PROGRAMME

CALLIE HUMAN BLOEMFONTEIN CAMPUS

28 JUNE 2018 | 14:30

CONSTITUTION OF THE CONGREGATION
Chancellor
Dr K Mokhele

OFFICIAL WELCOME AND WORD OF THANKS
Rector and Vice-Chancellor
Prof FW Petersen

INTRODUCTION OF GUEST SPEAKER
Vice-Rector: Research
Prof RC Witthuhn

GUEST SPEAKER
Author, Political Analyst and 2016 UFS Honorary Doctorate Recipient
Dr M du Preez

MUSICAL ITEM
"A Change is Gonna Come"
Music and lyrics by S Cooke
Performed by Mr T Willard, Mr A Mockie and Mr L Rantho

PRESENTATION OF MASTER'S CANDIDATES
Dean: Faculty of Natural and Agricultural Sciences
Prof PD Vermeulen

CONFERMENT OF MASTER'S DEGREES
Chancellor
Dr K Mokhele

PRESENTATION OF MEDALS
Dean: Faculty of Natural and Agricultural Sciences
Prof PD Vermeulen

PRESENTATION OF DOCTORAL CANDIDATES
Dean: Faculty of Natural and Agricultural Sciences
Prof PD Vermeulen

CONFERMENT OF DOCTORAL DEGREES
Chancellor
Dr K Mokhele

CONGRATULATORY MESSAGE
Chancellor
Dr K Mokhele

NATIONAL ANTHEM OF SOUTH AFRICA
Led by Ms J Marais and accompanied by the Graduation Instrumental Ensemble
under the direction of Mr A Esterhuyse

DISSOLUTION OF THE CONGREGATION
Chancellor
Dr K Mokhele

NATIONAL ANTHEM OF SOUTH AFRICA

Nkosi sikelel' iAfrika

Maluphakanyisw' uphondo lwayo,
Yizwa imithandazo yethu,
Nkosi sikelela, thina lusapho lwayo.
Morena boloka setjhaba sa heso,
O fedise dintwa le matshwenyeho,
O se boloke, O se boloke setjhaba sa heso,
Setjhaba sa South Afrika –
South Afrika.
Uit die blou van onse hemel,
Uit die diepte van ons see,
Oor ons ewige gebergtes,
Waar die kranse antwoord gee,
Sounds the call to come together,
And united we shall stand,
Let us live and strive for freedom,
In South Africa our land.

In order to maintain the dignity of the ceremony, you are requested to take note of the following:

- Please stand as the procession enters the hall
- Do not move around during the ceremony in order to take photos
- Please refrain from unacceptable actions such as whistling
- Please put your cellphone on silent so as not to disturb the proceedings
- We strive to conduct the ceremonies in a dignified manner
- Please do not leave the hall before the graduation proceedings have been concluded

ABOUT THE UFS

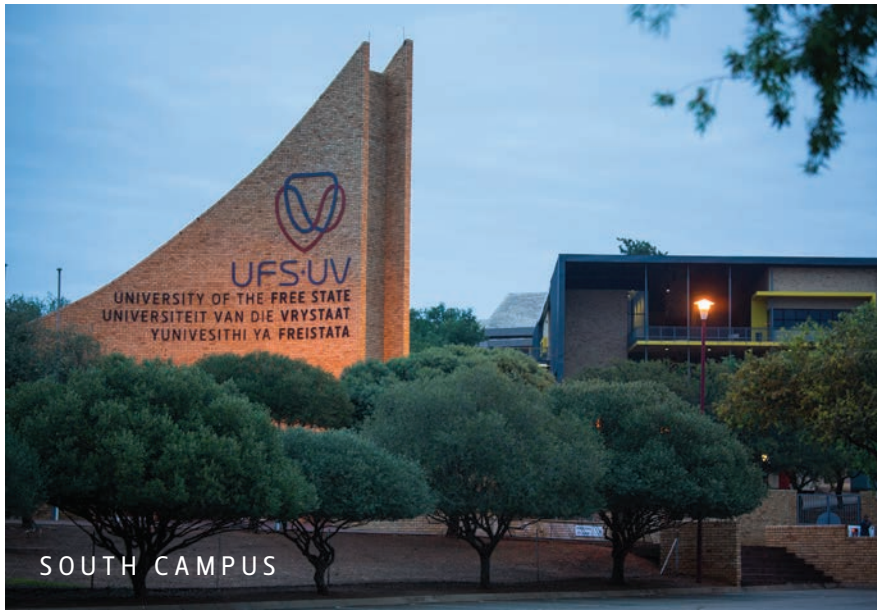
The University of the Free State (UFS) is one of the oldest institutions of higher education in South Africa. It opened its doors in 1904 in Bloemfontein as the Grey University College, with six students in the Humanities. Since then, the institution has grown to more than 40 000 students, spread over three campuses and across seven faculties (Economic and Management Sciences, Education, Health Sciences, the Humanities, Law, Natural and Agricultural Sciences, Theology and Religion).

Most of the students are located on the Bloemfontein Campus, with the Qwaqwa Campus situated in the picturesque Eastern Free State, serving a rapidly-growing number of rural students from the immediate area and surrounding provinces. The South Campus – also situated in Bloemfontein – serves as the centre for distance-learning programmes offered by the UFS, as well as alternative access to higher education for promising students who have not obtained the required marks in their final school examinations.

Over the years, the university has grown into an education hub which has positioned itself on the global stage, promoting research excellence, with exceptionally talented scholars and students who are recognised the world over, as well as alumni who have grown into influential leaders in society.


BLOEMFONTEIN CAMPUS


QWAQWA CAMPUS



SOUTH CAMPUS

DEVELOPMENT OF THE UFS CREST OVER MORE THAN A CENTURY

1904

Up to 1935, the same coat of arms was used as the Grey College School.

1935

By 1935, with the name change to University College of the Orange Free State, the coat of arms fell into disuse, especially among students.

1947

In 1947, an agreement between management and students led to the new motto Per Fidem ad Sapientiam (Through faith to wisdom).

1950

In 1952, it was changed to In Deo Sapientiae Lux (In God is the light of wisdom).
The traditional orange, white and blue, linking the UFS to the South African national colours, changed in the late 1990s.
The orange was replaced by cherry red.

UNIVERSITY OF THE **FREE STATE**
UNIVERSITEIT VAN DIE **VRYSTAAT**
YUNIVESITHI YA **FREISTATA**

2011

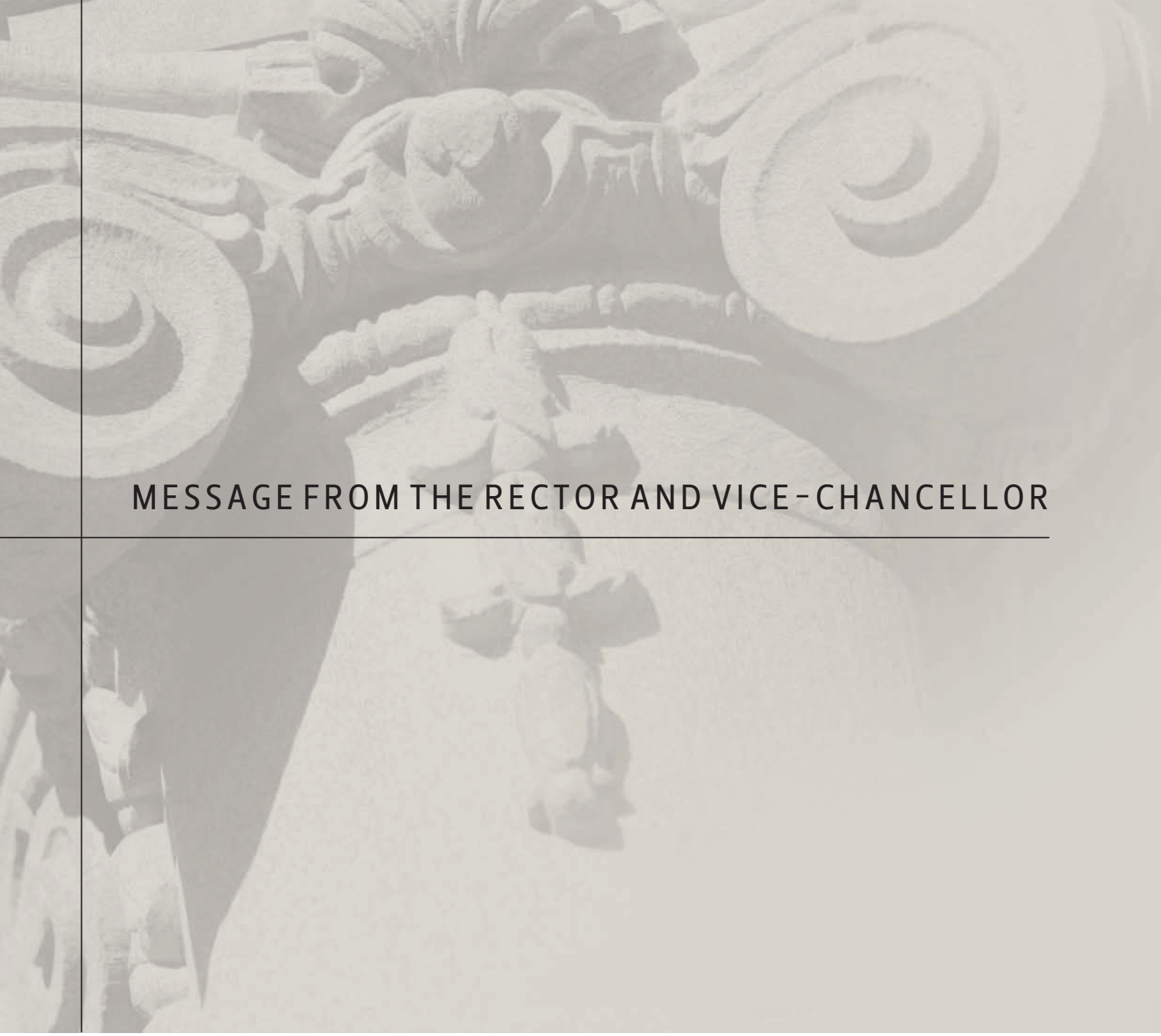
The academic brand – the historic University of the Free State crest that has been the symbol of the university since 1952, has evolved to embrace the aesthetic expectations of the stakeholders. The shape of the traditional academic shield has been simplified and contemporised. Much of the symbolism of the crest remains intact, acknowledging the location of the UFS brand as one of the country's premier institutions of higher education, with a proud history of academic excellence and an ever evolving, vibrant culture.

Honorary Awards | Honorary Doctorates

1950	GLP Moerdyk - DLitt (h.c.)
1951	NC Havenga – LLD (h.c.)
1952	Thos Blok – DEd (h.c.)
	SHS Rubidge – DSc (h.c.)
1955	CR Swart – LLD (h.c.)
	CA v Niekerk – LLD (h.c.)
1958	CPB Brink – LLD (h.c.)
	CF Visser – DEd (h.c.)
1959	DB Bosman – DLitt (h.c.)
	SP le Roux – DScAgric (h.c.)
	DF Malherbe – DLitt (h.c.)
	GH v Rooyen - MA (h.c.)
1960	SPE Boshoff – DLitt (h.c.)
1961	T Boydell – DPhil (h.c.)
1962	ES Botes – DEd (h.c.)
	PE Rousseau – DSc (h.c.)
1963	EH Louw – LLD (h.c.)
	EN Roberts – DSc (h.c.)
	JGF (Kaalkop) vd Merwe - DCom (h.c.)
	HF Verwoerd – DLitt et Phil (h.c.)
1966	PSZ Coetzee – DPhilTh (h.c.)
	PJ du Toit – DSc (h.c.)
	MS Louw – DCom (h.c.)
1967	SM Naudé – DSc (h.c.)
	LC Steyn – LLD (h.c.)
	BJ Vorster – LLD (h.c.)
1968	SJ Naudé – DCom (h.c.)
1969	CW (Nellie) Swart – DPhil (h.c.)
	AJJ Wessels – DCom (h.c.)
1970	GS Nienaber – DLitt (h.c.)
	HO Mönnig – DSc (h.c.)
1971	N Diederichs - DCom (h.c.)
	RS Verster – DPhil (h.c.)
1972	LW Hiemstra – DPhil (h.c.)
	PJ Meyer – DPhil (h.c.)
1975	PJ Nienaber – DLitt (h.c.)
	De la H de Villiers – DScAgric (h.c.)
	GJ Stander – DSc (h.c.)
1976	AJA Roux – DSc (h.c.)
1978	SP Botha – DSc (h.c.)
	EM van Zinderen Bakker – DSc (h.c.)
	HB Thom – DEd (h.c.)
1979	FCL Bosman – DPhil (h.c.)
	G Cronjé – DSocSc (h.c.)
	CJF Human – DCom (h.c.)
1980	G Boonzaier – DPhil (h.c.)
1981	PW Botha – DPhil (h.c.)
	B Human – DCom (h.c.)
	SG Shuttleworth – DSc (h.c.)
1982	BLS Franklin – DPhil (h.c.)
	GvN Viljoen – DEd (h.c.)
1983	L Luyt – DCom (h.c.)
	SF Zaaiman – DPhil (h.c.)
1984	HS Steyn - DSc (h.c.)
	FR Tomlinson – DScAgric (h.c.)
	JH vd Berg – DMed (h.c.)
1985	L Alberts - DSc (h.c.)
	GG Cillié – DPhil (h.c.)
	SPD le Roux – DLitt (h.c.)
	A Polson – DPhilMed (h.c.)
	J du P Scholtz – DPhil (h.c.)
1986	S Grové – DMus (h.c.)
	FP Retief – DMed (h.c.)
	JA Stegmann – DCom (h.c.)
1987	WA Joubert – LLD (h.c.)
	B Kok – DPhil (h.c.)
	WP Venter – DCom (h.c.)
1988	JJN Cloete – DAdmin (h.c.)
	FC Fensham – DLitt (h.c.)
	JW vd Riet –DPhil (h.c.)
1989	BJ Meyer – DSc (h.c.)
	N van Uden – PhD (h.c.)
1990	MG Corbett – LLD (h.c.)
	JS Rabie – DLitt (h.c.)
1991	SS Brand – DCom (h.c.)
	JWL de Villiers – DSc (h.c.)
	GT Fagan – DArch (h.c.)
	JH Hofmeyer – PhD (h.c.)
	E v Heerden – DLitt (h.c.)
1992	JP Louw – DLitt (h.c.)
	H Olivier – DSc (h.c.)
1993	JD Anderson - DMed (h.c.)
	RR Arndt – DSc (h.c.)
	SJ Naudé – LLD (h.c.)
1994	JJ Human – DPhil (h.c.)
	JA Myburgh – DMed (h.c.)
	JP vd Walt – DSc (h.c.)
1995	WA Landman – DEd (h.c.)
	WL Mouton – DPhil (h.c.)
1996	WDO Marasas – DSc (h.c.)
	NE Wiehahn – LLD (h.c.)
1997	AP Brink – DLitt (h.c.)
	B Hurwitz – DPhil (h.c.)
1998	FC Müller – DMed (h.c.)
1999	FM Claerhout – DPhil (h.c.)
	JJF Hefer – LLD (h.c.)
	S Nigam - DSc (h.c.)
	WL Nkuhlu – DCom (h.c.)
	MA Ramphele – DPhil (h.c.)
	HJO van Heerden – LLD (h.c.)
	FJ van der Merwe – PhD (h.c.)
2000	MH Daling – DCom (h.c.)
	TN Liversedge – PhD (h.c.)
	I Mahomed – LLD (h.c.)
2001	BP Gilbertson – DCom (h.c.)
	NR Mandela – LLD (h.c.)
	EC Taglauer – DSc (h.c.)
2002	BH Meyer - PhD (h.c.)
	BAK Rider – LLD (h.c.)
	CF Slabber – PhD (h.c.)
	JM Stetar – DEd (h.c.)
2003	EWA de Corte – DEd (h.c.)
	HA Serebro – DPhil (h.c.)
	AG Sykes – DSc (h.c.)
2004	S Badat – DPhil (h.c.)
	R Bringle – DPhil (h.c.)
	J de Wet – DMus (h.c.)
	CF Fauconnier – DSc (h.c.)
	GJ Gerwel – DPhil (h.c.)
	WD Jonker – DTh (h.c.)
	A Krog – DLitt (h.c.)
	K Mokhele – DPhil (h.c.)
	CJC Nel (Postuum) – PhD (h.c.)
	L Quayle – DMus (h.c.)
	T (Karel) Schoeman – DLitt (h.c.)
	YK Seedat – DMed (h.c.)
	MK Seely – DSc (h.c.)
	C Seerveld – DPhil (h.c.)
	F van Z Slabbert – DPhil (h.c.)
	JC Steyn – DLitt (h.c.)
	PA Verhoef – DTh (h.c.)
	L van den Heever – LLD (h.c.)
	HA Wessels – LLD (h.c.)
2005	A du P Heyns – DMed (h.c.)
	JJF Durand – DPhil (h.c.)
	JA Groenewald – DSc (h.c.)
	WH Neuser – DTh (h.c.)
	M Ramos - PhD (h.c.)
	SJ Terreblanche – DCom (h.c.)
2006	T Moss – PhD (h.c.)
	PV Cox – PhD (h.c.)
2007	BJ (Bannie) Britz – DArch (h.c.)
	KPD Maphalla - PhD (h.c.)
2008	D Ferreira – DSc (h.c.)
2009	JC Loock – PhD (h.c.)
	LTC Harms – LLD (h.c.)
2010	P Gordhan – PhD (h.c.)
	BBS Ngubane – PhD (h.c.)
	AH Strydom – PhD (h.c.)
	M Jones – PhD (h.c.)
2011	D Tutu – DTh (h.c.)
	P Fourie – DLitt (h.c.)
	OG Winfrey –DEd (h.c.)
	RWM Frater – PhD (h.c.)
	A Sawyer – DEd (h.c.)
2012	RJ Goldstone – LLD (h.c.)
	ER v Heerden – DLitt (h.c.)
	M Nussbaum – DLitt (h.c.)
	OW Prozesky – MD (h.c.)
	FDJ Brand – LLD (h.c.)
2013	ZKG Mda – DLitt (h.c.)
2014	ML Blum – PhD (h c)
	L Mulvey – DLitt (h c)
2015	L Brahimi – DPhil (h.c.)
	JM Samuel – DEd (h.c.)
	MA Oduyoye – DTh (h.c.)
	JD Sacks – DEcon (h.c.)
2016	RJ Khoza - DEcon (h.c.)
	TA Manuel - DEcon (h.c.)
	M du Preez – PhD (h.c.)
	J Samoff - DPhil (h.c.)
	F Haffajee - PhD (h.c.)
2017	PH Holloway - DSc (h.c.)
	M Botha - LLD (h.c.)

Shields of Honour, Council and Chancellor's Medals

1994	Prof FO Müller (Shield of Honour)
	RE Schoombie (Shield of Honour)
1995	Prof FO Müller (Chancellor's Medal)
	RE Schoombie (Chancellor's Medal)
1996	Prof S Mittman (Shield of Honour)
1997	Prof M Jansens (Shield of Honour)
1998	Prof CJC Nel (Chancellor's Medal)
	Prof C Swanepoel (Chancellor's Medal)
1999	WJ (Hansie) Cronje (Shield of Honour)
	Prof David Justice (Shield of Honour)
2000	Prof P Rosseel (Shield of Honour)
	Prof MJ Viljoen (Chancellor's Medal)
2001	Prof PC Potgieter (Chancellor's Medal)
2002	T Moss (Shield of Honour)
	Prof CD Roode (Chancellor's Medal)
2003	Prof HC Janse van Rensburg (Council's Medal)
	Prof SA Petersen (Shield of Honour)
2008	Ludo Helsen (Shield of Honour)
2009	Prof JU Grobbelaar (Council's Medal)
2010	Mrs AM Dippenaar (Chancellor's Medal)
2014	Dr H Verster (Chancellor's Medal)
2014	Mr JL Pretorius (Chancellor's Medal)
2016	Mr AD Osler (Chancellor's Medal)
	Ms M van der Merwe (Chancellor's Medal)
2017	Ms JS Isaacs (Chancellor's Medal)



MESSAGE FROM THE RECTOR AND VICE-CHANCELLOR

Dear Student

Congratulations on obtaining your degree! Graduation is a significant and memorable day and a culmination of the time you spent here at the University of the Free State (UFS). As a postgraduate student, you have become part of a fraternity of exceptional individuals who have graduated before you. As you know, there is nothing more fulfilling than walking across the stage and being capped, conscious of the fact that you have achieved what you set out to do in your academic career.

As a university recognised for academic excellence and quality education, we are proud to confer this degree upon you.

I join those who have helped you along the way to this big day – including your promotor, fellow students, friends, and loved ones – in applauding you for all the hard work and perseverance

that has made this moment possible. Enjoy and celebrate this exceptional day with family and friends.

Remember that you will always be a member of the Kovsie family. We encourage you to stay connected with the university, to become an active member of the alumni, and to give back by supporting your alma mater. The continued involvement of our alumni strengthens the university and its community. We hope that you are equally pleased to be part of the special alumni community of this 114-year old institution, and that you will keep in touch with the UFS.

With this shared sense of achievement, it is hoped that you had a challenging and enriching learning experience at the UFS and that you learnt about the value of succeeding in your goals.

The UFS is, after all, a place that inspires excellence and transforms lives.

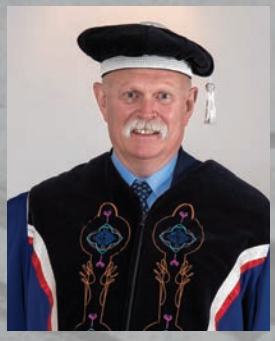
I wish you well in your career and with your future endeavours.

PROF FW PETERSEN
RECTOR AND VICE-CHANCELLOR

OFFICE BEARERS

CHANCELLOR
Dr K Khotso Mokhele
PhD (UCD,USA)

RECTOR AND VICE-CHANCELLOR
Prof FW Petersen
PhD (SU)



CHAIR OF COUNCIL
Mr W Louw
MEng (CIVIL) (SU)

VICE-RECTOR: RESEARCH
Prof RC Witthuhn
PhD (UFS)

VICE RECTOR: OPERATIONS
Prof P Naidoo
PhD (VISTA)

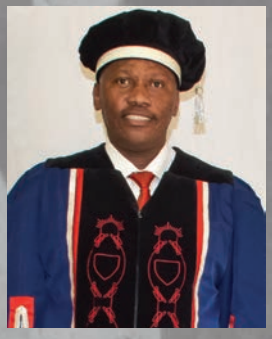
VICE-RECTOR: INSTITUTIONAL CHANGE, STUDENT AFFAIRS AND COMMUNITY ENGAGEMENT
Prof P LenkaBula
PhD (UNISA)

ACTING VICE-RECTOR: ACADEMIC
Prof HJ Kroukamp
DPhil (UPE)

REGISTRAR: GOVERNANCE AND POLICY
Dr MJG Vinger
PhD (UJ)

REGISTRAR: SYSTEMS AND ADMINISTRATION
Dr K Lazenby
PhD (UP)

CAMPUS PRINCIPAL: SOUTH CAMPUS
Prof D Coetzee
PhD (UFS)



ACTING CAMPUS PRINCIPAL: QWAQWA
Mr TI Manchu
MA (UFS)

PRESIDENT OF CONVOCATION
Prof JU Grobbelaar
DSc (UFS)

ECONOMIC AND MANAGEMENT SCIENCES
EKONOMIESE EN BESTUURSWETENSKAPPE
UFS·UV

EDUCATION
OPVOEDKUNDE
UFS·UV

HEALTH SCIENCES
GESONDHEIDSWETENSKAPPE
UFS·UV

THE HUMANITIES
GEESTESWETENSKAPPE
UFS·UV

LAW
REGSGELEERDHEID
UFS·UV

NATURAL AND AGRICULTURAL SCIENCES
NATUUR- EN LANDBOUWETENSKAPPE
UFS·UV

THEOLOGY AND RELIGION
TEOLOGIE EN RELIGIE
UFS·UV

DEANS

ACTING DEAN:
ECONOMIC AND MANAGEMENT SCIENCE

Prof P Burger
PhD (UFS)

DEAN:
EDUCATION

Prof LC Jita
PhD (MSU)

DEAN:
HEALTH SCIENCES

Prof GJ van Zyl
PhD (UFS)

DEAN:
THE HUMANITIES

Prof H Hudson
PhD (UFS)

DEAN:
LAW

Prof JC Mubangizi
LLD (UDW)

DEAN:
NATURAL AND AGRICULTURAL SCIENCES

Prof PD Vermeulen
PhD (UFS)

DEAN:
THEOLOGY AND RELIGION

Prof SD Snyman
DD (PRET)

GUEST SPEAKER

DR MAX DU PREEZ

Author, Political Analyst and 2016 UFS Honorary Doctorate Recipient

Dr Max du Preez is a veteran journalist, author, and analyst of South Africa's political economy – with an impressive thirteen titles on South African history and politics to his name. His latest book, *A Rumour of Spring – South Africa After Twenty Years of Democracy*, won the coveted Alan Paton Prize for Non-fiction in 2014.

After graduating in Political Science from Stellenbosch University, Dr Du Preez worked as a journalist, covering South African and regional politics. He was the political correspondent for the Financial Mail, Sunday Times, and Business Day. In 1988, he founded and edited the pioneering anti-apartheid weekly, Vrye Weekblad. Following the closure of the weekly in 1994, he joined the South African Broadcasting Corporation as a documentary filmmaker and anchor until 1999. Currently, Dr Du Preez is a columnist for news24.com and netwerk24.com.

He is also Extraordinary Professor in the School of Communication at North-West University, and a Fellow in the Centre for Leadership Ethics in Africa at the University of Fort Hare. Both the University of the Free State and Stellenbosch University awarded him honorary doctorates in 2016 and 2017, respectively.

Among his many awards are the Louis M Lyons Award for Conscience and Integrity in Journalism from the Niemann Fellows at Harvard University; the Nat Nakasa Award for Courageous Journalism from the SA National Editors' Forum; the Pringle Prize from the National Union of Journalists; the Award for Outstanding Journalism from the Foreign Correspondents Association; and the Yale Globalist International Journalist of 2006.

PLEASE NOTE

List of candidates receiving degrees, diplomas and certificates:

Degrees, diplomas, and certificates of candidates who are unable to attend the graduation ceremony will be conferred in absentia.

An * next to a name indicates that the degree, diploma or certificate is awarded with distinction.

FACULTY OF NATURAL AND AGRICULTURAL SCIENCES

DEAN |

PROF PD VERMEULEN

MASTER'S DEGREES

AGRICULTURAL SCIENCES

MASTER OF AGRICULTURE WITH SPECIALISATION IN AGRICULTURAL ECONOMICS

TERBLANCHE, Frederik

TRITICALE AS AN ALTERNATIVE TO MILLING WHEAT: THE CASE OF THE WESTERN CAPE PROVINCE, SOUTH AFRICA

Supervisor: Dr P Cloete

MASTER OF DISASTER MANAGEMENT

LETENO, Ntebaleng Annastacia

MAGAGULA, Lawrence Mangaliso

MAHLANGU, Thulani Gatsha

MAINAAKAE, Moatlhodiemang Patrick

MALAMBO, Judith Mainza

MLILO, Nokuzola Priscilla

MUKWASHI, Tsungai

RATLABALA, Mmagadima Judith

ROBERTSON, Brenna-Leigh

YALALA, Nonhlanhla Ndhlovu

ZANDILE, Lwando

MASTER OF ENVIRONMENTAL MANAGEMENT

DLAMINI, Sandile

DUMAKUDE, Nondumiso Londeka

HOWLETT-DOWNING, Chantelle Margaret

HUMAN, Ansuné

IHEMBA, Sakeus Karupu

KAPENYA, Mwema

KAZEURUA, Josua

LEGOALE, Tshiamo

MACHEBE, Lawrence

MANAVHELA, Victor Thinavhuyo

NGWEPE, Nthai Phuti

PALO, Madisemelo Cornelia

WILLIAMSON, Richard Deneys

MASTER OF SCIENCE IN AGRICULTURE WITH SPECIALISATION IN AGRICULTURAL ECONOMICS

ADETORO, Adetoso Adebiyi

WATER FOOTPRINT ASSESSMENT OF IRRIGATED SUGARCANE PRODUCTION

Supervisor: Dr H Jordaan

Co-Supervisor: Prof A Singels

MASTER OF SCIENCE IN AGRICULTURE WITH SPECIALISATION IN AGROMETEOROLOGY

ODENDAAL, Catherine

SIMULATING FUTURE RANGELAND PRODUCTION IN CENTRAL SOUTH AFRICA

Supervisor: Mr AS Steyn

Co-Supervisor: Dr HJ Fouché

MASTER OF SCIENCE IN AGRICULTURE WITH SPECIALISATION IN ANIMAL SCIENCE

HENDRIKS, Jurgen

INVESTIGATING INTO GENETIC PARAMETERS FOR FEEDLOT TRAITS OF TWO CATTLE BREEDS IN SOUTH AFRICA

Supervisor: Prof MM Scholtz

Co-Supervisors: Prof PWC Neser and Prof JB van Wyk

MASTER OF SCIENCE IN AGRICULTURE WITH SPECIALISATION IN FOOD SCIENCE

MWANZA, Elebert Pauline

IDENTIFICATION, PURIFICATION AND CHARACTERISATION OF KERATINOLYTIC ENZYMES OF CHRYSEOBACTERIUM CARNIPULLORUM

Supervisor: Dr C Boucher

Co-Supervisor: Prof CJ Hugo

MASTER OF SCIENCE IN AGRICULTURE WITH SPECIALISATION IN PLANT BREEDING

FOURIE, De Koning

THE INFLUENCE OF PLANT DENSITY AND ROW WIDTH ON PROLIFICACY IN MAIZE HYBRIDS

Supervisor: Prof MT Labuschagne

Co-Supervisor: Dr A Minnaar-Ontong

WESSELS, Roean*

SOLVENT RETENTION CAPACITY AND SWELLING INDEX OF GLUTENIN AS SELECTION TOOLS IN SOUTH AFRICA BREAD WHEAT BREEDING.

Supervisors: Dr B Wenzel and Prof M Labuschagne

MASTER OF SCIENCE IN AGRICULTURE WITH SPECIALISATION IN PLANT PATHOLOGY

MAREE, Gerrie Johanna*

HISTOPATHOLOGY OF RUST INFECTION IN WHEAT AND BARLEY

Supervisor: Prof ZA Pretorius

Co-Supervisor: Dr R Prins

MASTER OF SCIENCE IN AGRICULTURE WITH SPECIALISATION IN SOIL SCIENCE

MJANYELWA, Gladys Nokhwezi*

SPATIO-TEMPORAL DISTRUBUTION OF TEMPERATURE IN AN EXPANSIVE SOIL UNDER A LOW-COST HOUSE

Supervisor: Prof LD van Rensburg

External Supervisor: Dr L Theron

SCHIMPER, Johannes Jacobus

EFFECTS OF WHEAT PRODUCTION MANAGEMENT PRACTICES ON SOIL FERTILITY OVER 37 YEARS

Supervisor: Dr E Kotze

Co-Supervisor: Prof CC du Preez

MASTER OF SUSTAINABLE AGRICULTURE

BASTIAN, René Minette*

CHINDUNDU, Thembinkosi

DINGA, Sazi Siyabonga

ESABU, Anthony*

GORASES, Martha Ligola

HEPUTE, Hepurasanee Joe

HLONGWANE, Gugu Precious

HOVE, Mthintwa Tawanda*

JEPTHAS, Grant*

KHUMALO, Sabelo Qhawe

MAHLATHINI, Evans Phefo

MALATSI, Mpho

MAMETJA, Sechaba Daniel

MANYARARA, Mari Fungirayi

MAPUTLA, Motlatjo Kgaogelo

MAQALA, Lerato Bethuel

MASENGA, Kabange

MASENGA, Simon

MASHABELA, Nong Gabriel

MBABAZI, Nicholus*

MBOKAZI, Wiseman Philani

MCATA, Ncumisa Cordelia

MDHLOVU, Porciah Thembisile

MDINGI, Zukile

MKHIZE, Nozipho Nokuthula

MOLALAKGOTLA, Mokaba Jacoline

MSIBI, Bukeka Prudence

MTHIMKULU, Mamokete Petunia

MULUVHU, Tshisamphiri Success

MURWIRA, Liberty

MYENI, Nonhlanhla Pretty

NDLOVU, Rachael Sizakele

NGUBANE, Sindisiwe Sibongile

NKETIAH, Joseph Kwaku

NZAMA, Nhlakanipho Eugene

RAMAISA, Regina Mamohale

ROKHO, Mukhethwa

SHANDU, Bhekizazi

SWARAHLA, Adam Khakhantshane

TJIHO, Ihapa Clarence

TOMO, Mirian Da Encarnacâo

TSHIKHUDO, Lutendo Partrick

VAN ZYL, Jacobus Petrus*

VAN ZYL, Noél*

XULU, Mlungisi Tholisipho

ZENDA, Mashford

ZONDI, Sandile Gerold

BUILDING SCIENCES

MASTER OF ARCHITECTURE

BESTER, Su-Elna

BOSHOFF, Johanelle

BOSHOFF, Louisa Johanna

BOSHOFF, Willem Hendrik*

BOTHA, Lea

COETZEE, Gerhardus Jacobus

FACULTY OF NATURAL AND AGRICULTURAL SCIENCES

COETZEE, Nato
DE VILLIERS, André
JOHANNES, Julana
KLEYNHANS, Tanya
LATEGAN, Daniël Stephanus
MITCHELL, Jamie
NIEDERMEIER, Lena
OLIVIER, Dirk Wouter
OLIVIER, Eugene Pierre
ROODT, Leon-Pierre
ROUX, Gideon Jozua
SCHREUDER, Jani*
STEYN, Jacobus Hugo
THERON, Guido Jacques
VAN DYK, Stefan
VAN HEERDEN, Marli
VILJOEN, Maxcine
WHITEHEAD, Paul Johan
WILLEMSE, Ignatius Jacobus

MASTER OF ARCHITECTURE (PROFESSIONAL)

COLLEN, Edwin Landseer
DE BRUIN, Sumien
MCQUEEN, Gregory Ross
MENTZ, Joachim Frederik

MASTER OF LAND AND PROPERTY DEVELOPMENT MANAGEMENT WITH SPECIALISATION IN PROJECT MANAGEMENT

CHANDI, Isabella Natalie Orando
COETZEE, Drian Josua
KADUKU, Andrew
MLOMZALE, Sibonise

MASTER OF LAND AND PROPERTY DEVELOPMENT MANAGEMENT WITH SPECIALISATION IN VALUATION

KALANE, Cacisa Congiwe
LITHEKO, Olebogeng Mangaliso-Sobukwe Modise
NESHILA, Keuuavali Frasiscus
NGHIMANE, Naemi Ndilimeke
NTAPANE, Zimkitha Samantha
TSOLO, Nolubabalo Nonzwakazi Beauty

MASTER OF URBAN AND REGIONAL PLANNING

BAAS, Khatliso Simon
CHIPPS, Ruan
DINTSI, Sive
JANSE VAN RENSBURG, Marthinus Cornelius
KAOTA, Matshidiso Elizabeth
KHOOKHOO, Thabo Shadrack
KOTZE, André Jacques*
LOMBAARD, Munette*
LOUW, Ntomboxolo
MAANDA, Grace Sikunga
MABALANE, Malefu Brenda
MAFANTIRI, Mpho Lerato
MAGERMAN, Deon Cecil
MALISE, Mpharoane Lucy
MARHULUMBA, Thembisile
MOSIA, Fanyana
MOSOANG, Kachinga
MUDAU, Rendani
NTULI, Thobile Sikholiwe
TALE, Theresia Kelebogile
TSHAZI, Mlungisi Patrick
VAN DER WALT, Tjaart Botha

NATURAL SCIENCES

MASTER OF MINERAL RESOURCE MANAGEMENT

JORDAAN, Elaine
SHAPUMBA, Ageshe-Pombili Alexander

MASTER OF SCIENCE WITH SPECIALISATION IN BIOCHEMISTRY

DITHUGOE, Choaro David

ALCOHOL DEHYDROGENASE MEDIATED LACTONIZATION OF 1,6-HEXANEDIOL

Supervisor: Dr DJ Opperman
Co-Supervisor: Prof MS Smit

MOLAOA, Reitumetse Reabetswe*

CHARACTERISING BIOGAS PRODUCTION FROM WASTE WATER RESIDUES: UNDERSTANDING THE ROLE OF MICROBIAL METABOLISM

Supervisor: Prof E van Heerden
Co-Supervisors: Prof B Viljoen, Dr M Erasmus and Mr T Höppner

RAKAKI, Matshepo Elizabeth

EXPRESSION OF ROTAVIRUS, VP6, CAPSID PROTEIN IN VARIOUS YEASTS

Supervisor: Prof HG O'Neill

FACULTY OF NATURAL AND AGRICULTURAL SCIENCES

NATURAL AND AGRICULTURAL SCIENCES
NATUUR- EN LANDBOUWETENSKAPPE
UFS·UV

MASTER OF SCIENCE WITH SPECIALISATION IN BIOTECHNOLOGY

MAHLOMAHOLO, Bokang John

MICROBIAL SUCCESSION IN INDIGENOUS FERMENTED CEREAL BEVERAGES OF LESOTHO

Supervisor: Prof BC Viljoen

Co-Supervisor: Dr ED Cason

MASTER OF SCIENCE WITH SPECIALISATION IN CHEMISTRY

SMIT, Jireh Beatrix May-Li*

HYDROFORMYLATION OF STILBENES AS KEY STEP IN THE DEVELOPMENT OF NEW METHODOLOGY FOR THE SYNTHESIS OF MONOMERIC ISOFLAVONOIDS

Supervisor: Dr C Marais

Co-Supervisor: Prof BCB Bezuidenhout

MASTER OF SCIENCE WITH SPECIALISATION IN COMPUTER SCIENCE AND INFORMATICS

NKALAI, Lehlohonolo

MASTER OF SCIENCE WITH SPECIALISATION IN ENTOMOLOGY

ESTERHUYZE, Maria Moller

A COMPARATIVE STUDY IN ECTOPARASITE TOLERANCE BETWEEN PUREBRED BRAHMAN (BOS INDICUS) LINNAEUS, SUSSEX (BOS TAURUS) LINNAEUS AND BRAHMAN X SUSSEX CROSSBRED CATTLE IN THE FREE STATE, SOUTH AFRICA'

Supervisor: Ms EMSP van Dalen

Co-Supervisor: Dr SL Brink

MASTER OF SCIENCE WITH SPECIALISATION IN GENETICS

ACHILONU, Conrad Chibunna

IDENTIFICATION AND EXPRESSION ANALYSES OF CHALCONE SYNTHASE (CHS) AND ANTHOCYANIDIN SYNTHASE (ANS) GENES IN CLIVIA MINIATA

Supervisor: Mr MF Maleka

Co-Supervisor: Prof JJ Spies

BREYTENBACH, Nadia

GENETIC DIVERSITY AND PERFORMANCE TRIAT ANALYSES OF THE SA BOERPERD BREED

Supervisor: Miss H Bindeman

Co-Supervisor: Prof JP Grobler

DISEKO, Lerato Gloria

SCREENING FOR THE PRESENCE OF SINGLE NUCLEOTIDE POLYMORPHISMS ASSOCIATED WITH TYPE 2 DIABETES IN A BLACK SOUTH AFRICAN POPULATION

Supervisor: Dr G Marx

PETA, Kimberly Thando

MUTATION DETECTION IN THE ENDOGLIN GENE IN A FAMILY WITH HEREDITARY HAEMORRHAGIC TELANGIECTASIA

Supervisor: Dr G Marx

Co-Supervisor: Prof MJ Coetzee

MASTER OF SCIENCE WITH SPECIALISATION IN GEOHYDROLOGY

HUGHES, Philip James*

DETERMINATION OF THE POSSIBLE REQUIREMENT FOR REMEDIATION OF MANGANESE IMPACTED GROUNDWATER AT AN INDUSTRIAL FACILITY IN NELSPRUIT

Supervisor: Mrs A Allwright

MAKAHANE, Rendani Vele

ASSESSMENT OF HEAVY METALS POLLUTION IN SURFACE WATER OF DAMS AROUND BLOEMONTEIN

Supervisor: Prof A Atangana

Co-Supervisor: Dr LM Deysel

MAKOAE, Manthofeela Christinah

INVESTIGATING THE POSSIBILITY OF USING GROUNDWATER ASSOCIATED WITH DOLERITE STRUCTURES TO AUGMENT THE MUNICIPAL WATER SUPPLY TO

FACULTY OF NATURAL AND AGRICULTURAL SCIENCES

THE CITY OF BLOEMFONTEIN: INVESTIGATIONS IN THE CENTRAL BUSINESS DISTRICT

Supervisor: Dr FD Fourie

Co-Supervisor: Dr S Oke

MASEMOLA, Matshitane Eva

DEVELOPMENT OF A GROUNDWATER MODEL FOR NEW VAAL COLLIERY

Supervisor: Mr E Lukas

MATHOBO, Mashudu Clifford*

ANALYSIS OF EXACT GROUNDWATER MODEL WITHIN A CONFINED AQUIFER

Supervisor: Prof A Atangana

MOFOKENG, Setjhaba Seromo Ignatius

ASSESSMENT OF THE GROUNDWATER RESOURCES FOR USE IN JOZINI MUNICIPALITY, KWAZULU NATAL

Supervisor: Dr M Gomo

MOKITLANE, Lerato Michell

A BASELINE STUDY TO EVALUATE THE GROUNDWATER CONDITIONS AND PREDICT FUTURE IMPACTS OF MINING AT MATSOPA MINERALS

Supervisor: Dr FD Fourie

MOLAOLWA, George Goitseone

DEVELOPMENT OF THE TRAINING MANUAL FOR GROUNDWATER RESOURCE MANAGEMENT FOR MUNICIPALITIES IN SOUTH AFRICA

Supervisor: Dr J van der Merwe (posthumous)

MOLOKWE, Thato Boipelo

A FIELD INVESTIGATION TO COMPARE LOW-FLOW PURGING AND BAILER GROUNDWATER SAMPLING METHODS IN ALLUVIAL AND FRACTURED-ROCK AQUIFER SYSTEMS IN SOUTH AFRICA

Supervisor: Dr M Gomo

NTSEZE NJONGUO, Nancy

CRITICAL EVALUATION OF POTENTIAL MINE WATER DECANT AT THE SIGMA COLLIERY, SASOLBURG

Supervisor: Mrs A Allwright

OBERHOLZER, Schalk Jacobus

THE RELATIONSHIP BETWEEN THE GEOHYDROLOGICAL, GEOPHYSICAL AND PHYSICAL PARAMETERS OF THE VAALHARTS AQUIFER

Supervisor: Dr FD Fourie

PAXTON, Neville John

HYDROGEOLOGICAL INVESTIGATION OF THE RIETVLEI SANDSTONES, ROBERTSON, SOUTH AFRICA

Supervisor: Prof D Vermeulen

Co-Supervisor: Dr M Gomo

RAMOTSHO, Mmanthupi Amanda*

DIFFUSION OF SUBSURFACE WATER WITHIN A LEAKY AQUIFER WITH SELF-SIMILAR PROPERTIES: DERIVATION OF EXACT AND NUMERICAL SOLUTION

Supervisor: Prof A Atangana

RAUBENHEIMER, Reinardt

CONNECTIVITY OF GEOHYDROLOGICAL PROCESSES AND THE INTERACTION WITH SURFACE HYDROLOGY OF THE LETABA RIVER

Supervisor: Mrs A Allwright

TOWERS, Luke Cecil

WATER RESOURCE EVALUATION IN THE DANAKIL BASIN, ETHIOPIA:

GROUNDWATER SUPPLY FOR POTASH SOLUTION MINING

Supervisor: Mr F de Lange

VAN HEERDEN, Albert

AUGMENTATION OF RURAL WATER SUPPLY IN THE THABA NCHU AREA: GROUNDWATER AS A SUSTAINABLE MEDIUM TO LONG TERM SOLUTION

Supervisor: Mr F de Lange

Co-Supervisor: Dr J van der Merwe

VAN WYK, Morné*

USING A MULTIPLE WATER BALANCE APPROACH TO ESTIMATE RECHARGE FOR THE OPTIMUM MINE, MPUMALANGA PROVINCE

Supervisor: Mr E Lukas

MASTER OF SCIENCE WITH SPECIALISATION IN GEOLOGY

NEL, Luan

GEOSTATISTICAL SURFACE MODELLING OF RADIONUCLIDE DISTRIBUTION PATTERNS OVER GOLD TRAILINGS: THE NEW MACHAVIE TSF CASE STUDY

Supervisors: Dr RN Hansen and Mr R Rentel

MASTER OF SCIENCE WITH SPECIALISATION IN HOME ECONOMICS

DU TOIT, Liezl*

GELLING PROPERTIES OF CACTUS PEAR MUCILAGE-HYDROCOLLOID COMBINATIONS IN A SUGAR-BASED CONFECTIONARY

Supervisor: Dr C Bothma

MASTER OF SCIENCE WITH SPECIALISATION IN MATHEMATICAL STATISTICS

MEADES, Paul Louw*

INFERENCE ON TIME SERIES MODELS FOR PAIRED COMPARISONS

Supervisor: Dr M Sjolander

MASTER OF SCIENCE WITH SPECIALISATION IN MICROBIOLOGY

MEYBURGH, Cornelia Magdalena

VIRULENCE FACTORS OF SOUTH AFRICAN LACTOCOCCUS GARVIEAE ISOLATED FROM RAINBOW TROUT

Supervisor: Dr C Boucher
Co-Supervisor: Prof RR Bragg

MOTANYANE, Lithabiso

GENOTYPING AND WHOLE GENOME CLASSIFICATION OF GROUP A ROTAVIRUSES ORIGINATING FROM AN URBAN AND RURAL SITE IN MOZAMBIQUE

Supervisor: Dr HG O'Neill

Co-Supervisor: Prof AC Potgieter

MASTER OF SCIENCE WITH SPECIALISATION IN PHYSICS

ERASMUS, Lucas Johannes Bartel*

DEVELOPMENT OF AN OPTICAL THERMOMETRY SYSTEM FOR PHOPHOR MATERIALS

Supervisor: Prof JJ Terblans

Co-Supervisor: Prof HC Swart

MASTER OF SCIENCE WITH SPECIALISATION IN ZOOLOGY

DE JAGER, Gerhard Pieter*

TAXONOMIC STATUS OF TRICHODINA HETERODENTATA DUNCAN 1977 (CILIOPHORA: PERITRICHIA) USING STANDARD MORPHOLOGY, AS WELL AS MOLECULAR AND SOME ULTRASTRUCTURAL TECHNIQUES

Supervisor: Prof L Basson

Co-Supervisor: Prof JG van As (posthumous)

DEAN'S MEDAL

AWARDED TO A STUDENT WHO ACHIEVED THE BEST RESULTS IN RESPECT OF A MASTER'S DEGREE IN THE FACULTY OF NATURAL AND AGRICULTURAL SCIENCES

MATHOBO, Mashudu Clifford*

Master of Science with specialisation in Geohydrology

SENATE'S MEDAL

AWARDED TO A STUDENT WHO ACHIEVED THE BEST OVERALL RESULTS IN RESPECT OF UNDERGRADUATE AND POSTGRADUATE QUALIFICATIONS AWARDED IN ALL FACULTIES IN 2017

SCHELTEMA, Enrico

Bachelor of Science Majoring in Actuarial Science
Faculty of Natural and Agricultural Sciences

DOCTORAL DEGREES

AGRICULTURAL SCIENCES

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN AGRICULTURAL ECONOMICS

MARÉ, Frikkie Alberts

Frikkie Maré was born on 21 May 1986 and is originally from Hopetown. He received his secondary education from High School Hopetown, where he matriculated in 2004. He obtained the degrees BScAgric (Animal Science and Agricultural Economics) in 2008, BScAgricHons (Agricultural Economics) in 2009, and MScAgric (Agricultural Economics) in 2014. He started his career at the University of the Free State in 2008 as a research assistant in the Department of Agricultural Economics (UFS) and is currently the Academic Department Head of the same department.

With his thesis, ***THE WATER-ECONOMY NEXUS OF BEEF PRODUCED FROM DIFFERENT BREEDS OF CATTLE,*** the candidate makes a contribution to the agricultural industry by estimating the water footprint (WF), value added (VA) and associated economic water consumption (EWC) for different cattle breeds. The standard WF approach was enhanced to allow for the allocation of WFs according to the value factors of different products and by-products for every link in the value chain, using a bottom-up approach. The enhanced approach contributes to national and international WF research, as it estimates the WF of beef for the entire production process, and not only for the lifetime of one animal. The results indicate that notable differences do exist between breeds for each link in the value chain, and that the breed with the lowest overall EWC is not necessarily the breed with the lowest figures for any one value chain link.

Promoter: Dr H Jordaan

Co-Promoter: Dr MM Mekonnen

OWUSU-SEKYERE, Enoch

Enoch Owusu-Sekyere was born in Ghana on 12 December 1986. He received his secondary education in Wenchi, where he matriculated at Wenchi Methodist Senior High School in 2005. He obtained his BSc Honours degree in Agriculture (Economics Option) in 2010. He obtained his MSc degree in Agricultural Economics at the University of the Free State in 2014. He further obtained his MPhil degree in Agricultural Economics in 2015 at Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

With his thesis, ***MULTIPLE FOOTPRINT INDICATOR ASSESSMENT: IMPLICATIONS ON CONSUMER PREFERENCES AND WELFARE***, the candidate makes an important contribution to environmental sustainability in South Africa, focusing on carbon emission and water usage and how freshwater scarcity threatens human survival and food production. An in-depth and comprehensive information on water and carbon footprints are needed to effectively guide policy and decision makers in formulating appropriate policies to guide freshwater use and reduce greenhouse gas emissions. The candidate

developed a conceptual framework that depicts relevant factors needed to better understand consumers' welfare and choices of environmentally sustainable products in South Africa. A framework for environmental footprint labelling was developed, along with empirical models for estimating and conveying footprint information on food products. Four articles arising from the thesis have been published in internationally accredited peer-reviewed journals, and three articles were presented at international conferences. Three articles are under review by accredited journals.

Promoter: Dr H Jordaan

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN ANIMAL BREEDING

VAN DER WESTHUIZEN, Lené

Lené was born in Welkom on 9 October 1989. She received her secondary education in Riebeeckstad, where she matriculated at Riebeeckstad High School in 2007. She obtained a BSc Medical Microbiology degree in 2011, BScHons Genetics degree with distinction in 2011, and MSc Genetics degree with distinction in 2014. For her MSc dissertation, she received awards during the 2015 South African Society of Animal Science Congress and the Afrikaner Cattle Breeders' Society World Expo for exceptional research contributing to the breed. She continues her research in genetic diversity studies on livestock and wildlife species, as well as her PhD topic.

With her PhD thesis, ***IDENTIFICATION OF QUANTITATIVE TRAIT LOCI AFFECTING WET CARCASS SYNDROME IN SHEEP USING HIGH DENSITY SNP GENOTYPES***, the candidate makes a valuable contribution towards the understanding of the condition in the sheep industry. Wet carcass syndrome (WCS) is a condition predominantly found in sheep, which negatively affects the quality of their carcasses. During the pre-slaughter period, the animal appears to be clinically normal, showing no symptoms of an abnormality. However, during the slaughtering process, the carcass appears to be 'wet'. With this contribution, she attempted to identify a genetic basis that predisposes sheep to this condition. Two possible major genes, HTR2C and DMD, positioned on the non-homologous region of the X chromosome, have been identified as novel positional and functional candidate genes for wet carcass syndrome. This research contributes to the better understanding of wet carcass syndrome and these findings could contribute to possible solutions for the condition.

Promoters: Dr MD MacNeil and Prof FWC Neser

Co-Promoter: Prof MM Scholtz

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN DISASTER MANAGEMENT

MAIPISI, Albert

Albert Maipisi, born in Bikita District, Masvingo, Zimbabwe, obtained the Honours degree in Administration in 2011 from the University of Zimbabwe (UZ), and an MSc in Disaster Management at the National University of Science and Technology, Bulawayo, Zimbabwe, in 2013. While a PhD student at the UFS, he was a recipient of the EU Erasmus+ Study Mobility Programme, spending five months as an exchange student in Hungary. He started his career as a Trainee Hansard Reporter

in the parliament of Zimbabwe and is currently Senior Hansard Reporter. He is also a member of the Zimbabwe National Civil Protection Committee.

With his thesis, **STRENGTHENING DISASTER RISK REDUCTION (DRR) INTERVENTIONS IN ZIMBABWE,** the candidate makes a contribution to Disaster Risk Management theory and practice by assessing and evaluating the Zimbabwe's Disaster Risk Reduction (DRR) implementation progress linked to the five Hyogo Framework priorities for action and associated twenty-two core indicators. His research supports the Sendai Framework for Disaster Risk Reduction which charts the global course over the next 15 years. The candidate exposed the challenges encountered by Zimbabwe in achieving the Millennium Development Goals (MDGs) and the upcoming expectations of the Sustainable Development Goals. The negative social, economic, and political outlook of Zimbabwe contributed immensely to the uncoordinated DRR activities in the country. The study further proposed new DRR policy frameworks and the renewal of outdated operational and coordination systems.

Promoter: Prof AJ Jordaan

Co-Promoter: Dr PP Bongo

NDLOVU, Thabo

Thabo Ndlovu, born in Kwekwe, Zimbabwe, completed his Bachelor's degree in Agricultural Management in 2007 and his Masters' degree in Disaster Management at the University of the Free State in 2010. He also completed a Master's in Business Administration at the National University of Technology (NUST), Bulawayo, Zimbabwe. He started his career as Agricultural Officer for the Ministry of Agriculture in Zimbabwe and was later employed as a Programme Officer for European Union-funded projects under the Zimbabwe Ministry of Finance. Presently Thabo is a Lecturer at the National University of Science and Technology (NUST) in Bulawayo, Zimbabwe.

With his thesis, ***COMMUNAL LIVESTOCK DROUGHT RISK REDUCTION STRATEGIES: A CASE OF UMZINGWANE DISTRICT IN SOUTHERN ZIMBABWE***, the candidate makes a contribution to drought risk-reduction strategies. The candidate utilised the Arnstein Ladder of Participation, the Sustainable Livelihoods Framework, and the Drought Cycle Management Model to assess the preparedness of government, NGOs, and communities to deal with drought among communal livestock farmers in Matabeleland South, Zimbabwe. The study concluded that women are relegated by patriarchal barriers to silent stakeholders who are dictated by NGOs and government on drought risk-reduction activities. Disaster Risk Reduction activities are also fragmented, thereby increasing the drought vulnerability of communities. The study also highlighted the early involvement of farmers at the planning stage, from where they should capitalise on already possessed livelihood assets. The study proposes continuous drought preparedness and mitigation planning as a prerequisite to drought resilience.

Promoter: Prof AJ Jordaan

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN SUSTAINABLE AGRICULTURE

SONANDI, Awonke

Awonke Sonandi was born in the small town of Peddie in the Eastern Cape on 7 August 1967. He received his secondary education in the nearby town of Alice, where he matriculated at Phandulwazi Agricultural High School in 1986. He obtained an MSc Agriculture degree in 1993 at the then University of Natal; an MBA in 2008 with the Business School of the Netherlands;

and a doctorate in business leadership in 2014 with UNISA. Presently, he is the Director of Agricultural Extension and Advisory Services in the Department of Rural Development and Agrarian Reform in the Eastern Cape.

With his thesis, ***DETERMINING THE NUTRITIONAL STATUS OF CHILDREN FROM AGRI-BUSINESS FAMILIES IN THE EASTERN CAPE, SOUTH AFRICA***, the candidate identified numerous gaps in previous studies conducted in the field of food security, and the findings from the study dismiss the myth and long-held belief that children of agri-business families are automatically nutrition secure and have elevated nutritional status by virtue of being dependents of food producers. His study further found, against the popular belief by many policy makers, that food production and food availability are key to addressing individual food and nutrition insecurity and good nutritional knowledge. In view of the above findings, this study has charted a methodologically sound path to filling identified knowledge gaps. It also provides a comparative database in the agricultural sector of South Africa, thereby making a contribution to the availability of the much-needed national data on nutritional status with a view to updating dietary references for the intake of children.

Promoter: Dr JA van Niekerk

Co-Promoter: Prof E Zwane

BUILDING SCIENCES

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN CONSTRUCTION MANAGEMENT

XHALA, Ncedo Cameron

Ncedo Cameron Xhala, born in Mqanduli on 23 March 1976, matriculated from Gengqe SS in Mqanduli in 1994. In 2000, he obtained a Bachelor of Arts degree in Education and BScHons degree in Population Studies in 2005 from the former University of Transkei. In 2013, he obtained a Master in Town and Regional Planning from the University of Pretoria, and a Master of Science in the Built Environment (with specialisation in Project Management) with five distinctions in 2015 from Nelson Mandela University. He is a Deputy Director: Financial and Physical Planning at the Department of Higher Education and Training.

With his thesis**,** ***CHALLENGES AND LESSONS LEARNT IN THE FINANCING OF PUBLIC INFRASTRUCTURE IN SOUTH AFRICA, CZECH AND SLOVAK REPUBLICS: A COMPARATIVE STUDY*****,** the candidate contributes to the body of knowledge on public infrastructure investment in general and public private partnerships in particular. The findings indicate that appropriately structured public private partnerships with reasonable incentives hold great potential to deliver many economic, social, environmental, and technological benefits. Using an integrated approach to explore public private partnership as an alternative financing model, Ncedo identifies and ranks core success and failure factors of construction project implementation within the context of public private partnerships and formulates lessons to be learnt in that regard. To that extent, the study makes a valuable contribution to theory and provides lessons for industry practice. There are limited studies of this nature undertaken in less developed countries and the candidate clearly demonstrates originality, as is acknowledged by the examiners**.**

Promoter: Prof K Kajimo-Shakantu

Co-Promoter: Prof Ing J Nemec

NATURAL SCIENCES

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN AGRONOMY

SAKUMONA, Mushekwa

Mushekwa Sakumona was born in Kalabo, Zambia on 20 November 1973. He received his secondary education in Chingola where he matriculated at Chikola Secondary School in 1991. He obtained his BScAgric degree (Crop Science) in 1999 and an MSc degree in Plant Breeding and Seed Systems in 2012, both from the University of Zambia. He started his career as an agronomist in 1998. He later worked for the University of Zambia as a Tutor and Temporary Lecturer in the Department of Plant Sciences, School of Agricultural Sciences from 2011 to 2015. He is currently a Temporary Lecturer at the Seventh Day Adventist University (Rusangu) and Zambia Open University.

With his thesis, ***GROWTH, YIELD AND PHYSIOLOGICAL RESPONSE OF ZAMBIAN WINTER WHEAT CULTIVARS IN TWO ECOTOPES,*** the candidate provided some answers to the Zambian wheat industry about the exploitation of the water-rich warm ecotope of the Zambezi basin for wheat production. This will enable increased production in the country, thereby reducing the need to import wheat. The dynamic responses in the wheat cultivars from the study gave more insight on acclimation responses to the high ambient temperatures that now occur in all production ecotopes. In view of the current variabilities in seasonal weather conditions, this is significant information which can be used in the development and selection of suitable cultivars by breeders, and the choice of management options by producers in the attempt to enhance wheat production in the country. This makes an important contribution towards reducing wheat imports, thereby saving valuable foreign exchange.

Promoter: Dr J Allemann

Co-Promoter: Dr E van der Watt

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN APPLIED MATHEMATICS

BOLTON, Larisse

Larisse Bolton was born in Vanderbijlpark on 9 June 1986. She received her secondary education in Bloemfontein, where she matriculated at Eunice High School in 2004. She obtained a BSc in Chemistry and Mathematics in 2007, a BScHons in Mathematics and Applied Mathematics in 2008, and an MSc in Applied Mathematics in 2009 (all with distinction) at the University of the Free State.

With her thesis, ***PRACTICAL APPROACHES TO THE APPLICATION OF MATHEMATICAL MODELLING IN ONCOLOGY: FROM MODEL INVESTIGATION TO DATA-DRIVEN MODEL CONSTRUCTION***, the candidate contributes not only to the field of applied mathematics, illustrating possible avenues of application for mathematical modelling, but specifically also to cancer research. With this contribution, she brings to the forefront the ability of mathematical modelling to aid the clinician. She approached the application of mathematical modelling to the field of oncology from two perspectives: model adaptation

and model construction. First, she illustrated the possibility of mathematical models to suggest alternate mechanisms of growth, and second the ability of mathematical models to generate insights into observed behaviours indicated by real-life data. The investigations, inferences, and conclusions of her study serve as an indication of the value mathematical models and their related analyses hold in the continuous pursuit to find solutions to multiple questions in cancer research.

Promoter: Prof C Hui

Co-Promoters: Prof TM Acho and Prof DK Stones

FASONDINI, Marco

Marco Fasondini was born in Tzaneen on 8 August 1990. He received his secondary education in Tzaneen, where he matriculated at the Secondary School Ben Vorster in 2008. He obtained the degrees BSc in 2011, BScHons in 2012, and MSc in Applied Mathematics in 2014 at the University of the Free State. From 2014 until 2017 he was appointed as lecturer in the Department of Mathematics and Applied Mathematics at the UFS, and at present he is a postdoctoral research associate at the University of Kent in England.

In his thesis, **COMPUTATIONAL METHODS AND EXPLORATION OF THE MULTIVALUED PAINLEVÉ TRANSCENDENTS, WITH SPECIAL EMPHASIS ON P_{III},** the candidate makes a contribution to the computation and understanding of the Painlevé transcendents. These are mathematical functions that are becoming increasingly important in the fields of applied mathematics and physics. The candidate developed algorithms that allow, for the first time, the numerical computation of all the Painlevé transcendents on their Riemann surfaces. In doing so, new properties of the third Painlevé transcendent were discovered and analysed.

Promoter: Prof JAC Weideman

Co-Promoters: Prof B Fornberg and Prof JH Meyer

GNITCHOGNA BATOGNA, Rodrigue

Rodrigue was born in Yaoundé, Cameroon, on 4 February 1981. He received his secondary education in Cameroon, matriculating in 2000. He holds an MSc degree in Applied Mathematics, a BScHons degree in Mathematics and Applied Mathematics, a BScHons degree in Mathematical Statistics and Actuarial Science, a BSc degree in Mathematics and Applied Mathematics, and a diploma in Mathematics. Rodrigue won awards in Mathematics in both his undergraduate and postgraduate studies at the UFS, and also received academic merit bursaries. He was a part-time lecturer in the Department of Mathematical Statistics and Actuarial Science, UFS, from 2012 to 2013. Since 2014, he is a lecturer at the University of Namibia.

With his thesis, ***ANALYSIS OF OPTION PRICING WITHIN THE SCOPE OF FRACTIONAL CALCULUS***, the candidate contributed to pricing mechanisms of financial derivatives, and numerical methods for fractional partial differential equations. He exploited memory properties, non-locality, non-singularity, and 'globalness', of fractional derivatives, to develop and analyse a new class of time-fractional Black-Scholes equations, and successfully remediate to a notorious problem when pricing an option with the classic Black-Scholes model. The long-term prediction, and the failure to capture large jumps over small time

intervals, are due to the assumption that price changes of the underlying asset follow a Brownian-motion. As Markovian processes proved incapable of replicating these occurrences accurately, he applied the Atangana-Baleanu and Riemann-Caputo fractional derivatives in mathematical finance. These fractional operators have been efficient in describing complex anomalous diffusion systems. A novel method was developed by independent researchers, namely the 'Atangana-Batogna numerical scheme'. Four articles were published, and three are under review.

Promoter: Prof A Atangana

Co-Promoter: Dr E Ngounda

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN BEHAVIOURAL GENETICS

FOUCHÉ, Nadia

Nadia Fouché (Laubscher) was born in Bloemfontein on 17 May 1985. She matriculated at Cradock Secondary School in 2004. She enrolled at the UFS where she obtained the following degrees: BSc (cum laude) in 2009, BScHons in Psychology (cum laude) in 2010, and MSc in Behavioural Genetics (cum laude) in 2012. She started her career as a Research Assistant in the Centre for Teaching and Learning at the UFS in 2012. Currently she is the owner and Director of Quantemma (a research consultation firm) in Bloemfontein.

With her thesis, ***PUTATIVE GENETIC AND ENVIRONMENTAL FACTORS INFLUENCING ATTENTION-DEFICIT/ HYPERACTIVITY DISORDER (ADHD) IN A SOUTH AFRICAN SAMPLE***, the candidate made a substantial contribution to Behavioural Genetics, especially in factors involved in the aetiology of ADHD. She combined family studies and molecular methods to study possible links between heritable and environmental influences on the disease. She determined that many of the apparent conflicting results published are the results of neglecting gene-environment interactions in studies of ADHD. She also indicated that a search for rare mutations in well-known polymorphisms may be worthwhile when studying the genetic aetiology of ADHD. One of the leading international authorities on Behavioural Genetics accepted this thesis unconditionally. The candidate's research already resulted in two scientific publications and three lectures were presented at various conferences, including an international congress.

Promoter: Prof JJ Spies

Co-Promoter: Prof A Venter

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN CHEMISTRY

ALEXANDER, Orbett Teboho

Orbett was born in Bultfontein on 21 May 1989. He received his secondary education in Bultfontein, where he matriculated at Repholositswe Secondary in 2006. He obtained the degree BSc in 2011, BScHons in 2012, and the MSc degree (Chemistry) in 2015 at the UFS. He started his career as a postdoctoral fellow in Bloemfontein in 2018.

With his thesis, ***THE EFFECTS OF STRUCTURE AND LIGAND VARIATIONS ON THE LUMINESCENCE OF EUROPIUM(III) COMPLEXES***, the candidate makes a contribution to the fields of coordination chemistry and photoluminescence. With

this contribution, he attempts to correlate structure with photophysical properties of a series of europium(III)-ß-diketonato complexes utilising 1,10-phenanthroline as ancillary ligand. The results of this investigation provide a systematic approach to the design of OLEDs (Optical Light Emission Diodes) using europium(III) and will also be applied in the design of new photodynamic therapeutic agents. Orbett already has five scientific articles to his name and four more are envisioned for the near future.

Promoter: Prof HG Visser

Co-Promoter: Dr A Brink

BELAY, Alebel Nibret

Alebel Belay was born in Gimjabet, West Gojjam, Ethiopia, on 23 August 1988. He also received his secondary education in Gimjabet, where he matriculated at the Ankesha High School in 2006. He obtained his BSc in Applied Chemistry with distinction in 2010 at Madda Walabu University, Ethiopia, and an MSc in Physical Chemistry (cum laude) at Haramaya University, Ethiopia, in 2012. He started his career in 2012 as a lecturer at Bahir Dar University, Ethiopia.

With his thesis, ***COORDINATION CHEMISTRY OF NIOBIUM(V) AND TANTALUM(V) WITH HARD O-DONOR LIGANDS: A SOLUTION AND SOLID-STATE INVESTIGATION*****,** the candidate makes a significant contribution to the complex chemistry of niobium and tantalum. He synthesised novel niobium and tantalum complexes with selected bidentate ligands and investigated the factors which govern their stability, reactivity, coordination geometry, and bonding characteristics. By utilising X-ray crystallography as well as various spectroscopic methods, he successfully explored structure/reactivity relationships in these early transition metals to identify possible physical and chemical differences. His research could be used to develop greener and safer separation methods as the current industrial separation of the two metals, essential in nuclear power plants, involves highly toxic substances. To date, two papers from his thesis have been published in international journals, with three more in preparation. The candidate presented his results at three international conferences.

Promoter: Dr JA Venter

Co-Promoter: Prof A Roodt

KAMA, Dumisani Vincent

Dumisani Kama was born in Bultfontein on 30 April 1988 and received his secondary education in Bultfontein, where he matriculated at Repholositswe Senior Secondary School in 2006. He obtained his BSc degree in 2010, BScHons degree in Chemistry in 2013 and MSc degree in Inorganic Chemistry (cum laude) in 2015, all from the UFS. Dumisani was invited on three research visits to Europe; one to the ESRF in Grenoble in France on the state-of-the-art photo-crystallograpy beam line, and two to Zürich University, Switzerland. He is a postdoctoral fellow in Chemistry at the UFS in the single-crystal X-ray diffraction facility.

With his thesis, ***STRUCTURAL AND REACTIVITY RELATIONSHIPS IN ARYL AND ALKYLAMINE BISPHOSPHINE COMPLEXES OF Tc(I) AND Re(I),*** the candidate makes an important contribution to model radiopharmaceutical design with a focus on the development of Technetium(I) and Rhenium(I) tricarbonyl bisphosphine complexes. This may contribute to solving aspects of the current worldwide cancer crisis. This work included the successful identification and synthesis of a

range of rhenium synthons as potential radiotherapeutic agents, and technetium precursors for diagnostic nuclear medicine. These synthons and their bridging ligands were characterised by advanced techniques such as nuclear magnetic resonance spectroscopy and X-ray diffraction. In addition, preliminary biological evaluations of some of these complexes towards mitochondrial cytotoxicities were briefly evaluated and reported. His work already produced two peer-reviewed articles in internationally accredited journals, spanning collaborative research in Switzerland at the University of Zürich, and presentations of his research at different international conferences in India and Switzerland.

Promoter: Prof A Roodt

Co-Promoter: Dr A Brink

KUO, Chen-Miao

Chen-Miao Kuo was born in Tainan, Taiwan on 2 November 1981. She received her secondary education in Bloemfontein, where she matriculated at Eunice High School in 2001. She obtained a BSc degree in 2004, a BScHons (Chemistry) in 2005, and an MSc degree (Organic Chemistry) with distinction in 2008, all at the University of the Free State.

With her thesis, ***SYNTHESIS, CONFORMATION ANALYSIS, AND CHARACTERIZATION OF PHYSIOLOGICALLY IMPORTANT FLAVONOIDS AND ISOFLAVONOIDS***, the candidate makes an important contribution to the field of structure elucidation of isoflavonoid analogues through high-resolution NMR analysis. In addition to this excellent contribution, the candidate also addressed the intriguing, ancient problem of the preferred conformation of the heterocyclic ring of flavonoid molecules, and was able to identify the preferred conformation of five of the major types of flavonoids through the utilisation of modern molecular modelling techniques. The quality of her contribution is emphasised by the fact that some of the results from her thesis have already been published in an international scientific journal, while the rest of her work will definitely give rise to at least three more papers in similar journals. The candidate's work may also lead to the development of new, more reliable methodology for the determination of the absolute configuration of monomeric and oligomeric flavonoids.

Promoter: Prof BCB Bezuidenhoudt

Co-Promoter: Prof J Conradie

MOKOLOKOLO, Petrus Pennie

Pennie Mokolokolo was born in Maokeng on 2 November 1990 and received his secondary education in Kroonstad, where he matriculated at Motswela Secondary School in 2007. He obtained his BSc in 2012, BScHons in Chemistry in 2013, and MSc in Inorganic Chemistry in 2015. He completed two research visits to Grenoble, France, and Zürich, Switzerland. Separate from his PhD study, he was also involved in collaborative work with the University of Saint Petersburg, Russian Federation, resulting in two co-authored papers in the international literature. He is currently a post-doctoral fellow in the Department of Chemistry at the UFS.

With his thesis, ***SOLID STATE AND MECHANISTIC STUDY OF SCHIFF-BASE COMPLEXES OF MIDDLE TRANSITION AND PLATINUM GROUP METAL COMPLEXES*****,** the candidate makes a contribution to the understanding of the coordination behaviour of Schiff-base and oxine-type ligands to middle and late transition metal carbonyl complexes with application as radiopharmaceutical models. He evaluated steric and electronic properties of these ligands towards the fac-$[M(CO)_3]^+$ cores

(M = manganese, technetium or rhenium), and used X-ray crystallography and nuclear magnetic resonance spectroscopy to develop an experimental approach for the selective formation of novel dinuclear species. This already made a valuable contribution to the field of theranostic radiopharmaceuticals, which incorporates both therapeutic and diagnostic properties in a single molecule. He also investigated factors influencing the formation of one-dimensional metallophillic networks of rhodium(I) carbonyl compounds of importance in electronic and optical technologies. Two international papers already emanated from his work and a preliminary patent has been filed.

Promoter: Prof A Roodt

Co-Promoter: Dr A Brink

MOLOKOANE, Pule Petrus

Pule Molokoane was born in Westminster on 4 May 1989 and he received his secondary education in Tweespruit, where he matriculated at Unicom High School in 2006. He obtained his BSc degree in 2009, BScHons degree in Chemistry in 2011, and MSc degree in Inorganic Chemistry in 2013, all from the UFS. He is currently employed as a Forensic Analyst at the North-West Provincial Criminal Record and Crime Scene Management in Potchefstroom.

With his thesis, ***SOLID STATE AND MECHANISTIC STUDY ON PYRONE BASED COMPLEXES OF EARLY, MIDDLE AND PLATINUM GROUP TRANSITION METAL ELEMENTS***, the candidate makes an important contribution in three sub-domains of molecular nanoscience by developing new environmental-friendly ligands for metals. These have potential application in the beneficiation of hafnium and zirconium for which large reserves exist in South Africa, model radiopharmaceuticals for imaging and therapeutic applications based on zirconium, rhenium and rhodium, and homogeneous catalysis models based on rhodium. Different organometallic precursors were synthensised, characterised, and evaluated extensively. Accurate structures of the model complexes were determined by advanced X-ray crystallography, and time-resolved substitution kinetics indicated a probable dissociative activated pathway for substitution reactions of the radiophamaceutical models. Application of these novel compounds are currently being explored further. He already produced a peer-reviewed article in an international journal, with three manuscripts in preparation and various presentations at international conferences.

Promoter: Prof A Roodt

Co-Promoter: Dr M Schutte-Smith

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN GENETICS

MUSARA, Collen

Collen Musara was born in the Chibi district, Zimbabwe. He received his secondary education in the same province at the Terry Goss High School and Chibi High School in 2001 and 2003 respectively. He obtained the degrees BScHons (Crop Science and Horticulture) in 2007 from Midlands State University, Zimbabwe, and MSc (Crop and Forestry Science) in 2010 from Bindura University, Zimbabwe. He started his career as a full-time lecturer in 2008 at Bindura University of Science Education. He has so far published eight international peer reviewed articles, in areas such as seed science, forestry, organic agriculture, phylogenetic and biodiversity conservation.

With his thesis, ***STUDIES ON SOUTH AFRICAN AND NEW ZEALAND SPECIES OF BULBINELLA USING NUCLEAR AND CHLOROPLAST SEQUENCE DATA***, the candidate makes a contribution to elucidating the taxonomy of species in the plant bulb flowering genus Bulbinella and provide the first DNA sequence-based phylogeny for the genus based one multi-gene

phylogenies and a phylogenomic approach. With this contribution, he attempts to ascertain if New Zealand species truly group within the genus, and to characterize the species status of each species. The novel results of this investigation serve as an indication of the value this type of intervention holds for the attempt to find a solution to the dilemma of identifying and typing the species in Bulbinella, and indicated important focus points for follow-up studies to provide a solid classification of the genus and related genera.

Promoter: Dr P Spies

Co-Promoters: Dr M Gryzenhout and Prof JJ Spies

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN GEOHYDROLOGY

SAKALA, Emmanuel

Emmanuel Sakala was born in Gwanda, Zimbabwe on 6 March 1982. He received his school education in Gwanda and matriculated at Manama High School in 2000. He obtained a degree in Applied Physics (Honours) in 2005 and a Master's degree in Geophysics in 2007, both from the University of Science and Technology in Zimbabwe. In 2006, he started his career at Blanket Mine, Zimbabwe, and later worked as a project geophysicist for Vision Geophysics and chief geophysicist for Global Resources Exploration and Mining Company. From 2011, he has been employed as a senior scientist at the Council for Geoscience.

With his thesis, ***DEVELOPMENT OF RAPID ASSESSMENT TOOLS FOR GROUNDWATER VULNERABILITY MAPPING USING INTEGRATED GEOSCIENTIFIC DATASETS AND ARTIFICIAL INTELLIGENT ALGORITHMS: CASE STUDY FROM WITBANK AND ERMELO COALFIELDS, SOUTH AFRICA***, the candidate makes a significant contribution to the field of geohydrology. In his research the candidate developed a new approach for groundwater vulnerability assessment using artificial intelligence, specifically for groundwater vulnerability to acid mine drainage at a regional coalfield scale. The value of this research lies in the fact that the new approach allows many of the processes of vulnerability assessments to be automated, facilitating rapid groundwater vulnerability assessments.

Promoter: Dr FD Fourie

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN MICROBIOLOGY

AGUNBIADE, Mayowa Oladele

Mayowa Oladele Agunbiade was born in Ile-Ife, Osun State, Nigeria on 3 February 1982. He received his secondary education in Nigeria, where he matriculated at Ambassadors College in 1999. He obtained the BScHons degrees in Microbiology at Obafemi Awolowo University, Nigeria and University of Fort Hare in 2006 and 2010 respectively. Thereafter, he enrolled for an MSc in Microbiology at the University of Fort Hare and obtained the degree in 2012.

With his thesis, ***ASSESSMENT OF BIOFLOCCULANT PRODUCTION BY ACTINOMYCETES FROM RIVERS AND DAMS OF THE EASTERN FREE STATE PROVINCE OF SOUTH AFRICA AND THEIR POTENTIAL IN WASTEWATER TREATMENT***,

the candidate makes a contribution to knowledge by validating the potential of freshwater actinomycetes in flocculation. With this contribution, he explored the flocculating activities of the positive actinomycete strains in the treatment of different wastewaters and river water. The results of this investigation serve as an indication of the value this type of intervention holds for finding environmentally-friendly solutions to environmental problems through the replacement of chemical flocculants with microbial flocculants, thus suggesting the application of the bioflocculant as a biotechnological tool in wastewater treatment. The research generated three published articles in peer-reviewed journals.

Promoter: Dr AOT Ashafa

Co-Promoter: Prof CH Pohl-Albertyn

ALAYANDE, Kazeem Adekunle

Mr KA Alayande was born in the city of Ile-Ife, Nigeria, on 3 August 1979. He received his secondary education in Ile-Ife, Nigeria, where he matriculated at the School of Science Ile-Ife in 1997. He obtained his BSc (Hons) Microbiology in 2007 and MSc Microbiology in 2014 at the University of the Free State, South Africa.

With his thesis, ***EVALUATION OF ANTIMICROBIAL POTENTIAL OF THE LEAF AND STEM BARK EXTRACTS OF EUCLEA CRISPA (THUNB.) AND ITS POSSIBLE SYNERGISM WITH STANDARD ANTIBIOTICS***, the candidate makes a contribution towards development of bioactive substances of natural origin into affordable and readily available remedies for infectious diseases, particularly those associated with bacteria. With this contribution, he attempts to evaluate the ability of the plant extracts to improve efficacy of conventional antibiotics against resistant organisms as well as the mechanism of biocidal action of the plant extracts. The results obtained from this investigation validates the use of this plant in the management of infections and also serve as an indication of the value this type of intervention holds for the attempt to find a solution to the persistent and predominant resistance of microbial isolates against standard antibiotics.

Promoter: Dr AOT Ashafa

Co-Promoter: Prof CH Pohl-Albertyn

LEE, Ji-Yun

Ji-Yun Lee was born in Nairobi, Kenya. She was schooled in Bloemfontein and matriculated from Brebner High School in 2001. She obtained the degree BSc Microbiology (cum laude) and was awarded as the best Microbiology student in her class. She continued to complete both her BScHons and her MSc in Microbiology at the University of the Free State.

The candidate's thesis, ***INVESTIGATING THE POTENTIAL OF BACTERIOPHAGE INDUCTION AND PHAGE-DERIVED ENZYMES AS ALTERNATIVE ANTIBACTERIAL APPROACHES***, contributes to the knowledge of bacteriophages, with many attempts from the potential of these viruses and their enzymes to lyse the targeted bacterium. Bacterial infections are becoming harder to manage as bacteria gain resistance against antibiotics. Solutions such as bacteriophage therapy are investigated as alternatives or supplements to antibiotics. This contribution resulted in the expression of a bacteriophage enzyme which was tested against different pathogenic bacteria. This work paves the way to more in-depth studies. As a result

of her doctoral study, the candidate has attended five international conferences and three national conferences. She has also contributed to two published articles and a book chapter.

Promoter: Prof RR Bragg

Co-Promoters: Dr CE Boucher and Dr CW Theron

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN PHYSICS

OGUGUA, Simon Nnalue

Ogugua Simon Nnalue hails from Oroma Etiti Anam, Anambra state, Nigeria. He attended primary school at Ugborimili Primary School, Fegge Onitsha, Nigeria from 1993 to 1996. He later moved to Christ the King College, Onitsha, Nigeria, where he attended his secondary school from 1997 to 2002. After that he enrolled at the University of Nigeria, Nsukka in 2003, where he obtained a Bachelor's degree in Astrophysics in 2008. He further secured admission into the University of the Free State in 2010/2011, obtained his BScHons in Physics in 2013, and Master of Science in Nanoscience in 2015.

With his thesis: ***PREPARATION AND CHARACTERIZATION OF POWDERS AND PULSED LASER DEPOSITED THIN FILMS OF RARE-EARTH DOPED OXYORTHOSILICATES,*** the candidate makes a contribution to the study of the synthesis and characterisation of tuneable light-emitting nanomaterials applied to energy efficiency. The candidate has investigated the photoluminescence properties of rare-earths doped oxyorthosilicates phosphors in powder form and that were ablation deposited on silicon substrates using the pulsed laser deposition technique. He has demonstrated tuneable emission from rare-earths doped oxyorthosilicates with enhanced photoluminescence intensity. These materials were evaluated for application as sources of light in light-emitting diodes. He has presented his results at local and international conferences and has won two awards for the best publication and for the best poster presentation at the South African Conference in Photonics Materials. He has published four articles in internationally-accredited journals from his thesis.

Promoter: Prof OM Ntwaeaborwa

Co-Promoter: Prof HC Swart

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN PLANT BREEDING

ERTIRO, Berhanu Tadesse

Berhanu Tadesse Ertiro was born in the Amibera district of the Afar region in Ethiopia on 25 August 1979. He received his secondary education at Wachemo Comprehensive Secondary School (Hadiya zone) and Nemelefan Secondary School (Afar region) from 1994 to 1999. He obtained the degrees BSc (Plant Sciences) in 2003 and MSc (Plant Breeding) in 2009 from Haramaya University in Ethiopia. He started his career in 2004 as a junior maize breeder at the Ethiopian Institute of

Agricultural Research (EIAR) at the Bako Maize Research Centre. Currently, he is a senior maize breeder and national maize research coordinator at the EIAR.

With his thesis, ***PROSPECTS FOR MARKER ASSISTED IMPROVEMENT OF AFRICAN TROPICAL MAIZE GERMPLASM FOR LOW NITROGEN TOLERANCE,*** the candidate developed a potential breeding strategy for low nitrogen tolerance in maize. Low relative efficiency of indirect selection for grain yield under low nitrogen stress using grain yield under optimum conditions was seen. This confirmed higher efficiency of direct selection in target environments for the improvement of grain yield. Eighty-three significant marker-trait associations were identified with genome-wide association studies under both optimum and low-nitrogen conditions. The physical position of significant markers coincided with 158 putative genes and four genes previously reported to have association with low nitrogen tolerance. Therefore, these markers could be used for marker-assisted selection for the improvement of traits associated with it. Magnitudes of both genome-wide and phenotypic predictions were negatively affected by low nitrogen stress, and phenotypic prediction ability was consistently higher than genome-wide prediction ability for all traits under both nitrogen conditions.

Promoter: Prof MT Labuschagne
Co-Promoters: Dr M Olsen and Dr R Bernardo

MILES, Christina Wilhelmina

Chrissie Miles was born in Bethlehem on 7 August 1968. She completed her secondary education at Witteberg High School in Bethlehem in 1986. She was appointed as a research assistant in the Wheat Quality Laboratory at the then Small Grain Centre, Bethlehem, in 1986. She obtained a National Diploma in Botany (Field Husbandry) at the Pretoria Technicon in 1990. After completing a bridging programme, she obtained the degrees BScHons (Plant Breeding) in 2009 and MSc (Plant Breeding) in 2011 from the University of the Free State (both *cum laude*). She is currently a researcher at the Agricultural Research Council, Small Grain Institute.

With her thesis, ***RELATIONSHIPS BETWEEN MIXSMART PARAMETERS AND BREAD WHEAT QUALITY CHARACTERISTICS IN SOUTH AFRICAN DRY LAND CULTIVARS,*** the candidate contributed significantly to the current knowledge on the mixograph, subjected to Mixsmart® software analysis, as a tool for breeders and industry to predict bread-making quality of wheat genotypes. Six Mixsmart® parameters were selected based on their repeatability, coefficient of variation, coefficient of determination, and genotype contribution to variation from analyses of 10 genotypes grown at three locations for two seasons. These parameters showed highly significant correlations with the fixed, non-negotiable primary quality criteria used for the cultivar classification process in South Africa and can be used as indicators for quality. The study further showed that the six-minute dough-mixing time currently used by industry remains the most effective and that breeders and industry can use whole or white flour equally effectively in mixograph analysis.

Promoter: Prof MT Labuschagne

Co-Promoter: Dr A van Biljon

MWENYE, Obed John

Obed John Mwenye was born in the Nsanje district, in the southern region of Malawi on 28 August 1980. He completed his primary school education in the same district and received his secondary school education at Chikwawa Secondary School. He obtained his BScAgric (Crop Sciences) in 2004 from the University of Malawi, BScHons (Plant Breeding) in 2008, and

MScAgric (Plant Breeding, *cum laude*) in 2009, both from the University of the Free State. He is the commodity team leader for the Root and Tuber Crops Research Commodity group in the Department of Agricultural Research Services in Malawi.

With his thesis, ***ROOT PROPERTIES AND PROLINE AS POSSIBLE INDICATORS FOR DROUGHT TOLERANCE IN SOYBEAN***, the candidate makes a contribution to the identification of mechanisms involved in drought tolerance in soybean. Cultivars were evaluated in terms of root architecture, proline accumulation, and seed yield potential in glasshouse and field experiments. Drought-tolerant genotypes showed deep rooting ability and larger root-to-shoot ratios compared to sensitive genotypes. Consequently, drought-tolerant genotypes increased their biomass partitioning to roots as a coping mechanism to soil water-limited-induced-stress. Leaf proline concentration was significantly higher in drought-tolerant, compared to sensitive genotypes under severe drought stress conditions. This increased proline concentration was positively correlated with yield potential. Root properties and proline accumulation can be used as selection criteria in soybean breeding programmes in the development of drought-tolerant cultivars. Results from this study have been presented at conferences and one paper was published in an academic journal.

Promoter: Dr R van der Merwe

Co-Promoter: Prof LD van Rensburg

TAPERA, Terence

Terence Tapera was born in the Masvingo Province of Zimbabwe on 26 December 1981. He completed his secondary and advanced level education in the same province at Mwenezi Government High School and Mutendi High School in 1998 and 2003, respectively. He obtained the BScHons (Agronomy) in 2007 at Midlands State University and MSc (Crop Production) degrees at Africa University in 2013. He started his career as a teacher (2007-2010) and has been consulting for several organisations. Currently he is an entrepreneur and consultant.

With his thesis, ***EXPRESSION OF TOLERANCE TO DROUGHT AND LOW NITROGEN LEVELS IN MAIZE INBRED LINES AND HYBRIDS IN SOUTHERN AFRICA,*** the candidate evaluated the effectiveness of drought and low nitrogen tolerance breeding in early and late maturity hybrids from newly developed inbred lines and testers of the International Centre for the Improvement of Wheat and Maize (CIMMYT). Trials were conducted in Zambia, Zimbabwe, and South Africa under managed drought, low-nitrogen stress and optimum conditions. Stability analysis identified several hybrids that were consistently higher yielding and more stable than hybrids currently being planted by farmers. Genetic and agronomic data from field trials indicated the success story of the drought and low-nitrogen stress-tolerance hybrid breeding programme in reducing the effects of these stresses, which will help to sustain and improve the efficiency of the maize-based production systems in Southern Africa and other regions of sub-Saharan Africa where drought and low nitrogen conditions are major production constraints.

Promoter: Prof MT Labuschagne

Co-Promoters: Dr A Tarekegne, Dr NG Lebaka, and Dr K Mashingaidze

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN PLANT PATHOLOGY

SOKO, Tegwe

Tegwe Soko was born in Kadoma, Zimbabwe in 1973. He received a BSc Crop Science Honours (Plant Breeding) from the University of Zimbabwe in 1995 and taught Agriculture and Geography at high school from 1996 to 1998. Tegwe then joined

the Crop Breeding Institute (Department of Research and Specialist Services) as a wheat breeder and obtained a Master's degree in Crop Science (Plant Breeding) from the University of Zimbabwe in 2007. Since 2008, Tegwe has been employed at Seed-Co Limited as a wheat breeder where he is currently the wheat and small grains programme lead and head of the Rattray Arnold Research Station.

With his thesis, ***STEM RUST RESISTANCE AND YIELD PERFORMANCE OF IRRIGATED ZIMBABWEAN SPRING WHEAT***, the candidate investigated genetic resistance in wheat germplasm to highly virulent African races (the Ug99 group) of the stem rust fungus. He studied the nature and inheritance of stem rust resistance in a leading Zimbabwean wheat variety and introgressed key genes into local varieties using molecular marker-assisted selection techniques. To understand the level of protection provided by different resistance types, he quantified yield and quality losses in wheat varieties differing in their ability to endure rust infection. The final research component focused on multi-environment testing to identify superior genotypes for use as parents in breeding and for the purpose of commercialisation. His comprehensive research confirmed the complementary role of phenotyping and genotyping wheat germplasm in a disease-resistance breeding programme to enhance genetic gain, selection intensity, and speediness to market access.

Promoter: Prof ZA Pretorius

Co-Promoter: Dr R Prins

VAN SCHALKWYK, Hester Josina

Hester van Schalkwyk grew up on the farm Driekuil near Calvinia in the Great Karoo, South Africa. She received her secondary education at the foothills of the Hantam mountains and matriculated at the High School Calvinia in 2004. She obtained the BSc (2009: Human Life Sciences) and MScAgric (2011: Genetics) degrees at Stellenbosch University. Hester was the first South African to receive a PhD scholarship from the prestigious Monsanto's Beachell-Borlaug International Scholars Programme and spent 19 months at the Earlham Institute in the UK for bioinformatics training.

With her thesis, ***A PATHOGENOMIC APPROACH TOWARDS CHARACTERISING THE SOUTH AFRICAN POPULATION OF PUCCINIA STRIIFORMIS F. SP. TRITICI, THE CAUSAL AGENT OF WHEAT STRIPE RUST***, the candidate investigated the source of the 1996 incursion and genetic diversity of the current pathogen population in South Africa. Stripe rust is a devastating disease of wheat and causes regular and major yield losses around the globe. The study provides the first high-resolution, genomic view of historical and prevailing South African *Puccinia striiformis* f. sp. *tritici* (*Pst*) populations and adds valuable information to understanding the origin, migration, and adaptation of the fungus. Additionally, in an attempt to elucidate mechanisms of *Pst* infection and host resistance, a genomic base for investigation of candidate effector genes was established. Finally, the study suggested the recent incursion of a novel pathotype group, also recorded in Europe, East Africa, and New Zealand, into South Africa.

Promoter: Dr R Prins

Co-Promoters: Dr DGO Saunders, Dr LA Boyd, and Prof ZA Pretorius

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN PSYCHOLOGY

DE BEER, Annemarike

Annemarike, born in Pretoria on 11 April 1985, received her secondary education in Pretoria and matriculated at the Garsfontein High School in 2003. She obtained both her BSc degree (2006) and BSc (Hons) in Psychology (2007) at the North-West University. In 2010, she completed the MSc (Counselling Psychology) degree at the University of the Free State. She obtained a distinction for all three degrees. She commenced her professional career in 2011 as a counselling psychologist in private practice in Johannesburg.

With her thesis, ***PSYCHOFORTOLOGICAL EXPERIENCES OF DIFFERENTLY ABLED FIRSTYEAR STUDENTS***, the candidate contributes a salutogenic perspective to the experiences of first-year students living with a disability. Ryff's psychological well-being model served as theoretical model and a qualitative research approach embedded in a phenomenological paradigm were utilised. Although the first-year journey of the differently-abled students include several environmental, social, and academic challenges, it also allows opportunity for the enhancement of psychological well-being. The importance of an enabling environment and social support during their higher-education journey, including intrapersonal processes, such as a reason to persevere despite challenges and personal character strengths, were identified as important factors for growth towards greater independence and success. The findings of this study contribute to the realisation that all individuals are in fact differently-abled.

Promoter: Prof L Naudé

Co-Promoter: Dr L Nel

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN SOIL SCIENCE

BOUWER, Darren

Darren Bouwer was born in Queenstown on 15 September 1987. He received his secondary education at Queens College where he graduated in 2005. He obtained the following degrees at the University of the Free State: BSc (Soil Science) in 2008, BScHons (Soil Science) in 2009, MSc (Soil Science) with distinction in 2013. He commenced his career as a researcher at the UFS in 2009, where he worked on several consultancy and research projects. Since 2013, he is a director of a soil science consultancy company, Digital Soils Africa, providing innovative soil solutions to the agricultural and environmental sector.

With his thesis, ***INTEGRATION OF SOIL MORPHOLOGY, CHEMISTRY AND HYDROMETRY FOR OPTIMIZATION OF HYDROLOGICAL RESPONSE MODELS***, the candidate contributes to the conceptualisation and quantification of hydrological processes in semi-arid landscapes. The focus was mainly on the application of soil chemical properties in combination with soil morphological properties to characterise sub-surface lateral flowpaths in the Weatherley research catchment in the Eastern

Cape. Mechanistic modelling was used to quantify the fluxes of these pathways under different environmental conditions. The conceptualisation method was also successfully applied to characterise lateral flowpaths in hillslopes in the Kruger National Park. The hydropedological techniques developed in this study improved the understanding of lateral flow mechanisms. It further demonstrated that soil chemistry can be a valuable indicator of current soil-water regimes and can be used to conceptualise hydrological processes efficiently.

Promoter: Dr JJ van Tol

Co-Promoter: Prof PAL le Roux

LOKE, Palo, Francis

Palo Francis Loke was born in Likhoele, Mafeteng, Lesotho on 5 March 1980. He received his secondary education in 1999 at Masentle High School, Mafeteng, Lesotho. Palo was accepted at the National University of Lesotho in 2001, where he obtained his BSc in Agriculture in 2005; the same year he joined the Lesotho Defence Force as a soldier. In 2009 and 2011, respectively, Palo received his BSc Honours and MSc degrees in Soil Science, both from the University of the Free State, where he was also appointed as research assistant in 2010.

With his thesis, ***RESPONSE OF SOIL CARBON FRACTIONS TO LAND USE SYSTEMS UNDER ARID TO SEMI-ARID CLIMATES IN SOUTH AFRICA***, the candidate makes a unique contribution to the understanding of land-use impact on soil degradation and management interventions that could be employed to reverse the degradation under different agricultural activities. The candidate employed quantitative and novel qualitative analytical procedures to characterise soil-carbon fractions. Spectroscopic changes in organic carbon serve as indicators of soil degradation or restoration of the soil's productive capacity in response to selected management interventions in both arable and rangeland ecosystems. These contributions are a fitting addition to the knowledge on soil protection that has been generated at this university over the years and will make an immense contribution to the development of soil-protection policies in South Africa and countries that share similar agro-ecological settings.

Promoter: Dr E Kotze

Co-Promoter: Prof CC du Preez

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN STATISTICS

CHIFURIRA, Retius

Retius Chifurira was born on 11 June 1972 in Bulawayo, Zimbabwe**.** He did his secondary schooling at Bumburwi Secondary School and his advanced-level schooling at Morgan High School. He then trained as a secondary school teacher at Hillside Teacher's College. He later obtained a BSc (Mathematics and Statistics), a Postgraduate Diploma (Project Planning and Management) and a BScHons degree (Statistics and Operations Research). In 2010, he obtained an MSc degree (Statistics) with distinction at the University of the Free State.

In his thesis titled, ***MODELLING MEAN ANNUAL RAINFALL FOR ZIMBABWE***, the candidate contributes with the application of statistics in predicting rainfall in Zimbabwe. The candidate uses advanced statistical tools to model mean annual rainfall for Zimbabwe. Rainfall has a substantial influence on agriculture, food security, infrastructure development, water quantity, and the economy at large. The thesis consists of **two** sections. In the first section, the predictive influence of Southern Oscillation Index and standardised Darwin sea level pressure anomalies on the mean annual rainfall is investigated. The candidate uses a combination of time series and regression analysis to offer a powerful tool for predicting annual rainfall for Zimbabwe. In the second part, extreme value theory is used to develop an early warning system for droughts and flash floods for Zimbabwe. The thesis establishes the standardised Darwin sea level anomaly for the month of April as an important predictor of extreme rainfall in Zimbabwe.

Promoter: Dr D Chikobvu

IIYAMBO, Peter Tweuthigilwa

Petrus Tweuthigilwa Iiyambo was born in 1976 in Iikokola, northern Namibia. He attended primary schools in Iikokola and Windhoek and matriculated at Jan Jonker Afrikaner Secondary School in Windhoek in 1996. He obtained his BSc (Statistics) degree at the University of Namibia in 2002, and BSc (Hons) and MSc degrees in Statistics in 2006 and 2007, respectively, both at the University of the Free State. He was appointed a Science and Mathematics Teacher at Immanuel Shifidi Secondary School in Windhoek in 2001, Statistics Tutor in the Department of Statistics, University of Namibia in 2003, and was promoted to Lecturer in 2008.

With his thesis, ***FIDUCIAL INFERENCE BASED ON ORDER STATISTICS IN LOCATION-SCALE AND LOG-LOCATION-SCALE FAMILIES***, the candidate develops statistical methods using the fiducial paradigm, which is less known than either the classic frequentist or Bayesian paradigms in statistics. For location-scale families of distributions (two-parameter case) the required fiducial pivotal quantities can be written in closed form, so that the fiducial distribution of the two-model parameters can be calculated. For location-scale-shape families (three-parameter case), however, fiducial pivotal quantities for the parameters do not exist. Instead, the new concept of conditional fiducial pivotal quantities is introduced, which allows one to calculate the fiducial distribution of any two parameters, conditional on the third. The required joint distribution of all three parameters can then be calculated through the Gibbs sampler. While the Gibbs sampler is well-known in Bayesian inference, it is used here for the first time in the field of fiducial inference.

Promoter: Prof R Schall

DOCTOR OF PHILOSOPHY WITH SPECIALISATION IN ZOOLOGY

OTTO, Mia

Mia Otto was born on 29 November 1984. She matriculated at Sentraal High School, Bloemfontein, in 2002. She obtained her BSc Zoology (2010) and BScHons (2011) degrees, both from the University of the Free State. She graduated with her MSc (Conservation Ecology) in 2014 from Stellenbosch University. She started her career as a Freshwater Ecologist in 2011, Cape Town. With limited opportunities for diatom studies in South Africa, she returned to Bloemfontein to do her PhD. In 2018, she received a fellowship to attend the International Diatom Symposium to present her PhD research in Berlin in June.

With her thesis, **DIATOM COMMUNITY COMPOSITION AND ECOLOGICAL GRADIENTS ON SELECTED RIVERS IN THE EASTERN AND WESTERN CAPE, SOUTH AFRICA**, the candidate makes an exceptional contribution to freshwater resource management in Southern Africa. Through the contribution of baseline information which had been lost or, for some rivers, never been recorded before, she produced a reference condition. Worldwide, diatoms are regarded and are used as key monitoring tools for water quality, yet in South Africa the field of diatomology in freshwater monitoring remains underutilised. This is to a large extent due to the limited information available on diatom communities of Southern Africa, specifically the Eastern and Western Cape. This study filled a large section of the information gap, while uncovering ecological patterns of community distribution which, in a climate uncertain future, will provide critical information for large-scale freshwater resource management, towards ensuring sustainable water security for all.

Promoter: Prof JG van As (posthumous)

Co-Promoter: Prof LL van As and Dr J Taylor

The Main Procession graduation gowns – embroidered with rich diversity

South Africa, and the Free State in particular, has a long-standing friendship with our neighbouring country, Lesotho.

Through a shared history, we have become co-creators of our futures. For this reason, the UFS decided to incorporate our tradition with that of the Basotho in the design of our Main Procession graduation gowns.

The gowns are inspired by the Seanamarena – the traditional Basotho blanket. The different patterns on the Seanamarena indicate the status one holds in the Basotho nation or reflect the occasion being celebrated. Keeping the Seanamarena pattern in mind, we combined our traditional academic designs with that of the Basotho nation.

YOKE PATTERNS

Yoke pattern for the Chancellor and Vice-Chancellor

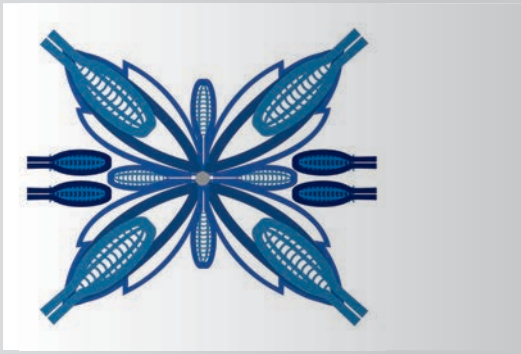
This Seanamarena pattern is an interpretation of a design – used exclusively for the king and chiefs – which means "to swear by the king". This blanket has the highest status of all Basotho blankets.

Yoke pattern for the Chairperson of the Council

This Seanamarena Victorian crest motif appeared after the visit of the Prince of Wales to Lesotho in 1925, which made a profound impression on the local people. Customers refer to this blanket as 'lesiba' – meaning feathers – when buying it.

Yoke pattern for the Vice-Rector

This Seanamarena Poone design symbolises good crops, wealth, and fertility. The Poone is given as a present to honour an important visitor.



Yoke pattern for Registrar

The same Seanamarena Poone design used for the Vice-Rector applies to the Registrar, with some slight design and colour alterations.

The Deans wear gowns made in the colours of the faculties or others which indicate the office they hold.

Be a proud Kovsie Alumnus and join us at events and reunions

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