

Curriculum vitae: Caston Sigauke

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Education

- 2014 PhD (Statistics) University of the Free State, South Africa.
- 2000 MSc (Operations Research) National University of Science and Technology, Zimbabwe.
- 1994 BEd (Mathematics) University of Zimbabwe, Zimbabwe.

Current position

- 2015- Senior lecturer, Department of Statistics, University of Venda

Honours and Awards

- 2017 DST-NRF Centre of Excellence-Mathematical and Statistical Sciences bursary/fellowship (for an MSc student) valued at R 80,000.00.
- 2016 Knowledge Share award: SASA/NRF Academic Statistics in Crisis. Value of Award R15,000.00.
- 2016 Awarded the DST-NRF Centre of Excellence in Mathematical and Statistical Sciences (CoE-MaSS) for funding a Workshop on Quantile Regression. Value of award R30,000.00.
- 2015-2017 Awarded the National Research Foundation (NRF) grant for Competitive Support for Unrated Researchers (CSUR). Project title "Probabilistic Load Forecasting". Value of award R688,500.00.
- 2015 Awarded the Faculty of Science Research grant (Faculty of Science, University of Witwatersrand). Value of award R30,000.00.
- 2014 Awarded the Faculty of Science Research grant (Faculty of Science, University of Witwatersrand). Value of award R30,000.00.
- 2014 Awarded the Dean's Research grant (Faculty of Science, University of Witwatersrand). Value of award R25,000.00.
- 2014 Vice Chancellor's research support (University of Witwatersrand). Value of award R15,000.00.
- 2012 Excellence award for being the best researcher in the School of Mathematical and Computer Sciences at the University of Limpopo, South Africa in 2012. Value of award R10, 000.00.
- 2011 Awarded the Knowledge Interchange Collaboration (KIC) travel grant by National Research Foundation (NRF) of South Africa. Value of award R15,000.00.

Membership of Associations

- Chartered member in the field of Statistical Sciences Facilitation: Institute of Certificated and Chartered Statisticians of South Africa (ICSSA). Membership Number: 13ChMo12.
- Member of the International Institute of Forecasters (IIF). Member ID: 7178.
- Member of the Operations Research Society of South Africa (ORSSA). Member ID 511.
- Member of the South African Statistical Association (SASA).

Research

- My current research is on probabilistic electricity demand forecasting and solar energy modelling.
- I currently supervise 2 PhD students and 4 Masters students. I have previously supervised 14 Masters students.
- My research interests are in: Forecasting and time series, Statistics of extremes, Statistical learning and modelling, Exploratory data analysis.

Consulting

- 2012–2013 Danish Energy Management A/S: Part-time Energy efficiency monitoring expert and statistical consultant working on the project for monitoring energy efficiency and carbon dioxide emissions for the Department of Energy, South Africa. 1 January 2012 to 31 December 2013. Duties: Identify review priorities; establish data gaps; establish data collection system; methodology establishment and data gathering; refinement of methodology, collection, data handling and reporting.
- 2009–2010 Energy statistical consultant, Energy Demand Forecasting Project for Eskom, South Africa (1-07-2009 to 31-03-2010). Duties: Our task was to develop short term forecasting models for hourly, daily and monthly electricity demand. The project was done in collaboration with the Nelson Mandela Metropolitan University.

Seminars, Workshops and Invited Talks Given

- 2016 Research Seminar at Eskom on transmission and distribution network demand forecasting.
- 2016 Research visit to Eskom National Control Centre in Johannesburg, South Africa.
- 2016 ICSSA/ORSSA/SASA breakfast seminar at Council for Scientific and Industrial Research (CSIR), Pretoria. "Short term hourly load forecasting during the peak period using quantile regression with an application to the unit commitment problem".
- 2014 Public seminar "Winter peak electricity demand modelling in South Africa". University of the Witwatersrand.
- 2013 Data validation workshop for the National Development Plan of South Africa, Vision 2030 in Pretoria.
- 2010 Eskom workshop on Energy, Economics Statistics and Datamining: Heritage Conference Centre, South Africa.
- 2009 Workshop on Forecasting and Modelling in Energy and Finance: Department of Statistics and Centre for Energy Research, Nelson Mandela Metropolitan University, Port Elizabeth in partnership with Eskom, South Africa. Title of paper presented: "A GARCH modelling approach to hourly electricity load forecasting".

Publications

PhD thesis

1. Sigauke, C. (2014). Modelling Electricity Demand in South Africa. PhD thesis. University of the Free State, South Africa.

Refereed journal articles

1. Lebotsa, M.E., Sigauke, C, Bere, A., Fildes, R. and Boylan, J.E. (2018). Short term electricity demand forecasting using partially linear additive quantile regression with an application to the unit commitment problem, *Applied Energy*, vol. 222, pp. 104-118.
2. Nemukula, M.M. and Sigauke, C. (2018). Modelling average maximum daily temperature using r largest order statistics: An application to South African data. *Journal of Disaster Risk Studies*. a467. <https://doi.org/10.4102/jamba.v10i1.467>
3. Sigauke, C. and Chikobvu, D. (2017). Estimation of extreme inter-day changes to peak electricity demand using Markov chain analysis: A comparative analysis with extreme value theory, *Journal of Energy in Southern Africa*, vol. 28, no. 4, pp. 68-76.
4. Sigauke, C. and Bere, A. (2017). Modelling non-stationary time series using a peaks over threshold distribution with time varying covariates and threshold: An application to peak electricity demand. *Energy Journal*, vol. 119, pp. 152-166.
5. Sigauke, C. (2017). Forecasting medium term electricity demand in a South African power supply system. *Journal of Energy in Southern Africa*, vol. 28, no. 4, pp. 54-67.
6. Sigauke, C. (2016) Volatility modeling of the JSE all share index and risk estimation using the Bayesian and frequentist approaches, *Economics, Management, and Financial Markets*, vol. 11, no. 4, pp. 33-48.
7. Sigauke, C. and Chikobvu, D. (2016). Peak electricity demand forecasting using time series regression models: An application to South African data. *Journal of Statistics and Management Systems*, vol. 19, no. 4, pp. 567-587.
8. Mokhele, M. and Sigauke, C. (2015). Modelling summer daily peak loads in South Africa using discrete time Markov chain analysis. *Mathematics and Statistics*, vol. 3, no. 5, pp. 121-128.
9. Sigauke C., Darikwa T.B. and Masemola M.I. (2014). Prediction of South Africas Tourism Hotel Accommodation Monthly Income: Challenges in an Environment Characterised by a World Recession and a World Cup. *Mediterranean Journal of Social Sciences*, vol. 5, no. 20, pp. 460-465.
10. Sigauke, C., Makhwiting, R. and Lesaoana, M. (2014). Modelling conditional heteroskedasticity in JSE stock returns using the Generalized Pareto Distribution. *African Review of Economics and Finance*, vol. 6, no. 1, pp. 41-55.
11. Maposa, D. Cochran, J.J., Lesaoana, M. and Sigauke, C. (2014). Estimating high quantiles of extreme flood heights in the lower Limpopo River basin, Mozambique, using model based Bayesian approach. *Natural Hazards and Earth System Sciences*, vol. 2, no. 8, pp. 5401-5425.

12. Makhwiting, R., Sigauke, C. and Lesaoana, M. (2014). Modelling tail behavior of returns using Generalized Extreme Value distribution. *Economics Management and Financial markets*, vol. 9, no. 1, pp. 41-52.
13. Sigauke, C., Verster, A. and Chikobvu D. (2013). Extreme daily increases in peak electricity demand: tail-quantile estimation. *Energy Policy Journal*, vol. 53, pp. 90-96.
14. Chikobvu, D. and Sigauke, C. (2013). Modelling influence of temperature on daily peak electricity in South Africa. *Journal of Energy in Southern Africa*, vol. 24, no. 4, pp. 63-70.
15. Verster, A., Chikobvu, D. and Sigauke, C. (2013). Analysis of the same day of the week increases in peak electricity demand in South Africa. *ORiON Journal*, vol. 29, no. 2, pp. 125-136.
16. Sigauke, C., (2013) Volatility modelling of real GDP growth rates in South Africa. *Economics Management and Financial Markets*, vol. 8, no. 2, pp. 81-94.
17. Kumar, S., Munapo, E., Ncube, O. and Sigauke, C., Nyamugure, P. (2013). A minimum weight labelling method for determination of a shortest route in a non-directed network. *International Journal of System Assurance Engineering and Management*, vol. 4, no. 1, pp. 13-18.
18. Chikobvu, D., Sigauke, C. and Verster, A. (2012). Winter peak electricity load forecasting in South Africa using extreme value theory. *South African Statistical Journal*, vol. 46, pp. 377-394.
19. Chikobvu, D. and Sigauke, C. (2012). Regression-SARIMA modelling of daily peak electricity demand in South Africa. *Journal of Energy in Southern Africa*, vol. 23, no. 3, pp. 23-30.
20. Sigauke, C., Verster, A. and Chikobvu, D. (2012). Tail quantile estimation of heteroskedastic intraday increases in peak electricity demand. *Open Journal of Statistics*, vol. 2, no. 4, pp. 435-442.
21. Chikobvu, D. and Sigauke, C. (2012). A frequentist and Bayesian regression analysis to daily peak electricity demand in South Africa. *African Journal of Business Management*, vol. 6, no. 40, pp. 10524-10533.
22. Sigauke, C. and Chikobvu, D. (2012). Short-term daily winter peak electricity demand in South Africa. *African Journal of Business Management*, vol. 6, no. 32, pp. 9243-9249.
23. Makhwiting, R., Lesaoana, M. and Sigauke, C. (2012). Modelling volatility and financial market risk of shares on the Johannesburg Stock Exchange. *African Journal of Business Management*, vol. 6, no. 27, pp. 8065-8070.
24. Makukule, N. A., Sigauke, C. and Lesaoana, M. (2012). Daily Electricity Demand Forecasting in South Africa. *African Journal of Business Management*, vol. 6, no. 9, pp. 3246-3252.
25. Chikobvu, D., Sigauke, C. and Verster, A. (2012). Winter peak electricity load forecasting in South Africa using extreme value theory with a Bayesian flavour. *Journal of Business and Economics*, vol. 3, no. 5, pp. 380-389.
26. Sigauke, C., Maposa, D. and Chagwiza, W. (2012). Modelling Commercial Banks liquidity Management Using Stochastic Programming. *International Journal of Business and Manage-*

- ment, vol. 7, no. 9, pp. 49-64.
27. Sigauke, C. and Chikobvu, D. (2011). Prediction of daily peak electricity demand in South Africa using volatility forecasting models. *Energy Economics Journal*, vol. 33, no. 5, pp. 882-888.
 28. Maposa, D., Mudimu, E., Sigauke, C., Mlilo, P., Nyamugure, P. and Dube, S. (2011). Relating glycemia levels in a Zimbabwean population to some established type 2 diabetes risk factors using multiple linear regression analysis. *Archives of Applied Science Research*, vol. 3, no. 1, pp. 333-342.
 29. Riba, S.J., Lesaoana, M, Sigauke, C. and Makwela, M.R. (2011). A logistic regression analysis of the occurrence of mine accidents in the Burgersfort area in South Africa. *Journal of Geology and Mining Research*, vol. 3, no. 1, pp. 188-192.
 30. Nyamugure, P., Maposa, D., Sigauke, C. and Chiyaka, E. (2011). A holistic application of process capability indices. *African Journal of Business Management*, vol. 5, no. 28, pp. 11413-11424.
 31. Sigauke, C. and Chikobvu, D. (2010). Daily peak electricity load forecasting in South Africa using a multivariate non-parametric regression approach. *ORiON Journal*, vol. 26, no. 2, pp. 97-111.
 32. Sigauke, C. and Talukder, H.M. (2003). A modified Osmans simulated annealing and tabu search algorithm for the vehicle routing problem. *The Australian Society for Operations Research*, vol. 22, no. 3, pp. 9-14.

Refereed conference proceedings

1. Maswanganyi, N., Sigauke, C. and Ranganai, E. (2017). Peak electricity demand forecasting using partially linear additive quantile regression models. *South African Statistical Journal: Peer-reviewed Proceedings of the 59th Annual Conference of the South African Statistical Association for 2017*, pp. 25-32.
2. Nemukula, M.M. and Sigauke, C. (2015). Modelling average minimum daily temperature using extreme value theory with a time varying threshold. *South African Statistical Journal: Peer-reviewed Proceedings of the 57th Annual Conference of the South African Statistical Association for 2015*, pp. 57-64.
3. Sigauke, C., Chikobvu, D. and Verster, A. (2012). Modelling daily increases in peak electricity demand using a generalized Pareto distribution. *South African Statistical Journal: Peer-reviewed Proceedings of the 54th Annual Conference of the South African Statistical Association for 2012*, pp. 58-66.
4. Sigauke, C. (2011). An Econometric study of currency crisis in a hyperinflationary economy: A case study. *Proceedings of the 40th Annual Conference of the Operations Research Society of South Africa*, pp. 29-36.
5. Sigauke, C., Maposa, D., Mudimu, E. and Nyamugure, P., (2010). Volatility modelling using ARIMA-GARCH models in a hyperinflationary economic environment: The Zimbabwean experience. *South African Statistical Journal: Peer-reviewed Proceedings of the 52nd Annual*

Conference of the South African Statistical Association for 2010: Special Issue 1, pp. 1-14.

Papers Presented at International Conferences

1. Sigauke C., Nemukula M.M. and Chikobvu D. Impact of temperature extremes on electricity demand: A case study. 21st Conference of the International Federation of Operational Research Societies, Quebec, Canada, 17-21 July 2017.
2. Nemukula M.M. and Sigauke C. Modelling average maximum daily temperature using r largest order statistics: An application to South African data. 61st ISI World Statistics Congress, Marrakech, Morocco, 16-21 July 2017.
3. Nemukula M.M. and Sigauke C. Modelling average minimum daily temperature using extreme value theory with a time-varying threshold. 10th International Conference on Extreme Value Analysis, Delft University of Technology, The Netherlands 26-30 June 2017.
4. Sigauke C. Modelling the effect of heatwaves on electricity demand: A case study. The 3rd International Conference on Energy and Environment Research, Barcelona, Spain, 7-11 September 2016.
5. Sigauke C. Modelling of extreme non-winter peak electricity demand: An application to South African data. The 36th International Symposium on Forecasting, Santander, Spain, 19-22 June 2016.
6. Sigauke C. and Dowdeswell M., Modelling peak electricity demand using extreme value theory with time varying parameters: An application to South African data. The 35th International Symposium on Forecasting, Riverside, California, USA, 21-24 June 2015.
7. Dowdeswell M. and Sigauke C., Non-stationary point processes and their extremes: an exploration of electricity demand in South Africa. The 9th International Conference on Extreme Value Analysis at the University of Michigan, Ann Arbor, June 15-19, 2015, USA.
8. Mokhele M. and Sigauke C. Modelling summer daily peak load demands in South Africa using discrete time Markov chain analysis. The 9th International Conference on Extreme Value Analysis at the University of Michigan, Ann Arbor, June 15-19, 2015.
9. Sigauke C. and Chikobvu D, A Markov chain analysis of daily changes to peak electricity demand in South Africa. The 34th International Symposium on Forecasting, Economic Forecasting Past, Present and Future, Rotterdam, The Netherlands, June 29 July 2, 2014.
10. Sigauke C. and Chikobvu D, A probabilistic characterization of day to day changes in peak electricity demand. The 34th International Symposium on Forecasting, Economic Forecasting Past, Present and Future, Rotterdam, The Netherlands, June 29 July 2, 2014.
11. Chikobvu D., Sigauke C. and Verster A., Winter peak electricity load forecasting in South Africa using extreme value theory with a Bayesian flavour. Poster presented at the International Society for Bayesian Analysis, June 2012 Conference, Kyoto, Japan.
12. Sigauke C. and Chikobvu D., Modelling daily peak electricity load forecasting in South Africa using a multivariate non-parametric regression approach. 19th Triennial Conference of the In-

ternational Federation of Operations Research Societies, Melbourne, Australia, July 10-15, 2011. Chaired the invited session FC-1: OR, Energy, and Africa in stream OR Applications in Energy.

13. Chikobvu D. and Sigauke C., Modelling daily peak electricity demand in South Africa using SARIMA and RegSARIMA models. Second Isibalo Young African Statisticians' Conference, 1-3 December 2010, Pretoria, South Africa.
14. Sigauke C., An econometric study of currency crises in developing economies: the Zimbabwean case. 18th Triennial Conference of the International Federation of Operations Research Societies, Sandton Convention Centre, South Africa, July 13-18, 2008. Chaired the session MC-13 Finance Applications.

International Conferences Attended without a presentation

1. 26-30 July 2015: IEEE Power Energy Society General Meeting, Powering up the next generation, Denver, Colorado, USA. Attended a full day tutorial on Energy Forecasting in the Smart Grid Era.

International Research visits

1. Research collaboration visit: Department of Mathematical Sciences, University of Malawi, 30 October 2017 to 3 November 2017. "Impact of temperature extremes on electricity demand: A case study".
2. Research collaboration visit: Lancaster Centre for Forecasting, Lancaster University, Management Science, December 5-9, 2016. "Short-term electricity demand forecasting using quantile regression with an application to the unit commitment problem". <http://www.research.lancs.ac.uk/portal/en/people/search.html?search=Caston+Sigauke&uri=&filter=>

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