



Faculty of Engineering, the Built Environment & Technology

Abstract and CV
Prof Farouk Smith

Farouk.Smith@mandela.ac.za

I was awarded my Ph.D. by the Electronics Engineering department at Stellenbosch University in 2007. My thesis was entitled Total Ionizing Dose Mitigation by means of Reconfigurable FPGA computing. In it, I explore the development of the novel FPGA Reprogrammable Switched Modular Redundancy (SMR) method for mitigating the effects of space radiation on satellite electronics. I have continued to pursue new solutions to the problem of space radiation effects on electronics throughout my career at Nelson Mandela University, resulting in several journal and conference publications as well as several patents, including 2 international patents and one US patent granted in 2015. My passion for research is evident and I will continue to encourage others to do the same.

I have 13 years' teaching experience in Analogue and Digital Electronics and Microprocessor Systems, as well as supervising over fifty undergraduate Final Year Projects and six MEng (Mechatronics) students to completion, with one PhD student that graduated in 2018. Currently I am supervising eighteen final year project students, three Masters, and two PhD students at Nelson Mandela University.

I am also aware of the importance of the pastoral care of students and take the role of teacher very seriously. I am experienced in liaising with colleagues to help students with a variety of problems. This was evident during the last 6 years I served as the head of the mechatronics department.

In terms of Nelson Mandela University research output units, I have 21 output units, excluding the 1 international US patent and 2 South African Patents.

I have strong links with the space industry, such as the Space Advisory Company (SCS) Aerospace Group, New Space Systems and SCS Space, and formed a research collaboration and partnership via the THRIP program to enhance space related research at Nelson Mandela University. We had 2 Masters Students on the program receiving full bursaries. Further, a current young staff member is doing her PhD in this related field under my supervision. The partnership with SCS Space results in me having regular discussions with the Chairman, as well as the CEO of SCS Space on research related efforts.

As a result of our close partnership with SCS space, the university was afforded an opportunity to run an experiment on the nSight Satellite that was launched in 2017. SCS space also consults with me for advice on radiation protection related issues for satellite electronics. Our close partnership also resulted in a joint THRIP application that was approved in 2018.

I also have a strong research relationship with Stellenbosch University and NRF iThemba labs in the area of space radiation effects on Satellite electronics. The research collaboration resulted in a

strategic allocation of dedicated space at the Cape Town iThemba labs facility for satellite electronics testing.

On 25th September 2019, myself and other SA researchers were in discussions with the representatives of the Joint Institute of Nuclear Research (JINR), in Dubna Russia, to facilitate the use of the research facilities utilised by the Russian Space Agency at the JINR for radiation hardness testing. This will enable SA based researchers and students to access state of the art research facilities at the JINR and will contribute positively to the research output of the Nelson Mandela University. I met with Dr. Vasily Anashin who is the deputy head and director of the United Rocket and Space Corporation (URSC), and the Institute for Space Device Development (ISDE), as well as with Dr Mitrofanov Semen who is the Head of Group for Radioactive Ion Beam Production and Beam Diagnostics at JINR. They were very impressed with our current setup at iThemba labs, and invited us to do heavy ion testing at their facilities in Dubna, Russia, a kind of test that is not currently possible in South Africa. On 15 December 2020, my research collaborator at Stellenbosch university, Dr Arno Barnard, received notification that our joint application for the South Africa-Joint Institute for Nuclear Research (SA-JINR)-Grants for JINR was approved, NRF grant number 129598.

We (Nelson Mandela University) are working with SCS-Space at the moment to get the payload modules for an export satellite project space qualified. We will be doing the space qualification of all the electronic boards for Total Ionizing Dose tolerance as well as Single Event Upsets.

My membership to the IEEE was elevated to the grade of Senior Member in 2014. This is the highest professional grade of IEEE for which a member may apply. It requires extensive experience and reflects professional accomplishment and maturity. Only 10% of more than 400,000 members have achieved this level.

Due to my standing in the international academic community, I act as a reviewer to:

Review Service to Journals:

- IEEE Transactions on Device and Materials Reliability
- Elsevier Microprocessors and Microsystems
- Recent Patents on Materials Science

Invitation as Keynote Speaker:

- Speech Invitation of AIMC-2020, Japan
- International Conference on Algorithm Design, Analysis & Optimization of Program Language” scheduled on March 18 - 19, 2020, Las Vegas, USA
- International Conference on Automation and Robotics which is scheduled from April 16-17, 2018 at Las Vegas, USA.
- "International Summit on Physics and Astronomy" scheduled to be held from November 14-15, 2019 in Osaka, Japan

Invitation to act as Editor for Journals:

- Executive Guest Editor of Current Mechanics and Advanced Materials
- The Open Artificial Intelligence Journal
- Invitation to act as Editor of the eBook series entitled “Artificial Intelligence Current Future Developments”

Review Service to Conferences:

- Speech Invitation of AIMC-2020, Japan
- International Conference on Algorithm Design, Analysis & Optimization of Program Language” scheduled on March 18 - 19, 2020, Las Vegas, USA
- International Conference on Automation and Robotics which is scheduled from April 16-17, 2018 at Las Vegas, USA.
- International Conference on Sensor Networks and Signal Processing (SNSP 2019)(Nov.19-22, 2019, National Dong Hwa University, Hualien, Taiwan)

Review Service to Universities:

- The Doctoral Degrees Board, invited me to examine a Ph.D. thesis submitted to the University of Cape Town.

CURRICULUM VITAE OF FAROUK SMITH

NAME Farouk Smith

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Gelvanpark
Port Elizabeth
6020

TELEPHONE NUMBERS Cell: +27 83 281 9015
Work: +27 41 504 3567

EMAIL Farouk.Smith@mandela.ac.za

BORN 03 December 1973, Port Elizabeth

AGE 47

NATIONALITY South African

IDENTITY NUMBER 7312035089087

HOME LANGUAGE English - good

OTHER LANGUAGES Afrikaans - good

DRIVERS' LICENSE code 08

HEALTH excellent

TERTIARY EDUCATION

Bachelor of Science (Physics) **University of Cape Town**
Award Physics Class Medal 1994
Date of Graduation 6 December 1994

Bachelor of Science Electrical Engineering **University of Cape Town**
Award Deans Merit List in Engineering 1995
Degree awarded with honours, 1996
Date of Graduation 13 December 1996

Master of Science in Electronic Engineering **University of Cape Town**
Full Thesis - Mobility management in wireless networks
Date of Graduation 13 December 2003

Doctor of Philosophy in Engineering **University of Stellenbosch**

Full Thesis - Total Ionizing Dose mitigation by means of Reconfigurable Computing
Date of Graduation 14 December 2007.

AWARDS

NMMU School of Engineering Emerging Researcher of the Year 2011
NMMU Innovator of the Year 2012
NMMU Faculty of Engineering Emerging Researcher of the Year 2012

PATENTS GRANTED

United States Patent 8,975,913 – Date granted – 10 March 2015.
South African Patent 2012/06115 – Date granted – 29 January 2014.
South African Patent 2018/01553 – Date granted - 19 December 2018.

RESEARCH GRANTS

NRF Thuthuka Grantholder 2011 – 2017.
TIA Seed Funding 2016 – 2020.

NRF EMERGING RESEARCHER NETWORK

Featured as the NRF Emerging Researcher for the month of April 2013.

PROFESSIONAL AFFILIATIONS

Registered Professional Engineer with the Engineering Council of South Africa.
ECSA Registration no. 20020083 - 23 May 2002.
Senior Member of the IEEE – Membership number: 80343202.

EMPLOYMENT HISTORY

- 1. Nelson Mandela Metropolitan University, Port Elizabeth**
Department: Mechatronics (January 2020 – Present)
Position: Professor and Head of Department: Mechatronics
- 2. Nelson Mandela Metropolitan University, Port Elizabeth**
Department: Mechatronics (January 2015 – December 2019)
Position: Associate Professor and Head of Department: Mechatronics

Farouk's duties include the following:

Lecture Electronics, Digital Electronics, Telecommunications, Microprocessors, as well as research in the field of microprocessors, FPGAs, Hardware Evolution, reconfigurable computing and space radiation effect on satellite electronics. Manage staff, budget and students in the department.

3. Nelson Mandela Metropolitan University, Port Elizabeth

Department: Mechatronics (June 2008 – December 2014)

Position: Senior Lecturer

Farouk's duties include the following:

Lecture Electronics, Digital Electronics, Telecommunications, Microprocessors, as well as research in the field of microprocessors, FPGAs, Hardware Evolution, reconfigurable computing and radiation effect on electronics.

4. Telkom SA Ltd, Pretoria Head Office

Department: Center of Excellence (January 2004 – January 2008)

Position: Research Engineer – Management of Technology.

Farouk's duties as a research engineer included the following:

Conduct satellite research for submission of a PhD in Engineering at the University of Stellenbosch. Farouk was conducting research in the area of radiation tolerance and protection of satellite electronics. He presented a novel technique for mitigating of radiation effects in FPGA's and other satellite electronics. Farouk also performed Telecommunications market research for Telkom SA Ltd that was presented to the Telkom CTO support office.

5. Telkom SA Ltd, Pretoria Head Office

Department: Center of Excellence (September 2001 – December 2003)

Position: Engineer – Management of Technology.

Farouk's duties as a research engineer included the following:

Conduct telecommunications research for submission of a MSc. in Engineering at the University of Cape Town. Farouk conducted research in the area of mobility management in Wireless ATM networks.

6. Telkom SA Ltd, Port Elizabeth Regional Head Office

Department: Radio Engineering Southern Region (May 1999 – August 2001)

Position: Junior Manager.

Radio Engineering involves the planning of line of sight point to point, and point to multi point radio systems.

6. ESKOM Telecommunications, Cape Town

Department: Telecommunications (January 1997 – April 1999)

Position: Telecommunications Engineer

7. ESKOM Telecommunications, Germiston

Department: Telecommunications (December 1995 – January 1996)

Position: Engineer in Training

PUBLISHED WORK

Local Conference Publications

- 1) F. Smith, N. Ventura, “Evaluating the Performance of Handoff Schemes in Wireless ATM Networks”, South African Telecommunications and Network Applications Conference (SATNAC) 2002.
- 2) F. Smith, N. Ventura, “A Mobility Enhanced ATM Switch and Signaling Architecture to support handoff in a Wireless ATM Network”, SATNAC 2003.
- 3) F. Smith, S. Mostert, “Low Cost Satellite Communication – Space Weather and Commercial Electronic Components”, SATNAC 2004.
- 4) F. Smith, S. Mostert, “Low Cost Satellite Communication – Designing Integrated Circuits to withstand Space Radiation”, SATNAC 2005.
- 5) F. Smith, S. Mostert, “Switched Modular Redundancy for TID Mitigation in Digital Circuits”, SATNAC 2006.
- 6) F. Smith, S. Mostert, “Reconfigurable computing for TID Mitigation in Digital Satellite Circuits”, SATNAC 2007.
- 7) F. Smith, A. Barnard, J.P. Potgieter, S. Van Aardt, S. Mostert, R. Smit and A. Brandt, “Radiation Hardness Assurance Testing at iThemba Labs: Strategy for Proton and Heavy Ion Single Event Effects Testing of Microelectronic Devices and Integrated Circuits”, South African Space Association 3rd Annual Congress , Hartebeesthoek Radio Astronomy Observatory, 2013.
- 8) F. Smith, A. Barnard, J.P. Potgieter, S. Van Aardt, S. Mostert and A. Brandt, “Total Ionizing Dose Hardness Assurance Testing of FPGAs using a Cobolt-60 source”, South

African Space Association 3rd Annual Congress, Hartebeesthoek Radio Astronomy Observatory, 2013.

- 9) F. Smith and S. Mostert, “Area Overhead Comparison of Various SEU Fault Tolerant Design Techniques”, South African Space Association 3rd Annual Congress, Hartebeesthoek Radio Astronomy Observatory, 2013.

International Conference Publications

- 10) F. Smith, S. Mostert, “Reconfigurable FPGA Computing to mitigate for Total Ionizing Dose Effects”, 2007 IEEE Aerospace Conference, Big Sky, Montana, USA, March 3 - 10, 2007, DOI : 10.1109/AERO.2007.352753.
- 11) F. Smith, S. Mostert, “Total Ionizing Dose Mitigation by means of Reconfigurable Computing”, IEEE RADECS 2007, September 10-14, 2007, Deauville, France.
- 12) F. Smith, “A virtual VLSI architecture for computer hardware evolution”, SAICSIT '10 Proceedings of the 2010 Annual Research Conference of the South African Institute of Computer Scientists and Information Technologists, DOI: [10.1145/1899503.1899536](https://doi.org/10.1145/1899503.1899536).
- 13) F. Smith, A. Barnard, “Double Modular Redundancy for Single Event Upset Mitigation”, IEEE RADECS 2010, 20–24 SEPTEMBER, 2010, Längenfeld, Austria.
- 14) A. Van Den Berg and F. Smith, “Hardware Evolution of a Digital Circuit using a Custom VLSI Architecture”, SAICSIT '13 Annual Research Conference of the South African Institute of Computer Scientists and Information Technologists, October 2013.
- 15) F. Smith, “Area Overhead Comparison of Various SEU Fault Tolerant Design Techniques”, 2013 SEE Symposium and Military and Aerospace Programmable Logic Devices Conference, 2013, San Diego, USA. Paper accepted for presentation.
- 16) F. Smith, S. van Aard, J.-P. Potgieter, A. Brandt, C. Nwosa, D. R. Faber, D. Wright, I. Tadadjeu Sonkeng, “66 MeV Proton Testing of the and-or Multiplexer SET Filter Circuit Implemented on a Flash FPGA”, IEEE Nuclear Science Symposium & Medical Imaging Conference, Washington State Convention Center • Seattle, WA USA • 8-15 November 2014.
- 17) Himunzowa G., Smith F. (2016) FPGA Based Self-tuning PI Controller Using IFT Technique. In: Silhavy R., Senkerik R., Oplatkova Z., Silhavy P., Prokopova Z. (eds)

Automation Control Theory Perspectives in Intelligent Systems. Advances in Intelligent Systems and Computing, vol 466. Springer.

- 18) F. Smith and S. Gaffoor, "An Amalgamation of hardening methods for Single Event Upset mitigation in Memory Elements", IEEE RADECS 2016 Proceedings, Brennen, Germany.
- 19) G. Himunzowa and F. Smith, "Study of IFT technique in a view to create a novel hardware," 2017 3rd International Conference on Computational Intelligence & Communication Technology (CICT), Ghaziabad, 2017, pp. 1-7.

International (ISI) Journal Publications

- 20) F. Smith and S. Mostert, "Total ionizing dose mitigation by means of reconfigurable FPGA computing," IEEE Transactions on Nuclear Science, vol. 54, pp. 1343-1349, Aug 2007.
- 21) F. Smith, "Single event upset mitigation by means of a sequential circuit state freeze," Microelectronics Reliability, Elsevier, vol. 52, pp. 1233-1240, 2012.
- 22) F. Smith, "A new methodology for single event transient suppression in flash FPGAs," Microprocessors and Microsystems, Elsevier, vol. 37, Issue 3, Pages 313–318, 2013.
- 23) Smith, F. and Van den Berg, A.E., "Hardware genetic algorithm optimisation by critical path analysis using a custom VLSI architecture", South African Computer Journal, Volume 56, No. 1, Pages 120 - 135, 2015.
- 24) M.R. Yousefi, F. Smith, S. Hatefi, K. Abou-El-Hossein, "Coupled Multi-Resolution FE-WMF Approach for Solving Forward Problem in Magnetic Induction Tomography Technology", International Journal of Electrical and Electronic Engineering & Telecommunications, Volume 9, No. 6, Pages 380 – 389, November 2020.
- 25) F. Smith, "Overhead and Performance Comparison of SEU fault tolerant circuits used in Flash FPGAs" International Journal of Electrical and Electronic Engineering & Telecommunications, Volume 10, No. 2, Pages 76 – 82, March 2021.
- 26) F. Smith, J. Omolo, "Experimental verification of the effectiveness of a new circuit to mitigate single event upsets in a Xilinx Artix-7 field programmable gate array", Microprocessors and Microsystems, Elsevier, Volume 79, November 2020.

- 27) F. Smith “Proton Beam Validation of a New Single Event Transient Mitigation Technique” *Journal of Electronic Testing*, Volume 36, Pages 785 – 792, 2020.
- 28) T. Jafarpour, F. Smith, , “Design of Multi-Wavelength Low-Level Laser Therapy Device for Assisting Bone Reconstruction Applications”, *Majlesi Journal of Electrical Engineering*, Volume 14, No. 2, Pages 117-125, 2020.
- 29) S. Hatefi, F. Smith, K. Abou-El-Hossein, J. Alizargar, “COVID-19 in South Africa: lockdown strategy and its effects on public health and other contagious diseases”, *Journal of Public health*, Elsevier, Volume 185, Pages 159 – 160, 2020.
- 30) G. Himunzowa, F. Smith, “Validation of Iterative Feedback Tuning Technique for Embedded Applications”, *Journal of the Brazilian Computer Society*, 2020, (under review).
- 31) S. Hatefi, F. Smith, K. Abou-El-Hossein, J. Alizargar, “The pandemic of COVID-19: current situation in South Africa”, accepted for publication in *Disaster Medicine and Public Health Preparedness*, Cambridge University Press, 2021.

Patents

Provisional South African

- 32) 2011/07718, A method for mitigating single event upsets in combinational electronic circuits, Farouk Smith - SEU mitigation for non-volatile FPGA's - ASIC, FLASH AND ANTIFUSE, 2011.
- 33) 2011/07719, A method for mitigating single event upsets caused by single event transients in volatile FPGA's, Farouk Smith - SEU mitigation for volatile FPGA's – SRAM, 2011.
- 34) 2012/00683, A method for mitigating single event upsets in combinational electronic circuits, Farouk Smith - SEU mitigation using gate delays, 2012.

International PCT applications

- 35) PCT/IB2011/000640, A method for mitigating single event upsets in sequential electronic circuits. Farouk Smith - SEU mitigation using freeze technique, 2011.

- 36) PCT/IB2012/055738, A method and circuit structure for suppressing single event transients or glitches in digital electronic circuits, Farouk Smith, 2013.
- 37) US patent for PCT/IB2012/055738 filed in April 2014.
- 38) Method and circuit structure for suppressing single event transients or glitches in digital electronic circuits, PCT/IB2017/055455 filed 11 September 2017.
- 39) United States Patent Application Publication: Pub . No . : US 2019/0020341 A1, 2019

Patents Granted:

- 40) Method and circuit structure for suppressing single event transients or glitches in digital electronic circuits, F Smith - US Patent 8,975,913, 2015
- 41) SEU Mitigation using a state-freeze technique, F Smith, SA Patent 2012/06115
- 42) Improved Muller C Element Implementation, F Smith, SA Patent 2018/01553

STUDENT SUPERVISION

Student surname & initials	Level (MEng/PhD)	Short title	Status (Ongoing/Graduated)	Year of graduation (if applicable)
Grayson Himunzowa	PhD	FPGA Design Methodology for IFT Based PID Algorithm	Graduated	April 2018
Shaaista Gaffoor	PhD	Optimization of Machine Vision Systems in Robotic Applications	Ongoing	Expected date of graduation December 2022
Sihle Tom	PhD (Co-Supervisor)	The development of a self-powered bacteriophage based biosensing device for the rapid detection of Listeria Monocytogenes	Ongoing	Expected date of graduation December 2022
Allan van den Berg	MEng	Hardware Evolution of a Digital Circuit using a Custom VSLI Architecture	Graduated	2014
Stefan van Aard	MEng	Total Ionizing Dose testing of Field	Graduated	April 2015

		Programmable Gate Arrays		
JP Potgieter	MEng	Single Event Upset testing of Field Programmable Gate Arrays	Graduated (1)	April 2015
Shaaista Gaffoor	MEng	Implementation and Optimization of Robust Machine Vision Systems in a Manufacturing environment	Graduated (1)	April 2018
Joshua Omolo	MEng	Mitigation of Single Event Upsets in a Xilinx Artix-7 Field Programmable Gate Array	Graduated (1)	April 2019
Blaine Visenyoue	MEng	The use of neural networks for the modelling and control of a dynamic non-linear system	Thesis submission December 2020	Expected date of graduation April 2021
Muema Malinda	MEng	Characterization Of Single Event Effects And Total Ionizing Dose Effects Of An Intel Atom Microprocessor	Thesis Submitted March 2019 and examiner reports received. The student passed. (1)	Expected date of graduation December 2019
Damien Hansen	MEng	Effects and Mitigation of Total Ionizing Dose and Single Event Effects on Microprocessors	Ongoing	Expected date of graduation December 2021
Mark Tumwesigwe	MEng	Testing And Mitigation Of Single Event Upsets And Total Ionising Dose In A Virtex Field Programmable Gate Array	Ongoing	Expected date of graduation April 2021
Ji Bae	MEng	Development of a Magnetic Levitation Test Platform for evaluation of CubeSat micro-thruster	Ongoing	Expected date of graduation December 2021

Year	Degree	Number	4th year Final Year Project Title	Student Name
2009	BEng	1	FPGA Controller for a 5-axis Robotic Arm	Akhona Tiki
2010	BEng	2	Surface Temperature Sensor	Julien De Klerk
	BEng	3	FPGA controller for a 5-axis robotic arm	Timothy Otieno
	BEng	4	Design of a Waypoint Follower Robot	Akshay Lakhani
	BEng	5	Off the shelf sun tracking sensor	Steven Mackhenzie
2011	BEng	6	The Design and Development of an XY Plotter	Raiyan Hamid
	BEng	7	Laser Projector	Rayan Dolley
	BEng	8	A mechatronic device that is able to level itself	Faizel Sandan
	BEng	9	modelling and conceptual design of a two-wheeled self-balancing electric vehicle	Alan Van Den Berg
2012	BEng	10	Inverted Pendulum Design and Implementation	JP Potgieters
	BEng	11	Control of a 5 DOF Robotic Arm	Munemo Todd
	BEng	12	To Design and build a door lock that can be controlled with a Bluetooth device like a cellular phone	Leon Maravanyika
	BEng	13	Image Projection by means of a Laser Pointer	Munir Kadernani
2013	BEng	14	Building a Scale Model of a Hotel Elevator	Henno Klinghoffer
	BEng	15	2-DOF Curve Plotting Robotic Arm	Gregory Burke
	BEng	16	Using a Brain Computer Interface to Control a Device	Kerri Plumstead
	BEng	17	Automatic Window Blinds Control	Shaib Jappie
2014	BEng	18	Two wheeled balancing robot	Kashifa Jeftha
	BEng	19	Styrofoam ball hovering system using airflow	Morné van Wyk
	BEng	20	Landmine Detection Robot	Muano Clifford Rambe
	BEng	21	Design of the gutter cleaning robot	Shaaista Gaffoor
	BEng	22	Head Movement Actuated Robotic Arm	Thanita Naidoo
2015	BEng	23	Electronic Circuit for a Mechanical Setup to enable Vacuum Testing	PEAR, S
	BEng	24	A Mechanical Setup to enable Vacuum Testing of Cube Satellites	MABI, U
	BEng	25	Miniature Reaction Wheel	BESTIC, A
	BEng	26	Inertial Measurement Unit	CAIRNCROSS, M
	BEng	27	Smart Automated Pill Dispenser	TIKI, A
	BEng	28	Autonomous Parking System	NELUHENI, M
	BEng	29	GPS-Guided Wheeled Robotic Systems for Outdoor Applications	HARTMAN, JG
2016	BEng	30	Equatorial mount to track celestial objects	Shuaib Jappie
	BEng	31	NeuroSky's MindWave	Dillon Scott
	BEng	32	Waypoint Follower Robot	Charl Coetzee
	BEng	33	Inertial Measurement Unit	Andile Msimang
	BEng	34	GPS-Guided Wheeled Robotic Systems for Outdoor Applications	Ethan Maritz
	BEng	35	Autonomous Parking System (APS)	Sinethemba Mali
	BEng	36	Electronic Circuit for a Mechanical Setup to enable Vacuum Testing	Muema Malinda
2017	BEng	37	Firefighting robot	Brett Richards
	BEng	38	Electromagnetic Braking System	Andre Netheling
	BEng	39	Hand Motion Controlled Robotic Arm	Scharl Smalberger
	BEng	40	Autonomous Parking System	Tinashe Njodzi
	BEng	41	A Mechanical Setup to enable Vacuum Testing of Cube Satellites	RC Botha
	BEng	42	Solar Panel With Sun Position Tracking	Ridhaa Darries
	BEng	43	Image to text recognition system	Tyden Louw
	BEng	44	Miniature Reaction Wheel	George Smith
	BEng	45	Cubesat	Christine Forbes
	BEng	46	Quadcopter	B Nelson
BEng	47	Solar Panel Deployment in a Cubesat for optimum solar tracking	J Slabbert	

	BEng	48	An efficient method for performing real-time object tracking	F Yzelle
2018	BEng	49	Ball hovering	Du Toit, Franco
	BEng	50	Single joint exoskeleton arm	Van Rensburg, Hans
	BEng	51	Design of a Hand Exoskeleton	Cull, Tristan
	BEng	52	Land Mine Detection Robot	Moodley, Deenolan
	BEng	53	Development of an Embedded 3D Robot Visual System using Genetic Algorithms	Hajee, Mohammed
	BEng	54	An efficient method for performing real-time object tracking	Szana, Tibor
	BEng	55	Development of CubeSat Altitude Determination and Control System and Test Platform	Bae, Ji
	BEng	56	Smart Automated Pill Dispenser	Mpi, Ziqamo
	BEng	57	Miniature Reaction Wheel	Gopichand, Shaish
	BEng	58	Design and Development of Eco-Car Telemetry System	Hoosein, Nureen
	BEng	59	Design and develop a filament extruder that can produce high quality filament suitable for FDM 3D printers	Egling, Marrion
	BEng	60	Automated Plant Watering System	Lebea, Letladi
	BEng	61	Hand motion vacuum cleaner	Luwaca, Wandile
	BEng	62	Robotic Object search and detection	Swartbooi, Saneliso
	BEng	63	Image to text recognition system	Emmanuel, Zinzan
	BEng	64	Remote Vehicle Tracking	Andile Msimang
2019	BEng	65	FS-1: Micro Maze Navigation	Kolbe, Bruce
	BEng	66	FS-2: Unmanned Aerial Systems	Corlett, Martin
	BEng	67	FS-3: Design of a Hand Exoskeleton	Seedat, Anees
	BEng	68	FS-4: Underwater Robot	Letseka, Motheo
	BEng	69	FS-5: Design and Building of Energy Efficient Propulsion System for Prototype Vehicle	Abraham, Chris
	BEng	70	FS-6: Development of an Embedded 3D Robot Visual System using Genetic Algorithms	Hajee, Mohammed
	BEng	71	FS-7: An efficient method for performing real-time object tracking	Akol, George
	BEng	72	FS-9: Smart Automated Pill Dispenser	Neave, Darren
	BEng	73	FS-10: Image to text recognition system	Koopman, Mischa
	BEng	74	FS-11: Autonomous Planet tracking	Momberg, Garion
	BEng	75	FS-12: CNC Plasma Cutter Table	Msimang, Andile
	BEng	76	FS-13: Persistence of Vision	Steele, Jarryd
	BEng	77	FS-14: Aerodynamic and aeroelastic characteristics of quad copters	Gajjar, Mishkaah
	BEng	78	FS-15: Spraying pesticides by means of a quadcopter	Ngwira, Vinjeru
	BEng	79	FS-16: Hexapod robot	Ramharakh, Chahil
	BEng	80	FS-17: A compact 2.5 axis CNC, focused on milling PCB prototypes from copper clad board	Guscott, Tyler
	BEng	81	FS-18 Solar Panel Cleaning Drone	Erasmus, Kurt
	BEng	82	FS19: CNC – Multi Colour 3D Printer	Qolo, Mava
	BEng	83	FS-20 Smart Mobility Scooter for Senior Citizens	Binta, Zizopho

Review Service to Journals:

- IEEE Transactions on Device and Materials Reliability
- Elsevier Microprocessors and Microsystems
- Recent Patents on Materials Science

Invitation as Keynote Speaker:

- Speech Invitation of AIMC-2020, Japan
- International Conference on Algorithm Design, Analysis & Optimization of Program Language” scheduled on March 18 - 19, 2020, Las Vegas, USA
- International Conference on Automation and Robotics which is scheduled from April 16-17, 2018 at Las Vegas, USA.
- "International Summit on Physics and Astronomy" scheduled to be held from November 14-15, 2019 in Osaka, Japan

Invitation to act as Editor for Journals:

- Executive Guest Editor of Current Mechanics and Advanced Materials
- The Open Artificial Intelligence Journal
- Invitation to act as Editor of the eBook series entitled “Artificial Intelligence Current Future Developments”

Review Service to Conferences:

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- International Conference on Sensor Networks and Signal Processing (SNSP 2019)(Nov.19-22, 2019, National Dong Hwa University, Hualien, Taiwan)
-

Review Service to Universities:

- The Doctoral Degrees Board, invited me to examine a Ph.D. thesis submitted to the University of Cape Town.

Panel Member on Middle Management Interviews:

- Appointments Committee for HoD appointments in the Faculty of Engineering

REFEREES

Title and Name	Position and Company/Institution	Email address	Contact number
Dr. Oswald Franks	Former Executive Dean: EBEIT, NMU	Oswald.Franks@mandela.ac.za	041 504 3955
Dr. Sias Moster	Chairman, Space Commercial Services Holdings Group	sias@scs-space.com	021 300 0060
Prof. Henk de Jager	Vice-Chancellor /Principal- CUT	laurabotha@cut.ac.za	051 507 3001