

**Welcome to the
Graduation Ceremony
of the
University of Johannesburg
1 October 2015 at 17:00**

**Welkom by die
Gradeplegtigheid
van die
Universiteit van Johannesburg
1 Oktober 2015 om 17:00**

**Le a Amogelwa
Moletlong wa Dikapešo wa
Yunibesithi ya Johannesburg
1 Diphlane 2015 ka 17:00**

**Niyamukelwa
eMcimbini wokweThweswa kweZiqu
weNyuvesi yaseJohannesburg
1 kuMfumfu 2015 ngele-17:00**

UNIVERSITY OF JOHANNESBURG

CHANCELLOR

Prof NS Ndebele
BA (Lesotho), MA (Cambridge UK), PhD (Denver USA)

SENIOR OFFICE-BEARERS OF THE UNIVERSITY

VICE-CHANCELLOR AND PRINCIPAL

Prof IL Rensburg
BPharm (Rhodes), MA, PhD (Stanford USA)

DEPUTY VICE-CHANCELLOR: ACADEMIC

Prof A Parekh
BA, BA Hons, MA (UDW), MA (Kansas USA), DPhil (UDW)

DEPUTY VICE-CHANCELLOR: RESEARCH, POSTGRADUATE STUDIES AND LIBRARY

Prof T Marwala
BS Eng (Case Western Reserve USA), MEng (UP), PhD (Cambridge UK)

REGISTRAR

Prof IC Burger
BA, HEd, BA Hons, MA, PhD (RAU)

DEPUTY VICE-CHANCELLOR: STRATEGIC SERVICES

Mrs ME Letlape
BSc (UFH)

DEPUTY VICE-CHANCELLOR: FINANCE

Mr J van Schoor
BCom, BCom Hons (RAU), CA (SA)

DEPUTY VICE-CHANCELLOR: INTERNATIONALISATION, ADVANCEMENT AND STUDENT AFFAIRS

(vacant)

CHIEF OF STAFF AND EXECUTIVE DIRECTOR: VICE-CHANCELLOR'S OFFICE

Ms KC Mketi
BA (Bophut), BA Hons (RAU), MBL (Unisa)

EXECUTIVE DEANS

FACULTY OF ART, DESIGN AND ARCHITECTURE

Prof F Freschi
BA (Wits), BA Hons (UCT), PhD (Wits)

FACULTY OF ECONOMIC AND FINANCIAL SCIENCES

Prof A Dempsey
BCom, BCom Hons, MCom (RAU), CA (SA)

FACULTY OF EDUCATION

Prof SJ Gravett
BA, HEd (PU for CHE), BEd, MEd, DEd (RAU)

FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

Prof S Sinha
BEng, MEng, PhD (UP)

FACULTY OF HEALTH SCIENCES

Prof A Swart
NDip, NHDip (TWR), BEd, MEd (RAU), DTech (TWR)

FACULTY OF HUMANITIES

Prof AB Broadbent
BA, BA Hons, MPhil, PhD (Cantab)

FACULTY OF LAW

Prof PH O'Brien
BCom, LLB, LLM, LLD (RAU)

FACULTY OF MANAGEMENT

Prof D van Lill
BSc, BSc Hons, MSc, PhD (US)

FACULTY OF SCIENCE

Prof D Meyer
BSc, BSc Hons, MSc (RAU), PhD (University of California, Davis)

MEMBERS OF COUNCIL

CHAIRPERSON

Prof RD Marcus

DEPUTY CHAIRPERSON

Mr MS Teke

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Prof IC Burger

Mr JP Burger

Mr D Bvuma

Ms TA Chaka

Ms S Dlamini

Mr TJ Dikgole

Mr CR Gebhardt

Prof D Hildebrandt

Mr G Khosa

Prof C Landsberg

Dr DSS Lushaba

Mr DM Manganye

Dr J Manyaka

Ms K Maroga (invitee)

Ms BJ Memela-Khambula

Dr P Mjwara

Mr M Mkhonta

Prof A Mohammadali-Haji

Mr MJN Njeke

Prof A Parekh

Mr K Rammutla

Prof IL Rensburg

Dr WP Rowland

Mr KB Sibiya

Mr K Thomas

Mr J van Schoor

Mr M White

PRESIDENT OF CONVOCATION

Mr M Mkhonto

Programme

Thursday, 1 October 2015 at 17:00

To ensure good order during the ceremony all those present are requested to leave the Auditorium only after the ceremony has been concluded.

The academic procession enters the Auditorium and the members of the procession take their seats on the stage.

The choir sings Gaudeamus Igitur (or a CD is played) while those present remain standing.

The Chancellor constitutes the congregation.

Choir.

Welcome.

The relevant Executive Dean presents the candidates to the Chancellor for the conferment of a degree/diploma/certificate.

Singing of the National Anthem.

The Chancellor dissolves the congregation.

The academic procession leaves the Auditorium while those present remain standing.

Lenaneo

Labone, 1 Diphlane 2015 ka 17:00

Go kgonthiša gore dilo di sepela ka tshwanelo nakong ya moletlo, bohle bao ba tilego moletlong ba kgopelwa go tšwa ka Holong ya kopano feela ka morago ga ge moletlo o phethilwe.

Sehlopha sa dirutegi se tsena ka Holong ya kopano gomme maloko a sehlopha se a dula ditulong tša ona sefaleng.

Khwaere e opela Gaudeamus Igitur (goba CD e tlo bapalwa) mola bao ba lego gona ba tšwela pele go ema.

Mokhanseliri o kopanya phuthego.

Khwaere.

Dikamogelo.

Hlogophethiši ya maleba ya lefapha e hlagiša dialoga go Mokhanseliri gore di newe tikrii/diploma/setifikeiti.

Go opelwa ga Koša ya Setšhaba.

Mokhanseliri o phatlalatša phuthego.

Sehlopha sa dirutegi se tšwa ka Holong ya kopano mola bao ba lego gona ba tšwela pele go ema.

Program

Donderdag, 1 Oktober 2015 om 17:00

Ter wille van die ordelike verloop van die plegtigheid
word alle aanwesiges vriendelik versoek
om die Ouditorium nie voor die einde van die plegtigheid te verlaat nie.

Die akademiese prosessie kom die Ouditorium binne en neem op die verhoog plaas.
Die koor sing Gaudeamus Igitur (of 'n CD word gespeel) terwyl die aanwesiges staan.

Die Kanselier stel die kongregasie saam.

Koor.

Verwelkoming.

Die betrokke uitvoerende dekaan stel die kandidate aan die Kanselier voor vir die
toekenning van 'n graad/diploma/sertifikaat.

Sing van die volkslied.

Die Kanselier ontbind die kongregasie.

Terwyl die aanwesiges bly staan, verlaat die akademiese prosessie die Ouditorium.

Uhlelo

uLwesine, 1 kuMfumfu 2015 ngele-17:00

Ukuze kuqinisekwe ukuthi konke kuhamba kahle ngesikhathi somcimbi, bonke abakhona
bacelwa ukuba baphume eHholweni kuphela lapho umcimbi usuphothuliwe.

Udwendwe lezifundiswa lungena ehholweni bese amalungu odwendwe ahlala phansi
esiteji.

Ikwaya icula i-Gaudeamus Igitur (noma kudlalwa iCD) ngalenkathi labo abakhona
besamile.

UShansela uhlanganisa ibandla.

Ikwaya.

Ukwamukelwa.

Izinhloko Eziyiziphathimandla ezithintekayo zethula abafundi kuShansela weNyuvesi
ukuze bathole idigiri/iploma/isitifiketi.

Kuculwa iHubo Lesizwe.

Gaudeamus Igitur

Gaudeamus igitur,
Juvenes dum sumus;
Post iucundum iuventutem,
Post molestam senectutem
Nos habebit humus.

Vivat academia,
Vivant professores,
Vivat membrum quodlibet,
Vivat membra quaelibet;
Semper sint in flore!

English

Let us rejoice, therefore,
While we are young.
After a pleasant youth
After a troubling old age
The earth will have us.

Long live the academy!
Long live the professors!
Long live each student;
Long live the whole fraternity;
For ever may they flourish!

Sesotho sa Leboa

Ka gona, a re thabeng,
Re sa le ba bafsa.
Ka morago ga bofsa bjo bo bose
Ka morago ga go tšofala mo go nago le
mathata
Lefase le tla ba le rena.

Phela thuto phela!
Phelang diprofesa phelang!
Phelang baithuti phelang;
Phela kagišano ka botlalo phela;
O ka re ba ka phela gabotse goyagoile!

Afrikaans

Laat ons dan vrolik wees,
Terwyl ons jonk is;
Na 'n aangename jeug.
Na 'n onaangename oudag,
Sal die aarde ons hou.

Lank lewe die universiteit,
Lank lewe die professore,
Lank lewe elke student,
Lank lewe al die studente,
Mag hulle vir ewig hul jeug behou!

Zulu

Ngakho, masithokoze
Sisebasha nje.
Emva kobumnandi bobusha
Emva kwezinkinga zobudala
Umhlaba uzosithatha.

Phambili ngemfundo!
Phambili boSolwazi!
Phambili nakuwe mfundi;
Phambili ngenhlangano yonke;
Maziqhubeke ngonaphakade!

QUALIFICATIONS

1. National Diploma (NDip)

Baloyi, Edward (Power)
Botha, Glenn Dylan (Engineering: Computer Systems)
Buckley, Christelle Kate (Town and Regional Planning)
Chipu, Matome Frans (Town and Regional Planning)
Dofi, Zovuyo (Town and Regional Planning)
Essilfie Conduah, Martin Ekow (Town and Regional Planning)
Ferreira, Brendan Clifford (Engineering: Civil)
Gama, Mdumo Irvin (Electronic)
Hlongwane, Ntshuxeko Comfort (Town and Regional Planning)
Kgoale, Mahlagalale Kgaogelo (Town and Regional Planning)
Khaba, Mpumelelo Given (Town and Regional Planning)
Letsoalo, Frans Mafa (Power)
Luvuno, Simphiwe Winfridah (Engineering: Electrical)
Machaba, Nsuku Goldsworthy (Town and Regional Planning)
Magawu, Phumeza (Power)
Mahlaba, Thuthukani Simphiwe (Engineering: Electrical)
Mahlauli, Gerry (Town and Regional Planning)
Makama, Patrick Nigros (Engineering: Civil)
Makamu, Thabitso Kenzy (Town and Regional Planning)
Malamule, Mpho (Engineering: Electrical)
Maluleke, Jacobeth Nhlamulo (Town and Regional Planning)
Maluleke, Tlangelani Eulender (Instrumentation Technology)
Manxiwa, Apiwe (Engineering: Electrical)
Mapeka, Pitsi Nteteku Edward (Engineering: Computer Systems)
Marwane, Olebogeng Godfrey Stephen (Town and Regional Planning)
Mashaba, Rodney Nkateko (Town and Regional Planning)
Mashau, Rafhiwa (Town and Regional Planning)
Masipa, Clan (Power)
Maso, Nolizwi (Engineering: Computer Systems)
Mathe, Joseph Thabo (Engineering: Electrical)
Mathini, Rhulani Perspicuous (Town and Regional Planning)
Matyhona, Mzwandile (Electronic)
Mdluli, Sibusiso Brain (Town and Regional Planning)
Mhlongo, Nkateko Clifford (Power)
Mkhize, Mfundo Ntethelelo (Electronic)
Mndebele, Donald Sebusiso (Engineering: Electrical)
Modise, Samuel Ditiro (Power)
Mohlala, Phahlephahle Isaac (Town and Regional Planning)
Molala, Nkalipho Nonkululeko (Town and Regional Planning)

Molatudi, Kopiane Success (Town and Regional Planning)
Molebatsi, Mpho (Town and Regional Planning)
Monyepao, Ntebaleng Arthur (Electronic)
Moremi, Lethabo Elias (Electronic)
Moropana, Mogase Emmanuel (Town and Regional Planning)
Moshoeshoe, Thabo Francis (Engineering: Electrical)
Mthembu, Bongani Arthur (Power)
Mthimkhulu, Khethukuthula (Town and Regional Planning)
Mthimunye, Johannes Joe Joe (Engineering: Electrical)
Mtimunye, Sana Emmanuel (Engineering: Electrical)
Murudi, Anza (Town and Regional Planning)
Mvundlela, Kholofelo Penilane (Engineering: Electrical)
Nel, Guilliam Johannes (Instrumentation Technology)
Ngoqo, Simphiwe Collen (Town and Regional Planning)
Nkalanga, Busie Fikile (Engineering: Electrical)
Nkambule, Sbongile (Instrumentation Technology)
Nkosi, Gerald Musa (Engineering: Civil)
Nukeri, Themba Steven (Power)
Poopedi, Tshepo Solomon (Town and Regional Planning)
Seekane, Gabi (Engineering: Civil)
Seemola, Mosima Codelia (Engineering: Civil)
Seima, Maela Augustine (Town and Regional Planning)
Selepe, Kgabo Raesetja Temoso (Town and Regional Planning)
Setjie, Maruping (Power)
Thene, Thibello (Electronic)
Theron, Steven (Engineering: Civil)
Thiba, Murendwa (Town and Regional Planning)
Tselanyane, Johannes Kagiso (Power)
Tshemese, Anelisa Vuyolwethu (Power)
Tshirangwana, Khuliso Natash (Engineering: Civil)
Zondo, Cebisile Veronica (Engineering: Electrical)

2. **Baccalaureus Technologiae (BTech)**

Dlamini, Lloyd (Engineering: Electrical)
Dube, Thobani Theo (Engineering: Electrical)
Gangqa, Xolela (Engineering: Electrical)
Hlako, Martin (Engineering: Electrical)
Hoon, Wynand (Engineering: Civil: Construction Management)
Kamanga, Jabulani (Engineering: Electrical)
Keys, Victor John (Engineering: Electrical)
Lekgotle, Olorato Precious (Engineering: Electrical)
Lesejane, Tumelo Faith (Engineering: Electrical)
Madi, Mduduzi Lebogang (Engineering: Civil: Water)
Maishe, Lufuno (Engineering: Electrical)
Mare, Andre Charl (Engineering: Civil: Construction Management)

Mathibe, Tshimo Raketlo (Engineering: Civil: Construction Management)
Matodzi, Hilda Nonhlanhla (Engineering: Civil: Water)
Mofokeng, Kleinbooi Moeti (Engineering: Civil: Transportation)
Moholo, Garetshose Gratitude (Town and Regional Planning)
Mollo, Tshehla Gary (Engineering: Electrical)
Mudau, Nndondeni (Engineering: Electrical)
Mulaudzi, Tshilidzi Innocent (Engineering: Electrical)
Muller, Jacobus Johannes Francois (Engineering: Civil: Construction Management)
Nemangaya, Dakalo (Engineering: Electrical)
Ngobeni, Princess (Engineering: Electrical)
Ngwana, Pebetsi Mmathabo (Engineering: Civil: Transportation)
Paepae, Makgetha Emmanuel (Engineering: Civil: Water)
Pearton, Christopher Trevor (Engineering: Civil: Structural)
Rajagopaul, Sirshen (Engineering: Electrical)
Raphiri, Jacinta Reneilwe (Engineering: Civil: Water)
Sindane, Thokozani Samuel (Engineering: Civil: Water)

3. **Baccalaureus Ingeneriae (BIng)**

Deokali, Sarvesh Sunil (Electrical and Electronic Engineering With Endorsement Information Technology)
Gumede, Phindiwe (Electrical and Electronic Engineering)
Khumalo, Mbongiseni (Electrical and Electronic Engineering)
Makhateng, Don Morena (Electrical and Electronic Engineering)
Moorcroft, Ronald Nelson (Electrical and Electronic Engineering With Endorsement Information Technology)
Morolong, Jeanette Tsholofelo (Electrical and Electronic Engineering)
Mumanga, Takawira Joseph (Electrical and Electronic Engineering)
Muranda, Charles (Electrical and Electronic Engineering)
Samakande, Tendai (Electrical and Electronic Engineering)
Van Dyck, Eddie Werner (Electrical and Electronic Engineering)
Zibani, Siyabonga Humphry (Electrical and Electronic Engineering)

4. **Magister Technologiae (MTech)**

Dada, Opeoluwa Rotimi (Extraction Metallurgy)
Dissertation: Characterisation of foundry greensand and its potential for reuse
Supervisor: Prof AF Mulaba-Bafubiandi
Co-supervisor: Mr F Varachia

Dyonase, Xhanti (Operations Management)
Dissertation: The absence of coherent business systems for South African manufacturing companies
Supervisor: Dr P Kholopane

Kipepe Mwata, Theodore (Engineering: Metallurgy) (with distinction)
Dissertation: Improving the energy efficiency of induction Furnace through foaming Slag
Supervisor: Dr X Pan
Co-supervisor: Dr D Nyembwe

Lumu, Tshibaka (Chemical Engineering)
Dissertation: Stripping effect on Fischer-Tropsch synthesis with switching between syngas with N₂ addition over co-based catalysts
Supervisor: Prof K Jalama
Co-supervisor: Prof D Hildebrandt
Co-supervisor: Prof D Glasser

Malenga, Ntumba Edouard (Engineering: Metallurgy)
Dissertation: Complexation and reductive jarosite dissolution in alkaline media for nickel recovery
Supervisor: Prof AF Mulaba-Bafubiandi
Co-supervisor: Dr W Nheta

Nyambe, Bangixhanti Gift Siyambulela (Operations Management)
Dissertation: The role of technology transfer in the industrial expansion of South Africa's cryogenic gas industry
Supervisor: Prof C Mbohwa

Sibiya, Mandisa (Construction Management) (with distinction)
Dissertation: Assessment of factors affecting the performance of construction projects in South Africa
Supervisor: Dr CO Aigbavboa
Co-supervisor: Prof WD Thwala

5. Magister Ingenieriae (MIng)

Hoogenboezem, Theunis Andries (Electrical and Electronic Engineering)
Dissertation: Energy efficiency characterisation of a Solar Photovoltaic water pump
Supervisor: Dr DC Pentz
Co-supervisor: Dr AS De Beer

Meyer, Larno Lourens (Engineering Management)
Dissertation: Influence of culture and human factors on project management contributing to the success of managing engineering teams in a global environment
Supervisor: Prof JHC Pretorius
Co-supervisor: Prof L Pretorius

Moyo, Thembani Thabo (Electrical and Electronic Engineering)

Dissertation: Helicopter UAV path planning for optimised powerline inspection

Supervisor: Mr F du Plessis

Co-supervisor: Prof J Meyer

Shonhiwa, Patrice (Mechanical Engineering)

Dissertation: An investigation of the energy efficiency of a computer laboratory

Supervisor: Prof A Nurick

Theledi, Thapelo (Engineering Management)

Minor Dissertation: Use of project management organisational structures to effectively utilise Eskom's scarce engineering resources

Supervisor: Prof JHC Pretorius

Co-supervisor: Dr A Wessels

6. **Magister Philosophiae (MPhil)**

Motjoadi, Vinny (Engineering Management)

Minor Dissertation: Sustainable quality efficiency in a South African energy provider

Supervisor: Prof JHC Pretorius

Co-supervisor: Dr A Vermeulen

7. **Doctor Philosophiae (DPhil)**

Marwala, Lufuno Ronald (Electrical and Electronic Engineering)

Thesis: Forecasting electricity demand in South Africa using artificial intelligence

Supervisor: Prof B Twala

Massyn Romo, Rosie Hermina (Engineering Management)

Thesis: Engineering skills management: A critical review of skills management factors in practice

Supervisor: Prof AL Nel

8. **Doctor Ingenieriae (DIng)**

Boulkaibet, Ilyes (Electrical and Electronic Engineering)

Thesis: Finite Element Model updating using Markov Chain Monte Carlo Techniques

Supervisor: Prof T Marwala

Co-supervisor: Dr L Mthembu

Jenkins, Raymond John (Engineering Management)

Thesis: A practical Genetic Algorithm/Monte Carlo model for identifying best plant design configurations

Supervisor: Prof JHC Pretorius

Co-supervisor: Prof L Pretorius

Manyere, Peter (Electrical and Electronic Engineering)

Thesis: Development of segmentation based image formation algorithm for spotlight synthetic aperture radar

Supervisor: Prof AL Nel

Tlotleng, Monnamme Titus (Mechanical Engineering)

Thesis: Laser assisted deposition of Titanium and Hydroxyapatite Biocomposites

Supervisor: Prof ET Akinlabi

Co-supervisor: Prof S Pityana

Co-supervisor: Prof M Shukla



Marwala, Lufuno Ronald (DPhil) (Electrical and Electronic Engineering)

Lufuno Ronald Marwala holds a Bachelor of Science (Eng) Electrical/Information degree, Postgraduate Diploma in Industrial Engineering and a Master of Science in Engineering from the University of the Witwatersrand. He has also completed a Programme in Business Management at UNISA and has studied Economics and Public Finance (with distinction) also at UNISA. He started his career as an Electrical Engineer at Eskom where he worked on strategic projects for Eskom, including projects on Eskom's capital expansion programme, specifically the construction of Akerlig Gas Turbine power station in Cape Town. He also worked in a team that designed Eskom's Next Generation Communication Network. He then worked for the Gauteng government as a specialist in the area of Information and Communication Technology (ICT), Innovation and Development. In this role, he developed and drafted the Gauteng province ICT strategy. Mr Marwala is currently working as a consulting engineer, focusing on engineering services.

The candidate introduces a novel artificial intelligence technique called extreme learning machines (ELM) and structural causal models (SCM) for forecasting electricity consumption using time series and causality approaches, respectively. Time series data was used to construct univariate models for forecasting a one step ahead electricity consumption, on a monthly basis. For causal analysis, the study is novel in that it mathematically models the relationship between electricity consumption and production levels in the manufacturing sector and mining sector in South Africa. The candidate introduced the use of basic ELM and optimally-pruned ELM (OP-ELM) to forecast the electricity consumption data series. The two techniques use a learning technique that converts a single layer feed-forward network learning problem into a linear problem which can find the universal minima and requires very small processing time. The work also introduced the use of SCM and graphical causal model for time series causal analysis in electricity consumption forecasting to identify the causal variables. Unlike Granger causality, which focuses on accurate modeling of the systems, SCM provides a framework for reasoning about the causal relationship between variables. SCM was successfully used to identify the causal variables. The work also used ELM and OP-ELM in conducting granger causality testing by using the causal variable identified using SCM. Experiments were performed using data series of electricity consumption and the manufacturing production index in the manufacturing sector and consumption and the mining production index in the mining sector. By using OP-ELM, the empirical results showed that a granger causal relationship existed between the manufacturing production index and electricity consumption in the manufacturing sector, which was not the case when using ELM. No causal relationship was found between the mining production index and electricity consumption using both ELM and OP-ELM.

Supervisor: Prof B Twala

Massyn Romo, Rosie Hermina (DPhil) (Engineering Management)

Rosie Hermina Massyn Romo was born on 12 April 1970 and matriculated in 1988 from the National School of Arts. Her early career was in Finance and Administration after which she moved into technology consulting in 1995. She worked in the telecommunication industry for 12 years, focusing specifically on Revenue Assurance and Fraud, and more recently in the banking industry to support technology adoption and business change initiatives. She obtained a BCom Honours (Industrial and Organisational Psychology) from UNISA in 2003 and went on to complete an MPhil in Engineering Management at UJ in 2011.

The candidate's research developed a Skills Gap Management Model and introduced the concept of a *job fitness ratio* as the guiding principle that organisations can and should adopt to take control of improved job definitions, to clearly articulate its skills demand to enable an improvement in the skills matching processes. The research was initiated from conflicting reports in industry, suggesting that while organisations report that they cannot find suitably skilled resources, there are large numbers of graduates and other experienced persons not finding employment. The job fitness ratio approach places the onus on the organisation to own and manage skills gaps by being thorough and consistent in how it manages, compensates or substitutes for the perceived lack of skills. If skills gaps are properly articulated and measured, then interventions can be targeted more effectively. This study assumes skills shortage as a constant and only provides a model describing the mechanism for defining and determining the skills gap as a fitness ratio between the individual and the job he is assigned to. It does not address ways to reduce the skills shortage or potential interventions to alleviate the skills gaps that organisations do experience. This work has been reported internationally and is also the basis of a book that is aimed at stimulating further research into the skills gap phenomenon in STEM organisations.

Supervisor: Prof AL Nel

Boulkaibet, Ilyes (DIng) (Electrical and Electronic Engineering)

Ilyes Boulkaibet was born in Algeria and received a BSc (Hons) in Electronic Engineering and a Master's in Engineering, specialising in Control Systems, from the University of Constantine in Algeria in 2004 and 2007, respectively. He obtained a Postgraduate Diploma in Mathematical Sciences from the African Institute for Mathematical Sciences (AIMS) in Cape Town and, in 2010, an MSc in Computer Science from Stellenbosch University. From 2011, he has been a doctoral student at the University of Johannesburg.

The problem of modelling complex structures is of great interest to electrical, mechanical, civil, and aeronautical engineering. Often a finite element model is used to achieve this goal, but the main shortcoming is that the predictions of finite element models are usually different from the physically measured data. This research is about developing methods based on Bayesian statistics to model the dynamic responses of structures and uncertainty quantification. To estimate the posterior probability function from the likelihood function, the prior distribution function and the evidence, Markov Chain Monte Carlo algorithms were used to update finite element models to better reflect the measured data. In particular, the Metropolis-Hastings, Slice Sampling, Hybrid Monte Carlo, Shadow Hybrid Monte Carlo, Evolutionary Monte Carlo and Separable Shadow Hybrid Monte Carlo algorithms were studied and applied to model complex structures. Three case studies were used to study these algorithms and the results obtained showed significant improvements over existing approaches. One ISI journal and four book chapters were published. Two further papers are under review by ISI-listed journals.

Supervisor: Prof T Marwala

Co-supervisor: Dr L Mthembu

Jenkins, Raymond John (DIng) (Engineering Management)

Ray Jenkins was born in Cullinan on 14 June 1965. He obtained his BSc Aeronautical Engineering degree (*cum laude*) in 1987 and his MSc Engineering degree in 1992, both from the University of the Witwatersrand. Throughout his career, he has been specialising in Reliability and Safety Engineering, Technical Risk Assessment and Physical Asset Management. Over the years, he has successfully completed many projects in the commercial, aerospace and military sectors, both in South Africa and in the UK. He is a registered Chartered Engineer in the UK and a registered Professional Engineer in South Africa. He is currently a senior consulting engineer at Reutech Solutions and is the project leader for a number of reliability and safety engineering projects in the power and military sectors.

Design engineers frequently grapple with alternative plant design configurations. Plant design is clearly about making many decisions where there is uncertainty and conflicting criteria. The plant has to meet all the availability, reliability and production criteria, usually specified in the form of minimum performance metrics. Economics also plays a critical role as these plants will incur large procurement and operating costs during their lifetime. Additional practical constraints are also imposed on the architecture of the plant. A practical everyday model that determines the best plant design configuration by meeting cost and performance considerations would be of tremendous value. However, the model would have to be realistic enough to be of practical value.

A practical model was developed by incorporating genetic algorithm into a powerful “off the shelf” Monte Carlo simulator. Additional coding was developed to incorporate a number of unique mode features. Prominent features included the chromosome coding of reliability block diagram tie sets, the numbering and tracking of system internal states and the search strategy to find the best solution. A practical case study, which identified the best design configuration for the Westinghouse Reactor Control System, was presented. The model has proven to be effective, computationally efficient and of practical value to design engineers. It is now being used in industry.

Supervisor: Prof JHC Pretorius

Co-Supervisor: Prof Leon Pretorius

Manyere, Peter (DIng) (Electrical and Electronic Engineering)

Peter Manyere was born on 23 August 1966. He completed his A levels at Lord Malvern High School in Harare in 1986. He originally trained as an Aircraft Engineer in the field of Avionics and qualified in 1993. In 1999, he obtained a BSc (Hons) Electrical Engineering degree from the University of Zimbabwe. In 2002, he obtained an Advanced Diploma in Radar Engineering from the PLA Radar Academy in Wuhan, China and in 2008 MSc (Communication Engineering) from Beijing University of Aeronautics and Astronautics (BUAA). In 2009, he obtained a Master of Business Administration (MBA) from Zimbabwe Open University. From 1988 to date, he has worked in various roles in the Zimbabwe Defence Forces, including as Officer Commanding Engineering Operations. He has also worked as a Lecturer at the University of Zimbabwe, the Women University for Africa (WUA), the Polytechnic of Namibia (PON) and as a Control Engineering assistant lecturer at UJ. Currently, he is employed in the Zimbabwe Defence Forces as a Research and Development Senior Engineer and also as a lecturer at the University of Zimbabwe.

The candidate's research focused on the Development of a Segmentation Based Image Formation Algorithm for Spotlight Synthetic Aperture Radar (SSAR), in which two processing algorithms for long duration pulsed linear frequency modulated SSAR data were developed. The use of long duration pulses yields highly accurate range resolved radar images, improved signal to noise ratio of the transmitted and received pulses, higher transmitter energy and extended radar range. However, these benefits are associated with the cost of large memory size requirements and the longer time required to process the data. In order to address these challenges, the candidate developed algorithms based on SSAR data segmentation one and two dimensions, using parallel processing together with sub-image recombination and error correction. The new algorithms have a significant impact on the SSAR image quality and SSAR data processing speed. To validate the performance of the developed algorithms, a wide range of tools were used, including subjective versus objective image quality comparison metrics. Algorithm performance indexing was accomplished by determining execution times for different input SSAR data loads in both noise-free and noisy environments and performance speedups of 3 to 6 times were achieved compared to the benchmark Polar Format Algorithm. This work has been disseminated internationally through both IEEE conference proceedings and journal articles.

Supervisor: Prof AL Nel

Tlotleng, Monnamme Titus (Ding) (Mechanical Engineering)

Monnamme Tlotleng is currently a researcher at the National Laser Centre (NLC) CSIR. He received his matric with merit, in 2003, at Letsatsing Science High School (one of the prestigious Dinaledi High Schools of South Africa) in Mafikeng, North West Province, South Africa. He graduated with a BSc (Hons) in Applied Chemistry and a Master of Science in Chemical Engineering from the University of the Witwatersrand. He worked as a candidate engineer at the Department of Energy on the Karoo gas exploration and drilling project. Later that year, he joined the CSIR NLC to work on the development of the quantum trap laser system. He registered in 2012 for his doctorate studies. His research interests are in laser materials processing and additive manufacturing. He currently reviews articles for *Applied Physics A* and *Materials Science and Engineering C* journals. He has also reviewed papers for many international conferences.

In his thesis, the candidate developed, optimised and successfully used the laser-assisted cold spraying (LACS) system to synthesise hydroxyapatite coatings on titanium grade 5 alloys for potential use in the field of biomedical engineering. Concurrently, the candidate developed and optimised laser direct metal deposition (DMD) and direct laser melting (DLM) techniques for the production of a candidate biomedical material. The research produced by the candidate was world-class in that the article published on the LACS results in the *Journal of Thermal Spray Technology* was the second ever to be published on the subject matter. His work has been presented at peer-reviewed international conferences. In summary, the candidate published two ISI-listed journal papers, nine peer-reviewed conference papers and two book chapters.

Supervisor: Prof ET Akinlabi

Co-supervisor: Prof S Pityana

Co-supervisor: Prof M Shukla

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