



# RESEARCH PRODUCTIVITY 2019

## 2019 List of Research Publications

### Book and Book Chapter

None

### Keynote and Invited Presentations

- [1] I E Davidson, "Grant Writing and Research Proposals", 2019 IEEE IAS/PES Power Africa Conference, International Training Institute, Maitama, Abuja, Nigeria, 22 August 2019.
- [2] I E Davidson, "University Presentations: Research Focus Areas – Opportunities for Collaboration and Student Mobility", 4<sup>th</sup> South Africa-Japan Universities Forum (SAJU) Conference, Future Africa Campus, University of Pretoria, 23 - 24 May 2019.
- [3] I E Davidson, "Advances in Long Distance Ultra-High Voltage DC Transmission Systems", Royal Academy of Engineering Guest Lecture and Postgraduate Research Seminar, FEBE Boardroom, Level 3, S4, Steve Biko Campus, Durban University of Technology, 12 April 2019.
- [4] I E Davidson, "Long-Distance UHVDC Technology - A Future Energy Disrupter"; The SAIEE KZN Centre, Chairman's Breakfast/Brunch Meeting on "Future Energy Disruption", Belvedere Room, Durban Country Club, 8.00am, 15 March 2019.
- [5] I E Davidson, "Successes in University – Industry Partnerships – Perspectives from Durban Univ. of Technology", Conference on Quality Engineering Education 2019, Safari Hotel & Conference Centre, Windhoek, 7 – 8 March 2019. [Royal Academy of Engineering RAE-UNIP Project on Higher Education Partnerships in Sub Saharan Africa, HEPSSA].

## DHET Accredited Journal Papers

- [1] Elutunji Buraimoh, Innocent E. Davidson and Fernando Martines-Rodrigo, "Fault Ride-Through Enhancement of Grid Supporting Inverter-Based Microgrid using Delayed Signal Cancellation Algorithm Secondary Control", *Energies* 2019, Vol 12, Issue 20, 3994; doi:10.3390/en12203994
- [2] Dhanpal Chetty, Gulshan Sharma and Innocent Davidson, "Active Power Regulation of the Power System considering DFIG based Wind Power in coordination with TCPS-SMES", *International Energy Journal*, Vol. 19, 2019, pp. 189 – 198. Available at <http://www.rericjournal.ait.ac.th/index.php/eric/article/view/2029>
- [3] Elutunji Buraimoh and Innocent E. Davidson, "Investigation of the Low Voltage Ride-Through of Inverter Using Virtual Inertia Methods in Micro-grid", *International Journal of Engineering Research in Africa*, Vol. 44, pp 200-212, ISSN 1663-4144, doi: 10.4028/www.scientific.net/JERA.44.200.
- [4] Usiholo Iruansi, Jules R. Tapamo, and Innocent E. Davidson, "Classification of Power-line Insulator Condition using Local Binary Patterns with Support Vector Machines," *IAENG International Journal of Computer Science*, Vol. 46, No.2, pp 300-310, 2019.
- [5] Bheki Madonsela, Innocent E Davidson and Crispin Mulangu, "Integrating DNP3 Devices into IEC61850 Server". *Interdisciplinary Journal of Economics and Business Law*, Vol. 8, Special Issue 2019, pp. 264-285.
- [6] Akhilesh Panwar, Gulshan Sharma and R. C. Bansal, "Optimal AGC Design for a Hybrid Power System using Hybrid Bacteria Foraging Optimization Algorithm", *Electric Power Component and System Journal*, Taylor & Francis, vol. 0, pp. 1-11, 2019.
- [7] Gulshan Sharma, "Optimal AGC Design for Diverse Sources of Power Generations in each Area Using Output Vector Feedback Control Technique", *International journal of Engineering. Research in Africa*, Vol. 45, pp. 99-114, 2019.
- [8] Gulshan Sharma, K. Loji and M. Kabeya, "Application of Diverse FACTS in AGC of Multi-area Interconnected Energy Systems", *Indonesian Journal of Electrical Engineering and Informatics*, Vol. 7, No. 2, pp. 241-254, 2019.

## Non-DHET Accredited Journal Paper

- [1] Adebisi, A.A., Lazarus, I.J., Saha, A.K., Ojo, E.E." Performance analysis of 8 kW grid-tied solar photovoltaic power plant in Durban, South Africa" *International Journal of Advanced Research in Engineering and Technology* 10(4), pp. 140-153, 2019.
- [2] Eddie Singh and Innocent E. Davidson, "Utilization of Line Surge Arrestors to Improve Overhead EHV DC Line Performance under Lightning Conditions", *International Journal of Applied Engineering Research*. Volume 14, No. 21, 2019 pp. 4030-4041. ISSN 0973-4562.
- [3] Akhilesh Panwar, Gulshan Sharma, S. K. Sahoo and R. C. Bansal, "Active Power Regulation of Hydro Dominating Energy System using IDD optimized FPA", *Energy Procedia*, Elsevier, vol. 158, pp. 6328-6333, 2019.
- [4] S. K. Sahoo, Gulshan Sharma, Akhilesh Panwar and R. C. Bansal, "Frequency Regulation of Wind Integrated Power System using Dual Mode Fuzzy", *Energy Procedia*, Elsevier, vol. 158, pp. 6321-6327, 2019.
- [5] Eddie Singh and Innocent E. Davidson, "Improving Overhead HV AC Line Performance using Line Surge Arrestors under Lightning Conditions with Economic Analysis", *International Journal of Applied Engineering Research*. Volume 14, Number 22, 2019 pp. 4126-4135. ISSN 0973-4562.
- [6] Ayodeji Akinyemi and Innocent E. Davidson, "Impacts of Renewable Distributed Generation on Harmonic Injection into a Distribution Network", *International Journal of Applied Engineering Research*, Vol. 14, No. 14, pp. 3137-3145, 2019, ISSN 0973-4562.
- [7] Gulshan Sharma, "Performance Enhancement of a Hydro-hydro Power System using RFB and TCPS", *International Journal of Sustainable Energy*, Taylor & Francis, Vol. 38, no. 7, pp. 615-629, 2019.

## Refereed Conference Proceedings

- [1] Eddie Singh and Innocent Davidson, "Utilization of Line Surge Arrestors to Improve Overhead HV AC Line Performance under Lightning Conditions". In *Proceedings of the 2019 South African Universities Power Engineering Conference/Robotics and Mechatronics/Pattern Recognition Association of South Africa (SAUPEC/RobMech/PRASA)*, 28 – 30 January 2019, Central University of Technology, Free State, Bloemfontein, South Africa, pp. 412 - 419. ISBN: 978-1-7281-0368-6.
- [2] Therasinamurthie P. Govender and Innocent Davidson, "Artisan Development and Training - An analysis of the Apprentice, Learnership and ARPL Trade Test Results of Candidates Tested at TEK-MATION Training Institute". In *Proceedings of the 2019 South African Universities Power Engineering Conference/Robotics and*

- Mechatronics/Pattern Recognition Association of South Africa (SAUPEC/RobMech/ PRASA)*, 28 – 30 January 2019, Central University of Technology, Free State, Bloemfontein, South Africa, pp. 643 – 647. ISBN: 978-1-7281-0368-6.
- [3] Elutunji Buraimoh and Innocent Davidson, "Comparative Analysis of the Fault Ride-Through Capabilities of the VSG Methods of Microgrid Inverter Control under Faults". In *Proceedings of the 2019 South African Universities Power Engineering Conference/Robotics and Mechatronics/Pattern Recognition Association of South Africa (SAUPEC/ RobMech/PRASA)*, 28 – 30 January 2019, Central University of Technology, Free State, Bloemfontein, South Africa, pp. 400 - 405. ISBN: 978-1-7281-0368-6.
- [4] Innocent Davidson, "The HEPSSA Project – A Catalyst for Capacity Building at Durban University of Technology". In *Proceedings of the 2019 South African Universities Power Engineering Conference/Robotics and Mechatronics/Pattern Recognition Association of South Africa (SAUPEC/RobMech/PRASA)*, 28 – 30 January 2019, Central University of Technology, Free State, Bloemfontein, South Africa, pp. 640 – 642. ISBN: 978-1-7281-0368-6.
- [5] Kabulo Loji, Innocent Davidson and Remy Tiako, "Voltage Profile and Power Losses Analysis on a Modified IEEE 9-Bus System with PV Penetration at the Distribution Ends". In *Proceedings of the 2019 South African Universities Power Engineering Conference/Robotics and Mechatronics/Pattern Recognition Association of South Africa (SAUPEC/RobMech/ PRASA)*, 28 – 30 January 2019, Central University of Technology, Free State, Bloemfontein, South Africa, pp. 703 - 708. ISBN: 978-1-7281-0368-6.
- [6] N Ganas, and K.T. Akindeji, "Analysis and Redesign of Protection System for a Sugar Company". In *Proceedings of the 2019 South African Universities Power Engineering Conference/Robotics and Mechatronics/Pattern Recognition Association of South Africa (SAUPEC/RobMech/ PRASA)*, 28-30 January 2019, pp. 364 – 369. ISBN: 978-1-7281-0368-6.
- [7] A.K. Onaolapo, K. T Akindeji and E. Adetiba: "Application of Artificial Neural Network for Fault Location in Distribution Network". In *Proceedings of the 2019 South African Universities Power Engineering Conference/Robotics and Mechatronics/Pattern Recognition Association of South Africa (SAUPEC/RobMech/ PRASA)*, 28-30 January 2019, pp. 299-304. ISBN: 978-1-7281-0368-6.
- [8] Eluntunji Buraimoh Innocent Davidson, "Development of an IGBT-Diode based Fault Current Limiter for Fault Ride-Through Enhancement in Microgrid Applications". In *Proceedings of the 2019 IEEE PES/IAS Power Africa Conference*, 20-23 August 2019, Abuja, Nigeria, pp. 146 – 151, doi: 10.1109/PowerAfrica.2019.8928645.
- [9] Olawale Ogunrinde, Ekundayo Shittu, Mobolaji Bello and Innocent E Davidson, "Exploring the Demand-Supply Gap of Electricity in Nigeria: Locational Evaluation for Capacity Expansions". In *Proceedings of the 2019 IEEE PES/IAS Power Africa Conference*, 20-23 August 2019, Abuja, Nigeria, pp 587 – 592, doi: 10.1109/PowerAfrica.2019.8928645.
- [10] Patrick Ogunboyo and Innocent Davidson, "Assessment and Analysis of Typical Eskom Secondary Distribution Network under Normal Steady State". In *Proceedings of the 2019 IEEE PES/IAS Power Africa Conference*, 20-23 August 2019, Abuja, Nigeria, pp. 633 – 638, doi: 10.1109/PowerAfrica.2019.8928645.
- [11] Abayomi A Adebisi, Akshay K Saha, Ian J Lazarus and Evans E Ojo, "Investigation to Determine the Impacts of SPV Penetration on an Unbalanced Distribution Grid". In *Proceedings of the 6<sup>th</sup> IEEE PES/IAS Power Africa Conference*, 20-23 August 2019, Abuja, Nigeria, pp. 116 –120.
- [12] Evans E Ojo, "The Developed Analytical Model Used to Evaluate the Dynamic Behavior of Power Line Conductors". In *Proceedings of the 6<sup>th</sup> IEEE PES/IAS Power Africa Conference*, 20-23 August 2019, Abuja, Nigeria, pp. 611 – 616.
- [13] Anuoluwapo O Aluko, David G Dorrell, Rudy Pillay-Carpanen and Evans E Ojo, "Frequency Control of Modern Multi-Area Power Systems Using Fuzzy Logic Controller". In *Proceedings of the 6<sup>th</sup> IEEE PES/IAS Power Africa Conference*, 20-23 August 2019, Abuja, Nigeria, pp. 645 – 649.
- [14] Abayomi A Adebisi, Ian J Lazarus, Akshay K Saha, and Evans E Ojo, "High PV Penetration Impact on an Unbalanced Distribution Network". In *Proceedings of the 6<sup>th</sup> IEEE PES/IAS Power Africa Conference*, 20-23 August 2019, Abuja, Nigeria, pp. 706 – 710.
- [15] Leonard Mukwekwe, Rudiren Pillay Carpanen and Innocent E. Davidson, "Assessment of the use of fixed load models in PV penetration studies of power distribution networks". In *Proceedings of the Conference on Sustainable Energy Supply and Energy Storage Systems (NEIS 2019)*, September 19-20, 2019, Helmut-Schmidt-University, Hamburg, Germany, pp.127 – 132.
- [16] Ngoni Gwatidzo and Innocent E. Davidson, "Modelling, Testing and Evaluation of HVDC equipment – HVDC Converters, DC breakers, DC transformer". In *Proceedings of the 9<sup>th</sup> CIGRE Southern Africa Regional Conference*, Johannesburg, South Africa, October 1-4, 2019.
- [17] Rodney Reddy, Innocent E. Davidson and Dayahalen Chetty, "Evaluation and Impact Assessment of Solar Roof-Top PV on Electric Power Distribution Networks". In *Proceedings of the 9<sup>th</sup> CIGRE Southern Africa Regional Conference*, Johannesburg, South Africa, October 1-4, 2019.
- [18] Innocent E. Davidson and Rodney Reddy, "Performance Evaluation of Solar Roof-Top PV on Eskom's LV Electric Power Distribution Networks". In *Proceedings of the 7<sup>th</sup> International Conference on Smart Grid (icSmartGrids 2019)*, 09 – 11 December 2019, Rdyges Newcastle Hotel, Newcastle, Australia.
- [19] A. Kehinde Onaolapo, K. Timothy Akindeji, and E. Adetiba, "Simulation Experiments for Faults Location in Smart Distribution Networks using IEEE 13 Node Test Feeder and Artificial Neural Network," *Journal of Physics: Conference Series*, vol. 1378, p. 032021, 2019/12 2019, doi: 10.1088/1742-6596/1378/3/032021.

- [20] K.T. Akindeji, R. Tiako and I. E. Davidson, "Use of Renewable Energy Sources in University Campus Microgrid – A Review". In *Proceedings of the 27<sup>th</sup> Domestic Use of Energy (DUE) Conference*, Wellington, South Africa, 25-27 March 2019, pp. 87 – 94. ISBN 978-0-6399647-3-7.
- [21] S.T Leholo, P.A Owolawi and K.T Akindeji, "Solar Energy Potential Forecasting and Optimization Using Artificial Neural Network: South Africa Case Study". In *2019 Amity International Conference on Artificial Intelligence (AICAI)*, Dubai, UAE, 4 -6 February 2019, pp.533-536.
- [22] Mehari Bule, Olorunfemi Ojo and Josiah Haruna, "The Dynamics of Capacitive Compensated Grid Connected Squirrel Cage Induction Generators". 2019 IEEE PES/IAS PowerAfrica, Abuja, Nigeria, 2019, pp. 605-610, doi: 10.1109/PowerAfrica.2019.8928870.
- [23] Josiah Haruna and OlorunfemiOjo, "Comprehensive Steady-State and Small Signal Analysis of a Full Order Off board Bi-directional Plug in Electric Vehicle (PEV) Charger for Vehicle to Grid (V2G) Operation," 2019 IEEE PES/IAS PowerAfrica, Abuja, Nigeria, 2019, pp. 104-109, doi: 10.1109/PowerAfrica.2019.8928855.
- [24] Jiayu Zhou ; Olorunfemi Ojo ; Fen Tan ; Josiah Haruna ; Poh Chiang, "A Carrier-Based Discontinuous PWM for Three- Level T-type Converters with Neutral-Point Potential Balancing," 2019 IEEE Energy Conversion Congress and Exposition (ECCE), Baltimore, MD, USA, 2019, pp. 5973-5980, doi: 10.1109/ECCE.2019.8913070.
- [25] Jiayu Zhou ; Olorunfemi Ojo ; Josiah Haruna ; Fen Tang, "Circulating Currents Suppression and Neutral-Point Potential Balancing Strategy for Parallel Three-Level T-type DC-AC Converters," 2019 IEEE Energy Conversion Congress and Exposition (ECCE), Baltimore, MD, USA, 2019, pp. 6891-6897, doi: 10.1109/ECCE.2019.8912912.

## Other Research Output (Non-Refereed Conference Proceedings)

None

## Higher Degrees Graduated Master of Engineering

**Madonsela**, Bhokinkosi, *BTech* .....*Electrical Engineering*  
 Dissertation: Integrating Power Transformer Protection scheme and Telecontrol RTU  
 Supervisor: Prof IE Davidson and Dr C. Mulangu.Sewchurran.

**Nkonyane**, Mfanasibili Stanley, *BTech*.....*Electrical Engineering*  
 Dissertation: The impact of poor power quality and harmonics on the performance of an electrical network. Case Study: DP3 Drillship (2013)  
 Supervisor: Dr E E Ojo and Dr B Rigby.

**Thakoordeen**, R.R., *BTech*.....*Electrical Engineering*  
 Dissertation: An Investigation into the Alternative Energy Solutions to Power Desalination Plants and the Storage of Energy using Graphene Supercapacitors Generated from Renewable Sources. (2016)  
 Supervisor: Dr. Evans Ojo

## Higher Degrees Graduated in other Institutions (UKZN) Doctor of Philosophy (2019)

None

## Master of Science in Engineering (2019)

**Goqo**, Zama, *BScEng (UCT)*.....*Electrical Engineering*  
 Dissertation: Design of a Micro-converter for Rooftop PV Application in a Low-Voltage Distribution Network

Supervisor: Prof D Dorrell and Prof IE Davidson

**Mukwekwe**, Leonard Kwamuchaguma, *BScEng (UNAM)*.....*Electrical Engineering*

Dissertation: Analysis of optimal PV penetration levels with time-variant loads in power distribution networks

Supervisor: Dr Rudy Capernum and Prof IE Davidson

## Higher Degrees under Examination Master of Engineering

**Leholo**, Sempe, *BTech, Electrical Engineering*

Dissertation: Modelling and Optimization of Hybrid Micro-grid System for LTE Base Station. (2018)

Supervisor: Prof P A Owolawi and Mr. K T Akindeji

## Higher Degrees under Supervision Doctor of Engineering

**Gumede**, Makhosonke, *BTech, MEng, Electrical Engineering*

Dissertation: The extraction of power and fresh water from the ocean off the coast of KZN utilizing ocean thermal energy conversion (OTEC) techniques (2015)

**Supervisor:** Dr P Naidoo and Prof M Walker

**Adebisi**, Abayomi, *BEng (Hons), MEng, Electrical Engineering*

Dissertation: Investigation of the Impart Photovoltaic System on the Distribution Grid (2017)

Supervisor(s): Assoc. Professor Ian Lazarus, Assoc. Professor Ashkay Saha and Dr Evans Ojo

**Buraimoh**, Elutunji, *BTech (LAUTECH), MScEng (OAU), Electrical Engineering*

Dissertation: Development of D-Facts Based Microgrid System Using Supervisory Control (2018)

Supervisor: Prof IE Davidson

**Dakora**, Jonas Don-Yelee, *BTech (CPUT), MEng (DUT) Electrical Engineering*

Dissertation: Analysis of Modern Space Solar Power Satellite Systems and Space Rectenna. (2019)

Supervisors: Professor IE Davidson and Dr Gulshan Sharma

**Akinyemi**, Ayodeji Stephen, *OND, HND, PGD, MSc (UCT)* .....*Electrical Engineering*

Dissertation: Voltage rise mitigation at the Point of Common Coupling (PCC) of large Renewable Distributed Generation (RDG) and Distribution Network

Supervisor(s): Prof IE Davidson and Prof Olorunfemi Ojo

**Madonsela**, Bhokinkosi, *BTech MEng (DUT)*.....*Electrical Engineering*

Dissertation: Evaluating the Communications, Navigation and DSurveillance (CNS) Capabilities for the Future Air Traffic Controlling Systems

Supervisor: Prof IE Davidson and Dr C. Mulangu.

**Rampith**, Viren, *BTech, MTech, Electrical Engineering*

Dissertation: A Smart Grid for a Smart City: Technical and Financial Analysis of a Sustainable eThekweni Municipality.

Supervisor: Prof IE Davidson

## Master of Engineering

**Shezi**, Siphesihle Brian, *BTech Electrical Engineering*

Dissertation: The study of the upgrade and improvement of power electronics protection system for locomotives. (2019)

Supervisor: Dr Evans Ojo

**Sewnarain**, Shikhar, *BTech, Electrical Engineering*

Dissertation: Harnessing Tidal Energy for Power Generation in South Africa. (2017)

Supervisor: Dr. Onunka and Mr. K T Akindeji

**Pillay**, Caleb Jordache, *BTech, Electrical Engineering*

Dissertation: Performance and Cost Evaluation of Multi-Terminal HVAC and HVDC Transmission Systems.

Supervisor: Dr M Kabeya and Prof IE Davidson

**Nguefack**, Louis, *BTech, Electrical Engineering*

Dissertation: Power Quality Enhancement Using DSTATCOM on Grid-Tied Photovoltaic System. (2020)

Supervisor: Prof IE Davidson and Mr Abayomi Adebisi

**Ntombela**, Mlungisi Eric, *BTech Electrical Engineering*

Dissertation: Algorithm for power losses and efficiency evaluation for power distribution systems. (2020)

Supervisor: Dr M Kabeya

**Nel**, Jacques j, *BTech Electrical Engineering*

Dissertation: Designing off-grid hybrid renewable power generation system for rural electrification. (2020)

Supervisor: Dr Evans Ojo and Mr Clarence Leaoneka

**Moma**, Christophe, *BTech Electrical Engineering*

Dissertation: Modern power electronic technology for the grid integration of renewable energy sources. (2019)

Supervisor: Dr M Kabeya

**Mhlongo**, Sanele P, *BTech, Electrical Engineering*

Dissertation: Power quality enhancement of smart distribution network with high penetration of renewable distributed generation. (2019)

Supervisor: Prof IE Davidson

**Masikane**, Sboniso B, *BTech, Electrical Engineering*

Dissertation: Voltage stability in distribution network. (2019)

Supervisor: Dr. G Sharma and Mr. K T Akindeji

**Estrice**, Milton, *BTech, Electrical Engineering*

Dissertation: Investigating the mitigation technique of frequency control for load stability of interconnected power system. (2019)

Supervisor: Dr. G Sharma and Mr. K T Akindeji

**Ayar**, Prenushka, *BTech Electrical Engineering*

Dissertation: Investigation and Mitigation of Temporary Overvoltage caused by Filters, Correcting Harmonics Produced by Motor Drives. (2019)

Supervisor: Dr. Tunji Akinrinde

**Goolam**, Hoosen Nadneem, *BTech Electrical Engineering*

Dissertation: Controlled Switching of 11kV Vacuum Circuit Breaker for Fault Interruption. (2018)

Supervisor: Dr Evans Ojo and Prof Nelson Ijumba

**Khumalo**, Simanga Wonder, *BTech Electrical Engineering*

Dissertation: Investigating the impact of induction motor starting techniques on power quality. (2020)

Supervisor: Dr M Kabeya and Dr B Rigby

**Buthelezi**, Kwanele M, *BTech Electrical Engineering*

Dissertation: Analysis of Fault Location Algorithms in Transmission Grid Lines. (2020)

Supervisor: Dr M Kabeya and Dr B Rigby

**Magenuka**, Kenneth Thand'uxolo K, *BTech Electrical Engineering*

Dissertation: Kernel estimation modelling and optimization of hybrid power system for a typical South African rural area

Supervisor: Dr M Kabeya and Mr. K T Akindeji

**Mtukushe**, Namhla Faith, *BTech Electrical Engineering*

Dissertation: The analytical study on the establishment of a tidal power plant in South Africa. (2019)

Supervisor: Dr Evans Ojo

**Ndlela**, Nomihla W, *BTech, Electrical Engineering*

Dissertation: Design and integration of African Power Grids into a Smart African Super-Grid. (2020)

Supervisor: Prof IE Davidson

**Joshi**, Milan, *BTech, Electrical Engineering*

Dissertation: Load frequency control of a hydro dominating interconnected power system. (2019)

Supervisor: Dr. Sharma and Prof IE Davidson

**Tshikomba**, Salome Busisiwe Jiyane, *BTech BSc (Hons), Electrical Engineering*

Dissertation: Technical Analysis and Mitigation Measures for Illegal Electricity Theft for Domestic and Commercial End Users (2017)

Supervisor: Prof IE Davidson and Dr Evans Ojo

**Gwatidzo**, Ngoni, *BTech, Electrical Engineering*

Dissertation: Modelling, Testing and Evaluation of HVDC Equipment and components – DC Breaker, DC Transformers and Insulation Coordination in HVDC Systems. (2018)

Supervisor: Prof IE Davidson

**Zulu**, Musawenkosi L, *BTech, Electrical Engineering*

Dissertation: Power Flow and Fault Analysis of a Hybrid DC Microgrid: PV System and Wind Energy System. (2019)

Supervisor: Dr Evans Ojo

**Khumalo**, Nkosinathi Emmanuel, *BTech, Electrical Engineering*

Dissertation: Optimal sizing and control of lithium-ion battery energy storage system to be used for maximum demand peak shaving, peak energy utilisation and peak energy export. (2018)

Supervisor: Prof IE Davidson and Dr M Kabeya

**Malanda**, Sindisiwe Cindy, *BTech, Electrical Engineering*



Dissertation: Transient Fault Analysis of a VSC-Based Multi-Terminal HVDC Scheme. (2018)  
Supervisor: Prof IE Davidson and Dr Grain Adam.

**Leholo**, Sempe, *BTech, Electrical Engineering*

Dissertation: Modelling and Optimization of Hybrid Micro-grid System for LTE Base Station. (2018)  
Supervisor: Prof P A Owolawi and Mr. K T Akindeji

**Bahara**, R.K., *BTech, Electrical Engineering*

Dissertation: Analytical and Numerical Investigation of the Integration of Wind Energy in Distribution Network. (2019)  
Supervisor: Dr. Evans Ojo

## Community Service Activities

- [1] International Guest Lecture and Seminar, Host: Prof IE Davidson, Presenter: Professor Mitsuru IZUMI, Office of Liaison and Cooperative Research, Tokyo University of Marine Science & Technology (TUMSAT), 4-5-7, Konan, Minato-ku, Tokyo 108-8477, JAPAN. Title: "The Blue Economy", Time: 13.00 – 14.00 hours, Friday: 1st Nov 2019. Venue: Faculty Boardroom, S Block, L3, S4
- [2] Guest Lecture and Postgraduate Research Seminar, Host: Prof IE Davidson, Presenter: Prof Joseph Olorunfemi Ojo: "Research-What is New?", Time: 09.00 – 12.00 hours, Wed: 7<sup>th</sup> August 2019, Venue: FEBE Boardroom, Level 3, S4, Steve Biko Campus, Durban University of Technology.
- [3] DUT-Eskom EPPEI Workshop, Presenter: Prof IE Davidson: "DUT-Eskom: Opportunities for Collaboration and Research", Time: 09:00 – 12:00 hours, Wed: 6<sup>th</sup> June 2019, Venue: EPE Boardroom, Level 3, S7, Steve Biko Campus, Durban University of Technology,
- [4] Royal Academy of Engineering Lecture and Seminar on Quality Engineering Education, Host: Prof IE Davidson, Presenter: Prof Frank P L Kavishe: "Enhancing Engineering Education through University Industry Partnerships", Monday 27 May 2019, 0900 – 12.00pm, Venue: Faculty of Engineering Boardroom, S7 Level 3, Steve Biko Campus.
- [5] 4<sup>th</sup> South Africa-Japan Universities Forum (SAJU) Conference, Presenter: Prof I E Davidson, "University Presentations: Research Focus Areas – Opportunities for Collaboration and Student Mobility", 23 - 24 May 2019, Venue: Future Africa Campus, University of Pretoria.
- [6] Royal Academy of Engineering Guest Lecture and Postgraduate Research Seminar, Presenter: Prof I E Davidson. Title: "Advances in Long Distance Ultra-High Voltage DC Transmission Systems". Venue: FEBE Boardroom, Level 3, S4, Steve Biko Campus, Durban University of Technology, Time: 09.00 – 12.00 hours, Fri: 12 April 2019.
- [7] SAIEE KZN Presentation, Presenter: Prof I E Davidson. Title: Long-Distance UHVDC Technology - A Future Energy Disrupter". Venue: The SAIEE KZN Centre, Chairman's Breakfast/Brunch Meeting on "Future Energy Disruption", Belvedere Room, Durban Country Club, Time: 8.00am, 15 March 2019.
- [8] Mr. K T Akindeji: Conference Reviewer: SAUPEC 2019
- [9] Mr. K T Akindeji: Journal Reviewer: International Journal of Renewable Energy Research (IJRER).
- [10] Mr. K T Akindeji: External examiner for Design Project III (MUT)
- [11] Dr. Evans Ojo, Conference Reviewer: SAUPEC 2019.
- [12] Professor IE Davidson, Journal Reviewer: IEEE Transactions (Power Delivery, Energy Conversion); IEEE Transactions (Power Electronics), IEEE Access, Electric Power Systems Research Journal, International Journal of Electrical Power and Energy Systems, International Journal of Renewable Energy Research (IJRER), Frontiers in Energy, Renewable Energy (Elsevier), Journal of Advanced Computational Intelligence and Intelligent Informatics (JACIII), Technology and Economics of Smart Grids and Sustainable Energy Journal, Engineering Science and Technology: An International Journal, International Journal of Green Energy, International Journal of Ambient Energy, Mathematical Problems in Engineering (Hindawi)
- [13] Professor IE Davidson, External Examiner for Masters and Doctoral Theses: CPUT, UCT, UP, UJ, TUT.
- [14] Professor IE Davidson, Conference Reviewer: SAUPEC 2019, IEEE Power Africa 2019, icSmartGrid 2019.
- [15] Dr. G Sharma: External Examiner: MSc Dissertation: Jamilla Kombe (Student No.-204002255), School of Engineering, University of Kwazulu-Natal, South Africa on "Improvement of Voltage and Dynamic Performance of Transmission Power Networks using Distributed Superconducting Magnetic Energy Storage Systems", 2019.



- [16] Dr. G Sharma: Journal of Energy Research (Wiley), *International Journal of Engineering Research in Africa*, International Transactions on Electrical Energy System.
- [17] Dr. G. Sharma: Member, International Scientific Committee of Electrical & Computer Engineering, World Academy of Science Engineering & Technology Journal.
- [18] Dr. G Sharma: Member of Technical Program Committee of International Conference of Computing, Communications & Cyber Security (IC4S), Springer, 12-13<sup>th</sup> October 2019, Chandigarh, India.
- [19] Dr. G Sharma: Marking of P1 & P2 Assessment and WIL Industrial visits.
- [20] Dr. M Kabeya: Conference Reviewer: SAUPEC
- [21] Dr. M Kabeya: Journal Reviewer: Energy Storage Journal, International Journal of Electrical Power and Energy Systems
- [22] Dr Sharma: Journal Reviewer: IEEE Transactions on Power System, IET Generation Transmission & Distribution, Electric Power Component & System Journals, Applied Soft Computing Journal (Elsevier), Ain Shams Eng. Journal (Elsevier), International Journal of Emerging Electric Power Systems (De-Gruyter)
- [23] Dr G Sharma: External Examiner: MSc Dissertation: Denzil Moodley (Student No. 200271547), School of Engineering, University of Kwazulu-Natal, South Africa on "Process Design and Sensitivity analysis of a CHP Retrofit Supplemental On-site Electrical Power Generation at ENGEN Oil Refinery", 2019.

## Research Grants

- [1] Principal Investigator: Prof IE Davidson: Eskom TESP Grant (Smart Grids): R70 000.00
- [2] Principal Investigator: Prof IE Davidson: Eskom TESP Grant (HVDC): R70 000.00
- [3] Principal Investigator: Prof IE Davidson: Eskom TESP Grant (Centre for RTPPS): R50 000.00
- [4] Principal Investigator: Mr Timothy Akindeji: Eskom TESP Grant (Rural Rectification): R90 000.00
- [5] Principal Investigator: Dr Musasa Kabeya: Eskom TESP Grant: R50 000.00
- [6] Principal Investigator: Mr. Kabula Loji (Autonomous off-grid PV energy system studies): R30 000.00
- [7] Project Leader / Principal Investigator: Prof IE Davidson: Research and Development Programmes in Space Science and Technology (Satellite Communication and Navigation), funded by the Department of Science and Technology (DST), South Africa. Project Grant: 2018 – 2019: R1 595 000.00
- [8] Co-Investigator: Prof IE Davidson: Royal Academy of Engineering United Kingdom Award (2017 – 2019): £140 000.00
- [9] DHET-Accredited Outputs Research Incentive Award: Prof IE Davidson: Research Rewards for Research: R171 105.98
- [10] Durban University of Technology Research Award: Prof IE Davidson: Top Faculty Researcher of the Year Award (Platinum Category): R40 000.00
- [11] DUT Conference Travel Grant: Prof IE Davidson, 2019 Conference Travel Award: R35 996.15
- [12] DUT Conference Travel Grant: Elutunji Buraimoh, DEng Student, 2019 Conference Travel Award: R23 999.79
- [13] DUT Conference Travel Grant: Abayomi Adebisi, DEng Student, 2019 Conference Travel Award: R250316.55
- [14] Department of Science and Technology, South Africa: Prof IE Davidson, Space Science Research Grant (2018 – 2019) :R1 595 000.00

## Honours, Awards and Recognitions

- [1] **2019: Durban University of Technology Top Faculty Researcher of the Year Award (Platinum Category)**  
Recipient of the award of "*Top Faculty Researcher of the Year (Platinum Category)*", at the Durban University of Technology's Annual Research & Innovation Awards (based on 2018 research outputs), Hilton Hotel, 12-14 Walnut Rd, Durban Central, Durban, 4001, 22<sup>nd</sup> Nov 2019. Prize Money: R40000:00