/jsvi.1999.3003
5. **T. Marwala**. Probabilistic fault identification using a committee of neural networks and vibration data. *American Institute of Aeronautics and Astronautics, Journal of Aircraft*, 38, 2001, pp. 138-146. https://doi.org/10.2514/2.2745
6. **T. Marwala**. Scaled conjugate gradient and Bayesian training of neural networks for fault identification in cylinders. *Computers and Structures*, 79(32), 2001, pp. 2793-2803. https://doi.org/10.1016/S0045-7949(01)00140-7
7. **T. Marwala**. On fault identification using pseudo-modal-energies and modal properties. *American Institute of Aeronautics and Astronautics Journal*, 39, 2001, pp. 1608-1617. https://doi.org/10.2514/2.1488
8. **T. Marwala**. Probabilistic fault identification using vibration data and neural networks. *Mechanical Systems and Signal Processing*, 15, 2001, pp. 1109-1128. ISSN: 0888-3270. https://doi.org/10.2514/2.2745
9. **T. Marwala**. Finite element updating using wavelet data and genetic algorithm. *American Institute of Aeronautics and Astronautics, Journal of Aircraft*, 39, 2002, pp. 709-711. https://doi.org/10.2514/2.2985
10. **T. Marwala**. Fault classification using pseudo modal energies and neural networks. *American Institute of Aeronautics and Astronautics Journal*, 41(1), 2003, pp. 82-89. https://doi.org/10.1061/(ASCE)0733-9399(2004)130:11(1346)
11. **T. Marwala**. Fault classification using pseudo modal energies and probabilistic neural networks. *American Society of Civil Engineers, Journal of Engineering Mechanics*, 13(11), 2004, pp. 1346-1355. https://doi.org/10.1061/(ASCE)0733-9399(2004)130:11(1346)

12. **T. Marwala** and S. Sibisi. Finite element updating using Bayesian framework and modal properties. *American Institute of Aeronautics and Astronautics, Journal of Aircraft*, 42(1), 2005, pp. 275-278. https://doi.org/10.2514/1.11841
13. M. Lagazio and **T. Marwala**. Assessing different Bayesian neural network models for militarized interstate dispute. *Social Science Computer Review*, 24(1), 2005, pp. 1-12. https://doi.org/10.1177/0894439305281512
14. L.A. Machowski and **T. Marwala**. Using object-oriented calculation process framework and neural networks for classification of image shapes. *International Journal of Innovative Computing, Information and Control,* 1(4), 2005, pp. 609-623. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.476.2579&rep=rep1&type=pdf
15. M. Abdella and **T. Marwala**. The use of genetic algorithms and neural networks to approximate missing data in database. *Computing and Informatics*, 24, 2006, pp. 1001-1013. (Special issue paper selected from the *IEEE 3rd International Conference on Computational Cybernetics, 2005. ICCC 2005.*, 2005, pp. 207-212) https://doi.org/10.1109/ICCCYB.2005.1511574
16. **T. Marwala** and S. Chakraverty. Fault classification in structures with incomplete measured data using autoassociative neural networks and genetic algorithm. *Current Science*, 90(4), 2006, pp. 542-548. https://www.jstor.org/stable/24088946
17. F.V. Nelwamondo, **T. Marwala** and Unathi Mahola. Early Classifications of bearing faults using hidden Markov models, Gaussian mixture models, Mel-frequency Cepstral coefficients and fractals. *International Journal of Innovative Computing, Information and Control*, 2(6), 2006, pp. 1281-1299. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.95.7657&rep=rep1&type=pdf
18. B. Betechuoh Leke, **T. Marwala** and T. Tettey. Autoencoder networks for HIV classification. *Current Science*, 9(11), 2006, pp. 1467-1473. https://www.jstor.org/stable/24093843
19. **T. Marwala**. Bayesian training of neural network using genetic programming. *Pattern Recognition Letters,* 28, 2007*,* 452–1458. https://doi.org/10.1109/IJCNN.2006.247374
20. F.V. Nelwamondo, S. Mohamed and **T. Marwala**. Missing Data: A comparison of neural network and expectation maximisation techniques. *Current Science*, 93 (11), 2007, pp. 1514-1521. https://www.jstor.org/stable/24099079
21. F.V. Nelwamondo and **T. Marwala**, "Fuzzy artmap and neural network approach to online processing of inputs with missing values," *SAIEE Africa Research Journal*, vol. 98, no. 2, pp. 45-51, June 2007, https://doi.org/10.23919/SAIEE.2007.9487820
22. S. Mohamed, D. Rubin and **T. Marwala**, "An adaptive strategy for the classification of g-protein coupled receptors," *SAIEE Africa Research Journal*, vol. 98, no. 3, pp. 71-80, Sept. 2007, https://doi.org/10.23919/SAIEE.2007.9488130
23. F. Nelwamondo and **T. Marwala**. Techniques for handling missing data: Applications to online condition monitoring. *International Journal of Innovative Computing, Information and Control*, 4(6), 2008, pp. 1507-1526. http://www.ijicic.org/contents.htm
24. M. A. Herzog, **T. Marwala**, T. and P.S. Heyns. Machine and component residual life estimation through the application of neural networks. *Reliability Engineering & System Safety*, 94(2), 2009, pp. 479-489. https://doi.org/10.1016/j.ress.2008.05.008.
25. **T. Marwala** and B. Crossingham. HIV status estimation using optimization, rough sets and demographic data. *Current Science*, 95(9), 10 November 2008, pp. 1123-1124.
26. P.B. Patel and **T. Marwala.** Caller behaviour classification using computational intelligencer methods. *International Journal of Neural Systems*, 2010, https://doi.org/10.1142/S0129065710002255 pp. 87-93

27. L. Mthembu, **T. Marwala**, M.I. Friswell and S. Adhikari. Model selection in finite element model updating using the Bayesian evidence statistic. *Mechanical Systems and Signal Processing,* 2011, https://doi.org/10.1016/j.ymssp.2011.04.001
28. I.S. Msiza, Mmamolatelo E. Mathekga, F.V. Nelwamondo and **T. Marwala.** Fingerprint segmentation: An investigation of various techniques and a parameter study of a variance-based method. *International Journal of Innovative Computing, Information and Control*, 7(9), September 2011, pp. 5313-5326. http://www.ijicic.org/10-03078-1.pdf
29. M. Duma, B Twala, F.V. Nelwamondo and **T. Marwala**. Partial imputation to improve predictive modelling in insurance risk classification using a hybrid positive selection algorithm and correlation-based feature selection. *Current Science* 103(6), 2012, pp. 697-704. https://www.currentscience.ac.in/Volumes/103/06/0697.pdf
30. M. Duma, B Twala, F. Nelwamondo, and **T. Marwala**. Predictive modeling with missing data using an automatic relevance determination ensemble: A comparative study. *Applied Artificial Intelligence*, 26, 2012, pp. 967–984. https://doi.org/10.1080/08839514.2012.741377
31. G. Anderson, **T. Marwala** and F.V. Nelwamondo. Multicore scheduling based on learning from optimization models. *International Journal of Innovative Computing, Information and Control ICIC International,* 9(4), 2013*,* pp. 1511-1522. http://www.ijicic.org/ijicic-12-02027.pdf
32. F.V Nelwamondo, D. Golding, **T. Marwala.** A dynamic programming approach to missing data estimation using neural networks. *Information Sciences* 277, 2013, pp. 49-58. https://doi.org/10.1016/j.ins.2009.10.008
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Patents

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Foreword

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COMPLETED AND CURRENT RESEARCH STUDENTS

Supervised **37** doctoral and **48** students, from **21** different countries, to completion.

Doctoral Supervision

1. Sizwe M. Dhlamini **Nationality**: South Africa **Degree**: PhD: Electrical Engineering, University of the Witwatersrand **Year:** 2007 **Thesis**: Bushing Diagnosis Using Artificial

Intelligence and Dissolved Gas Analysis. **Where Now?** Entrepreneur in Montreal, Canada.

2. Fulufhelo Vincent Nelwamondo **Nationality**: South Africa **Degree**: PhD: Electrical Engineering, University of the Witwatersrand **Year:** 2008 **Thesis**: Computational Intelligence Techniques for Missing Data Imputation. **Where Now?** Postdoctoral fellowship at Harvard University and now Chief Executive Officer of the National Research Foundation.
3. Brain Betechuoh Leke **Nationality**: Cameroon **Degree**: PhD: Electrical **Thesis**: Computational intelligence for modelling HIV. **Where Now?** IT engineer in Johannesburg and also worked for the CSIR and now at McKinsey & Co.
4. David Starfield **Nationality**: South Africa **Degree**: PhD: Electrical Engineering, University of the Witwatersrand **Year:** 2009 **Thesis**: Towards Clinically Useful Coded Apertures for Planar Nuclear Medicine Imaging. **Co-Supervisor**: D.M. Rubin **Where Now?** Senior Manager E4D Technologies, Texas, USA.
5. Pretesh Bhoola Patel **Nationality**: South Africa **Degree**: PhD: Electrical Engineering, University of the Witwatersrand **Year:** 2010 **Thesis**: An IVR Call Performance Classification System Using Computational Intelligence Techniques. **Where Now?** Worked as an engineer for CSIR and Bytes Technology, then worked as a Senior Lecturer at the University of Johannesburg and is Senior Data and Applied Scientist at Microsoft.
6. Megan Jill Russell **Nationality**: South Africa **Degree**: PhD: Electrical Engineering, University of the Witwatersrand **Year:** 2010 **Thesis**: Towards an Innovative Electronic, Artificial Larynx. **Co-Supervisor**: D.M. Rubin, B. Wigdorowitz, University of the Witwatersrand **Where Now?** In private business.
7. Meir Perez **Nationality**: South Africa **Degree**: PhD: Electrical Engineering, University of the Witwatersrand **Year:** 2012 **Thesis**: Machine Learning and Soft Computing Approaches to Micro-array Differential Expression Analysis and Feature Selection. **Co-Supervisor**: D.M. Rubin, L.E. Scott, & W. Stevens, University of the Witwatersrand **Where Now?** A lecturer at the University of Johannesburg and now Senior Data Scientist at Wix.com in Israel.
8. Linda Simo Mthembu **Nationality**: South Africa **Degree**: PhD: Mechanical Engineering, University of the Witwatersrand **Year:** 2012 **Thesis**: Finite Element Model Updating. **Co-Supervisor**: M. Friswell & S. Adhikari, Swansea University, U.K. **Where Now?** A senior lecturer at the University of South Africa.
9. Bo Xing **Nationality**: Chinese **Degree**: Doctor of Engineering: Mechanical Engineering, University of Johannesburg **Year:** 2012 **Thesis**: Soft Computing in Remanufacturing. **Co-Supervisors**: K. Battle & F.V. Nelwamondo **Where Now?** Was an associate professor at the University of Johannesburg.
10. Craig Boesack **Nationality**: South Africa **Degree**: PhD: Electrical Engineering, University of the Witwatersrand **Year:** 2013 **Thesis**: On the Analysis and Design of Genetic Fuzzy Controllers: An Application to Automatic Generation Control of Large Interconnected Power Systems Using Genetic Fuzzy Rule Based Systems. **Co-Supervisor**: F.V. Nelwamondo **Where Now?** Chief Engineer at Eskom Holdings SOC.
11. George Anderson **Nationality**: Botswana and Ghana **Degree**: DPhil: Electrical Engineering, University of the Witwatersrand **Year:** 2013 **Thesis**: Operating System Scheduling Optimization. **Co-Supervisor**: F.V. Nelwamondo **Where Now?** Works as a senior lecturer at the University of Botswana.
12. Mlungisi Duma **Nationality**: South Africa **Degree**: DPhil: Electrical Engineering, University of Johannesburg **Year:** 2013 **Thesis**: Predicting Insurance Risk Using Incomplete Data. **Co-Supervisor**: F.V. Nelwamondo & B. Twala **Where Now?** Application Development Manager at First National Bank.

13. Ian Shaw **Nationality**: Hungarian **Degree**: DPhil: Electrical Engineering, University of Johannesburg **Year:** 2013 **Thesis**: A Study of Analogies between Processes in Technical and Biological Systems. **Co-Supervisor**: D.J. van Wyk **Where Now?** Retired.
14. Bolanle Tolulope Abe **Nationality**: Nigerian with Permanent Resident of South Africa **Degree**: PhD: Electrical Engineering, University of the Witwatersrand **Year:** 2014 **Thesis**: Ensembles Classifiers for Land Cover Mapping. **Where Now?** Senior lecturer at the Tshwane University of Technology.
15. Ali Hassan **Nationality**: Jordan **Degree**: DPhil: Electrical Engineering, University of Johannesburg **Year:** 2014 **Thesis**: Potential Use of Artificial Intelligence in the Mining Industry: South African Case Studies. **Co-Supervisor**: B. Twala **Where Now?** Assistant Professor at Higher Colleges of Technology, United Arab Emirates.
16. VP Kommulla **Nationality**: India **Degree**: DIng: Mechanical Engineering, University of Johannesburg **Year:** 2014 **Thesis**: Characterization of Native African Napier Fibre and Napier Grass Fibre Strands/Epoxy Composites. **Co-Supervisor**: K.O. Reddy & M. Shukla MNNIT, India **Where Now?** Senior lecturer at the University of Botswana.
17. Evan Hurwitz **Nationality**: South Africa **Degree**: DIng: Electrical Engineering, University of Johannesburg **Year:** 2014 **Thesis**: Efficient Portfolio Optimization by Hybridized Machine Learning. **Where Now?** Senior Data Scientist at Arca Blanca, United Kingdom.
18. Satyakama Paul **Nationality**: India **Degree**: DPhil: Electrical Engineering, University of Johannesburg **Year:** 2014 **Thesis**: Modelling of Merger and Acquisition Target Prediction for Novice Acquirer: A Computational Intelligence Perspective. **Co-Supervisor**s: F. Buarque , University Pernambuco, Brazil **Where Now?** Co-Founder and CTO at BrainEnTech Neuroscience Bangalore, India
19. Ilyes Boulkaibet **Nationality**: Algeria **Degree**: DIng: Electrical Engineering, University of Johannesburg **Year:** 2015 **Thesis**: Finite Element Model Updating Using Markov Chain Monte Carlo Techniques. **Co-Supervisor**: M. Friswell & S. Adhikari, Swansea University, U.K. **Where Now?** Assistant Professor at the American University of Kuwait.
20. Stephen Akinlabi **Nationality**: Nigeria **Degree**: DIng: Electrical Engineering, University of Johannesburg **Year:** 2016 **Thesis**: Experimental Study and Finite Element Analysis of Lase Formed Steel for Enhanced Structural Integrity. **Co-Supervisor**: M. Shukla, MNNIT, India **Where Now?** Postdoctoral Fellow, University of Johannesburg
21. Marcos Alvares **Nationality**: Brazil **Degree**: DPhil: Electrical Engineering, University of Johannesburg **Year:** 2017 **Thesis**: Tolerance to Complexity: Automatic Prioritising Testing on Large Scale and Distributed Software Development Projects. **Co-Supervisor**: F. Buarque University of Pernambuco, Brazil **Where Now?** Principal Security Researcher at FireEye, Inc., Netherlands.
22. Pramod Kumar Parida **Nationality**: India **Degree**: DPhil: Electrical Engineering, University of Johannesburg **Year:** 2017 **Thesis**: Causality: Exploratory Data Analysis and Knowledge Discovery. **Co-Supervisor**: S. Chakraverty National Institute of Technology, Rourkela, India **Where Now?** Assistant Professor at University of Petroleum and Energy Studies Bangalore Urban, Karnataka, India
23. Ahmed Abdi Yusuf Ali **Nationality**: Somalia and Kuwait **Degree**: DIng: Electrical Engineering, University of Johannesburg **Year:** 2017 **Thesis**: Various Optimization Algorithms Adaptation and Case Study Applied on Optimal Location and Sizing of Distribution Generation Systems in Electrical Power Grids. **Co-Supervisor**: Bhekisipho Twala **Where Now?** Senior Lecturer at the University of Johannesburg.
24. Collins Achepsah Leke **Nationality**: Cameroon **Degree**: DPhil: Electrical Engineering, University of Johannesburg **Year:** 2017 **Thesis**: Computational intelligence techniques for higher dimensional missing data estimation. **Co-Supervisor**: Bhekisipho Twala **Where Now?** Senior Lecturer at the University of Johannesburg

25. Venu Kuthadi **Nationality**: India **Degree**: DIng: Electrical Engineering, University of Johannesburg **Year:** 2018 **Thesis**: An efficient web services framework for approximate data collection in wireless sensor networks. **Where Now?** Associate Professor at Botswana International University of Science and Technology (BIUST)
26. Rajalakshmi Selvaraj **Nationality**: India **Degree**: PhD: Electrical Engineering, University of Johannesburg **Year:** 2018 **Thesis**: Network security by preventing DDOS attack using honeypot. **Where Now?** Senior Lecturer at Botswana International University of Science and Technology (BIUST)
27. Gugulethu P. Mabuza-Hocquet **Nationality**: South Africa **Degree**: PhD: Electrical Engineering, University of Johannesburg **Year:** 2018 **Thesis**: Reconnaissance and assessment of IRIS features towards human iris classification. **Where Now?** Research Group Leader at the Council for Scientific and Industrial Research
28. Abhishek Ranjan **Nationality**: India **Degree**: PhD: Electrical Engineering, University of Johannesburg **Year:** 2018 **Thesis**: Malicious Attacks Detection in Wireless ad hoc Networks. **Where Now?** Dean at Botho University in Lesotho.
29. Tanmoy Roy **Nationality**: India **Degree**: PhD in Electrical Engineering **Year:** 2019 University of Johannesburg **Thesis**: Detecting Emotions from Speech Using Machine Learning Techniques **Where Now?** Post-doctoral Fellow at the University of Johannesburg
30. Robert Pokote Mutyavavire **Nationality**: Zimbabwe **Degree**: PhD in Mechanical Engineering **Year:** 2020 University of Johannesburg University of Johannesburg **Thesis**: Stochastic Dynamic Modelling of Empty Rail Wagon Redistribution Management in South Africa **Where Now?** Lecturer at the University of Johannesburg.
31. Peter Olukanmi **Nationality**: Nigeria **Degree**: PhD in Electrical Engineering Year: 2021 University of Johannesburg **Thesis**: Addressing Shortcomings of the K-means Algorithm vis the Central Limit Theorem and Chebyshev's Inequality. **Where Now?** Post-doctoral Fellow at the University of Johannesburg
32. Rendani Mbuvha **Nationality**: South Africa **Degree**: PhD in Electrical Engineering Year: 2021 University of Johannesburg **Thesis**: Parameter Estimation Using Probabilistic Techniques. **Where Now?** Queen Mary University of London Google Deepmind Fellow and a board member of Bidvest Life (effect 1 January 2021).
33. Tariq Shahzad – PhD in Electrical Engineering University of Johannesburg **Nationality**: Pakistan Topic: Development of physiological indices using modern signal processing approaches (Completed)
34. Joshua Maumela – PhD in Electrical Engineering University of Johannesburg **Nationality:** South Africa Topic: A Meta-heuristic Optimisation Algorithm Based on Ubuntu Philosophy: Introduction and Applications of Ulimisana Optimisation Algorithm (Completed) **Where now?** Digital Insight Manager at Standard Bank South Africa.
35. Daniel Muller – PhD in Electrical Engineering University of Johannesburg **Nationality:** Israel Topic: Value Rational Planning and Decision Making in Oversubscription Systems (Completed) **Where now?** Chief Technology Officer BTB be the Bank, Tel Aviv.
36. Wilson Mongwe – PhD Electrical Engineering University of Johannesburg **Nationality**: South Africa Topic: Hybrid Monte Carlo Methods in Machine Learning: Stochastic Volatility Methods, Shadow Hamiltonians, Adaptive Approaches and Variance (Completed) **Where now?** Senior Quantitative Analyst. ABSA Bank.
37. Marwan Sherri – PhD Mechanical Engineering University of Johannesburg **Nationality**: Jordan Topic: Evolutionary Markov Chain Monte Carlo Algorithms for Bayesian Model Updating Evolutionary Markov Chain Monte Carlo Algorithms for Bayesian Model Updating (Completed)

Master's Supervision

1. Lungile Mndileki Zanoxolo Mdlazi **Nationality**: South Africa **Degree**: MEng: Mechanical Engineering, University of Pretoria **Year:** 2003 **Thesis**: A Synchronous Filter for Gear Vibration Monitoring Using Computational Intelligence. **Co-Supervisor**s: P.S. Heyns & C.J. Stander **Where Now?** Design Engineer at Rotek Engineering.
2. Nadim Mohamed **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2003, Completed with Distinction **Thesis**: Detection of Epileptic Activity in the EEG Using Artificial Neural Networks **Co-Supervisor**: D.M. Rubin **Where Now?** Head, Technology, Media and Telecom Research at SBG Securities (Standard Bank).
3. Brain Betechuoh Leke **Nationality**: Cameroon **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2005, Completed with Distinction **Thesis**: Optimal Selection of Stocks Using Computational Intelligence Methods. **Where Now?** Went on to obtain a PhD under my supervision and is currently an associate partner at McKinsey & Co.
4. Zaheer Ahmed Dindar **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2005 **Thesis**: Artificial Neural Networks Applied to Option Pricing. **Where Now?** Managing Partner at BeyondSoil.
5. Michael M. Pires **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2005, Completed with Distinction **Thesis**: Option Pricing Using Support Vector Machines and Neural Networks. **Where Now?** Putman Mechanical, USA.
6. Bradley van Aardt **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2005 **Thesis**: Multi-Agent Communication and Collaboration. **Where Now?** IT engineer at Intellect Solutions.
7. Lukasz A. Machowski **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2005, Completed with Distinction **Thesis**: Image Shape Classification Using Computational Intelligence and Object Orientation: **Where Now?** IT engineer at SynThesis Software Technologies.
8. Mussa Abdella **Nationality**: Eritrea **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2006, Completed with Distinction **Thesis**: The Use of Genetic Algorithms and Neural Networks to Approximate Missing Data in Database. **Where Now?** IT engineer in Norway.
9. E Habtemariam **Nationality**: Eritrea **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2006, Completed with Distinction **Thesis**: Artificial Intelligence for Conflict Management. **Co-Supervisor**: M. Lagazio **Where Now?** IT engineer in Johannesburg.
10. Elbert Marais **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2006 **Thesis**: Predicting Global Internet Instability Caused by Worms Using Neural Networks. **Where Now?** Technology Director in New Zealand.
11. Trevor Ransome **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2006 **Thesis**: Automatic Minimization of Patient Setup Errors in Proton Beam Therapy. **Co-Supervisor**s: D.M. Rubin & E.A. de Kok **Where Now?** IT engineer at Entelect Solutions in Cape Town.
12. Gareth Setati **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2007 **Thesis**: Machine Learning for Decision-Support in Distributed Networks. **Where Now?** Senior Manager: Program Management Office at MTN.
13. Morongwe Malebye **Nationality**: South Africa **Degree**: MBA, University of the Witwatersrand **Year:** 2007 **Thesis**: Forecasting the JSE All Index Share Using Neural Network Techniques. **Where Now?** Consultant in the mining industry.

14. T. Djonon Hyppolyte **Nationality**: Cameroon **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2007 **Thesis**: Machine Condition Monitoring Using Neural Networks: Feature Selection Using Genetic Algorithm. **Where Now?** Senior Consultant, Data Scientist at Alithya in Canada.
15. Taryn Tim **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2007, Completed with Distinction **Thesis**: Predicting HIV Status Using Neural Networks and Demographic Factors. **Where Now?** Business analyst at ThoughtWorks.
16. Pretesh Bhoola Patel **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2007 **Thesis**: A Forecasting of Indices and Corresponding Investment Decision-Making Application. **Where Now?** Worked as an engineer for CSIR and Bytes Technology, then worked as a Senior Lecturer at the University of Johannesburg and is Senior Data and Applied Scientist at Microsoft.
17. Simon Scurrell **Nationality**: British **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2007 **Thesis**: Automatic Detection of Pulmonary Embolism Using Computational Intelligence. **Co-Supervisor**: D.M. Rubin, Wits **Where Now?** Software engineer in London.
18. Evan Hurwitz **Nationality**: South Africa **Degree**: MSElectrical Engineering, University of the Witwatersrand **Year:** 2007 **Thesis**: Multi-Agent Modelling using Intelligent Agents in Competitive Games. **Where Now?** Completed a PhD at the University of Johannesburg under my supervision and Senior Data Scientist at Arca Blanca, United Kingdom.
19. Lunga Dalton **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2007, Completed with Distinction **Thesis**: Time Series Analysis Using Fractal Theory and Ensemble Classifiers with Application to Stock Portfolio Optimization. **Where Now?** Completed a PhD at Purdue University, USA and now Scientist at Oak Ridge National Laboratory Knoxville, Tennessee, United States.
20. Dhiresh Surajpal **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2007, Completed with Distinction **Thesis**: An Independent Evaluation of Subspace Facial Recognition Algorithms. **Where Now?** Head of Partnerships, Telecoms, Africa, EMEA Partnership Solutions at Google.
21. Thando Tettey **Nationality**: Ghana **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2007, Completed with Distinction **Thesis**: A Computational Intelligence Approach to Modelling Interstate Conflict: Conflict and Causal Interpretations. **Where Now?** Engineer at a Defense Industry and Head Of Engineering and Architecture – Digital at Investec United Kingdom.
22. Shakir Mohamed **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2007, Completed with Distinction **Thesis**: Dynamic Protein Classification: Adaptive Models Based on Incremental Learning Strategies. **Co-Supervisor**: D.M. Rubin **Where Now?** Went to complete a PhD at the University of Cambridge and now an engineer at Google Deepmind.
23. Michael Herzog **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of Pretoria **Year:** 2007, Completed with Distinction **Thesis**: Machine and Component Residual Life Estimation Through the Application of Neural Networks. **Co-Supervisor**: P.S. Heyns, UP **Where Now?** Senior engineer at ThyssenKrupp.
24. Busisiwe Vilakazi **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2007, Completed with Distinction **Thesis**: Machine Condition Monitoring Using Artificial Intelligence: The Incremental Learning and Multi-Agent System Approach. **Where Now?** Went to complete a Doctorate Degree at Oxford University in the UK and now a businesswoman in Johannesburg.

25. Daniyel Falk **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2007 **Thesis**: Enhancement of Noisy Planar Nuclear Medicine Images using Mean Field Annealing. **Co-Supervisor**: D.M. Rubin **Where Now?** Technical Director at StringTheory.
26. Jonathan Spiller **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2007 **Thesis**: Object Localization Using Deformable Templates. **Where Now?** Software Engineer in Israel.
27. Bodie Crossingham **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2008 **Thesis**: Rough Set Partitioning Using Computational Intelligence Approach. **Where Now?** Consultant Accenture in Texas and Johannesburg.
28. Gregory Hulley **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2008 **Thesis**: Incremental Learning Algorithms Applied to Flow Cytometry Data for Multi-Class Diagnosis of Leukemia. **Where Now?** Engineer at Origin Energy.
29. Bunty Kiremile **Nationality**: Uganda **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2008 **Thesis**: Non-stationarity Detection. **Where Now?** Engineer at the Eskom and now in Uganda.
30. Nthabiseng Unathi Hlalele **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2009, Completed with Distinction **Thesis**: The Impact of Missing Data Imputation on HIV Classification. **Co-Supervisor**: F.V. Nelwamondo **Where Now?** Engineer at the CSIR and now at Eskom.
31. Vukosi Marivate **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2009 **Thesis**: Investigation into the Effect of Social Learning in Reinforcement Learning Board Game Playing Agents. **Co-Supervisor**: F.V. Nelwamondo **Where Now?** PhD graduate of Rutgers University in the USA and now a Senior Lecturer at the University of Pretoria.
32. Jaisheel Mistry **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2009 **Thesis**: Estimating Missing Data with Confidence Intervals. **Co-Supervisor**: F.V. Nelwamondo **Where Now?** Python and Java Developer at BMW Group via ISANQA.
33. Lesedi Masisi **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2009 **Thesis**: Investigating the Structural Diversity within a Committee of Classifiers and Their Generalization Performance **Co-Supervisor**: F.V. Nelwamondo **Where Now?** Engineer at the CSIR and a PhD graduate from Concordia University in Canada. Senior Lecturer at Wits University.
34. Tendani Malumedzha **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2009 **Thesis**: Modeling Multiple Object Scenarios for Feature Recognition and Classification Using Cellular Neural Networks. **Co-Supervisor**: F.V. Nelwamondo **Where Now?** Engineer at the CSIR.
35. Wabo Majavu **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2009 **Thesis**: Classification of Web Resident Sensor Resources Using Latent Semantic Indexing and Ontologies. **Where Now?** Worked for CSIR, then Accenture, then MTN and currently at Sentech.
36. Miguel Fernandes **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2011, Completed **Thesis**: SVM to Automatically Detect Epileptic Patterns in EEG. **Co-Supervisor**: D.M. Rubin, University of Witwatersrand **Where Now?** Associate Director at BCG GAMMA in Singapore.
37. A.K. Mohamed **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of the Witwatersrand **Year:** 2011 **Thesis**: The Use of the Improved EEG Interpretation in a Sensorimotor BCI for the Control of Prosthetic Hand. **Co-**

Supervisor: L. John, University of Cape Town **Where Now?** Lecturer at the University of the Witwatersrand.

38. Lindokuhle J. Mpanza **Nationality**: South Africa **Degree**: MSc: Electrical Engineering, University of Johannesburg **Year:** 2012 **Thesis**: A Rough Set Approach to Bushings Fault Detection. **Where Now?** Avionic Systems Engineering Manager at Denel Aeronautics.
39. Zanele Ngenisile Grace Mkhize **Nationality**: South Africa **Degree**: MPhil: Electrical Engineering, University of Johannesburg **Year:** 2012 **Thesis**: Motion Planning Approaches for Autonomous Robot in Static and Dynamic Environment. **Where Now?** Engineer at the CSIR.
40. Msizi Khoza **Nationality**: South Africa **Degree**: MEng: Electrical Engineering, University of Johannesburg **Year:** 2013 **Thesis**: Economic Modeling Using Computational Intelligence Techniques. **Where Now?** Principal: Structured Finance at Absa Group.
41. Tshegofatso Thejane **Nationality**: South Africa **Degree**: MEng: Electrical Engineering, University of Johannesburg **Year:** 2013 **Thesis**: A Comprehensive Electrical Model of the Human Auditory Periphery for Auto-acoustic Emissions Study. **Co-Supervisor**: F.V. Nelwamondo **Where Now?** Product Manager at Fundabotix (Pty) Ltd.
42. Collin Achepsa Leke **Nationality**: Cameroon **Degree**: MEng: Electrical Engineering, University of Johannesburg **Year:** 2014, Completed with Distinction **Thesis**: Empirical Evaluation of Optimization Techniques for Prediction and Classification Tasks. **Where Now?** Senior Lecturer at the University of Johannesburg.
43. Joshua F. Maumela **Nationality**: South Africa **Degree**: (MEng: Electrical Engineering, University of Johannesburg **Year:** 2014 **Thesis**: Condition Monitoring of Transformer Bushings Using Computational Intelligence: Focus on Attribute Reduction. **Co-Supervisor**: F.V. Nelwamondo **Where Now?** Proceeded to Waseda University in Japan where he completed a Master in Economics.
44. Norman Nelufule **Nationality**: South Africa **Degree**: MPhil: Electrical Engineering, University of Johannesburg **Year:** 2014 **Thesis**: Combining Multiple Iris Matchers using Advanced Fusion Techniques to Enhance Iris Matching Performance. **Co-Supervisor**: F.V. Nelwamondo **Where Now?** PhD student at Chiba University Japan.
45. Sicelo Xulu **Nationality**: South Africa **Degree**: MPhil: Electrical Engineering, University of Johannesburg **Year:** 2015, Completed with Distinction **Thesis**: Modelling Renewable Energy Sources for South Africa. **Co-Supervisor**: B. Twala. **Where Now?** Managing director of City Power Johannesburg.
46. Daniel J. Joubert **Nationality**: South Africa **Degree**: MPhil: Mechanical Engineering, University of Johannesburg **Year:**2016, Completed with Distinction **Thesis**: Markov Chain Monte Carlo Methods for Finite Element Model Updating. **Where Now?** Engineer at AHRLAC.
47. Yanga C. Tekane **Nationality**: South Africa **Degree**: MPhil: Electrical Engineering, University of Johannesburg **Year:** 2016, Completed with Distinction **Thesis**: Landscape Aware Miniature Aerial Vehicles. **Co-Supervisor**: B. Twala **Where Now?** Engineer at the CSIR.
48. Borriane Yousseu Tchaleu **Nationality**: Cameroon **Degree**: MEng: Electrical Engineering, University of Johannesburg **Year:** 2020, Completed with Distinction **Thesis**: Effective Algorithms to Predict Customer Churn in Financial Services. **Co-Supervisor**: Collins Leke **Where Now?** Student at UJ.

Students under Supervision

1. Lukasz Machowski – PhD **Nationality**: Poland Topic: Data Science
2. Craig Wing – PhD **Nationality:** South Africa: Engineering management
3. Thendo Sigodi – PhD **Nationality:** South Africa: Finance and AI

REFERENCE

1. **Professor Fernando Buarque de Neto** Associado: Escola Politécnica, Universidade de Pernambuco, Brazil. Adjunct Professor: Electrical & Computer Engineering, Texas A&M University, (ECE@TAMU), USA. Email: fbln@ecomp.poli.br, Phone: +558131847542
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   e-mail: rmurenzi@twas.org / rmurenzi@gmail.com Telephone: +393476881734
3. **Prof Adam Habib,** Director of the School of Oriental and African Studies (SOAS), University of London, SOAS University of London, Thornhaugh Street, Russell Square, London WC1H 0XG UK Phone: +447912487280 Email: ah130@soas.ac.uk
4. **President Kgalema Motlanthe** Former President of the Republic of South Africa
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