

RESEARCH REPORT
2014/15



ACHIEVING EXCELLENCE

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





achieving
EXCELLENCE

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Message from the VICE-CHANCELLOR

Prof Jonathan Jansen

Foreword

For smart universities in the global system of knowledge production, merely generating large volumes of research or producing high numbers of graduates is no longer enough. What matters is research excellence – by which I mean the quality, depth and sophistication of works of scholarship. To be sure, such thinking is counter-intuitive in the narrow managerialist climates that govern the modern university.

More than before, state-subsidised universities have been transformed into factory production lines because of the pressure to produce more rather than better. In South Africa, for example, increasing enrolments of students have become ends in themselves, since the subsidy formula not only rewards institutions on the basis of the numbers which show up, it also penalises those institutions who fail to meet government-determined enrolment targets. Similarly, producing large volumes of research is in and of itself a subsidy-optimising activity, given that those producing more publications in relation to their competitors receive much more official funding. And so the rush for quantity outpaces any concern for quality.

It is important not to be overly critical of this factory-model of academic production, for the ability to pay staff and keep the lights on, so to speak, depends on how much money a university makes, to put it crudely. And

Voorwoord

Vir slim universiteite in die globale stelsel van kennisproduksie is die blote generering van groot volumes navorsing of die lewering van hoë getalle gegradueerdes nie meer genoeg nie. Wat saak maak, is navorsingsuitnemendheid – hiermee verwys ek na die gehalte, diepte en gesofistikeerdheid van vakkundige werke. Natuurlik is so 'n siening teen-intuïtief in die benouende klimaat (gekenmerk deur bestuurdersheerskappy) wat die verloop van sake by die moderne universiteit bepaal.

Staatsgesubsidieerde universiteite word meer as ooit tevore omskep in fabrieksproduksielyste as gevolg van die druk om hoër getalle op te lewer, eerder as beter gehalte. In Suid-Afrika het die verhoging van die aantal studente-inskrywings byvoorbeeld 'n doel op sigself geword, aangesien die subsidieformule nie net instellings beloon op grond van die aantal studente wat opdaag nie, maar ook die instellings wat nie daarin slaag om die regering se inskrywingsmikpunte te haal nie, penaliseer. Die produsering van groot volumes navorsing is ook op sigself 'n subsidie-optimaliserende aktiwiteit, in die lig daarvan dat diegene wat meer publikasies produseer as hul mededingers, baie meer amptelike befondsing ontvang. Op hierdie wyse oortref die najaging van kwantiteit dus enige besorgdheid oor kwaliteit.

Lentswe la Ketapele

Bakeng sa diyunivesithi tse hlalefileng sistiming ya lefatshe lohle ya tlhahiso ya tsebo, ho hlalisa dipatlisiso ka bongata feela kapa ho hlalisa dipalo tse ngata tsa baithuti ba mangolo a phahameng a yunivesithi ha e sa le phihlello e lekaneng. Sa bohlokwa ke dipatlisiso tse tswileng matsoho – mme ka sena ke bolela boleng, botebo le ho rarahana ha mesebetsi ya boithuto. Ho etsa bonnete, monahano o jwalo o hanyetsana le mehopolo e nepahetseng maemong a tsa botsamaisi moo ho sa shebisisweng ntlha ena ka botebo tsamaisong ya yunivesithi ya sekwalelwale.

Ho feta nakong e fetileng diyunivesithi tse tsheheditsweng ka ditjhelete ke mmuso di fetotswe ho ba ditsi tsa tlhahiso tse sebetlang jwalo ka difeme ka lebaka la kgetello e bakwang ke hore di be le tlhahiso e kgolo ho fapana le e ntlafetseng. Afrika Borwa mona, ho etsa mohlala, dikamohelo tse eketsehang tsa palo ya baithuti di fetohile taba ya bohlokwa ka ho fetisisa hobane mokgwa wa tshehetso ya ditjhelete wa sabsidi ha o putse feela ditsi ho latela dipalo tse phahameng tse bonwang, empa hape o otlala ditsi tse hlolehang ho phethahatsa ditekanyetso tse lekantsweng ke mmuso bakeng sa palo ya baithuti ba amohelang. Ka tsela e tshwanang, ho hlalisa dipalo tse phahameng tsa tsa dipatlisiso ke tshebetso e iputsang ka boyona mabapi le tshehetso ya sabsidi hobane ditsi tse hlalising dipatlalatsa tse eketsehileng haholo papisong

Foreword

since every one of the 25 public universities is trapped in the same game, the competition for the share of the same-sized government cake can be quite intense at an institutional level, even though the system-wide effects are so obviously harmful for smaller, disadvantaged campuses.

“We now have, for the first time in our history, two A-rated scholars, one in mathematical statistics and the other in education and human development.”

The University of the Free State (UFS) is not immune to these subsidy pressures, but we took a principled position six years ago that the standard of education would not be compromised, whether in the entrance requirements for high school graduates or the standing of learned journals in which academics published. Of course we needed more research and research products in an institution where a relatively small cohort of academics was active in research. And so we placed considerable emphasis on recruiting the best academics, preparing young staff for upper Y and P ratings through the National Research Foundation (NRF), and more senior academics in the A and B categories of rating.

We now have, for the first time in our history, two A-rated scholars, one in mathematical statistics and the other in education and human development. Professor Melanie Walker is, for example, now the highest rated education scholar in South Africa (A1) and Professor Max Finkelstein the only A rated scholar in his field. We also have more B rated scholars than before and more rated scholars in total than in UFS history. The push for quality over quantity reflects also in the fact that we now have five SARCHI Research Chairs, when a few years ago we had none. Starting from a low base we plan

Voorwoord

Dit is belangrik om nie te krities te staan teenoor hierdie fabrieksmodel van akademiese produksie nie, want die vermoë om personeel te betaal en by wyse van spreke die ligte aan te hou, hang af (om dit kras te stel) van hoeveel geld 'n universiteit maak. Omdat elkeen van die 25 openbare universiteite vasgevang is in dieselfde spel, kan die mededinging vir 'n deel van die regeringskoek van dieselfde grootte nogal intens wees op institusionele vlak, ten spyte van die feit dat die stelselwye uitwerking daarvan so duidelik skadelik is vir kleiner, benadeelde kampusse.

Die Universiteit van die Vrystaat (UV) is nie immuun teen hierdie subsidiedruk nie, maar ons het ses jaar gelede 'n beginselstandpunt ingeneem dat die standaard van opvoeding nie gekompromitteer sal word nie, hetsy betreffende die toelatingsvereistes vir matrikulante of die status van vakkundige tydskrifte waarin akademië publiseer. Natuurlik het ons meer navorsing en navorsingsprodukte benodig in 'n instelling waar 'n relatief klein groepie akademië aktief was in navorsing. Dus het ons aansienlike klem geplaas op die werwing van die beste akademië en die voorbereiding van jong personelede om hoër Y- en P-graderings van die Nasionale Navorsingstigting te ontvang, asook die voorbereiding van meer senior akademië om gradering in die A- en B-kategorieë te ontvang.

Ons het nou vir die eerste keer in die geskiedenis van die universiteit twee A-gegradeerde vakkundiges – een in wiskundige statistiek en die ander in opvoedkunde en menslike ontwikkeling. Professor Melanie Walker is byvoorbeeld nou die hoogste gegradeerde vakkundige in opvoedkunde in Suid-Afrika (A1), en professor Max Finkelstein is die enigste A-gegradeerde vakkundige in sy studieveld. Ons het ook meer B-gegradeerde vakkundiges as voorheen, en 'n groter totale aantal gegradeerde vakkundiges as ooit tevore in die UV se geskiedenis. Ons nastrewing van kwaliteit eerder as kwantiteit word ook weerspieël in die feit dat ons nou vyf SARCHI-navorsingstoele het ('n paar jaar gelede het ons geen navorsingstoele gehad nie), en ons beplan om op 'n lae vlak te begin en hierdie hoëvlaknavorsingsaktiwiteite in die komende jare te eskaleer.

Die dividende wat opgelewer is ten opsigte van 'n prioriteit wat etlike jare gelede bepaal is, naamlik om groot beleggings te maak in die

Lentswe la Ketapele

le bahlodisani le tsona di fumana tshehetso ya tjelete e eketsehileng haholo ho tswa ho mmuso. Ka hona lehlaphahlapha la ho fumana dipalo tse phahameng tsa baithuti e ba taba ya bohlokwa ho feta ngongoreho efe kapa efe e mabapi le boleng.

Ho bohlokwa ho se sehollle ho feta tekanyo mmatlolo ona o sebitsang jwalo ka wa difeme o sebediswang bakeng sa tlhahiso ya tsa thuto hobane bokgoni ba hore ho lefellewe ditjeo tsa motlakase, ka moo ho leng ka teng, bo itshetlehlile hodima hore na ke tjelete e kae eo yunivesithi e e etsang, ha re bua puo-phara. Mme hobane e nngwe le e nngwe ya diyunivesithi tse 25 tsa setjhaba di kene kgabong e le nngwe, ka tsela e tshwanang tlhodisano bakeng sa seabo sa dihlapiso tsa mmuso tse sa eketseheng ka boholo e dutse e iphile matla boemong ba diyunivesithi leha dikamo tse akaretsang tse bakwang ke sistimi di feela di le kotsi bakeng sa dikhamphase tse nyane, tse hlohang menyetla.

Yunivesithi ya Foresitata ha e kgone ho pholoha dikgatellong tse na tse tswang ke kabo ya disabsidi empa re nkile kgato e hlakileng dilemong tse tshetsehang tse fetileng ya hore boemo ba thuto bo keke ba behwa kotsing ho sa natswe hore na ke mabapi le ditlhoko tsa ho kena yunivesithing bakeng sa baithuti ba tswang dikolong tse phahameng kapa boemong ba dijenale tseo barupelli ba phatlalatsang ho tsona. Ke nnete re hloka dipatlisiso le dihlahiswa tsa dipatlisiso tse eketsehileng setsing seo ho sona palo e fokolang ya barupelli e itahletseng ka setotswang dipatlisisong. Ka hona re entse tjehebisiso e kgolo hodima ho thaottha barupelli ba hlwahlwa ka ho fetisisa, ho hlophisa basebetsi ba batjha dilemong bakeng sa ditekanyo tse phahameng tsa Y le P ka botataisi ba Setheo sa Naha sa Dipatlisiso (National Research Foundation) le barupelli ba eketsehileng ba phahameng mekgahlelong ya ditekanyo ya A le B.

Jwale, lekgetlo la pele nalaneng ya rona, re na le barupelli ba babedi ba mekgahlelong wa A, a le mong o lefapheng la dipalopalo tsa mmetse mme e mong o lefapheng la thuto le ntshetsopole ya setjhaba. Profesara Melanie Walker, ho etsa mohlala, jwale ke morupelli ya maemong a phahameng ka ho fetisisa ho tsa thuto Afrika Borwa (A1) mme Profesara Max Finkelstein ke yena feela morupelli ya mekgahlelong wa A lefapheng la hae. Hape re

Foreword

to escalate these high level research activities in the coming years.

Perhaps the most significant achievement in terms of our focus on research excellence has been the pay-offs in relation to a priority set a few years ago to make major investments in the publication of scholarly books. In the humanities and social sciences, in particular, the significance of “the book” was something that we had to persuade academics about, because of the short-term pressure of generating more individual articles to satisfy the well-meaning commitments of an academic dean. But a book requires incredible patience and deferred academic gratification since, compared to most journal articles, it takes a long time to produce a quality monograph.

But the scholarly book comes with a massive pay-off for a humanities or education scholar as a landmark contribution to the field, a substantive consideration in academic promotion or advancement, and a marker of achievement against which the standard of the second and third and fourth books would be measured. A scholarly book is not, however, a didactic textbook or study guide; it is a work of theoretical and methodological invention, a long-term study of a complex problem that advances the field and the scholar alike. The good news is that the UFS is one of the leading

Voorwoord

publikasie van vakkundige boeke, was miskien die mees beduidende prestasie wat ons fokus op navorsingsuitnemendheid betref. Veral in die geesteswetenskappe en sosiale wetenskappe moes ons (weens die korttermyndruk om meer individuele artikels te genereer om te voldoen aan die vereistes van 'n welmenende akademiese dekaan) akademië oorreed om ook aandag te gee aan die belangrikheid van “die boek”. 'n Boek verg egter ongelooflike geduld en uitgestelde akademiese bevrediging omdat dit in vergelyking met die meeste tydskrifartikels so lank neem om 'n monografie van hoë gehalte te produseer.

Die vakkundige boek lewer egter massiewe dividende op vir 'n vakkundige in die geesteswetenskappe of opvoedkunde as 'n mylpaal-bydrae tot die studieveld, 'n substantiewe oorweging vir akademiese bevordering of vordering en 'n prestasie-aanduider waaraan die standaard van die tweede, derde en vierde boeke gemeet sal word. 'n Vakkundige boek is egter nie 'n didaktiese handboek of studiegids nie; dit is 'n werk gekenmerk deur teoretiese en metodologiese innovering, 'n langtermynstudie van 'n komplekse probleem wat tot voordeel sal strek van beide die studieveld en die vakkundige. Die goeie nuus is dat die UV een van die toonaangewende universiteite in die land is wat die produksie van vakkundige boeke betref, en dit sonder 'n universiteitsdrukkery op sy perseel.

Lentswe la Ketapele

na le barupelli ba eketsehileng ba mokgahlelo wa B ho feta pele le barupelli ba eketsehileng ka kakaretso nalaneng ya UFS. Tshututso bakeng sa boleng ho feta bongata e bontshwa hape ke taba ya hore jwale re na le Badulasetulo ba Dipatlisiso ba SARCHI - dilemong tse mmalwa tse fetileng, ba ne ba le siyo - mme ho qala motheong o tlase re rerile ho phahamisa boemo bona ba ditshebetso tsa tsa dipatlisiso dilemong tse tlang.

Mohlomong phihlelo e kgolo ka ho fetisisa e mabapi le tjhebisiso ya rona dipatlisisong tse tswileng matsoho e bile dikatleho tse mabapi le bohlokwa bo tekilweng dilemong tse mmalwa tse fetileng, mme sena e bile ho etsa matsete a maholo phatlalatsong ya dibuka tsa thupello. Dithutong tse mabapi le batho le tsa disaense tsa setjhaba, haholoholo, bohlokwa ba “buka” ke ntho eo re ileng ra lokela ho susumetsa barupelli ho e etsa ka lebaka la kगतello e bakwang ke ho hlalisa dingolwa tse eketsehileng tsa batho ka bo-mong ho phethahatsa boikitletso ba maikemisetso a matle ba ho ba hlooho ya lefapha ya borupelli. Empa buka e hloka mamello e kgolo ka tsela e makatsang le ho fanyehwa ha kgotsofalo ke barupelli kaha ho nka nako e telele ho hlalisa sengolwa se tebileng sa boleng, papisong le bongata ba dingolwa tsa dijenale.

Empa buka ya borupelli e fana ka moputso o moholo haholo ho morupelli wa tsa dithuto tsa botho kapa wa thuto jwalo ka tlatsetso e kgolo lefapheng lena, tshakatsheko e tebileng kgodisong kapa ntshetsopeleng ya tsa borupelli, le setshwai sa phihlelo seo papisong le sona boemo ba buka ya bobedi le ya boraro le ya bone di tla lekannngwa ka sona. Buka ya borupelli, leha ho le jwalo, ha se bukana ya ho ruta kapa tataiso bakeng sa baithuti; ke mosebetsi wa boithahisetso ba tsa theori le mekgwa, phuputso ya nako e telele ya bothata bo rarahaneng bo tswelletsang lekala la thuto le moithuti ka tsela e tshwanang. Ditaba tse monate ke hore UFS ke e nngwe ya diyunivesithi tse etelletseng pele tlhahisong ya dibuka tsa borupelli empa e se na setsi sa kgatiso sa yunivesithi diahelong tsa yona.

Qetellong letshwao le tiileng ka ho fetisisa la boikitletso ho tsa dipatlisiso tse tswileng matsoho le tlišwa ke boleng ba baithuti ba mangolo a phahameng a thuto ya yunivesithi. Re qadile ho hohela ba bang ba baithuti ba hlwahlwa ka ho fetisisa ba mangolo a Masters le PhD le balekane ba dithuto tsa kamora



Foreword

universities in the country in terms of the production of scholarly books – and that has been achieved without a university press on its premises.

Ultimately the surest sign of a commitment to research excellence comes through the quality of a university's postgraduate students. We have started to attract some of the best Masters and PhD students and a competitive core of postdoctoral fellows in recent years. These Postgraduate students, Fellows and Associates have made a vast contribution to the quality and magnum of the institutional research effort in places like the History research group of Professor Ian Phimister or the Ground Water Studies group of Professor Danie Vermeulen or the Race and Reconciliation research group of Professor Andre Keet or the Plant Breeding group of Professor Maryke Labuschagne or the education research group of Professor Loyiso Jita—among many others.

Why are these senior students so important? Because it is from this group that the UFS will be able to hire the best and the brightest to become junior academics and, over time, senior professors. Thankfully, the current cohort of senior students and Fellows are also the most diverse group of young scholars and scientists and this bodes well for addressing another national concern, namely, the shortage of black professors in the academy. There still is no other option for building a world-class group of new professors than along this long, hard road of learning to become a scholar through investment opportunities such as our Prestige Scholars Programme.

It is with considerable pride that I commend every academic researcher at the UFS for exceptional commitment and effort to help the University achieve its international standing on the basis of such an uncompromising dedication to the quest for research excellence. The many stories, illustrations, awards and achievements of academics listed in this 2014/2015 Annual Research Report testify to these ideals. |

Voorwoord

Uiteindelik kan die sekerste aanduiding van 'n verbintenis tot navorsingsuitnemendheid gevind word in die gehalte van 'n universiteit se nagraadse studente. Ons het oor die afgelope paar jaar begin om die beste Magister- en PhD-studente te lok, asook 'n mededingende kerngroep nadoktorale genote. Die nagraadse studente, genote en medewerkers het 'n enorme bydrae gelewer tot die gehalte en omvang van die institusionele navorsingsprojek in die Geskiedenisnavorsingsgroep van professor Ian Phimister of die Grondwaterstudiegroep van professor Danie Vermeulen of die navorsingsgroep oor Ras en Versoening van professor Andre Keet of die Planteteeltgroep van professor Maryke Labuschagne of die Opvoedkundenavorsingsgroep van professor Loyiso Jita, en vele ander.

Waarom is hierdie senior studente so belangrik? Omdat die UV mettertyd uit hierdie groep die beste en knapste studente sal kan aanstel om junior akademici en uiteindelik senior professore te word. Gelukkig is die huidige groep senior studente en genote ook die mees diverse groep jong vakkundiges en wetenskaplikes, en dit belooft veel vir die oplossing van nog 'n nasionale kwelpunt, naamlik die tekort aan swart professore in die akademie. Daar is steeds geen ander opsie vir die ontwikkeling van 'n wêreldklasgroep nuwe professore as om hierdie lang, moeilike roete van studie te volg om 'n vakkundige te word deur middel van beleggingsgeleenthede soos ons *Prestige Scholars*-program nie.

Dit is met groot trots wat ek elke akademiese navorser aan die UV loof vir buitengewone toewyding en harde werk om die universiteit te help om sy internasionale status te bereik op grond van so 'n koersvaste verbintenis tot die nastrewing van navorsingsuitnemendheid. Die talle verhale, illustrasies, toekennings en prestasies van akademici wat in hierdie Jaarlikse Navorsingsverslag vir 2014/2015 vermeld word, getuig van dié ideale. |

Lentswe la Ketapele

lengolo la bongaka dilemong tsa moraorao. Baithuti ba mangolo a kamora la bongaka, Bomphato le Basebedisani ba entse tlatsetso e kgolo ho boleng le maemo a boikitlaetso ba tsa dipatlisiso ba setsi makaleng a jwalo ka sehlopha sa dipatlisiso tsa Histori sa Profesara Ian Phimister kapa sehlopha sa Diphuputso tsa Metsi a ka Tlasa Lefatshe sa Profesara Danie Vermeulen kapa sehlopha sa dipatlisiso tsa Merabe le Poelano sa Profesara Andre Keet kapa sehlopha sa dipatlisiso sa Tswadiso ya Dimela sa Profesara Maryke Labuschagne kapa sehlopha sa dipatlisiso tsa thuto sa Profesara Loyiso Jita—hara tse ding tse ngata.

Ke hobaneng baithuti baa ba phahameng ba le bohlokwa hakaa? Hobane ke ho tswa sehlopheng sena UFS e tla kgona ho hira barupelli ba hlwahlwa le ba hlalefileng ka ho fetisisa ho ka ba barupelli ba maemo a tlase mme, ha nako e ntse e tsamaya, e tla ba diprofesara tsa maemo a phahameng. Ka lehlohonolo, sehlopha sa hajwale sa baithuti ba phahameng le Bomphato ke sehlopha se kopantseng merabe e mengata ka ho fetisisa ya barutehi ba batjha le boramahlale mme sena ke taba e ntle bakeng sa ho rarolla ngongoreho e nngwe e boemong ba naha, e leng, kgaello ya diprofesara tsa batho ba batsho ho tsa thupello. Ho sa ntse ho se na kgetho e nngwe bakeng sa ho aha sehlopha se maemong a lefatshe sa diprofesara ho feta tsela ena e telele, e boima ya ho ithuta hore motho e be morutehi ka motjha wa menyetla ya matsete e jwalo ka Lenaneo la Barutehi ba Phahameng (Prestige Scholars Programme) la rona.

Ke ka motlotlo o phahameng ke kgothaletsang mofuputsi e mong le e mong wa UFS bakeng sa boikitlaetso le boiteko bo kgetholohileng ho thusa yunivesithi ho fihlella maemo a yona a matjhaba ka motheo wa boikitlaetso bo sa thekeseleng mabapi le ho fihlella dipatlisiso tse tswileng matsoho. Dipale tse ngata, ditshwantshiso, dikgau le dikatleho tse thathamisitsweng Tlalehong ena ya Dipatlisiso ya Selema le Selema ya 2014/2015 ke bopaki ba mekutu ena. |



Message from the VICE-RECTOR: RESEARCH

Prof Corli Witthuhn

Message

The research report of the University of the Free State (UFS) reflects our outstanding research achievements over a two-year period (2014 and 2015) and represents the first of our bi-annual reports. The focus of this report is on "Achieving Excellence" and many of our top researchers and groups of researchers are featured in this publication. These outstanding individuals and groups are celebrated for the international impact of their research, their productivity, dedication and hard work. In spite of recent financial and social challenges in the national higher education sector, these scientists and scholars have remained focused and continued to have an impact nationally, but more importantly also internationally, in their respective fields of expertise. We celebrate each and every individual researcher who contributed to the research outputs of the UFS over this period.

During 2014 and 2015 we have again been successful in reaching many of our research goals. We are proud of the significant increase in research outputs in high-impact accredited international journals. We have made significant strides in the number of book publications and have improved our national university standing. We are maintaining the growth in the number of NRF-rated researchers and the number of postdoctoral fellows joining UFS research groups. We have expanded our expertise in research contract management and the support of

Boodskap

Die navorsingsverslag van die Universiteit van die Vrystaat (UV) weerspieël ons uitstekende navorsingsprestasies oor 'n tydperk van twee jaar (2014 en 2015) en verteenwoordig die eerste van ons tweejaarlikse verslae. Die fokus van hierdie verslag is op die bereiking van uitnemendheid, endaar word in hierdie publikasie verwys nattle van ons topnavorsers en -navorsersgroepe. Hierdie uitnemende individue en groepe word hoog aangeskryf vir die internasionale impak van hul navorsing, hul produktiwiteit, toewyding en harde werk. Ten spyte van onlangse finansiële en sosiale uitdagings in die nasionale hoërondewyssektor het hierdie wetenskaplikes en vakkundiges gefokus gebly en steeds in hul onderskeie kundigheidsterreine 'n impak uitgeoefen – nie net op nasionale vlak nie, maar ook internasionaal. Ons vier die prestasies van elke individuele navorser wat gedurende hierdie tydperk bygedra het tot die navorsingsuitsette van die UV.

Gedurende 2014 en 2015 was ons weereens suksesvol met die bereiking van baie van ons navorsingsmikpunte. Ons is trots op die beduidende toename in navorsingsuitsette in geakkrediteerde navorsingstydskrifte met 'n hoë impak. Ons het met rasse skrede gevorder wat die aantal boekpublikasies betref, en het ons nasionale posisie vergeleke met ander universiteite in die land aansienlik verbeter. Ons

Moleatsa

Tlaleho ya diphuputso ya Yunivesithi ya Foreistata (UFS) e bontsha diphihlello tse tswileng matsoho tsa rona nakong ya dilemo tse pedi (2014 le 2015) mme ke tlaleho ya pele ya sebopeho sa tlhahiso ya ditlaleho habedi ka selemo. Tjhebisiso ya tlaleho ena e hodima "Phihlello ya Katleho" mme bongata ba bafuputso ba rona ba atlehleng haholo le dihlopha tsa bafuputso ba hlahella phatlalatsong ena. Batho bana le dihlopha tse hlahelletseng ka mahetla ba tlotlwa bakeng sa seabo sa diphuputso tsa bona boemong ba matjhaba, tlhahiso ya bona, boikitlaetso le ho sebetsa ka thata. Ho sa natswe diphephetso tsa moraorao tsa tsa ditjhelete le tsa setjhabeng sekthareng ya thuto e phahameng, borasaense le barupelli bana ba dutse ba tsepamisitse maikutlo mme ba tswela pele ho ba le seabo naheng, empa sa bohlokwa ka ho fetisisa le matjhabeng mafapheng a bona ka ho fapana a boitsebelo. Re tlotla mofuputso e mong le e mong ya tlatseditseng ditlhalisong tsa diphuputso tsa UFS nakong ena.

Nakong ya 2014 le 2015 re atlehle hape ho fihlella dipakane tsa rona tsa tsa diphuputso. Re motlotlo ka keketseho e kgolo ya ditlhalisong tse phahameng tsa diphuputso tse hlahileng dijenaleng tse tlotlehleng tsa matjhaba. Re entse dikgatelopele tse kgolo palong ya dibuka tse phatlalatswang mme re ntlafaditse maemo a yunivesithi ya rona ka tsela e kgolo boemong ba naha. Re tswelleltsa pele kgolo palong ya bafuputso ba maemong a

Message

innovation and commercialisation. This will be an area of growth for the UFS and we will report on the successes in our endeavour to commercialise our relevant research in future reports.

"We are constantly innovating in order to better support our academic and support staff in increasing their research outputs."

We are deeply engaged in addressing the challenges of increasing the research capacity of staff at the UFS. Unfortunately, over the past three years we have not seen a significant increase in the number of staff with doctoral degrees. We have already initiated programmes to support academic and support staff to improve their qualifications and we are hopeful that we will be able to improve on the current 42% of academic staff with doctoral degrees. All of these programmes are supported by the research skills development programme offered by the Postgraduate School.

We are constantly innovating in order to better support our academic and support staff in increasing their research outputs. We fund interdisciplinary projects and collaborative projects with the Central University of Technology (CUT), we are developing a mentorship programme for younger academics, and we actively seek ways to ensure that the academics at the UFS reflect the demographics of our beautiful country. We are also in the process of implementing tuition bursaries for master's and doctoral students in order to increase our postgraduate student numbers.

I wish to thank the UFS staff for their excellent guidance and mentorship to the researchers of the future – those people who will become the leaders who will build a better future for us all. Finally, I want to thank all the funders of the research activities at the UFS, who have made this significant progress possible. |

Civilian

Boodskap

handhaaf die groei in die aantal NNS-gegradeerde navorsers en die aantal nadoktorale genote wat by UV-navorsingsgroepe aansluit. Ons het ons kundigheid in die bestuur van navorsingskontrakte en die ondersteuning van innovering en kommersialisering uitgebrei. Hierdie sal 'n groeipunt wees vir die UV, en ons sal in toekomstige verslae terugvoering gee oor die suksesste wat ons behaal het in ons strewe om ons relevante navorsing te kommersialiseer.

Ons is intensief betrokke by die proses om die uitdagings om die navorsingskapasiteit van personeel aan die UV te verhoog, die hoof te bied. Oor die afgelope drie jaar was daar ongelukkig nie 'n beduidende toename in die aantal personeellede met doktorsgrade nie. Ons het reeds programme geïnisieer om akademiese en steundienspersoneel te ondersteun in die verbetering van hul kwalifikasies, en ons is hoopvol dat ons sal kan verbeter op die huidige 42% van akademiese personeel met doktorsgrade. Al hierdie programme word gesteun deur die program vir die ontwikkeling van navorsingsvaardighede wat deur die Nagraadse Skool aangebied word.

Ons is voortdurend besig met innovering teneinde ons akademiese en steundienspersoneel beter te kan ondersteun om hul navorsingsuitsette te verhoog. Ons befonds interdisziplinêre projekte en samewerkingsprojekte met die Sentrale Universiteit vir Tegnologie (SUT), ons is besig om 'n mentorskapsprogram vir jonger akademiëci te ontwikkel en ons beywer ons daarvoor om wyses te vind om te verseker dat die akademiëci aan die UV die demografie van ons pragtige land weerspieël. Ons is ook besig om klasgeldbeurse vir magister- en doktorale studente te implementeer ten einde die getalle van ons nagraadse studente te verhoog.

Ek wil graag die UV-personeel bedank vir hul uitmuntende leiding en mentorskap aan die navorsers van die toekoms – diegene wat die leiers sal word wat vir ons almal 'n beter toekoms sal bou. Laastens wil ek al die befonders van die navorsingsaktiwiteite aan die UV bedank, aangesien hulle al hierdie beduidende vordering moontlik gemaak het. |

C. W. F. H. H. H.

Moleatsa

NRF le palong ya barutehi ba dithuto tsa kamora lengolo la bongaka ba kenang dihlopheng tsa diphuputso tsa UFS. Re atolositse boqhetseke ba rona tsamaisong ya dikonteraka tsa diphuputso le tshehetso ya boithahisetso le tshebetso ya meralo ya kgwebo. Sena e tla ba sebaka se fanang ka kgolo bakeng sa UFS mme re tla tlaleha dikatleho maitheko a rona a ho sebitsa diphuputso tsa rona tsa kamoso tse amehang ho latela meralo ya kgwebo.

Re ikhlaaditse ka tsela e matla ho rarolleng diphephetso tsa ho eketsa bokgoni ba diphuputso ba basebetsi ba rona mona UFS. Ka bomadimabe, nakong ya dilemo tse tharo ha re a bona kgolo e matla palong ya basebetsi ba fumanang lengolo la bongaka. Re se ntse re qadile mananeo a tshehetsang basebetsi ba barupelli le ba tshehetso ho ntlafatsa mangolo a bona mme re na le tshelo ya hore re tla kgona ho ntlafatsa hodima 42% ya hajwale ya basebetsi ba borupelli ba nang le mangolo a bongaka. Mananeo ana ohle a tshehetswa ke lenaneo la ntshetsopele ya ditsebo tsa diphuputso le fanang ke Sekolo sa Mangolo a Phahameng la Yunivesithi.

Re dula re etsa diphetolo mabapi le hore na re ka tshehetsa basebetsi ba borupelli le ba tshehetso hantle le ho feta jwang ho eketsa dithlahiso tsa bona tsa tsa diphuputso. Re lefella diprojeke tse parolang mafapha le diprojeke tsa tshebedisano mmoho le Central University of Technology (CUT), re thehile lenaneo la tlhomello bakeng sa barupelli ba batjha mme re dula re batla ditsela tsa ho netefatsa hore barupelli ba UFS e ba sesupo sa sebohepo sa dipalopalo tsa merabe tsa naha ena ya rona e ntle. Hape re mosebetsing wa ho kenya tshehetsong dibasari bakeng sa tefello ya dithuto bakeng sa baithuti ba mangolo a masters' le la bongaka e le ho eketsa dipalo tsa baithuti ba rona ba mangolo a phahameng a yunivesithi.

Ke laketsa ho leboha basebetsi ba UFS ka tataiso le tlhomello ya bona e tswileng matsoho ho bafuputsi ba kamoso – e leng batho ba tlang ho ba baetapele ba tla aha bokamoso bo botle bakeng sa rona bohle. Qetellong, ke batla ho leboha balefelli bohle ba mesebetsi ya diphuputso ena UFS, kaha le kgonahaditse kgatelopele ena e kgolo. |

awithin

The background is a dense field of glossy, spherical objects in various shades of blue and black. Overlaid on this are several white geometric lines: a large diagonal line from the top-left to the bottom-right, and a smaller diamond-shaped line in the center-right. A semi-transparent white triangle is positioned on the left side, containing the text.

| achieving
EXCELLENCE



Message from the Senior Director: Research Development

Dr Glen Taylor

Message

Universities are accepted as and expected to be the knowledge generators in the knowledge economy. As they face the challenges and opportunities of modern-day society and the global economy, universities have had to adapt the way they not only do their business, but how they think about their business. In broad brush strokes, universities have evolved from being 'educational universities', in which their responsibility was seen as being to educate students and contribute to scientific knowledge for the public domain, to the next stage of being 'research universities'. This became the mantra of most universities in the latter half of the twentieth century, during which universities accepted the responsibility to actively support industry and society interests. Collaboration with industry and other partners was now essential, and professional bodies were established within universities to manage this interaction.

The next stage in the evolution of universities has been the 'entrepreneurial university', with universities partaking in the creation of a business future, and issues such as venture creation, incubation, and risk management become important. The fourth stage, in which some are already participating, but which for many remains a 'future stage', is the 'knowledge platform university'. This type of university sees its responsibility to build the knowledge markets

Boodskap

Daar word aanvaar en verwag dat universiteite die genereerders van kennis in die kenniseconomie sal wees. Weens die uitdagings en geleenthede van die hedendaagse samelewing en die globale ekonomie waarmee hulle gekonfronteer word, moes universiteite aanpassings maak – ten opsigte van die wyse waarop hulle hul besigheid bedryf, maar ook hoe hulle oor hul besigheid dink. In die breë gestel het universiteite ontwikkel van 'opvoedkundige universiteite' met die verantwoordelikheid om studente op te voed en by te dra tot wetenskaplike kennis vir die openbare domein, tot die volgende stadium as 'navorsingsuniversiteite'. Dit het in die laaste helfte van die twintigste eeu, toe universiteite die verantwoordelikheid aanvaar het om nywerheids- en samelewingsbelange aktief te steun, die mantra van die meeste universiteite geword. Samewerking met die nywerheid en ander vennote was nou noodsaaklik, en professionele liggame is binne universiteite gevestig om hierdie interaksie te bestuur.

Die volgende stadium in die ontwikkeling van universiteite was die 'entrepreneurskapsgerigte universiteit' met universiteite wat deelgeneem het aan die skepping van 'n besigheidstoekoms, en kwessies soos ondernemingskepping, inkubasie en risikobestuur het belangrik geword. Die vierde stadium, waaraan sommige universiteite reeds

Moleatsa

Diyunivesithi di amohetswe e le, mme di lebeletswe ho ba, bahlahisi ba tsebo moruong wa tsa tsebo. Jwalo kaha di tobane le diphephetso le menyetla ya setjhaba sa kajeno le moruo wa lefatsho lohle, diyunivesithi di ile tsa lokela ho fetola e seng feela tsela eo di etsang kgwebo ya tsona ka yona, empa le ka moo di nahanang ka teng mabapi le kgwebo ya tsona. Ka puo ya sebopeho se akareletsang, diyunivesithi di fetohile ho tloha ho beng 'diyunivesithi tsa thuto', moo boikarabello ba tsona bo neng bo bonwa e le ho ruta baithuti le ho latsetsa tsebo ya saense bakeng sa setjhaba, ho ya mohatong o latelang wa ho ba 'diyunivesithi tsa diphuputso'. Sena e bile lepetjo la bongata ba diyunivesithi halofong ya bobedi ya mongowahakgolo wa mashome a mabedi, moo diyunivesithi di amohetseng boikarabello ba ho tshehetsa indasteri le ditabatabelo tsa setjhaba ka tsela e sehlahlo. Tshebeletsano le indasteri le balekane ba bang jwale e bile bohlokwa, mme ditheo tsa porofeshenale di thehilwe kahara diyunivesithi ho laola tshebeletsano ena.

Mohato o latelang wa phetoho ya diyunivesithi e bile wa 'yunivesithi ya bohwebi', moo diyunivesithi di nkileng karolo ho thehwenng ha bokamoso ba kgwebo, mme dintlha tse jwalo ka ho thehwa ha kgwebo, kgodiso, le taolo ya kotsi di bileng bohlokwa. Mohato wa bone, oo ho oona tse ding di se ntse di nkile seabo, empa

Message

and platforms of the knowledge society. And so the university and parts of the university form partnerships to establish research consortia and research platforms, industry clusters and platforms, and creative commons and open-source platforms. This is an environment where the university and business are increasingly overlapping. It is a challenging future, but one which we will have to enter.

"The full scope of our efforts lies in the notion that excellent research can create an improved quality of life and a better world."

To succeed in such a future, we need to be excellent. But what is excellence? It is a continually moving target, but one which speaks of being unusually good or superior, and surpassing ordinary standards. And, when it comes to research, we cannot remove excellence from impact. The full scope of our efforts lies in the notion that excellent research can create an improved quality of life and a better world.

And so, in this Research Report, we celebrate excellence in this spirit. We celebrate and acknowledge some of the individuals and groups who are contributing to weaving the fabric of excellence at the University of the Free State, and helping to prepare us to move forward into a new stage in the evolutionary journey that universities find themselves on. |



Boodskap

deelneem maar wat vir alle 'n 'toekomsstadium' bly, is die 'kennisplatformuniversiteit'. Hierdie tipe universiteit beskou dit as sy verantwoordelikheid om die kennismarkte en -platforms van die kennissamelewing te bou. Die universiteit en dele van die universiteit gaan dus vennootskappe aan om navorsingskonsortiums en navorsingsplatforms, nywerheidsklusters en -platforms, asook *creative commons*-en oopbronplatforms, te vestig. Hierdie is 'n omgewing waar daar toenemende oorvleueling is tussen die universiteit en besigheid. Dit is 'n uitdagende toekoms, maar een wat ons sal moet binnegaan.

Om binne so 'n toekoms suksesvol te wees, sal ons uitnemend moet wees. Maar wat is uitnemendheid? Dit is 'n mikpunt wat bly verskuif, maar een wat daarop dui dat die instelling buitengewoon goed of superieur is, en gewone standaarde oortref. Wat navorsing aanbetref, kan ons nie uitnemendheid en impak skei nie. Die volle omvang van ons strewe is geleë in die idee dat uitnemende navorsing beter lewensgehalte en 'n beter wêreld kan skep.

In hierdie Navorsingsverslag vier ons dus uitnemendheid in hierdie gees. Ons gee erkenning aan sommige van die individue en groepe wat bydra tot die proses om uitnemendheid aan die Universiteit van die Vrystaat tot stand te bring, en wat help om ons voor te berei om vorentoe te beweeg in 'n nuwe stadium van die ontwikkelingsreis wat universiteite onderneem. |



Moleatsa

oo ka mabaka a mangata o dutseng e le 'mohato wa kamoso', ke 'yunivesithi ya polatefomo ya tsebo'. Mofuta ona wa yunivesithi o bona boikarabello ba oona ba ho aha mebaraka ya tsebo le dipolatefomo tsa tsebo setjhabeng. Mme yunivesithi le dikarolo tsa yunivesithi di etsa selekane ho theha boikopanyo ba tsa diphuputso le mehato ya diphuputso, dihlotshwana tsa indasteri le dipolatefomo, le ditshebetso tsa tshwano tsa boitlhaishetso le dipolatefomo tsa mehlopi e bulehileng. Ena ke tikoloho eo ho yona yunivesithi le kgwebo di parolanang ka tsela e eketsehang haholo. Ke bokamoso bo boima, empa boo re tla lokela ho kena ho bona.

Ho atleha bokamosong bo jwalo, re hloka ho sebetso ka tsela e tswileng matsoho. Empa tshebetso e tswileng matsoho ke eng? Ke tekanyetso e dulang e fetoha, empa e buang ka ho loka kapa ho phahama ho sa tlwaelehang, mme e fetang maemo a tlwaelehileng. Hape, ha re tla diphuputso, re keke ra hlwaya tshebetso e tswileng matsoho kamong ena. Lepatlalele le feletseng la maiteko a rona le thehilwe hodima kutlwisiso ya hore diphuputso tse tswileng matsoho di ka theha boleng ba bophelo bo ntlafetseng kapa lefatshe le ntlafetseng.

Mme ka hona, Tlalehong ena ya Diphuputso, re keteka boemo bona bo tswileng matsoho. Re keteka le ho ananela ba bang ba batho ka bomong le ka dihlopha ba tlatsetsang ho lohlong ha kobo ena ya tshebetso e tswileng matsoho Yunivesithing ya Foreistata, le ho thusa ho re hlophisetsa ho fetela pele mohatong o motjha leetong la dipheto ho leo diyunivesithi di iphumanang di le ho lona. |



AMONG THE VERY BEST

The UFS is proud of all its researchers. Some are among the nation's very best – as evidenced by the recognition of their peers and the awards they receive.



PROFESSOR Melanie Walker

When Melanie Walker registered for her Bachelor of Arts degree at the University of Natal in Durban in the early 1970's, little could she have imagined that she would one day be heralded as a global authority in her discipline.

After completing her undergraduate and Master's studies (in history) at the University of Natal, she spent a number of years teaching history at disadvantaged secondary schools in the Western Cape. This first-hand experience of educational inequality profoundly affected the future direction of her research, fostering a long-standing commitment to social justice research and equality practices. Her PhD at the University of Cape Town focused on transformative teacher development in black primary schools.

Melanie Walker shifted from school-based teacher development to university lecturer and student development in 1991, when she joined the University of the Western Cape. Thereafter she moved to the United Kingdom where she led university teaching and learning at the University of Glasgow, and held chairs at the University of the West of England, and the elite University of Nottingham, where she was both director of graduate students and a director of research. She was also Associate Professor at the University of Sheffield.

In the early 2000s Melanie began to engage systematically with the work of Amartya Sen and Martha Nussbaum, applying their ideas to

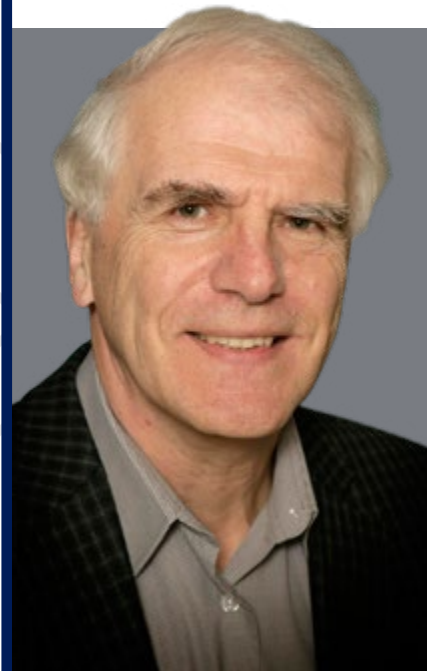
higher education; this represented a completely new direction in the field of both capabilities and higher education at the time, and she has continued to lead the field as it expands. The overarching theme of her research work has been social justice and higher education for inclusive human development within education and in society. She draws on interdisciplinary resources to explore "how higher education need not necessarily legitimise the interests of the powerful in society, but can instil public values and support democratic outcomes, advancing just opportunities and outcomes for all students by fostering their human capabilities".

Melanie Walker has in no small part shaped the focus of research on human development and specifically the formation of human capabilities in and through higher education, as a contribution to a more just and equitable society. In her first book on the capability approach, *Higher Education Pedagogies*, she defined the field by applying capabilities innovatively to higher education and drafting a list of worthwhile higher education capabilities. Her co-edited book with Elaine Unterhalter, *Amartya Sen's Capability Approach and Social Justice in Education* was a further seminal contribution. Then, in the book, *Professional Education, Capabilities and the Public Good* (co-authored with Monica McLean), using case studies from South African universities, she provided new perspectives on how universities can be the "engine of reform" and contribute to social change through the quality of their professional education programmes. Similarly, *Human Development and Capabilities* – Re-

imagining the university of the 21st century (edited together with Alejandra Boni and winner of Manuel Castells prize in Spain), shows how universities might advance equalities rather than widen them and how they can contribute to a sustainable democratic society.

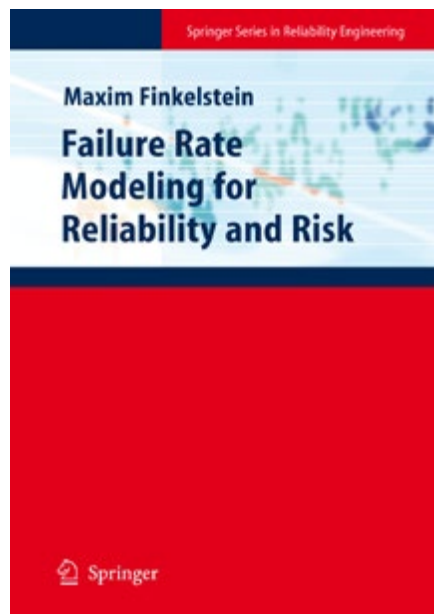
Professor Walker joined the University of the Free State in 2012, as Senior Research Professor of Higher Education and Human Development, and was awarded a prestigious Tier One DST/NRF SARCHI Chair in Higher Education and Human Development (2013-2017). She was Director of Research Training and a senior researcher in the European Union-funded Marie Curie *EDUWEL* project (2010-2014), and she has retained her ties with the University of Nottingham, where she is an honorary professor. In 2014 was elected as Vice-President of the Human Development and Capability Association. Melanie is also a fellow of ASSAf.

The reputation of the young student educated in Natal and Cape Town continues to grow – and her collaborators include colleagues in Germany, Italy, Spain, the UK and other countries in Africa. Her research group of postgraduate students and postdoctoral fellows is drawn from countries from Africa, but has also included fellows from Finland, India and Vietnam. She is indeed a forward-looking researcher, contributing to the future research agenda of her field. This has been endorsed by the A1 rating conferred by the NRF, which acknowledges her as a leading international researcher, her work unequivocally recognised by peers world-wide for its high quality and impact. |



PROFESSOR Max Finkelstein

He greets you with a European accent and a smile as warm as a Highveld day – and sometimes he might even be wearing his ushanka. This is no surprise, as Professor Maxim Finkelstein’s journey has taken him from Russia to the Free State.



After obtaining his MSc in mathematical physics from Leningrad State University, he completed his PhD in Operations Research at Leningrad Elektropribor Institute, and his Doctor of Science degree (*habilitation*) in Operations Research from St Petersburg Elektropribor Institute. He worked at the Institute until 1998, when he left Russia and joined the University of the Free State.

“This made him the only A-rated researcher in “probability and statistics” in South Africa.”

Max Finkelstein is a visiting research professor at the Max Planck Institute for Demographic Research in Germany, and ITMO University in Russia. He is currently a distinguished professor in the Department of Mathematical Statistics and Actuarial Science at the UFS, and recently recognised by his peers as “a leading scholar

in his field internationally for the high quality and impact of his recent research outputs”, achieving an A2 rating from the NRF. This made him the only A2 rated researcher in “probability and statistics” in South Africa.

Professor Finkelstein is a specialist in stochastic modeling, and most of his research career has been devoted to mathematical reliability theory and its application to models of repair and maintenance, point processes, structural reliability, and stochastics in demography.

His work in the field of reliability theory has shed considerable light on areas of general repair, burn-in, heterogeneity and shock models in reliability applied not only to mechanical systems but also to biological systems. The latter was as a result of his collaboration with the Max Planck Institute for Demographic Research, where he has applied his models to population aging and mortality.

Over and above his NRF A2 rating, Professor Finkelstein has earned considerable recognition for his work, winning three Sichel medals for best publication (in 2004, 2007 and 2015) from the South African Statistical Association, and he was also elected as an Honorary member of the South African Statistical Association in 2015.

He is the author of about 200 papers and five books on different aspects of stochastic modeling. |



PROFESSOR Pieter Meintjes

His happiest memories of growing up in the small town of Sabie in Mpumalanga were trout-fishing in the streams or swimming in the deep rock pools; but he was always obsessed with physics and astronomy – so now he gazes at the stars. Professor Pieter Meintjes, from the Department of Physics, specialises in multi-wavelength astronomy of higher energy cosmic sources, and is considered a pioneer in astrophysics at the UFS and is one of the top researchers in his field in the country – having recently obtained a B-rating from the NRF.

Simply stated, multi-wavelength astronomy is astronomy as viewed across the electromagnetic spectrum instead of being restricted to visible light. These advances have only been possible since the 20th Century, when instruments that examine all parts of the electromagnetic spectrum became available. Before that, astronomers learned almost all they knew about sources in the sky from only a minute fraction of electromagnetic radiation that is visible to the eye.

Meintjes has increasingly focused his research on the multi-wavelength emission from several classes of high energy cosmic sources, AE Aquari, the supersoft X-ray sources, Gamma-ray binaries, as well as radio galaxies and AGN that seem to be associated with the previously unidentified EGRET and Fermi-LAT sources. Over the last decade, his research, and that of his postgraduate students, has made substantial

contributions towards our understanding of the plethora of processes that drive these systems. His long association with the Novalike Variable star AE Aquarii has resulted in fundamentally increasing the theoretical understanding of its evolution. Similarly, his investigation of the influence of the infrared excess of Pulsar-Be-star discs on the gamma-ray production rate at periastron passage events, was very favourably received by the high energy community, and investigations of founding counterparts of the unidentified EGRET/Fermi-LAT sources showed that radio galaxies can indeed be considered as a serious contender for some of these unidentified gamma-ray sources.

The importance of Pieter's research was recognised when, in 2013, he was invited to become a member of the elite High Energy Stereoscopic System (HESS) gamma-ray astronomy consortium, as well as the international Cerenkov Telescope Array (CTA) consortium. The HESS consortium operates the most powerful air-Cerenkov telescope in the world – located in Namibia. Together with MeerKAT/SKA and SALT, this gives researchers in South Africa a unique multi-wavelength network.

South Africa is a favourable international location for astronomy due to its geographic position, advanced astrophysics infrastructure, and dark night skies free of radio interference; research in this area has received high priority status in South Africa. The NRF has expressed concern that the country runs the risk of not being able to maximise the benefits from its location and astronomy facilities, and the country could be subject to a form of 'knowledge colonisation' due to a lack of adequate human

capital. People like Pieter Meintjes, with his commitment to advancing knowledge about multi-wave astronomy and training the next generation of astrophysicists, help ensure that this risk is being mitigated.

Pieter Meintjes counts his MSc and PhD supervisor at the North-West University, Professor Okkie de Jager, as a major influence on his life and career. "He was brilliant and extremely enthusiastic; it was a privilege to work with him. Now that I am a supervisor, I try to instil that same work ethic and enthusiasm into my students." |





PROFESSOR Jeanet Conradie

Jeanet Conradie, professor in the Department of Chemistry, has consistently been one of the University's top researchers, unfailingly producing high numbers of publication output units annually. In terms of the quality of her journal outputs, her research has considerable impact.

Her academic career only began in earnest in 2000, which makes her achievements that much more remarkable. She has produced over 146 academic publications and over 114 conference contributions in her field of research, and 14 MSc and PhD students have been fortunate to graduate under her enthusiastic study guidance.

Having completed her MSc in Physics at the University of Pretoria in 1981, she chose to raise her three children before returning to academia. At this stage she decided to change her focus, and she completed her PhD in Chemistry at the UFS in 2000. She subsequently spent a postdoctoral study leave period at the University of Tromsø, Norway in 2002/2003.

A PhD in Chemistry combined with a strong background and expertise in physics, computer science, mathematics and applied mathematics, led her in the direction of computational chemistry – which she describes as “a beautiful combination of chemistry and quantum physics, using mathematical methods to solve chemistry problems via high-performance computerised calculations.”

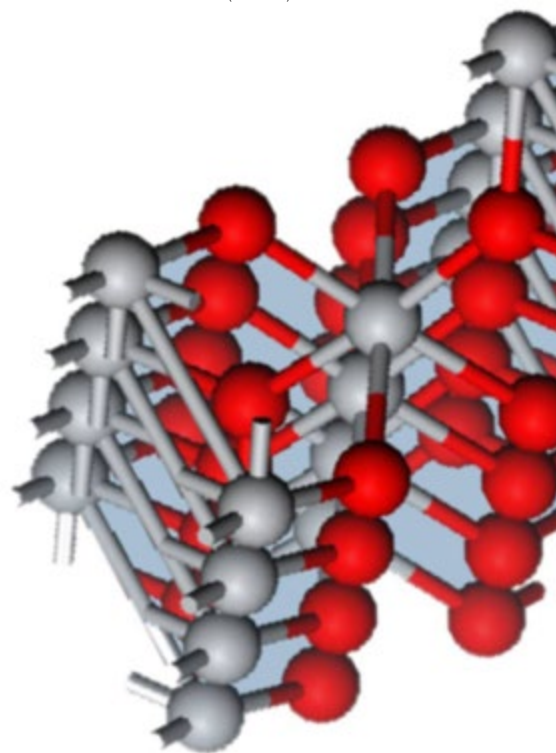
The main focus of Professor Conradie's research is on the synthesis, computational chemistry,

electrochemistry and kinetics of transition metal complexes. This involves density functional theory calculations of transition states and reaction-intermediates, that cannot be observed by chemical experiments.

“... a beautiful combination of chemistry and quantum physics, using mathematical methods to solve chemistry problems via high-performance computerised calculations.”

These calculations shed light on and provide a better understanding of factors influencing the reactivity of complexes. They can then be streamlined for use in different applications, such as in catalysis. Her research also focuses on the calculation of mathematical relationships and trends between experimentally measured parameters, empirical parameters and energies calculated by means of density functional theory. These relationships make it possible to design custom-made complexes with a specific reactivity.

Professor Conradie's performance has also been recognised by others. In 2014, she was runner-up in the senior category for Distinguished Women Researchers: Physical and Engineering Science in the Department of Science and Technology's Women in Science awards. She also received the Merck Medal for 2014 from the South African Chemistry Institute, for her paper 'Redox potentials of ligands and complexes. A DFT approach' (S. Afr. J. Chem. 2011, 64, 203-209). She is a member of the Academy of Science of South Africa (ASSAf). |



CHAIRS, CENTRES, UNITS, CONSORTIA

The Path towards **Excellence**

At the University of the Free State, strategic groupings of researchers are not only the recognition of excellence, but also the vehicle of the path towards excellence. Here are some of our most important and strategic research groups.

SARChI Chair in **SOLID STATE LUMINESCENT AND ADVANCED MATERIALS**

Professor Hendrik Swart

The *SARChI Chair in Solid State Luminescent and Advanced Materials* focuses on development of phosphors to radiate light for several hours. This research has the potential to replace conventional light sources with light sources that have impressive economic and environmental savings. These light sources present opportunities for exciting and unlimited applications that can improve the quality of life of resource-poor communities, add to advanced technologies and promote the use of 'green' applications based on sunlight – the one 'infinite' and readily available energy source.

The research being undertaken by the group aims to advance established and emerging areas, especially in second, but also in third generation, nanotechnology, which is

supported and complemented by the work on advanced materials. Priority research for the Chair is the development of luminescent nanomaterials, focusing on different groups of novel solid state luminescent materials and the development of their physical and chemical surface properties.

The main research objectives for the Chair are thus to develop new highly efficient phosphors that can withstand degradation, as well as another set of phosphors with a long afterglow that will harvest sunlight by day and emit light during the night.

In addition, research is being undertaken to develop small electroluminescent devices to test light emitting diode (LED) phosphors and luminescent materials for photovoltaic (PV)

cells, and to develop phosphors used in solar cell applications.

The research group affiliated to the Chair has state-of-the-art equipment at its disposal, including a Field Emission Scanning Electron Microscope (FE-SEM), specifically designed for research in nanoscience and nanotechnology, and a fluorescence spectrophotometer, financed by the NRF National Nanotechnology Equipment Programme and the University.

The holder of the Chair, Professor Hendrik Swart, is a leader in his field, and for the past 20 years "has been conducting research on any substance that glows". He considers his biggest success as the fact that he has built a powerful group of researchers in solid state luminescent and advanced materials. |





“The Research Chair therefore focuses on how higher education can contribute to building human capital for a knowledge economy, while at the same time contributing substantially to the public good of improving lives, by addressing social mobility and continuing inequalities in South Africa.”

SARChI Chair in HIGHER EDUCATION AND DEVELOPMENT



How do we build a decent society, with human capabilities secured for all? What is the role of universities when it comes to reducing inequalities and contributing to social justice inside universities and in the wider society? These are some of the questions that the *SARChI Chair in Higher Education and Development* and the International Centre within which it is housed, continually ask of scholars and the broader community. This Research Chair is the first of its kind in the world and serves as a national, African and global knowledge hub.

Internationally the question of what public universities should be doing in a world of moral urgencies and remediable injustices, is increasingly important. The Research Chair therefore focuses on how higher education can contribute to building human capital for a knowledge economy, while at the same time contributing substantially to the public good and improving lives, by addressing social mobility and continuing inequalities in South Africa.

The capabilities approach to human development that underpins all the research undertaken by the group, is rooted in the theory developed by economist Amartya Sen and philosopher Martha Nussbaum. In this approach, human development, human well-being and agency are evaluated based on the extent to which capabilities are fostered for diverse individuals. That is, what each person is actually able to be and to do, and what each person has reason to value being and doing, in order to build a society that values creating capabilities for all.



Thus the main focus of the research programme is to interrogate the role of education in advancing human development in education and society, including, but not reduced to, economic opportunities and economic development. Questions and strategies which focus only on economic growth cannot be sustainably addressed in the absence of questions related to what kind of society we want; what is important in a democratic society, and what kind of higher education is valuable, relevant and desirable.

Both the Chair and the graduate and post-doctoral research group of around 15 early career researchers it supports, are at the cutting edge internationally in researching and taking

forward these ideas. In the short time since the Chair was established in 2013, Professor Walker and her research group have produced a steady stream of peer reviewed articles in international journals, books with leading publishers (with more in the pipeline for 2016 and 2017), and national and international conference papers. In addition, they have raised around ZAR 17 million in external research grants over and above the core funding from the NRF. Under the leadership of Professor Walker, the senior researcher Dr Merridy Wilson-Strydom, PhD students and post-doctoral fellows are making their mark internationally at high profile conferences based on their world-leading research and developing their own publication profiles.

SARChI Chair in DISEASE RESISTANCE AND QUALITY IN FIELD CROPS

Despite recent advances, headlines regarding hunger and food security remain alarming: one in every nine people goes to bed hungry each night, and 795 million people do not eat enough to be healthy. Most of the world's undernourished people are found in southern Asia, followed closely by sub-Saharan Africa; a third of all deaths in children under five in developing countries is linked to undernourishment, and sub-Saharan Africa is the region with the highest prevalence of hunger. Furthermore, food demand is expected to increase substantially by the middle of the century – with estimates anywhere from 60% to 90% and even higher. The primary demand factors are the world's growing population and rising incomes in developing countries. Global food security is therefore expected to remain a worldwide concern for at least the next 50 years, especially with the anticipated further disruption to food production due to climate change.

One major reason for Africa's current dilemma is the underperformance of its vital agricultural sector. Food production in most of sub-Saharan Africa has not kept pace with the population increase, and the Green Revolution largely bypassed sub-Saharan Africa in terms of its aim to increase crop yields with hybrid varieties of maize, wheat and rice. In response the UFS, over the years, established expertise in disease resistance and food quality of major field crops. In 2015 it was allocated a **SARChI Chair in Disease Resistance and Quality in Field Crops**. The Chair has a strong emphasis on advancing food

security and nutrition in Africa, and contributing significantly to poverty reduction and achieving sustainability goals. The Research Chair therefore focuses on plant breeding for disease resistance and quality in field crops.

The research on disease resistance concentrates on the genetics of rust resistance, through multidisciplinary approaches involving plant pathology, genetics, plant breeding, botany, statistics and microscopy. Wheat accounts for a fifth of humanity's food supply; however, efforts to meet the current and increasing demand for wheat are severely constrained by stagnating yields, increasing costs, and virulent new diseases such as race Ug99 of the stem rust fungus. The importance of Ug99 was recognised in 2005 when Nobel Laureate Norman E Borlaug warned the world about the serious threat it could pose to food security. Four of the eight known variants of Ug99 now occur in South Africa, showing the vulnerability of its wheat crop to migrating and mutating rust strains. This has focused the eyes of the international wheat community on South Africa and, more specifically, on the work done at UFS under leadership of Professor Zakkie Pretorius. He is leading this area of research within the Chair.

The food quality research component of the Chair focuses on the improvement of nutritional value and quality in major crops such as wheat, maize, cassava and sweet potato. This includes the improvement of iron and zinc content, protein content and provitamin A in maize, sweet potato and cassava. Starch quality in



Professor Maryke Labuschagne

these crops is also very important for food end use quality. In wheat the aim remains to study and improve bread baking quality.

Ensuring food security also requires the involvement of not just biologists, agronomists and farmers, but also ecologists, policymakers and social scientists. The holder of the Chair, Professor Maryke Labuschagne, believes that food security is one of the key factors for stability and prosperity on the continent. There are relatively few active plant breeders in Africa, highlighting the need for the type of programmes that form part of the Chair. Labuschagne is a recognised leader in this field, having received the prestigious 'Continent Lifetime Achiever Award' in 2015 from Africa's Most Influential Women in Business and Government Programme, for her commitment and continuous contributions to food security. She is an NRF-rated researcher, and author or co-author of over 160 articles in accredited journals.

The uniqueness and strength of this Chair lies in that it not only involves the breeding of cereal crops that are resistant to disease, but it also explores ways of improving the quality of the crops for processing and consumption. |

“Arboviruses are significant because they have the capacity to spread from endemic regions and cause outbreaks of disease.”

SARChI Chair in

VECTOR-BORNE and ZOO NOTIC PATHOGENS

The **SARChI Chair in Vector-borne and Zoonotic Pathogens** builds on existing research strengths at the UFS and will contribute towards identifying medically significant arboviruses and zoonotic pathogens in the country. Arboviruses are significant because they have the capacity to spread from endemic regions and cause outbreaks of disease; it is difficult to predict how extensive an outbreak will be, as was the case with the Ebola virus outbreak in West Africa, which demonstrated how under-preparedness can have devastating implications and impact on a health system. In recent years a number of medically significant arboviruses have re-emerged after long periods of absence, or have spread and established new endemic regions. The reasons for the emergence are likely multi-factoral and include global warming, changes in weather patterns that influence vector populations, increased animal movement, as well as human activities such as changes in farming practices and land development.

Zoonotic pathogens also have potential for emergence and re-emergence and the occurrence of tick-borne zoonotic diseases in Southern Africa is well-established. Similarly, the mosquito-borne viruses such as Rift Valley Fever, West Nile, Wesselsbron, and Sindbis, cause sporadic outbreaks annually, and larger outbreaks frequently associated with heavy rainfall favouring vector breeding.

These trends of emergence and re-emergence of arboviral and zoonotic pathogens emphasise the importance of increasing both human and veterinary surveillance and developing capacity and awareness. Monitoring and control of the spread of these pathogens requires a multidisciplinary approach, which is the focus of the Chair. The research being undertaken by the group associated with the Chair uses cutting edge technology to develop detection assays for diagnostic and epidemiologic application, to investigate methods of control, including vaccines and antiviral drug discovery,

and to increase public awareness by identifying disease associations.

Professor Felicity Burt, the holder of the Chair, has extensive experience in the field of arboviruses and viral haemorrhagic fevers. She was previously employed as a medical scientist at the National Institute for Communicable Diseases (NICD), working and doing research on viral haemorrhagic fevers and arbovirology, and was responsible for the development and establishment of specialised diagnostic tests for confirming outbreaks of viral haemorrhagic fevers across Africa. She was part of the Global Outbreak and Response Network (GOARN) of the WHO, and was a member of international response teams that investigated the outbreaks of Ebola and Rift Valley fever in central Africa and Saudi Arabia respectively. |



Professor Felicity Burt

“Research by scholars in the social psychology and peace building fields, has shown compellingly that past traumas tend to be passed on inter-generationally.”



SARChI Chair in **HISTORICAL TRAUMA AND MEMORY**

The *SARChI Chair in Historical Trauma and Memory* goes to the heart of the issues of contemporary debates about historical trauma, its aftermath, and its expression in memory and other symbolic forms of expression such as violence. South Africa's transition process from apartheid to democracy brought the country to a threshold of a bright and hopeful future for its citizens. Yet we have not lived up to this promise of change and transformation. There has been the emergence of different forms of violence, especially crowd violence that often leads to brutal killings in township communities, xenophobic violence, unspeakable forms of rape, and reports of violence committed by the police against civilians.

Research by scholars in the social psychology and peace building fields, has shown compel-

lingly that past traumas tend to be passed on inter-generationally, and that the 'memory' of the humiliation associated with historical trauma often provokes violence in communities that have suffered collective experiences of trauma and oppression over an extended period.

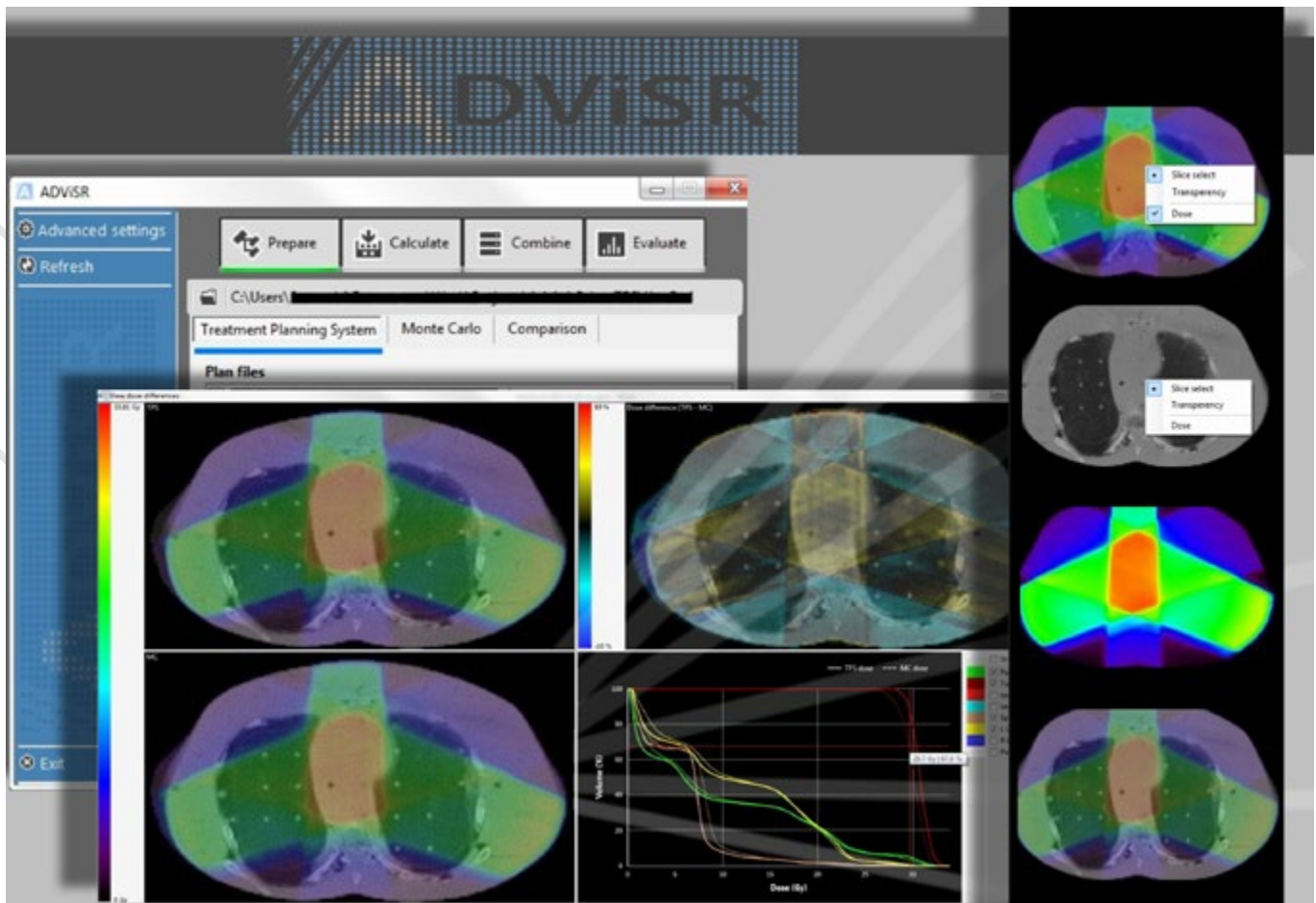
In contrast, however, the aftermath of the catastrophic events of the genocide in Rwanda has not produced the kinds of extreme violence witnessed in South Africa.

This Chair brings together research in Rwanda and in South Africa to explore the impact of the genocide and political violence among survivors who were directly affected, and the repercussions of these experiences in the broader communities of the younger generation who had no direct experiences of the violence.

Current debates on historical trauma and its transgenerational legacies came into prominence in the 1990s, with studies investigating the repercussions of the Holocaust among descendants of survivors. At the same time, the popularity of studies on historical trauma in the 1990s in the humanities and social sciences was linked to the rise of memory studies and the various ways in which past trauma, and especially historical trauma, is represented among descendants of survivors and their communities.

The Holocaust and other perspectives inspired by Europ-American case studies, have, to date, been the primary reference point for the canonical texts on historical trauma and memory. The Chair in Historical Trauma and Memory provides the unique opportunity to shift focus to the global south, by exploring new avenues of inquiry in this field. |

High-Energy X-ray Beam Advanced Radiation Dosimetry and Verification (HARD) MRC FLAGSHIP



“Radiation therapy has undergone radical changes in recent years, resulting in new directions for patient radiation treatment planning.”



Prostate phantom for hip prosthesis dosimetry studies.

Cancer will affect about one in every three people in the western world, and, as life expectancy increases, there is a concomitant increased burden on existing resources. This is also the case in South Africa, where advanced stage cancers are still being seen at presentation. The treatment of these tumours is expensive and utilises equipment which requires significant technological skill and scientific expertise.

In radiation therapy, patients are treated with high energy X-rays. Since these rays can damage healthy and cancerous tissue, the use of radiation in the treatment of the patient must first be carefully planned. This is done using dedicated dose calculation algorithms and a suitable patient model that usually consists of a set of Computed Tomography image data. An accurate radiation beam model is vital for accurate radiation dose calculation. This is an internationally active research field currently being researched in Canada, the USA and Europe.

In practice, a cancer patient is treated on a linear accelerator and accurate dose delivery relies on the accuracy with which the dose can be calculated in the patient. In order to perform accurate absorbed dose calculations of the radiation beams traversing the patient, accurate beam description models are required. In South Africa, Monte Carlo simulation techniques for computer based absorbed dose

calculations are relatively underutilised amongst medical physicists, although this is regarded as the golden standard method for dose calculation. The driving force behind the **HARD MRC Flagship** is the maintenance and improvement of state-of-the-art techniques to localise, plan and verify external radiation beam treatment for cancer patients, and to improve treatment planning for advanced techniques, such as Intensely Modulated Radiation Therapy and Intensely Modulated Arc Therapy, where appropriate imaging techniques must be used for tumour localisation.

Radiation therapy has undergone radical changes in recent years, resulting in new directions for patient radiation treatment planning. Tumour localisation and registration across different modalities are now prime considerations, and this involves several imaging modalities. Additionally, more accurate radiation treatment planning and verification is essential to harmonise with improved imaging technologies. This provides the main focus for the HARD MRI Flagship project, where the research has focussed on improved dose calculation and verification using sophisticated computer simulation codes, known as Monte Carlo codes.

The Flagship project, led by Dr Frederick du Plessis of the Department of Medical Physics, strives to utilise this powerful dose calculation tool in dose

verification protocols. Work is done on developing radiation source models for radiation delivery equipment as well as developing software to interface the Monte Carlo dose calculation engine with treatment planning systems and to account for treatment parameters, source models and patient geometry models. Work is also being done on the development of an add-on novel multi-leaf collimator system for conformal electron therapy.

Another aspect of the overall research project focuses on image registration as well as the advancement of QA procedures to ensure optimal treatment plan verification prior to radiation treatment. The research utilises Monte Carlo methods as the method of choice for dose calculation, and the incorporation of radiation treatment machine parameters for semi-automatic radiation source modelling.

The ability to carry out Monte Carlo verification along the entire treatment planning algorithm pathway will be a major step forward, as currently it is generally not easy to accurately verify, using physical measurements, the treatment plans generated for current technology radiotherapy delivery systems. To be able to do the verification with the use of verified simulation models will represent a significant improvement in the accuracy and veracity of the process, and also a significant saving in cost. |



SANRAL Chair in **SCIENCE, MATHEMATICS AND TECHNOLOGY EDUCATION**



Professor Loyiso Jita

The UFS, in partnership with the South African National Roads Agency, launched the **SANRAL Chair in Science, Mathematics and Technology Education** on 11 September 2014. The objective of the Chair is to help improve the quality of teaching and learning in these subjects at schools in the province, nationally and regionally.

At school level it helps to train teachers, support student-teacher interns and incentivise education results so that participating schools become centres of excellence. At an academic level, the SANRAL Chair supervises a cohort of doctoral and master's students, while also guiding research and publications in mathematics, science and technology education.

Professor Loyiso Jita was appointed as the first SANRAL Chair. He described the endowment of R30 million over the next five years to establish the Chair, as a launching pad. "It's a beginning for something bigger; in the coming five years we would like to launch a centre of excellence. It will be a good beginning for the University as it will begin to focus attention on the education of technology, maths and science. Furthermore, this programme will assist the University to produce education leaders who can turn around maths and science education in disadvantaged schools throughout Southern Africa."

Loyiso Jita, a former Fulbright scholar and NRF-rated researcher, joined the UFS in 2012 as a Research Professor. |



SANRAL PhD graduates with Rector

Collaborative Consortium for the DEVELOPMENT OF UNDERUTILIZED CROPS



Professor Wijnand Swart

Food insecurity is a major concern in Southern Africa, and addressing it requires, *inter alia*, broadening the food base on the sub-continent. Agriculture accounts for about 30% of sub-Saharan Africa's GDP and 66% of manufacturing value added in most African countries is based on agricultural raw materials. The agricultural sector, and in particular crop production, is therefore integral to broadening the food base. However, numerous pressures, such as climate change, pests and diseases, urbanisation, population growth and other factors, continually hamper efforts to alleviate food insecurity by depending on staple crops only.

The food base can be broadened by developing certain indigenous or exotic underutilised crops that have the potential for utilisation in food products. The 20th Century witnessed the systematic collection to rescue the genetic resources of staple crops, while at the start of this century an awareness has arisen of the need to rescue and improve the use of those crops left aside by research, technology, marketing systems, as well as conservation efforts. These underutilised crops (sometimes referred to as minor, orphan, neglected, underexploited, underdeveloped, lost, new, novel, promising, alternative, local, traditional, or niche crops) could play an important role in addressing the food and agricultural challenges of the future. Many indigenous Southern African plant grains,

vegetables and tubers have potential to provide variety in diets and broaden household food bases.

The potential of many underutilised crops lies not only in their hardiness and nutritional value, but also in their versatility in terms of utilisation. They may contain nutrients which can be explored for the food industry to meet the growing demand for functional foods containing nutraceuticals as a result of the increase in diet- and lifestyle-related diseases.

The establishment of the **Collaborative Consortium for the development of underutilised crops to broaden the food base in Southern Africa**, involving the UFS, the Agricultural Research Council (ARC) and Durban University of Technology (DUT), each bringing their own unique strengths, is addressing these important issues. The main aim of the Collaborative Consortium is to develop integrated crop value chains based on exotic and indigenous underutilised crops. This is being done through a multi-disciplinary approach, in three contiguous focus areas.

The UFS is recognised as a world-leader in research on both conventional and underutilised crops. Various disciplines at the University – such as entomology, plant pathology, and plant breeding – have a long history in the development of new crops and enhancement of traditional crops. The UFS is therefore primarily

involved in the first and second focus areas described below.

The first area deals with production technologies for managing crop environments, striving to gain a better understanding of how plants are influenced by biological and physico-chemical constraints in their environment, and how these constraints can be managed or manipulated to the benefit of the crop in question and the environment, by means of traditional or new technologies. The second focus area deals with genetic technologies for crop improvement. Research is being undertaken to enhance genetic material of designated underutilised crops by developing new varieties or hybrids, and developing new protocols for the evaluation and verification of these in target areas. In addition, the development and enhancement of sustainable seed multiplication, supply and distribution systems are investigated. In the third focus area, innovative product development for value addition, technology transfer and market development are being studied, primarily at the DUT. This focus area is directed towards establishing the nutritional quality and health promoting properties of underutilised existing and newly bred indigenous and exotic crops, improving quality and safety of existing production, and developing new high value functional products from these crops for value addition. |



Robert WM Frater Centre for **CARDIOVASCULAR RESEARCH**



Professor Francis Smit



“In order to recellularise heart valve and whole heart scaffolds, specific cell lines from the future recipient will have to be cultured. These cell lines can then be introduced to the heart scaffold, using a bioreactor.”

The **Robert WM Frater Centre for Cardio-vascular Research** was officially opened in November 2015. The Centre is named after Professor Robert WM Frater, a South African born American surgeon, internationally recognised for his outstanding academic, clinical, and scientific contributions to cardiac surgery. The Centre focuses on research and treatment of cardiovascular diseases and the development of cardiovascular products in Africa for Africa. Through tissue engineering, pericardium and heart valves are developed for *in vitro* and *in vivo* testing and evaluation.

The Centre, under the leadership of Professor Francis Smit, Head of the Department of Cardiothoracic Surgery, also boasts a sophisticated engineering laboratory, where heart-valve mechanics and fluid dynamics are tested on state-of-the-art pulse duplication and fatigue testing apparatus.

Computational flow models are developed in collaboration with the Stellenbosch University Mechanical Engineering Department, which will hopefully contribute to future valve design.

The bio-engineering division also houses the homograft bank where human valves are prepared and cryopreserved for transplanting and preservation. A process of tissue decellularisation and sterilisation, now being patented, was developed here by Professor Smit and Professor Pascal Dohmen (extraordinary professor at the UFS from the Charité University in Berlin). Using this process, pericardium, heart valves and whole hearts have been decellularised for implantation in rat and ovine experimental models in the large animal laboratory.

In order to recellularise heart valve and whole heart scaffolds, specific cell lines from the future recipient will have to be cultured. These include the endothelial cells lining the vessels, fibroblasts involved in maintaining substructures of the heart, and, importantly, contracting myocytes. These cell lines can then be introduced to the heart scaffold, using a bioreactor.

The researchers at the Centre have successfully cultured endothelial cells and fibroblasts in a rat

model and, by using neonatal rat hearts, have managed to culture living, beating heart cells in the laboratory. In the longer term the research aims at ‘building’ a heart that could be used for organ donation – connecting the bioengineered heart to the recipient.

The Robert WM Frater Centre is currently planning a study of Dilating Cardiomyopathy, causing dilatation and failure of the heart in Africans. This study aims to uncover the genetic and possible infections associated with this devastating disease, supported by endomyocardial biopsy studies in collaboration with Prof Peter Schultheiss, a world authority in this field, also from the Charité University in Berlin.

The Wheels of Hope Programme also forms part of the Centre. Financed by John Williams Motors and Life Rosepark Hospital, in collaboration with the UFS and the Central University of Technology, the Programme focuses on rheumatic heart disease detection programmes in schools in central South Africa. |



Indigenous Knowledge Systems (IKS) LEAD PROGRAMME

The *Indigenous Knowledge Systems (IKS) Lead Programme*, under the directorship of Dr Motlalepula Gilbert Matsabisa, was created in the Department of Pharmacology at the UFS in 2014, as a result of its transfer from the Medical Research Council (MRC) following extensive re-structuring of the MRC. The research undertaken by the IKS Lead Programme focuses on some key priority diseases of the country and region – malaria, HIV, cancer, and diabetes.

Malaria is a priority disease and is prevalent in rural and poor areas, resulting in many traditional health practitioners claiming to treat and cure the disease. There may well be substance to these claims, as the most effective antimalarial drugs – Quinine, Chloroquine and Artemisinin – are derived from plants. The current research is investigating a South African medicinal plant that has been shown to have *in vitro* antiplasmodial activity, with subsequent isolation and characterisation of novel non-symmetrical sesquiterpene compounds with

antimalarial activity. The compounds have been patented and resulted in eight national patents granted.

There is anecdotal evidence regarding traditional treatments being effective immune boosters, and therefore applicable to HIV. Research into these traditional treatments is ongoing, and, based on the results, a licence agreement is being negotiated. Memoranda of Understanding have been signed between the UFS and the pharmaceutical industry on commercialisation of products. Preliminary *in vivo* studies are now confirming that the products are indeed immune boosters or they reconstitute the immune system. This project has advanced to clinical research and MCC approval is awaited for the Phase II clinical study.

A second study, an observational clinical study of a product, Manayimmune, has been submitted to MCC for ethical clearance. The two products have been developed and formulated into 350mg and 500mg unit dose capsules. This

project is funded by the Department of Science and Technology (DST) as part of the IKS Product Development Platform which is coordinated by the UFS Department of Pharmacology.

There are traditional health practitioners who purport to treat and cure cancer. Current research is looking to verify these claims through cell culture to mechanism of cell death for those extracts that show activity in selected cultured cancer cell lines. The project also investigates the mechanism through which these plant products and extracts bring about their anticancer activities, looking at the effects on VEGF, PGF and the NAT gene and studying the anticancer resistance effects of the plants through the modulation of select drug transporter gene and the P-gp. This project is funded by the NRF.

Diabetes mellitus is the fifth highest cause of natural death in South Africa, with an estimated 58 people dying of the disease every day. Many traditional health practitioners claim to have treated and cured diabetes. The IKS



“... the research group has been working with communities on indigenous teas and coffees. A number of product prototypes have been made, and the research products have been branded as the I-Brand.”

Lead Programme is researching these plants and medicines as inhibitors of key enzymes responsible for diabetes. A number of extracts have been generated and of these, six have activity in more than three diabetes disease targets; two of these extracts are recommended for further studies in diabetic induced animals.

The IKS Lead Programme is already a preferred partner to the Department of Science and Technology (DST). The Lead Programme coordinates the ATM Bioprospecting and Product Development Flagship – a role that moved with it from the MRC. The IKS Lead Programme has also been tasked with coordinating and chairing DST’s latest and newest Health Beverages Product Development Flagship.

In a project funded by the NRF and DST, the research group has been working with communities on indigenous teas and coffees. A number of product prototypes have been made, and the research products have been branded as the I-Brand. |



AFROMONTANE RESEARCH UNIT



Nestled in the foothills of the sandstone mountains that characterise the Maloti Mountains and near the merger points between the Free State, KwaZulu-Natal, and Lesotho, lies the Qwaqwa Campus of the UFS. The area boasts a rich diversity of plant and animal species, with unique habitats; it also has a unique and diverse history, containing the largest and most concentrated group of rock paintings in Africa, south of the Sahara.

These mountains are also the most important water catchment area for Lesotho and South Africa. However, the area is prone to a number of environmental stresses and faces important developmental challenges.

Globally mountains and highlands, despite having played an important role in the history of humankind and having been sources of valuable assets, have largely been viewed as peripheral to the rest of the global ecosystem, with an associated lack of attention to their sustainable development.

There is, however, growing international interest in montane environments and livelihoods, as evidenced, *inter alia*, during the 2002 World

Summit on Sustainable Development, and the 2012 Rio+20 United Nations Conference on Sustainable Development, resulting in an official resolution calling for greater efforts towards the conservation of mountain ecosystems; however, in South Africa the 'montane' element of South Africa/Lesotho has not been adequately recognised in research and planning terms.

It was these three imperatives – the opportunities offered by the geographic situation of the Qwaqwa Campus, the growing international focus on research on montane environments, combined with the niche opportunity offered by developing a relatively new area of research – that influenced the establishment of the **Afromontane Research Unit** (ARU) at the Qwaqwa Campus in 2015.

The ARU focuses on the sustainable development of the Maloti-Drakensberg Afromontane area, with research activities stretching across 600 km of mountain range in two countries. Informed by the social, socio-economic, environmental and conservation challenges of the study area, as well as the communities that call them home, the ARU is organised into three inter-related and multi-disciplinary themes.

The theme on Conservation and sustainable usage of Afromontane biodiversity researches issues in this biologically unique area, as well as ecosystem goods and services and the green economy, climate change and natural hazards, and land use and catchment management.

The second theme (Living and doing business in Afromontane environments), focuses on mountain-specific development strategies. It therefore incorporates studies of food security, Afromontane economies, sustainable tourism, rural development and connectivity, and social-ecological systems.

The third theme, Sustainable futures for the people of the Afromontane, addresses critical issues of sustainability within Afromontane communities, who have not received the priority and attention they deserve – given the adaptive and differentiated processes of their livelihoods, often found in their indigenous knowledge and practices, and their entrenched cultural and historical heritage and diversity. This research theme considers culturally and contextually responsive education; culture, heritage and language; and gender, vulnerabilities, resilience and sustainability. |

OUR RISING STARS

Our new generation of researchers will help us to be leaders, not followers, and elevate the University to new heights. Here we profile and celebrate but a few.



Dr Andrew Cohen

Andrew Cohen completed his master's at the University of Oxford, and went on to complete his PhD at Sheffield University. He became interested in the development of the British Empire during his undergraduate studies and from then on studied this crucial aspect of 20th Century history. Through his master's thesis he sought to explore the Central African Federation's public relations campaign in Britain, and his subsequent PhD thesis considered interlocking aspects of the Federation's demise.

After completion of his PhD he realised that the area he found most intellectually stimulating was the relationship between multinational business and politics at a national level, and he embarked on a postdoctoral fellowship at the University of Pretoria, which allowed him to develop his interest in the role of business in the late colonial/early postcolonial period in Africa. While at the University of Pretoria he was one of fifteen early career scholars chosen in a highly competitive worldwide competition to attend a month-long workshop on decolonisation in Washington DC.

He joined the UFS as a research fellow in the International Studies Group of Professor Ian Phimister, and was a lecturer in the Department of Economics.

Andrew's work has been described as having the potential to position him as a leading figure with significant international recognition in his field. He is an NRF Y rated researcher.



Dr Abdon Atangana

Originally from Cameroon, Abdon Atangana completed his MSc Applied Mathematics in 2010 and his PhD in Geohydrology in 2013. He was then appointed a postdoctoral research fellow and senior researcher in the UFS Institute for Groundwater Studies. His speciality is applied mathematics, but he does his research in methods and applications of partial and ordinary differential equations; fractional differential equations; perturbation methods; asymptotics methods; iterative methods; groundwater modelling; and uncertainties analysis.

While he is one of the most prolific and productive researchers the UFS has ever produced, displaying exceptional levels of scholarly output (44 journal articles and one book chapter in 2014/15), he cemented his research standing when he solved a problem in the field of fractional calculus by introducing a fractional derivative called "Beta-derivative" and its anti-derivative called "Atangana-Beta integral". He is an NRF Y rated researcher.



Dr Daniel Spence

Daniel Owen Spence is a historian of the late British Empire who uses indigenous naval

service to understand imperial constructions of race and their impact on colonial and postcolonial societies. This was inspired by his training under Sheffield Hallam University's noted imperial historians, where he completed his MA and subsequently his PhD in 2012.

His thesis involved substantial overseas investigations of archives in Singapore, Malaysia, Trinidad, the Cayman Islands, Hong Kong, and the UK, where he analysed documents, oral histories and recorded original interviews.

Spence lectured at Sheffield Hallam University in Imperial and International History until 2012, when he secured a postdoctoral research fellowship at the UFS to develop an African case study to augment his Asian and Caribbean research.

In March 2013 he won a three-year Postdoctoral Innovation Scholarship from the National Research Foundation, and learned Kiswahili in preparation of archival research in Kenya and Tanzania; he later investigated the National Archives of Australia, New Zealand, Canada and Fiji.

At the UFS, he co-founded the 'International Studies' seminar series, a constructive interdisciplinary forum for early career researchers. This has facilitated networking and collaborative opportunities by attracting leading scholars from Europe, Africa, America and Australia, and has stimulated several MA and PhD student projects in Southern and Central Africa.

For the first quarter of 2014, he was awarded a Visiting Fellowship at Leiden University's African Studies Centre, and in 2015 he was appointed as a Research Associate on the University of Sydney's Australian Research Council Laureate project 'Race and Ethnicity in the Global South'. Spence has published two scholarly monographs, with IB Tauris and Manchester University Press' prestigious 'Studies in Imperialism' series, several articles in leading international journals, and is internationally recognised as an expert on colonial naval culture in the British Empire.



Dr Rudo Ngara

Rudo Ngara's research could not be more topical or important, given the dry conditions of central South Africa. The primary focus of her research lies in understanding how crops, particularly cereals, respond and adapt to a range of abiotic stress factors – such as drought, high salinity, and extremely high temperatures. She seeks to develop resilient crops that are better suited to produce maximally under harsh environmental conditions. To achieve her goals, Rudo is establishing a gene discovery platform utilising proteomic tools on sorghum, a crop with natural drought and heat tolerance.

Rudo graduated with an MSc in Biotechnology from the University of Zimbabwe, and subsequently a PhD in Biotechnology from the University of the Western Cape (in 2009). After a postdoctoral fellowship at the same university and working there as a lecturer, she joined the UFS in 2013 as a lecturer in the Department of Plant Sciences on the Qwaqwa Campus. She was selected to form part of the Vice-Chancellor's Prestige Scholars Programme in 2015.



Dr Lindie Koorts

As a student Lindie Koorts was interested in the dynamics of Afrikaner identity in the post-apartheid context, and she sought to trace the roots of nationalist identity by studying the politicians who shaped Afrikaner nationalism. This became the subject of her MA dissertation at the University of Johannesburg, which examined DF Malan's intellectual background and his studies in theology and philosophy before his entry into politics.

It was this study that introduced her to a new genre – biography – and she decided to pursue

this avenue through her DPhil in History at Stellenbosch University, with a thesis entitled *DF Malan: a political biography*. Realising that very few South African historians wrote biography, she spent a year (2008) at the Institute of Biography at the University of Groningen, as a guest-PhD. The result was the first comprehensive, post-apartheid biography of Malan. She revised and translated the manuscript, which was published in 2014 under the title *DF Malan and the Rise of Afrikaner Nationalism (DF Malan en die opkoms van Afrikaner-nasionalisme)* by Tafelberg Publishers. For the work Koorts received the prize for Best Debut Author at the 2014 Woordfees, the South African Translators' Institute Prize for Outstanding Translation in Non-Fiction, and the book was shortlisted for both the Alan Paton and KykNET-Rapport prizes.

Wishing to broaden the scope of her research, her postdoctoral research, first at the University of Pretoria and then at the UFS, focused on the relationship between capital and the state in late-19th Century Southern Africa, in particular the intricate networks between the mining industry and the Transvaal government.

Lindie Koorts is a member of the International Studies Group, and will be appointed as a senior lecturer in the Centre for Africa Studies in 2016.



Prof Irikidzayi Manase

Irikidzayi Manase is a graduate of the University of Zimbabwe and the University of KwaZulu-Natal. He completed his MA in English studies at UKZN in 2003, having examined the way that Southern African cities are mapped in selected South African and Zimbabwean fiction.

His PhD in English studies from the same university focused on the literary and cultural imaginings of fictional Johannesburg from 1978 to 2003. In 2007, having just completed his PhD, he joined the University of Venda, where he lectured for eight years before joining the UFS in 2014. An Associate Professor in English, Irikidzayi is rated by the NRF as a Y researcher. His research, located in literary and cultural studies of Southern Africa, focuses on how spaces and

places – such as cities, nations, the land and futurist/science fictional – are imagined, lived and the cultures created in those spaces.

His areas of research interest, on which he has presented papers at local and international conferences and published, are: imaginaries of city lives and cultures; the everyday use of technology and the mediation of identities; science fiction in South Africa; and the contestations over the imaginaries of land, politics, culture and identities in post-2000 Zimbabwe.



Dr Charles Haddad

Charles Haddad, Senior Lecturer in the Department of Zoology and Entomology, is one of Africa's leading scholars on spiders. For his master's degree he investigated the biodiversity and role that spiders play in pistachio orchards as biological control agents; however, his 2012 doctorate indicated a shift in direction to focus on the taxonomy and biology of ant-like sac spiders (Corinnidae) in the Afrotropical Region – a family that has historically received little attention.

Haddad continues to describe the multitude of new species from the continent in order to contribute to a clear understanding of the biodiversity of the spider family, providing the basis for his more applied work in the fields of biogeography, molecular phylogeny, and evolutionary history. This includes work on the role of spiders as predators of various insect pests in crops, and of termites in grassland. He has also been involved in taxonomic research on several other spider families through collaborative efforts, including Salticidae, Gallieniellidae and Penestomidae, and together with the new corinnid taxa he has described more than 160 new species.

Charles Haddad is currently serving as the assistant project manager for the South African National Survey of Arachnida, and is on the expert panel of the World Spider Catalog. He also serves on the executive of the International Society of Arachnology and is the chair of the African Arachnological Society. In 2015 he was awarded a Y rating by the NRF.



Dr Rory Pilosof

A Zimbabwean by birth, Rory Pilosof left the country to travel and study, and after completing his undergraduate studies at the University of Cape Town, returned to Zimbabwe to get a better understanding of issues relating to identity, race and land. In 2007 he began his PhD at the University of Sheffield on white farming discourse and identity. "I chose Sheffield, among other reasons, because Professor Ian Phimister was a member of the faculty. His standing as a historian of Southern Africa and his particular interest in the political economy of central and Southern Africa made him an ideal choice as supervisor".

Having completed his PhD in 2009, Rory returned to Southern Africa to take up a postdoctoral position at the University of Pretoria. During this time, he expanded his research into matters around land control, ownership and possession, with the main focus on how white farmers justified their land holdings after independence and how issues of land reform have been debated. His work on agrarian change in Zimbabwe made international impact and led directly to an invitation by the International Institute of Social History in Amsterdam to become a member of their global collaboration on changing labour relations in Africa.

Subsequent to his fellowship at the University of Pretoria, he was offered a second postdoctoral position by the Centre for Africa Studies at the UFS, which allowed him to continue his work on processes of agrarian change and shifting labour relations in Zimbabwe. It also offered him the opportunity to work closely with Ian Phimister again. He was appointed senior lecturer in the Department of Economics in 2015.

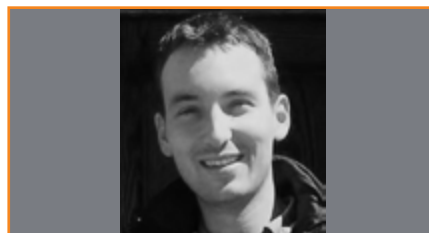


Prof Riaz Seedat

Having completed his MMed in Otorhinolaryngology with distinction at the UFS in 2002, Riaz

Seedat was accepted as a fellow of the College of Otorhinolaryngologists in the following year. During his training he initially became interested in researching acoustic neuromas, and following the completion of his training, he developed the areas of otolaryngologic allergy and paediatric otorhinolaryngology in the Department of Otorhinolaryngology. These remain his principal areas of research, particularly on allergic rhinitis, chronic suppurative otitis media, and recurrent respiratory papillomatosis, that is caused by human papillomavirus (HPV).

In 2009 he received the Karl Storz award from the South African Society of Otorhinolaryngology – Head and Neck Surgery, which is awarded to an otorhinolaryngologist under the age of 40 who has made a significant contribution to the field in South Africa. Seedat is an elected councillor of the College of Otorhinolaryngologists of South Africa, and served as secretary for the College for the triennium 2012 to 2014, and as both a senator and board member of the Colleges of Medicine of South Africa for the same period. Professor Seedat currently has active collaborations with the Allegheny-Singer Research Institute, Pittsburgh, UA, and the HPV6/11 Global Diversity Consortium. He is an NRF C rated researcher.



Dr Jakub Urbaniak

Jakub Urbaniak completed his master's in Theology at the Adam Mickiewicz University in Poznan, Poland. In 2006, he was granted a three-year scholarship for full-time research by the French government, on completion of which he was awarded a doctorate in Philosophy of Religion from l'Université de Bretagne Occidentale in Brest, France, and a DTh from the Adam Mickiewicz University. His doctoral thesis was devoted to a Romanian existentialist thinker and aphorist, Emil Cioran, and examined Cioran's personal grappling with Buddhism and Christianity.

In 2010, Urbaniak came to South Africa as a volunteer of the French Christian NGO called Fidesco. Three years later he was offered a full-time teaching position at St Augustine's

college of South Africa, a Catholic university in Johannesburg, and this country became his new home. He has been a Senior Lecturer in Systematic Theology and Philosophy of Religion at St Augustine since.

He completed his postdoctoral fellowship at the University of Pretoria (2013-2014), where he was involved in the research project regarding *Human rights and religious diversity within the contemporary South African context*. He is a research fellow at the Faculty of Theology of the UFS, and in 2015 was awarded the NRF Y rating.

His research over recent years has examined questions raised by global ecumenism with the focus on Hans Küng's theology of religions and global ethics. Recently, thanks to a number of encounters with Black, Feminist and Queer African theologians, his 'contextual turn' has been catalysed. He has engaged in particular with Tinyiko Maluleke's Christological approach.

His current research focuses on the category of 'life' as a hermeneutic key to bridging the gap between ecological theologies and contextual/liberation theologies, with their various social-political emphases.



Dr Martin Nyaga

Martin Munene Nyaga successfully completed his PhD in Medical Virology within record time at the University of Limpopo, Medunsa Campus. He is currently the Medical Researcher in charge of the Next Generation Sequencing Unit at the UFS.

Dr Nyaga has collaborated both locally and internationally with institutions that are world-class leaders in his area of interest, namely molecular virology and Next Generation Sequencing. Among the institutions that have hosted him for research fellowships are the J Craig Venter Institute in Rockville, USA and the Laboratory of Viral Metagenomics at the REGA Institute in Belgium. During these fellowships he acquired cutting edge research techniques in microbial genome applications which are beneficial for understanding disease mechanisms and evolutionary factors of viruses and other microbes.

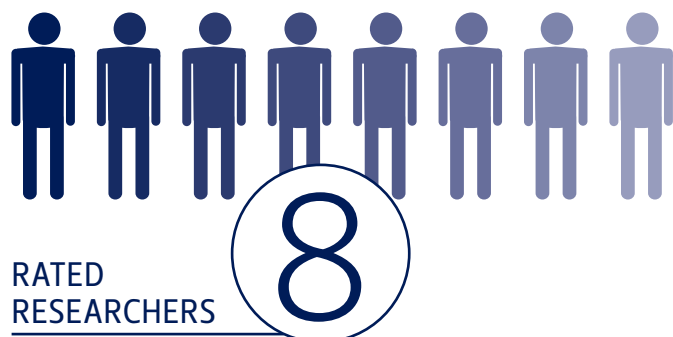


FACULTY **HIGHLIGHTS**

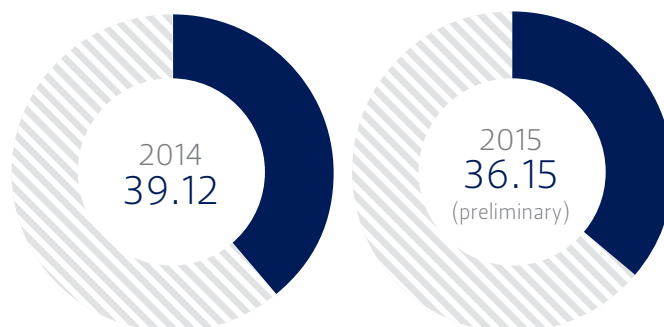


Faculty of Economic and Management Sciences

Dean: Prof Hendri Kroukamp



ACCREDITED JOURNAL UNITS



Making headlines

2014

Erasmus Mundus scholarship awarded to Jan Cloete from the Centre for Development Support, for further study at the University of Antwerp.

Honorary Doctorate conferred on Professor Jeffrey Sachs, the world's leading development economist and promotor of the United Nations Sustainable Development Goals.

Professor Philippe Burger successfully completed a 20-year review of fiscal policy in South Africa on behalf of the National Treasury.

2015

International Monetary Fund (IMF) invited Professor Philippe Burger to make a presentation on the South African Labour Market in Washington DC.

Mareve Biljohn, from the Department of Public Administration, awarded Erasmus Mundus scholarship to Ghent University.



Faculty of Education

Dean: Prof Sechaba Mahlomoholo



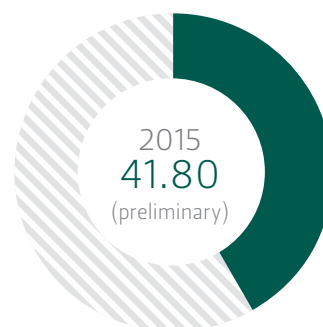
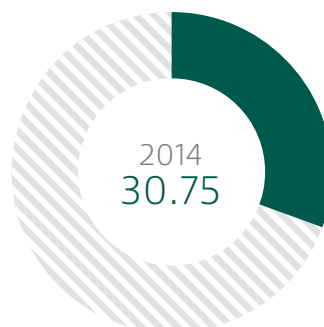
RATED RESEARCHERS

4

RESEARCH CHAIRS



ACCREDITED JOURNAL UNITS



Making headlines

2014

Qwaqwa Campus hosted Education Association of South Africa (EASA) Conference, with the theme "The long walk to freedom: Complexities and successes on the road to improve education in South(ern) Africa".

Dr Mafu Rakometsi (PhD 2008), alumnus of the UFS and CEO of UMALUSI (Council for Quality Assurance in General and Further Education and Training), presented a lecture titled 'Educational Transformation in South Africa' at an Alumni function hosted by the Faculty of Education.

The South African Education Research Association (SAERA) 2015 Conference was held at the UFS Bloemfontein Campus from 27 to 30 October 2015. The conference theme was 'Strengthening educational research for sustainable futures'.

Maths, Accounting and English teacher development project awarded by ETD SETA to Mr Mosia, Dr Tlali and Dr Moloi.

2015

The Faculty of Education conferred an honorary doctorate on Dr John Samuel, in recognition of his active role as a national and international strategist in the education system.



Faculty of Health Sciences

Dean: Prof Gert van Zyl



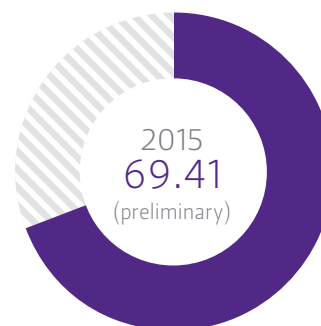
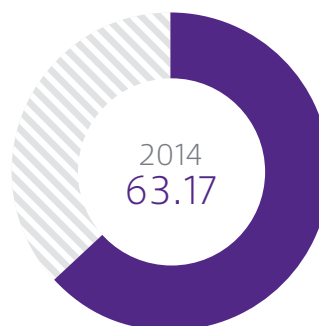
RATED RESEARCHERS

9

RESEARCH CHAIRS



ACCREDITED JOURNAL UNITS



Making headlines

2014

Professor Alicia Sherriff from the Department of Oncology, elected President of the South African College of Oncology.

Professor Schalk Wentzel, Head of the Department of Urology, elected President of the South African College of Urology.

Professor Felicity Burt from the Department of Medical Microbiology and Virology, awarded grant by the National Health Laboratory Service to study candidate vaccines for Crimean-Congo haemorrhagic fever virus and other arboviruses.

The Dean of Health Sciences, Professor Gert van Zyl, admitted as an Inaugural Fellow of the Association for Medical Education in Europe (AMEE).

Dr Sanet du Toit, an affiliated lecturer at the Department of Occupational Therapy, honoured with the International Association of Homes and Services for the Aging (IAHSA) Award for Excellence in Applied Research for her work as the first Dementia Mapper from Africa.

Professor William Rae, Head of the Department of Medical Physics, appointed to the College of Radiologists.

2015

The newly established Division of Virology at the UFS to be one of only five laboratories in the country involved in crucial diagnostic and testing services for HIV viral load monitoring, early infant diagnosis, and HIV resistance testing.

Ethical award in the health professions category awarded to Prof André Venter, Head of the Department of Paediatrics and Child Health by the international organisation, Unashamedly Ethical.



Faculty of the Humanities

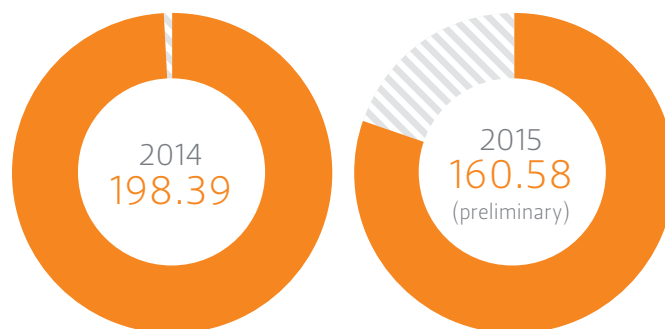
Dean: Prof Lucius Botes



RESEARCH CHAIRS



ACCREDITED JOURNAL UNITS



Making headlines



Professor Naomi Morgan, lecturer in the Department of Afrikaans and Dutch, German and French, received the prestigious Chevalier de l'Ordre des Arts et des Lettres (Knight in the Order of Arts and Letters).

Professor Annie van den Oever delivered inaugural lecture, titled 'Foundational questions for a film and visual media programme'. Van den Oever is Extraordinary Professor for Film and Visual Media in the Faculty of the Humanities, and also a senior researcher for Film at the University of Groningen, the Netherlands, and an Associated Researcher for Film at Paris 1, Panthéon Sorbonne, France.

Inaugural lecture delivered by Professor Helene Strauss of the Department of English, titled 'The spectacles of promise and disappointment: Political emotion and quotidian aesthetics in post-transitional South Africa'.

Honorary Doctorate, *DPhil honoris causa*, conferred by the Faculty of the Humanities on Professor Laura Mulvey, a feminist film theorist, and professor at Film and Media Studies at Birkbeck, University of London.

Professor Kobus Marais from the Department of Linguistics and Language Practice, awarded the first UFS Book Prize for Distinguished Scholarship, for his book *Translation theory and development studies: A complete theory approach* (2014, Routledge, New York).

2015

Professor Nico Luwes awarded National Arts Council award for the performance of 'Die nag van die hiënd'.

Dr Anja Botha awarded the D Cohen fellowship by the International Association for Child Adolescent Psychiatry and Allied Professions (IACAPAP) in recognition of her work as an emerging international scholar in the field of child and adolescent mental health.

Special Issue for *Africa Insight* (vol 44, no 1, June 2014), on 'Contextualising African identities, othering and the politics of space', joint guest edited by Professors Heidi Hudson and Henning Melber, who was appointed as Extraordinary Professor in the Centre in 2013.

Dr Kudzayi from the Department of English (Qwaqwa Campus) awarded the Nordic Africa Institute Africa Guest Researcher Fellowship to spend three months in Uppsala, Sweden (March to June 2015), researching representations of the postcolonial city.

Dr Chitja Twala, lecturer in African and South African history, was accepted as Visiting Scholar at the Harvard Graduate School of Arts and Science.

Cardiff University bestowed Honorary Professorship in Political Philosophy on Professor Pieter Duvenage of the Department of Philosophy, in acknowledgement of his contribution and commitment to philosophical research in South Africa and internationally.

Professor Heidi Hudson, of the Centre for Africa Studies, appointed by the President of the International Studies Association to serve on the Committee on the Status of Women.

Dr Anneli Botha of the Department of Political Studies and Governance awarded prestigious Terrorism Research Initiative (TRI) Award for the 'Best Doctoral Thesis on Terrorism and Counter-Terrorism' (2014).

Danré Strydom, lecturer in the Odeion School of Music, included on the Buffet Crampon executive list of representative artists.

Dr Johann Rossouw, Senior Lecturer in the Department of Philosophy, selected as one of the six winners of the 2015 Akfrikaanse Taal- en Kultuurvereniging (ATKV) Academy Awards.

Centre for Health Systems Research & Development (CHSR&D), together with research associate, Professor Edwin Wouters from the University of Antwerp, secured R4.3 million from the Flemish Interuniversity Council to conduct a randomised control trial to assess the extent and sources of HIV & TB stigmas among healthcare workers.

Dr Lakhdar Brahimi, a prominent global peace leader and member of The Elders, an alliance of peace and human rights advocates chaired by Kofi Annan, awarded honorary doctorate by the Faculty of the Humanities and the Centre for Africa Studies.

The book, *National Liberation in Postcolonial Southern Africa: A Historical Ethnography of SWAPO's Exile Camps*, by Dr Christina Williams from the Department of Anthropology, and published by Cambridge University Press, was launched at Stanford University in November 2016. The book has been lauded for its invaluable contribution and depth of its scholarship. The author is a member of the Vice-Chancellor's Prestige Scholars Programme and a former Fulbright scholar.

The Odeion School of Music became the first in the country to launch an Organ Chair, named after the international organist Liesbeth Schlumberger-Kurpershoek, a French-South African organist and pedagogue.

Professor Dap Louw, distinguished professor and forensic psychologist from the UFS Department of Psychology, received the prestigious Lifelong Achievers Award from the University of Johannesburg in recognition of the major contribution he has made during his career in psychology.

The book *Musics of the Free State: Reflection on a musical past, present, and future* (2015, Zagreb, Croatian Musicological Society) highlights how musical culture may bind humankind together, or split it apart.

Dr Willem Boshoff of the Department of Fine Arts, participated in the prestigious Venice Biennale. He also had two solo exhibitions in the Goodman Gallery (2014) and the SMAC Gallery (2015).

The Faculty of the Humanities obtained a R6.3 million Mellon Grant to advance an inclusive professoriate through humanities.



Faculty of Law

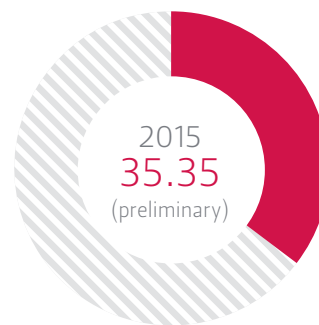
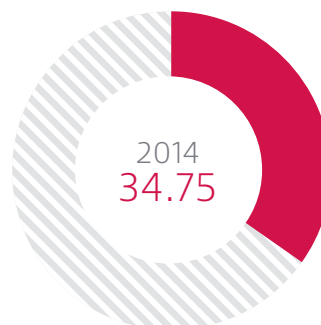
Dean: Prof Caroline Nicholson



RATED RESEARCHERS

3

ACCREDITED JOURNAL UNITS



Making headlines

2014

Database on various facets of human trafficking established at UFS library, as part of research led by Professor Beatri Kruger of Department of Public Law.

Justice Malcolm Wallis presented his inaugural lecture titled 'Compatibility of commercial certainty and constitutionalism'. He was appointed as a Professor Extraordinary in the UFS Department of Mercantile Law in 2014.

Professor Beatri Kruger presented keynote address titled 'Killing human trafficking in South Africa: chaos, challenges and celebrations' at gala dinner with the theme 'Protect a woman, protect a child' on 14 February, hosted by the Faculty of Law in collaboration with the International Association of Women Judges.

Professor Ralph Mawdsley, from the Cleveland-Marshall School of Law at the Cleveland State University, inaugurated as extraordinary professor by the Faculty of Law. His inaugural lecture was titled 'Diversity, affirmative action and higher education: Searching for clarity in federal court decisions'.

2015

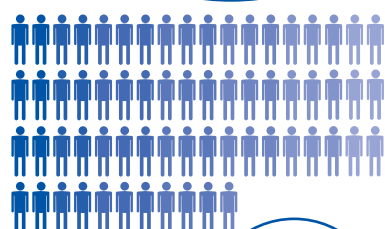
Georgia du Plessis of Department of Public Law invited to address Flemish Parliament on the topic of her PhD research – 'Religious freedom within South African education'.

Twenty years of human rights celebrated at gala dinner hosted by Faculty of Law, South African Human Rights Commission, and the Free State Department of Education.



Faculty of Natural and Agricultural Sciences

Dean: Prof Danie Vermeulenn



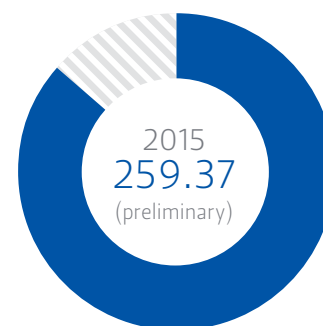
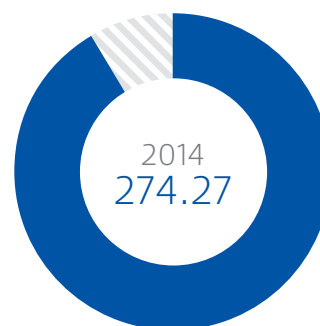
RATED
RESEARCHERS

65

RESEARCH CHAIRS

3

ACCREDITED JOURNAL UNITS



Making headlines

2014

Dr Alice Brink, Prestige Scholar and lecturer in the Department of Chemistry, one of 15 young scientists from across the world selected by UNESCO to participate in a round-table discussion at the Opening Ceremony of the International Year of Crystallography in Paris, France.

Professor Rodney Moffett, Honorary Research Associate in the Department of Plant Sciences at the Qwaqwa Campus, published a book titled *A Biographical Dictionary of Contributors to the Natural History of the Free State and Lesotho*, addressing gaps in recent publications in the field.

The Statistics Consultation Unit was established in Department of Mathematical Statistics and Actuarial Science to provide support and service to all UFS researchers.

Professor Gustav Visser of the Department of Geography awarded prestigious Society of South African Geographers (SSAG) Fellowship for his significant contribution to Geography in South Africa.

Dr Aliza le Roux from the Department of Zoology and Entomology on the Qwaqwa Campus elected to serve on the executive committee of South African Young Academy of Science (SAYAS).

LECO CHN628 Series Elemental Analyser, valued at R1.5 million, set up in Department of Microbial, Biochemical and Food Biotechnology, will enable quick results to determine nitrogen, carbon/nitrogen and carbon/hydrogen/nitrogen in organic matrices.

Professor Jeanet Conradie selected as runner-up in SA Women in Science Awards.

2015

Professor Oriel Thekiso awarded the TW Kambule NRF-NSTF Award for an emerging researcher in recognition of his outstanding contribution to science, engineering and technology through research and its outputs over a period of up to six years after the award of his PhD.

Professor Magdalena Blum received an Honorary Doctorate, *DPhil honoris causa*, from the Faculty of Natural and Agricultural Sciences, in recognition of her work to modernise and strengthen rural advisory services. She works for the Food and Agricultural Organisation of the UN.

Professor Johannes Cronjé appointed as visiting professor in the Faculty of Natural and Agricultural Sciences, in collaboration with the Centre for Teaching and Learning. The title of his inaugural lecture was 'Tablets, painkillers or snake oil – a remedy for education?'.

Following the discovery of the first Eukarya in the deep subsurface (*Nature*, 2010) by a research group from the UFS Department of Microbial, Biochemical and Food Biotechnology and their international collaborators, Professor Gaetan Borgonie from Extreme Life Isyensya, together with the UFS researchers, take this research further, resulting in a paper released in *Nature Communications*.

The Director of the Disaster Management Training and Education Centre (DiMTEC), Dr Andries Jordaan, was invited to serve on a specialist committee of the United Nations; he is the only representative from South Africa on this Committee. He also serves as an expert scientist in disaster risk for the United Nations Environmental Program (UNEP), as part of the CLIMWARM research programme to develop an early warning system for extreme events in Western Africa.

SA Academy of Science and Arts (Faculty of Science and Technology) awarded medal to Professors Jo van As and Johann du Preez, together with two academics from two other universities, for their book, *Die verhaal van lewe en die omgewing: 'n Afrika-perspektief*.

Professor Maryke Labuschagne from the Department of Plant Sciences, one of only nine women on the continent to receive the prestigious 'Country Lifetime Achiever Award' from Africa's Most Influential Women in Business and Government Programme.

UFS one of four international institutions approved by the UN Group of Experts on Geographical Names (UNGEGN) to help establish an international training consortium to offer postgraduate course in toponomy.

Dr Dirk Strydom of the Department of Agricultural Economics and a member of the Vice-Chancellor's Prestige Scholars Programme (PSP), chosen as the 2015 Free State Agriculturalist of the Year by the Agricultural Writers Central Region.

The Institute for Groundwater Studies (IGS) collaborates with SADC Member States and the World Bank in a five-year project to build sustainable groundwater management in the region.

Bright Pephrah, a PhD student in the Department of Plant Sciences, received an award from the competitive Program for Emerging Agricultural Research Leaders (PEARL) of the Bill and Melinda Gates Foundation for a project to improve the beta-carotene content in cassava.

Dr Francois Deacon of the Department of Animal, Wildlife and Grassland Sciences, contracted by the United Nations to save the 30 remaining giraffe in the Congo.

Dr James Allemann of the Department of Soil, Crop and Climate Sciences, was elected as council member and appointed a fellow of the Weed Science Society.

Department of Physics awarded R8.6 million by the NRF National Nanotechnology Equipment Programme to purchase a tuneable laser based time resolved fluorescence spectrophotometer.

UFS hosted world summit in the International Year of Crystallography.

DiMTEC becomes the first institution in Africa to implement and test the use of drones for disaster risk assessment.

Dr Aliza le Roux selected to represent the NRF as Future Leader at the Science and Technology in Society Forum in Japan.

Professor Paul Grobler of the Department of Genetics, delivered his inaugural lecture on 'Intensive breeding of game: The good, the bad and the ugly'.

Department of Quantity Surveying and Construction Management hosted the 8th Annual Quantity Surveying Research Conference.

Dr Gert Ceronio from the Department of Soil, Crop and Climate Sciences was elected as council member of the Crop Production Society.

DiMTEC researchers included in a research consortium of universities consisting of the Freie Universität Berlin, Fraunhofer Institute and four African universities, to study integrated watershed management in Africa. This project forms part of the EU Vision 2020 agenda.

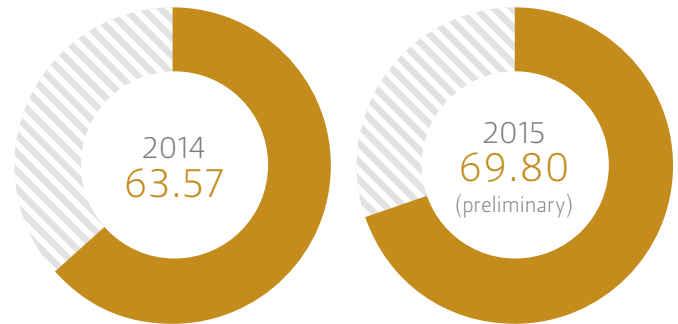


Faculty of Theology

Dean: Prof Fanie Snyman



ACCREDITED JOURNAL UNITS



Making headlines

2014

Colloquium on 'Theology in Higher Education – Mapping the challenges' held on Bloemfontein Campus, bringing together 11 deans of Theology from Africa and Europe.

Dr Mercy Amba Oduyoye received an honorary doctorate from the Faculty of Theology in acknowledgement of the trailblazing work she has done in the field of African women's theology.

Professor Fanie Snyman, Dean of Theology, became the first South African writer to feature in the prestigious *Historical Commentary of the Old Testament* series, with his book *Malachi*.

2015

As part of celebrating its 35th year of existence, the Faculty of Theology hosted an international and multi-disciplinary congress on the theme of 'Re-thinking Justice and Righteousness in Society'. Twenty-seven papers were read by academic staff members from different faculties within the UFS as well as academics from Africa and Europe.

Dr Peter Nagel was appointed as the first post-doctoral researcher in the Department of New Testament.

The background is a dark gray with a dense, chaotic pattern of white, hand-drawn scribbles. Overlaid on this are several white geometric shapes: a large triangle in the top left, a diamond in the center, and a large triangle in the bottom left. A dark blue diagonal line runs from the top left towards the bottom right. The text is positioned on the left side, within a white triangular area.

Overview of **UFS RESEARCH AND INNOVATION**

OUR PURPOSE AND OUR PEOPLE

The UFS Research Strategy aims to accomplish the following:

1. Improve international research excellence, impact and visibility by attracting, supporting and developing excellent scholars.
2. Develop research focus areas that will be recognised nationally and internationally for their research excellence.
3. Provide a sustainable and supportive research environment with appropriate management, physical and financial resources.
4. Extend and sustain both local and global partnerships and networks.
5. Translate innovative research into viable commercialisation.

These strategic aims are populated with a range of actions; some are initiatives and programmes that are already in place, others are expansions and extensions of current initiatives, and others are new interventions. All aim to ensure research excellence and impact.

The Directorate Research Development (DRD) sees its mission as being to advance the University's success in research and innovation in support of higher education, societal benefits and economic development, and to effectively implement the UFS Research Strategy. Each member of the DRD team has an uncompromising commitment to operational excellence, client connectedness, and service centredness in their different roles in serving the needs of the UFS research enterprise.



Innovation team (L to R):
Gerardus Verhoef,
Prudence Clarke, Ayanda Makhanya
and Karen Booysen.



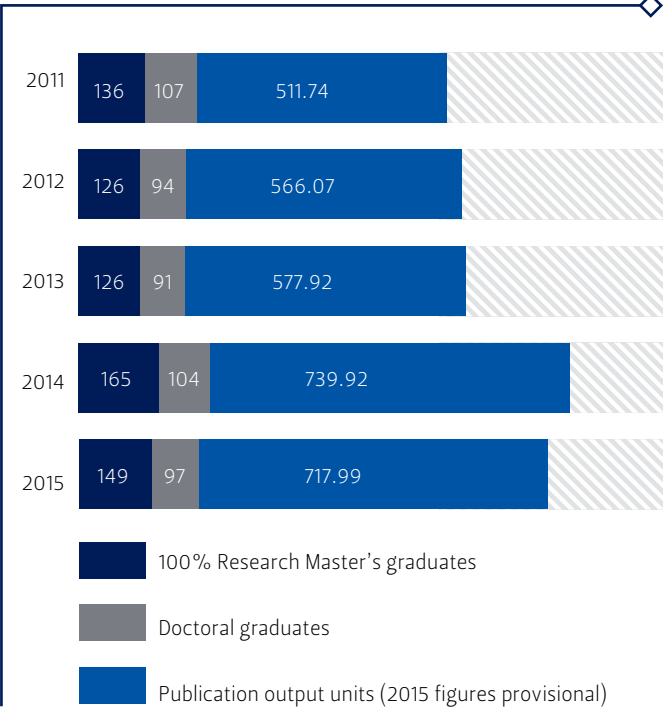
Researcher support team (L to R):
Eleanor van der Westhuizen,
Lelani Oosthuizen,
Mandy Jampies, Riana Visser
and Nolu Moepe.



Information management and administration team (L to R):
Themba Masiba, Anna-Marie Pienaar,
Geraldine Meyers, Werner Nel,
Willem Kilian, Maricel van Rooyen
and Nompulelelo Maleo

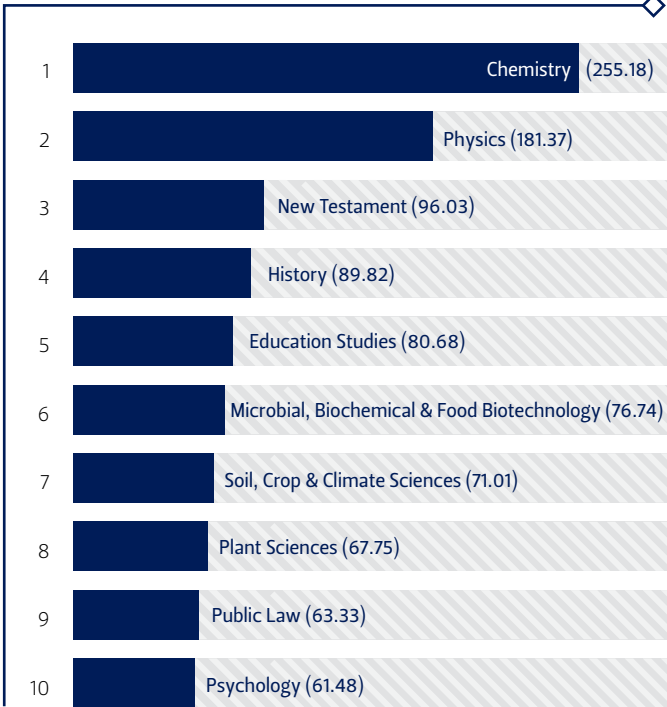
By the NUMBERS

RESEARCH OUTPUTS

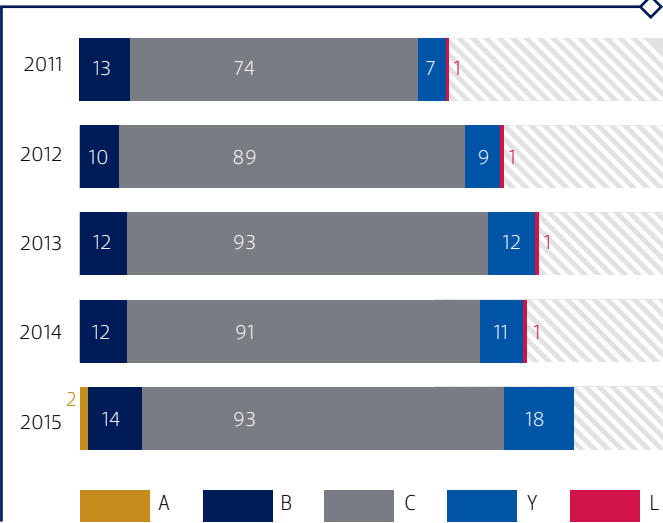


TOP DEPARTMENTS 2011-2015

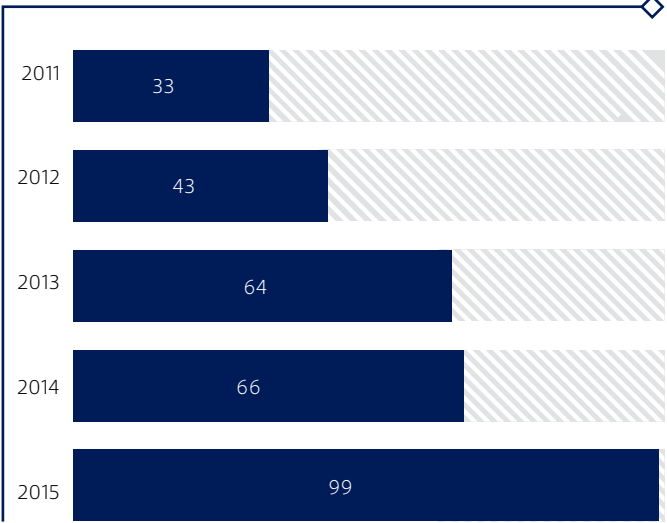
(based on total publication output units)



RATED RESEARCHERS

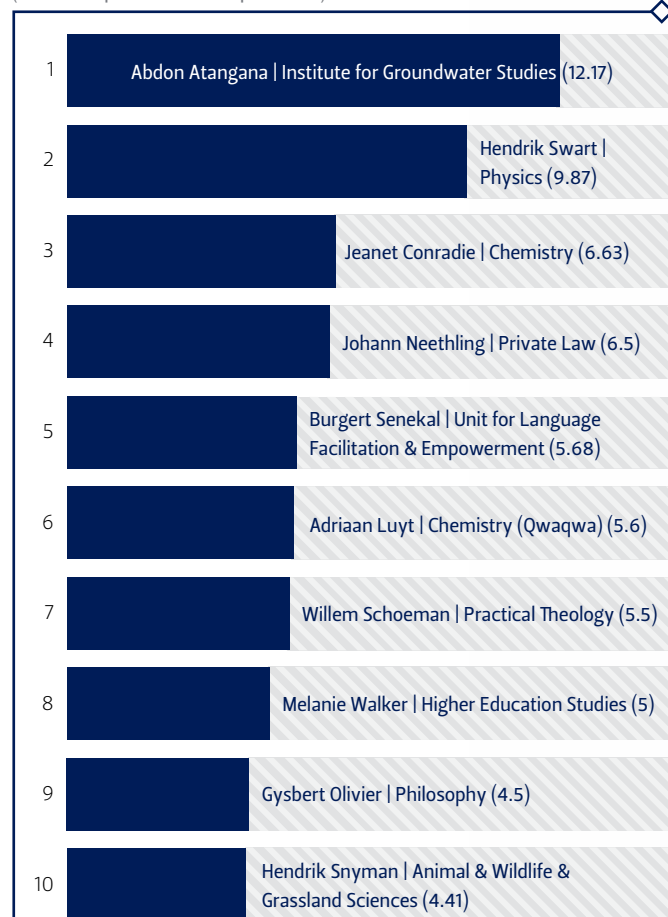


POSTDOCTORAL FELLOWS

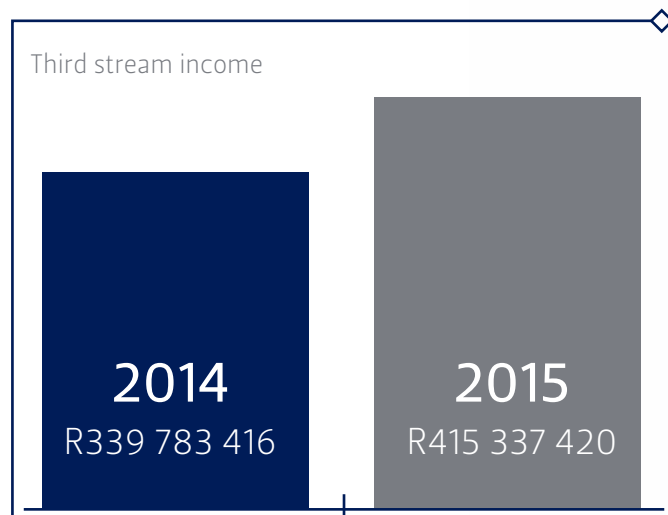


TOP RESEARCHERS 2015

(based on publication output units)



FUNDING



Publication output
2014 & 2015:

1458

Postgraduates
2014 & 2015:

Masters: 314
Doctoral: 201

Postdoctoral
fellows:

33% increase
from 2014 to 2015

Research related
contracts:

Average of 23 signed
per month
Linear growth trend >12%
per quarter

Scholarly books:

Growth in subsidy units from
13.83 in 2010 to
98.52 in 2014

Rated researchers:

127

Patent families:

25

(UFS does not count individual
patents granted or patent
applications, but rather
patent families)

Third stream
income:

22% increase
from 2014 to 2015

Start-up
companies:

6

Fostering academic excellence through partnerships with industry

Collaboration between universities and industry is not a new concept; however, the rise of the global knowledge economy places a greater emphasis on the need for strategic partnerships that foster innovative research. At the UFS the research environment can be represented by a sustainable circular flow where industry and granting agencies have a direct and indirect impact on the University. These partnerships foster academic excellence and grow research capacity. This requires moving out of comfort zones and putting in place structures and processes to make them mutually beneficial. We strive to provide an enabling environment for cooperation between academia and industry and grantors, so as to effectively transform innovation emanating from research and development into entrepreneurial ventures which create jobs and value to benefit the Free State Province in particular, and South Africa in general.

Over the past two years, the UFS has consolidated its efforts in this regard. Major projects and contracts have been negotiated with the World Bank, the Technology Innovation Agency, and others. In 2014, the UFS took the lead with a Department of Science and Technology (DST) sponsored project to develop a science and technology park strategy. This strategy forms the basis of our entrepreneurship programme that is scheduled to commence in 2016; it is currently supported by a NIMPO grant. Essentially the programme evolved around a strategy that aims to foster multidisciplinary projects, develop entrepreneurial skills, and support a target group of undergraduate students through their academic careers. It is envisaged these students will eventually become entrepreneurial researchers and inventors whilst working on existing innovations of more established research groups, and that successful companies will eventually plough back resources in the form of grants, bursaries and royalties. In this regard it is important to understand that the UFS measures success in the manner in which start-up companies are empowered to contribute to the local economy and how the University's technology is accepted by industry. The Incubator, that will focus on agri-processing, water related technologies and community health issues within the African context, will be the anchor of the Science Park and used to develop industry linkages for long term research support. |

Gerardus Verhoef

Director: Contracts and Research

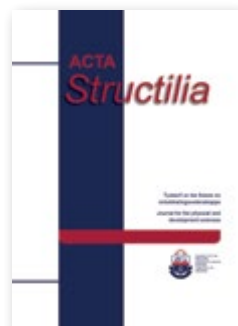
At the UFS the research environment can be represented by a sustainable circular flow where industry and granting agencies have a direct and indirect impact on the University.

OUR RESEARCH JOURNALS

The field of locally produced academic journals is relatively small in South Africa, and is increasingly dominated by multinational journal publishers. The UFS has a long history of publishing its own scholarly journals. Eight of the academic journals produced by the UFS are accredited.



Acta Academica is a Scopus academic journal dedicated to scholarship in the humanities, publishing scholarly articles that examine society, culture and politics past and present, from a critical social theory perspective.



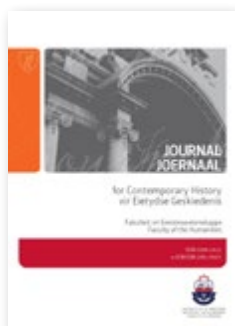
Acta Structilia is a South African accredited national journal for independently adjudicated research articles on any topic in the field of the physical and development sciences.



Acta Theologica is an ISI accredited journal, and the official theological journal of the UFS Faculty of Theology.



Communitas is a nationally accredited academic journal publishing scientific articles in the context of community communication, information impact and related disciplines.



Journal for Contemporary History, published by the UFS Faculty of the Humanities, is a national academic and accredited journal which publishes articles of a contemporary historical or political nature dealing with topics on sub-Saharan Africa and, in particular, South Africa since 1945.



Journal for Juridical Science is an IBSS accredited journal which publishes scholarly articles/case notes/notes in law.



Perspectives in Education is an IBSS accredited professional, peer-reviewed journal that encourages the submission of previously unpublished articles on contemporary educational issues.



Town and Regional Planning is the accredited peer-reviewed journal of the UFS Department of Town and Regional Planning.

Rated researchers

Surname	Name	Department/Affiliation	Rating
Albertyn	Koos	Department of Microbial, Biochemical and Food Biotechnology	C
Atangana	Abdon	Institute for Groundwater Studies	Y
Atkinson	Doreen	Centre for Development Support	C
Basson	Linda	Department of Zoology and Entomology	C
Beelders	Tanya	Department of Computer Science and Informatics	Y
Bezuidenhout	Barend	Department of Chemistry	C
Booyesen	Frikkie	Department of Economics	C
Bragg	Robert	Department of Microbial, Biochemical and Food Biotechnology	C
Brown	Stephen	Department of Paediatrics and Child Health	C
Burger	Philippe	Department of Economics	C
Burt	Felicity	Department of Medical Microbiology	C
Cilliers	Louise	Department of Greek, Latin and Classical Studies	C
Coetsee-Hugo	Liza	Department of Physics	Y
Coetzee	Jan	Department of Sociology	C
Cohen	Andrew	International Studies Group	Y
Conradie	Jeanet	Department of Chemistry	C
De Villiers	Pieter	Department of New Testament	C
De Wet	Johann	Department of Communication Science	C
De Wet	Corene	Department of Open Distance Learning	C
Dejene	Birhanu	Department of Physics	C

Surname	Name	Department/Affiliation	Rating
Du Plessis	Theo	Unit for Language Facilitation and Empowerment	C
Du Preez	Christo	Department of Soil, Crop and Climate Sciences	C
Du Preez	James	Department of Microbial, Biochemical and Food Biotechnology	C
Du Toit	Jackie	International Studies Group	C
Duvenage	Pieter	Department of Philosophy	C
Erasmus	Elizabeth	Department of Chemistry	Y
Esterhuyse	Karel	Department of Psychology	C
Finkelstein	Max	Department of Mathematical Statistics and Actuarial Science	A
Franke	Angelinus	Department of Soil, Crop and Climate Sciences	C
Gordon	Robert	Department of Anthropology	C
Grobbelaar	Johan	Department of Plant Sciences	B
Grobler	Paul	Department of Genetics	C
Grove	Bennie	Department of Agricultural Economics	Y
Gryzenhout	Marieke	Department of Plant Sciences	Y
Haddad	Charles	Department of Zoology and Entomology	Y
Heideman	Neil	Faculty of Natural and Agricultural Sciences	C
Henning	Johan	Faculty of Law	B
Heunis	Christo	Centre for Health Systems Research and Development	C
Holmes	Peter	Department of Geography	C
Hugo	Celia	Microbial, Biochemical and Food Biotechnology	C



Surname	Name	Department/Affiliation	Rating
Ingle	Mark	Centre for Development Support	C
Jansen	Jonathan	Top Management	B
Kotze	Tina	UFS Business School	C
Kroon	Ted	Department of Physics	C
Kroukamp	Hendri	Faculty of Economic and Management Sciences	C
Labuschagne	Maryke	Department of Plant Sciences	C
Le Roux	Pieter	Institute for Groundwater Studies	C
Le Roux	Aliza	Department of Zoology and Entomology	Y
Litthauer	Derek	National Control Laboratory for Biological Products	C
Louw	Dap	Department of Psychology	C
Luyt	Riaan	Department of Chemistry	B
Mahlomaholo	Sechaba	Faculty of Education	C
Manase	Irikidzayi	Department of English	Y
Marais	Kobus	Department of Linguistics and Language Practice	C
Marais	Lochner	Centre for Development Support	C
Meintjes	Petrus	Department of Physics	B
Meiring	Muriel	Department of Haematology and Cell Biology	C
Meyer	Johann	Department of Mathematics and Applied Mathematics	B
Miller-Naude	Cynthia	Department of Hebrew	B
Morgan	Naomi	Department of Afrikaans and Dutch, German and French	C
Mukwada	Geofrey	Department of Geography	C
Müller	Eleanor	Department of Chemistry	Y
Naude	Jacobus	Department of Hebrew	B
Naude	Luzelle	Department of Psychology	Y
Neethling	Johann	Department of Private Law	B
Neethling	Theodor	Department of Political Studies and Governance	C

Surname	Name	Department/Affiliation	Rating
Neser	Frikkie	Department of Animal, Wildlife and Grassland Sciences	C
Ntwaeaborwa	Martin	Department of Physics	C
Olivier	Gysbert	Department of Philosophy	B
O'Neill	Trudi	Department of Microbial, Biochemical and Food Biotechnology	C
Opperman	Dirk	Department of Microbial, Biochemical and Food Biotechnology	Y
Osthoff	Gary	Department of Microbial, Biochemical and Food Biotechnology	C
Pelser	André	Department of Sociology	C
Peters	Walter	Department of Architecture	C
Pohl-Albertyn	Carolina	Department of Microbial, Biochemical and Food Biotechnology	C
Pretorius	Zakkie	Department of Plant Sciences	B
Pretorius	Seef	Department of Soil, Crop and Climate Sciences	C
Prins	Rene	Department of Plant Sciences	C
Purcell	Walter	Department of Chemistry	C
Roodt	Andreas	Department of Chemistry	C
Roos	Wiets	Department of Physics	C
Roos	Neil	International Studies Group	C
Rossouw	Johann	Department of Philosophy	C
Scott	Louis	Department of Plant Sciences	B
Seedat	Riaz	Department of Otorhinolaryngology	C
Smit	Martie	Department of Microbial, Biochemical and Food Biotechnology	C
Smit	Nico	Department of Animal, Wildlife and Grassland Sciences	C
Smith	Bradley	Department of Private Law	C
Snyman	Hennie	Department of Animal, Wildlife and Grassland Sciences	C
Snyman	Fanie	Faculty of Theology	C
Solomon	Hussein	Department of Political Sciences	C
Strauss	Pieter	Department of Church History and Polity	C

Surname	Name	Department/Affiliation	Rating
Strauss	Helene	Department of English	Y
Swart	Hendrik	Department of Physics	B
Swarts	Jannie	Department of Chemistry	C
Terblans	Koos	Department of Physics	C
Thomas	Kylie	Institute for Reconciliation and Social Justice	C
Tolmie	Francois	Department of New Testament	C
Tucker	Ross	School of Medicine	C
Urbaniak	Jakub	Department of Systematic Theology	Y
Van Coller	Hennie	Department of Afrikaans and Dutch, German and French	C
Van Tol	Jacobus	Department of Soil, Crop and Climate Sciences	Y
Van den Berg	Jan-Albert	Department of Practical Theology	C
Van der Merwe	Abrie	Department of Mathematical Statistics and Actuarial Science	C
Van Heerden	Esta	Department of Microbial, Biochemical and Food Biotechnology	C
Van Huyssteen	Cornie	Department of Soil, Crop and Climate Sciences	C
Van Rensburg	Dingie	Centre for Health Systems Research and Development	B
Van Rensburg	Leon	Department of Soil, Crop and Climate Sciences	C
Van Staden	Annalene	Unit for Language Facilitation and Empowerment	C
Van Wyk	Japie	Department of Animal, Wildlife and Grassland Sciences	C

Surname	Name	Department/Affiliation	Rating
Van Wyk	Pieter	Centre for Microscopy	C
Van Zyl	Martin	Department of Mathematical Statistics and Actuarial Science	C
Vermeulen	Danie	Institute for Groundwater Studies	C
Verster	Pieter	Department of Missiology	C
Verster	Andrehette	Department of Mathematical Statistics and Actuarial Science	Y
Vetrik	Tomas	Department of Mathematics and Applied Mathematics	Y
Viljoen	Martina	Odeion School of Music	C
Viljoen	Chris	Department of Haematology and Cell Biology	C
Von Eschwege	Karel	Department of Chemistry	C
Walker	Sue	Department of Soil, Crop and Climate Sciences	C
Walker	Melanie	Centre for Research on Higher Education and Development	A
Walker	Stephen	Unit for Professional Training and Services in the Behavioural Sciences	C
Walsh	Corinna	Department of Nutrition and Dietetics	C
Walubo	Andrew	Department of Pharmacology	C
Weideman	Albert	Faculty of the Humanities	C
Wessels	André	Department of History	C
Witthuhn	Corli	Top Management	C



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Co-Coordiators

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Prof Corli Witthuhn

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achieving
EXCELLENCE

