UFS Research Strategy 2015-2019

Excellence and impact through transformative research

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Preface

Strategic planning serves a number of purposes, but in developing the University of the Free State (UFS) Research Strategy for the next five years, it has presented the opportunity for an honest assessment of where we are, how we operate, and where we want to be. Our research strategy of the past five years (2010-2014) has served us well; we have made sound progress in terms of shifting our research development from an administrative to a strategic function, and in accelerating efforts to place research at the core of all academic activity. However, the University's ranking in ninth position on the National Higher Education Ranking System illustrates the ongoing challenge we face. We recognise that our research can become stronger and have greater impact with a more defined strategy and enhanced institutional arrangements.

Excellence in research is core to the UFS mission. Research challenges conventional wisdom and promotes a spirit of interrogation in an open intellectual environment. This pursuit of knowledge brings with it a responsibility to society to ensure that the conduct of our research is ethical, visionary, transformative, and beneficial, and to communicate our research.

We are of the firm opinion that research improves lives and contributes to the improved wellbeing of societies. Research contributes to solving the world's most difficult problems; the complexity of the issues facing society requires that universities engage with these issues, using their dept of talent across all disciplines.

Our strategy recognises and accepts these challenges and responsibilities. Through this strategy we aim to increase our visibility as an institution that not only creates and advances knowledge, but also one that makes significant contributions to major social, economic, and environmental challenges across disciplinary and sectoral boundaries.

We will continue to nurture scholarship, develop new knowledge and increase our understanding of our society and our world. This cannot be done without a clear strategy, the right people, appropriate resources and an understanding of our environment.

Professor Corli Witthuhn
Vice-Rector: Research

March 2015

Our context

Introduction

The environment for higher education, locally and globally, is changing rapidly; education and research are becoming increasingly global and competitive. These trends will accelerate in the next few years.

Higher education institutions in South Africa are strategically driven to develop the highest standards of research as the reputation and recognition of these institutions lie in their ability to generate new knowledge of high impact and relevance.

Research at the University of the Free State (UFS) has made steady progress in the past ten years, with increases in both the volume and quality of research. However, despite improvements in all those metrics which are generally recognised as reasonable indicators of relative performance, our 'ranking' on the National Higher Education Ranking system has dropped. This illustrates the ongoing challenge the university faces in identifying and exploiting its competitive advantage and niche in a highly competitive environment and in meeting changing market demands by developing new products, delivering and organising products in new ways and finding novel ways to tap old and new resources.

The UFS 2015-2019 research strategy aims to address these challenges through providing an institutional framework to drive the next phase of research development at the University, making research a priority for the institution. This strategy focuses on our commitment to research excellence and impact through transformative research, and how the University will promote and nurture it.

Informing the research strategy

Research at the UFS is informed and shaped by many factors; externally these include (*inter alia*) the National Development Plan, the National Research and Development Strategy the Ten-Year Innovation Plan, and the nature of research funding.
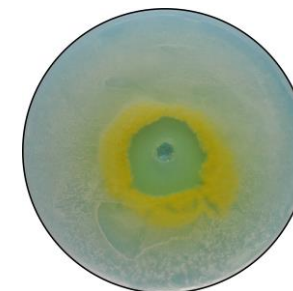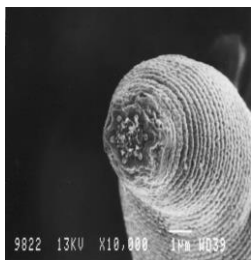
The UFS Research Strategy, at its core, seeks to promote relevant elements of the UFS Mission, namely

- Setting the highest standards for undergraduate and postgraduate education.
- Recruiting the best and most diverse students and professors into the University.
- Advancing excellence in the scholarship of research, teaching and public service.
- Promoting innovation, distinctiveness and leadership in both academic and human pursuits.
- Establishing transparent opportunities for lifelong learning for academic and support staff.

The UFS Research Strategy is also informed by the UFS Strategic Plan[1], which identifies three key performance areas: The Academic Project, the Human Project and the Support Services Foundation.

In the past five years, the UFS has made tremendous strides in terms of the Human Project. Looking forward, the University will be required to carefully plan the further development of the Academic Project.

The Academic Project aims to enhance the general academic advancement of the University, and also specifically aims at developing research excellence through, inter alia, expecting academics to remain

at the forefront of their disciplines, to become (or remain) internationally recognised experts in their fields, to publish scholarly work in the top journals of their disciplines and to enable themselves to train the next generation of professionals. Various systems, regulations and policies have been put in place to ensure that the aims of the Academic Project are met, including the Academic Promotion Policy, regulations regarding NRF ratings and minimum research output requirements.

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[1] University of the Free State Strategic Plan, 2012-2016, May 2012
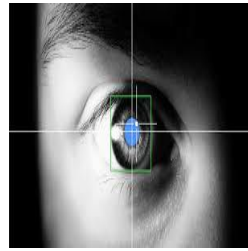
The Research Strategy

Research excellence and innovation are integral to the vision of the University of the Free State. Our goal is to address fundamental and strategically important questions, and to deliver economic, social and cultural impact at regional, national and international levels. This will require competing with our peers globally and raise the quality of our research.

Strategic research aims

The UFS research strategy is built upon the following five aims:

1. Improving international research excellence, impact and visibility through attracting, supporting and developing excellent people.
2. Developing research focus areas that will be recognised nationally and internationally for excellence.
3. Building stronger local and global partnerships and networks.
4. Providing a sustainable and supportive research environment with appropriate management, physical and financial resources.
5. Supporting and developing innovative research into commercialisation.

The move of the university to become a research university requires greater focus and greater efficiency.

UFS Strategic Plan 2012-2016

These strategic aims are populated with a range of actions; some of these are initiatives and programmes which are already in place, others are expansions and extensions of current initiatives, while others are new interventions – all aimed at ensuring that we improve our research excellence and impact.

Research Strategy actions

1. Improving international research excellence, impact and visibility through attracting, supporting and developing excellent people.

The UFS strives to create and maintain a work environment which attracts and retains the best researchers, including postgraduate students and postdoctoral fellows, and professional staff who provide essential contributions to research. The University cannot realise any of its goals without the best researchers. To attract, retain and develop the best researchers, an internationally competitive research experience is necessary. The University's policies and programmes for recruitment, promotion and performance management must align with our strategic priorities and support excellent research.

A: Promoting research excellence

Research excellence is a critical component of research success in a university environment. The UFS has implemented a number of key interventions to cultivate this:

A: PROMOTING RESEARCH EXCELLENCE

- Researcher development programme
- New class of senior professors
- Mid-career development programme
- Research leave
- Centre for Statistical Consultation

B: ENSURING CONTINUITY AND SUSTAINABILITY

- Retention of retiring researchers
- Postdoctoral fellowships
- Prestige Scholars' Programme
- Postgraduate School
- Research Fellows
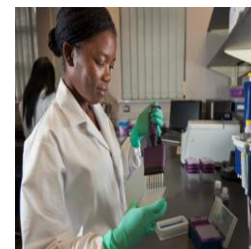
i) Researcher development programme

The Researcher Development Programme, based on the UK Vitae Research Development Framework, was implemented at the UFS to promote staff excellence in research. The programme is tailor-made for the purpose of developing the research skills of staff members and is evaluated and improved on an annual basis. The programme's key features are:

- Workshops aimed at the development of knowledge and skills in research methodology, research ethics, technology transfer and research management.
- The development of research supervision capacity for inexperienced research supervisors with relevant skills and an understanding of UFS postgraduate policies and procedures through workshops and discussion groups.
- Monthly article-writing retreats for staff members aiming to increase their research productivity, as well as improve the quality of their publications.

ii) New class of senior professors

In an effort to accelerate The Academic Project, detailed in the UFS Strategic Plan[2] a group of senior professors who have a significant impact on research activities in terms of their research output, their number of registered postgraduate students and through their established networks, are in the process of being appointed. This project is aimed at broadening the research culture of the university and will be expanded upon over the course of the next five years with the appointment of research-active critical scholars identified by the UFS to contribute to increasing the research outputs of the UFS in order to position it as a more critical player in the academic research landscape of South Africa.

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[2] University of the Free State Strategic Plan, 2012-2016, May 2012, pp 26

iii) Mid-career development programme

Available data on the research productivity of UFS staff show that almost half of current staff members are not contributing to the research outputs of the University. This was addressed through the introduction of the mid-career development programme in 2013. The programme aims to stimulate, support and develop research activity of academic staff members in various stages of their careers. It provides mentorship among researchers and support in obtaining doctoral degrees and NRF ratings.

iv) Research leave

The University recognises that research leave is an essential element in the intellectual and academic life of individual staff and the institution as a whole in that it assists staff to remain at the forefront of their disciplines and to publish scholarly work in the top journals of their disciplines. A set of research leave regulations governs the conditions for such leave. The University is developing a new leave policy that will address research leave for academic and support staff in order to promote the improvement of research outputs.

v) Centre for Statistical Consultation

The Centre for Statistical Consultation provides a free service to researchers and postgraduate students to improve the statistical quality of their research data for publication.

vi) Incentivising research activities

Incentivising research is an important element of promoting a culture of research excellence t a university. The current process of providing researchers with incentives based on the number of research outputs and NRF ratings will be reviewed by the University on an annual basis. A process of benchmarking incentives provided to researchers to align the University's guidelines with that of other universities will also be implemented.

> Research is fundamental to the new vision of the University.
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> UFS Strategic Plan 2012-2016
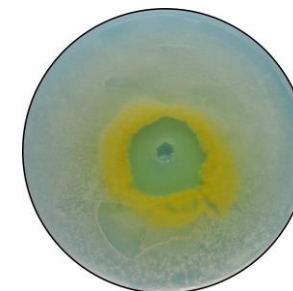
B: Ensuring continuity and sustainability of staff excellence

Investment in staff excellence is a timeous and cost intensive exercise. In order to ensure the long-term success of such an investment, providing for continuity in staff excellence is as important as investing in the development of staff excellence. Age distribution in the academic staff demographic of the University is an important factor to take into account in planning continuity, as the productive age of researchers in the UFS environment tends to lean towards the higher end of the age spectrum. While it is important to generate a new generation of academics to even out the age distribution challenge, it is also of significant importance to retain existing expertise.

The UFS has implemented the following programmes, projects, and initiatives to ensure continuity and sustainability in research excellence:

i) Retention of existing research staff excellence

The "Intervention to Retain Retiring Researchers" proposes the development of a senior research fellows programme to retain productive retiring academics through the production of subsidy-earning publications, or through the supervision of postgraduate students. Criteria for the selection of researchers for the purposes of the proposed programme will include an excellent research record and / or the possession of skills that are critical to the university.

ii) Increase in number of post-doctoral fellowships

Post-doctoral research fellowships are a significant contributor to research development at the university. The University faces a significant challenge in this regard in it that the limited funds available for postgraduate students hampers its ability to attract high quality students in a fiercely competitive market. For the purposes of increasing research outputs and for the development of talented academics, the funding for post-doctoral fellowships will be raised, in order to generate additional fellowships. The aim of this process will be to sustain a significant yearly increase in the number of postdoctoral fellows at the University. Moreover, academics will also be encouraged to apply for fellowships outside of the University.

iii) Prestige Scholars' Programme

The Vice Chancellor's Prestige Scholars' Programme (PSP) is aimed at developing the next generation of researchers. Its focus is on the preparation of new-generation world-class South African scholars. The programme seeks to fast-track the scholarly careers of 25 selected promising young staff members[3] that represent the next generation professors in the post-doctoral period of their careers through an advanced mentorship and development programme. The programme aims to create and sustain international networks with leading universities and scholars in the world, to the benefits of these young scholars.

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[3] University of the Free State Strategic Plan, 2012-2016, May 2012, p 28

These scholars are benchmarked by means of ambitious standards for the next generation professoriate in South Africa.

iv) Postgraduate School research development programme

A significant challenge in terms of research development at the UFS lies in that only 40% of its current staff hold doctoral degrees. In order to address this problem, the Postgraduate School implemented a research development programme aimed at assisting staff to complete their doctoral qualifications through a research proposal development and mentoring programme. In 2014, the Postgraduate School initiated an additional programme that identifies the 30 top achieving honours and master's degree students at the UFS

for opportunity to develop their academic identity and encourage them to continue their studies at the university. Although the programme does not guarantee employment for selected participants at the UFS, it does provide the Institution with a pool of excellent future researchers, from which it can potentially recruit.

i) Appointment of research fellows

Based on the success of other higher education institutions in recruiting research fellows to promote research development and increase research outputs, the UFS developed a guideline for the management, appointment and remuneration through the offering of financial incentives for publication outputs by research fellows to be reviewed annually.
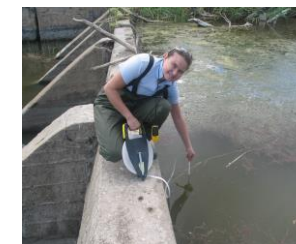
2. Developing research focus areas that will be recognised nationally and internationally

The UFS is strategically driven to generate research that is relevant, both nationally in terms of goals stipulated *inter alia* in the millennium development goals and the challenges identified in the National Development Plan (NDP), and internationally. Competition for funding on both a national and international level is a key driving force in generating relevant research, which is read and cited broadly and in turn assists in building a culture of research excellence that leads to the national and international recognition of a research-intensive university. In order to generate research that meets the requirements of relevance,

the UFS is working towards the following:

vii) *Increasing the number of South African Research Chairs Initiative (SARChI) Chairs*

Aligning itself with the UFS Strategic Plan[4], the UFS Research Strategy aims to work towards increasing its number of SARChI Chairs. SARChI is "*a flagship initiative designed to attract and retain excellence in research and innovation at South African universities*", into which the Department of Science and

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[4] University of the Free State Strategic Plan, 2012-2016, May 2012, pp 27-28

- Increase the number of SARChI Chairs
- Identify and develop strategically important research areas
- Consolidate and build research on the Qwaqwa Campus
- Encourage multi-disciplinary research
- High impact in-house journals

Technology invests R200m annually. An increase of UFS chairs in the programme would thus not only assist in generating research excellence at the University, but also contribute substantially towards gaining additional funding over the five-year period of the programme.
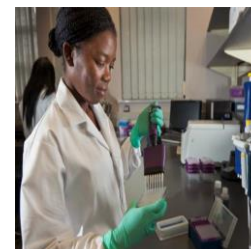
The UFS aims to create a critical mass of researchers in the funded area and building up research output to the point that the Chair is self-funded by the expiration date of the programme, in order to enable it to continue should funding not be renewed. As noted in the UFS Strategic Plan, the UFS has applied for several chairs in the current application round.

viii) Focusing on and identifying strategically important research areas

In order to balance existing capability with potential and opportunities, optimally use scarce resources and align institutional competencies with the external environment and internal aspirations, the University will continue to develop its portfolio of flagship and high impact research areas, working across and between disciplines. These will be in carefully selected research priority areas where the University has particular strengths, or where leadership wishes to develop particular strengths as part of the strategic positioning of the institution.

Research focus areas are essential building blocks upon which the Research Strategy is based. They are outward-looking, with trans-, multi- and interdisciplinary partnerships and alliances with other universities, funding agencies, government and non-government agencies and the private sector, searching for unique opportunities in South Africa, Africa and internationally. They will be key participants in the innovation and commercialisation initiatives and will provide a good environment for nurturing and innovating around the research-teaching nexus.

Resources, staffing and infrastructure will need to be aligned with the identified focus areas, which will be developed into Centres of Excellence.

ix) Consolidating and building research capacity at the Qwaqwa Campus

As part of the above initiatives, special attention will be given to the Qwaqwa Campus. Due to its history, research activity at the Campus requires particular interventions and capacity building. In order to fast-track research development it will be necessary to consolidate the research activities into clearly

articulated programmes. These should provide a vehicle for research development and must be relevant, suitable and appropriate for the Campus, building on its current and potential strengths. The research area(s) identified should be focussed and realistic, and should provide opportunities for inter- and transdisciplinary research by harnessing existing research expertise and attracting additional expertise. The Qwaqwa Campus should be the primary driver of such research areas, but collaboration within the UFS and beyond should be a strong feature so such programmes.

To this end, and as a starting point, the Afromontane Research Unit has been identified and will be developed over the next five years.

x) Encouraging multi-disciplinary research

Understanding the complex elements and forces within nature and society requires examination from the perspective of multiple disciplines. Major societal challenges can rarely be addressed using the finding of a single research discipline. Multi-disciplinarity generates synergies and increases the possibility of creative ideas.

The UFS will create a cultural environment that encourages, enables and supports its researchers to engage in multi-disciplinary research efforts. This will entail recognising the different pace with which multi-disciplinary research may proceed, and the need for more flexible organisational structures and reward systems.

A key starting point to foster productive multi-disciplinary collaboration will be the development of strong clusters of research activity, which bring people and infrastructure together.

xi) Developing in-house journals for ISI/IBSS accreditation

The UFS currently has a range of in-house scholarly journals, of varying types and quality. The University plans to identify two or three of the most suitable journals, which are aligned with its areas of research excellence, and support them to become high impact journals, ultimately with ISI or IBSS accreditation.
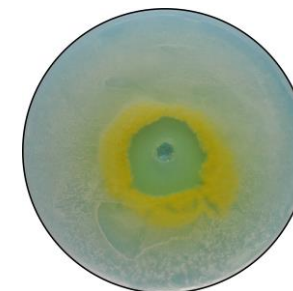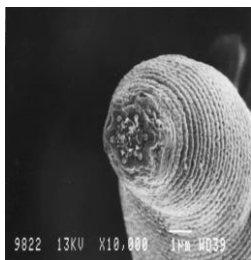
3. Building stronger local and global partnerships and networks

An increasingly important dimension of our strategy will be collaborations and partnerships, with fellow researchers and with a wider community of research funders and sponsors. This will build strong research networks and infrastructures with the capacity to address the big issues and generate new insights and knowledge. Research collaborations of this nature present strategic opportunities to improve the scale, quality and impact of our research.

There are many benefits from collaborative partnerships - researchers are exposed to different perspectives; they bring much needed skills, complementary resources and infrastructure; they provide access to industry-specific expertise; they provide opportunities for additional or diversified funding sources. Strategic partnerships with international researchers can bring global visibility and brings benefits to teaching and learning programmes.

Where appropriate the UFS will further enhance existing international partnerships, and create new ones as appropriate, building on initiatives where individual research leaders and groups have already identified complementary strengths in and engaged with their counterparts at other institutions. UFS will form strategic partnerships, for example with commerce and industry, to

TYPES OF PARTNERSHIPS TO BE PURSUED INCLUDE:

- Research collaboration where strengths are complementary
- Research collaboration where combined expertise offers exceptional potential
- Research collaboration with local, regional, national and international centres of excellence
- Collaboration with commercial and non-commercial organisations to foster relevant research and product development
- Partnerships with research-active overseas campuses
- Collaboration with business and industry
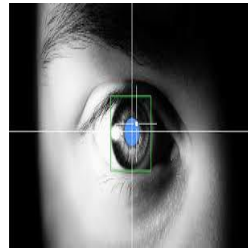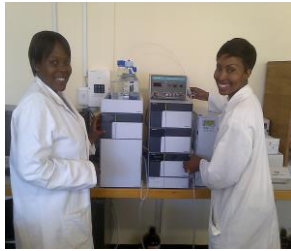
enable the impact of our research to be widened and deepened.

We will consider the establishment of flexible part-time affiliations with UFS for internationally excellent academics with whom collaboration already exists or is deemed essential, who located at excellent universities abroad, as well as the creation of pathways through which those universities' students could transfer to UFS as their research potential emerges.

Internationally, our existing collaborations are primarily with colleagues in Europe, the United Kingdom, the United States of America, and Canada. We will continue to encourage and support partnerships with colleagues in these countries, but we would also like to

build links at individual- team- and faculty levels in other countries and regions that are strategically important – particularly countries in Africa, but also with Brazil, Russia, India and China. These countries have been selected because of the opportunities presented by BRICS.

The University will continue its commitment to public engagement, in order to understand public concerns and attitudes, to inform public opinion and to address the barriers to adapting individual, organisational and mass behaviour.

"What do we know and celebrate about research partnerships? One, it takes hard work to establish and sustain productive relationships. Two, it cannot happen without dedicated individuals on each side to want to make the partnership work; reciprocity is key. Three, it often requires third-party funding through government agencies, foundations of the private sector. Four, it works best with productive outcomes planned in advance and delivered on time; such productivity in turn attracts further funding. Five, it builds enduring relationships across cultures and geographies which, in the end, is why science and scholarship are so important in the quest for decency, humanity and civilisation."

Jonathan Jansen

4. Providing a sustainable and supportive research environment with appropriate management, physical and financial resources.

The University strives to create an environment that supports research excellence, with appropriate financial, physical, management and knowledge resources.

i) Research related policies and governance structures

A sound governance and management system is a critical success factor in the development of a research-intensive university. Locally and globally the higher education landscape is changing, bringing new challenges to research management. In order to ensure that research is the fibre of the core business of the University of Free State its management and governance systems must be brought in line with this changing environment. Policies, systems and structures need to be aligned to promote and support the strategic priorities.

All research related polices and governance structures will be reviewed, and where necessary adapted or changed in order to ensure optimal support and accountability.

REVIEW OF RESEARCH RELATED POLICIES AND GOVERNANCE STRUCTURES

INFORMATION MANAGEMENT:

- RIMS
- Postgraduate candidate management
- Research inventory
- Open Access Policy

FINANCIAL ACCOUNTABILITY AND SUSTAINABILITY

RESEARCH INFRASTRUCTURE

MEASURING RESEARCH PERFORMANCE AND IMPACT

COMMUNICATING OUR RESEARCH

ii) Information management

Higher education institutions and research councils rely on accurate and reliable research information to support strategic planning, manage the research process and improve reporting to external bodies such as funders and government bodies. The UFS aims to address this through the following:

- **RIMS**

The primary research information management tool implemented by the UFS is RIMS - an international information management system focusing on the sharing, transfer and archiving of research information. RIMS is a multi-faceted system that facilitates a single approach for the integrated management of proposals, protocols, patents and publications. Its eventual aim is to integrate all current systems on various levels, including administrative systems, such as Human Resources and the Student System, both of which are already in place. The UFS Financial System and non-administrative systems such as D-space will be integrated at a later stage. In future, system-to-system submission of funding proposals locally and internationally will also be submitted through RIMS.

The Compliance Module within RIMS consists of three sub-modules: Human Studies, Animal Studies and Environmental Safety and enables researchers to create, submit and track proposals for ethical clearance. All ethics applications will be dealt with electronically through RIMS and once fully operational, the application and meeting process will save time and staff resources.

The Research Outputs Module in RIMS provides mechanisms to capture publications and other assets from research activity; this information is then used to quantify research performance, justify government funding, promote university accomplishments and build publication repositories. RIMS support staff are collaborating with the UFS Library to create an e-form

for postgraduate students to submit their final dissertations and theses electronically. Eventually, the system will also integrate with systems such as D-Space, an open source software package, which services a specific need as a digital archives system, focused on the long-term storage, access and preservation of digital content.

The Technology Transfer Module is operational in the production environment and researchers are able to create and submit an invention, patent or research agreement to the Research Office through RIMS for approval.

The system poses some challenges that need to be addressed. The initial configuration of each module to suit the needs of the University is time-consuming methods will be investigated. An effective electronic business process for every module should be implemented to ensure that business processes are replicated on the system. Continuous development, training and improvement processes will be provided for different role players to ensure the effectiveness of the system (researchers, administrative staff, board members, coordinators and heads of departments).

- **Postgraduate candidate management**

The low throughput rate of postgraduate students poses a significant challenge to the University as it leads to an overload of research supervisors and income loss through the loss of subsidy. It also impacts the output of postgraduate students. The tracking of postgraduate students' progress forms an integral part of the management of student throughput rates and the determination of supervision capacity to expand the University's postgraduate student cohort. The MS Dynamics Candidate Research Management programme was acquired by the UFS to enable candidate tracking, for implementation by 2018. The programme facilitates a range of applications that track a student's progress from first application to graduation. It generates information on an individual student's progress through various stages of study, including proposal approval, title

registration, ethics approval and notice of submission. It also generates automatic notices to students and supervisors in the case of failure to meet deadlines. The UFS Postgraduate School can use information generated by the system to indentify students at risk of not completing their dissertations/theses within the time limit, and implement targeted interventions. The implementation of the student tracking system will be a huge step forward in the University's ability to monitor supervisor load, the success of a supervisor's students and the performance of departments.

- **Research inventory**

A key element of the strategy is the further development of a searchable database which records the

institution's research activities. it will provide a resource for improved management of research, facilitate collaboration (internally and externally), and be a resource for external stakeholders (such as potential academic collaborators and funding agencies) wishing to gain an insight into the extent of our activity in a particular area.

- **Open Access Policy**

The UFS Library and Information Service (LIS) has a role in championing and leading the way forward in terms of the visibility and discoverability of all UFS scholarly output. Researchers recognise that their work is not complete until the

results have been fully communicated and are openly made available for others to build on and learn from. An Open Access Policy has been approved in order to facilitate this process. The policy serves to pave the way to officially embed the LIS in the research process. The Open Access Policy affords scholars the opportunity to work faster and more effectively, incorporating the latest findings in their work by allowing immediate and barrier-free online access to published work.

Open Access is a fundamental constituent to scientific productivity, results in rapid publication with the potential to speed up the translation of ideas into innovative new services and products. Most importantly the LIS recognises scholarly publications as one of the key assets of the University and seeks to ensure that

these assets are managed effectively and efficiently for the benefit of the UFS and the academic community.

iii)   Financial accountability and sustainability

Requirements for financial accountability are becoming more and more stringent, and increasingly complicated as funding sources diversify. It is therefore essential that financial and budgeting systems are optimal and transparent. To optimise our research success, our budget model should be synchronised to enable research activity at the highest level. This includes regular scrutiny of the model to ensure that we are minimising hurdles to research, or eliminating drivers of unintended

behaviours that are prejudicial to research activity.

Currently the UFS derives its research funding from a variety of sources. In order to grow the research endeavour at the University it will be essential to diversify the funding base even wider, looking more to international funding.

iv)   Research infrastructure

Excellent research requires the right tools and infrastructure. This is more than equipment, but also includes skilled professionals to manage and support the research infrastructure. It is essential to further improve the management of our capabilities and the planning of our investments.

As a starting point the University will implement a Strategy for the management of research equipment. Innovative ways of accessing and/or obtaining large, cutting edge items of research equipment will be investigated and developed.

v)   Measuring research performance and impact

Research performance, impact and uptake must be understood and measured in such a way that it contributes to the continuous improvement of our research. As previously indicated, it means generating better and more meaningful data to promote informed decision-making.
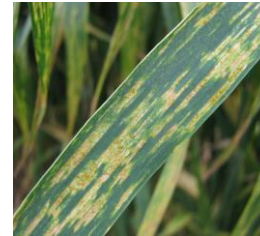
The University (through the Directorate for Research Development) will concentrate on measuring what is important in terms of quality, excellence, scholarship, outcomes and impact. Flexible systems will be required to capture information about our research and research training that crosses faculty boundaries.

Measuring and describing the impact and uptake of academic research is becoming increasingly important, and our diverse range of funders expect reporting on the impact of the work that they sponsor.

Impact is the demonstrable contribution that excellent research makes to society and the economy. This is more than only commercial or economic related outcomes. Research at universities can also have a profound impact on society and our understanding of ourselves and others.

Tracking the impact that research has made can be in five areas:

- Advancement of knowledge
- Application of research outputs
- Legislation and policy
- Economic benefits
- Community benefits

The University will develop a framework for measuring and reporting on impact and uptake

v) Communicating our research

Communicating publicly the research successes, strengths and achievements of the University is important to building its international research image. A strategy is required to ensure that public information about research and research training is collected once, and then synthesized and packaged in as many different contexts as possible. Online information must showcase not only our current research and researchers, but also the contributions of researchers who have been affiliated with the UFS.

Our researchers also have a responsibility to promote research at all levels, including through public debates, external peer reviews, committee membership, etc.
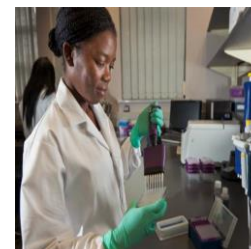
5. Support and develop innovative research into commercialisation

Rather than viewing universities as "ivory towers" devoted to the pursuit of knowledge for its own sake, a growing number of governments of industrial and developing economies seek to use universities as instruments for knowledge-based economic development and change. They have also sought to increase the rate of transfer of academic research advanced to industry and to facilitate the application of these research advances by predominantly domestic firms as part of a broader effort to improve national economic performance. Many universities give higher priority to objectives such as company creation, supporting faculty recruitment and retention, enhancing research funding, creating an entrepreneurial culture and attracting venture investment in their regions.

The goal of the University's research commercialisation strategy is to take the university's expertise, innovations and inventions to national, regional and global markets for the advancement of the University, its staff and its students, and for the economic and social welfare of the country. Other imperatives include helping to recruit and retain top researchers and postgraduate students; fostering ties with the private sector and investors, enabling a better understanding of market requirements from universities, spin-out companies and placement of students; instituting best practice contract management systems and improving turnaround time of contracts and generating third-stream income. Innovation and commercialisation are imperative if the UFS is to stay abreast of national and international trends. Contract income (including income generated by short courses), remains the largest part of the third income stream at South African universities.

Innovative research can only be commercialised if the protection of intellectual property (IP) is based on these premises. The UFS, as a major public institution, has a responsibility to manage IP created as a result of its various activities in a manner that
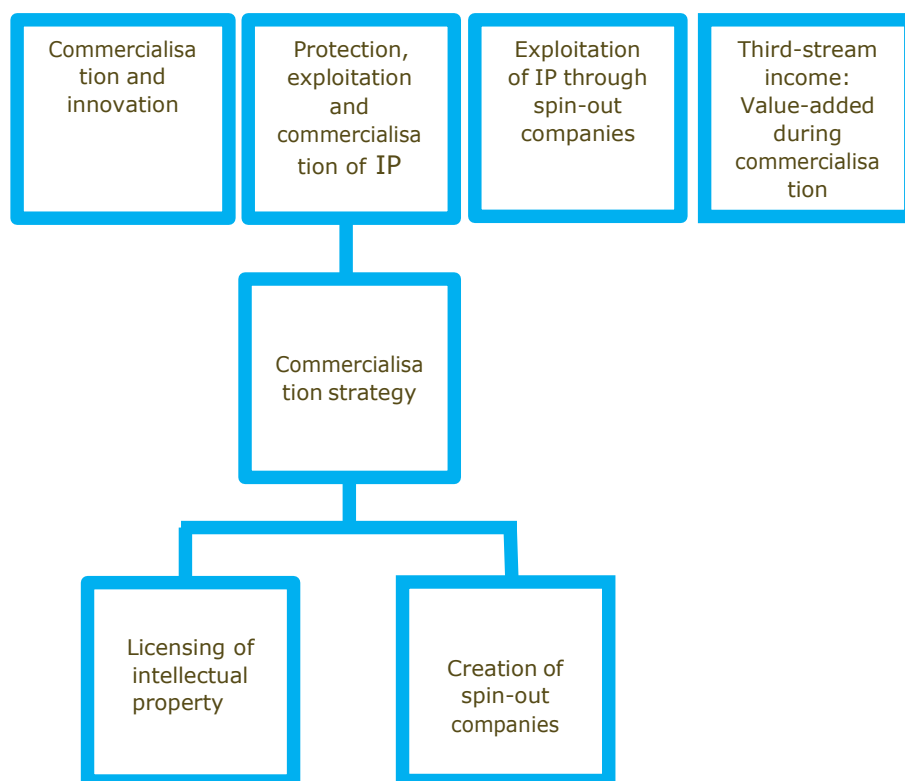
furthers its mission and benefits the wider community. Proper management of IP by the UFS will help attract research investment and research collaborators, encourage the use of innovative teaching and learning materials and technologies and promote linkages with industry. It also helps attract, reward and retain outstanding staff and students; facilitate the increased transfer of knowledge across all sectors of the economy; and generate financial returns for the UFS and the creators of IP.

The commercialisation strategy will generally involve one of the following two routes, but is not limited to them and specific requirements may lead to different strategies:

i) Licensing intellectual property

A license gives a company the right to use the intellectual property (IP) to make a product and, in return, the UFS usually gets a royalty on the sales turnover of the product. The UFS retains ownership of the IP and if the company does not fulfil its contractual obligations, the license can be cancelled. A license may be exclusive (only one company gets the right) or non-exclusive. A license may also be restricted to a particular geographic area.

Figure 1: *UFS Research Commercialisation Structure*
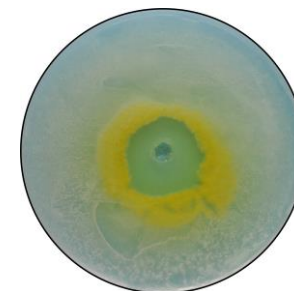
ii)   Creation of a spin-out company

The UFS may assign the IP of the spin-out company or may license the intellectual property to the spin-out company. The UFS will generally get income from dividends issued by the spin-out company or from sale of shares, but may also get royalty on turnover depending on the agreement between with the spin-out company.

In cases where the UFS decides, in consultation with the creator(s)/ inventor(s) or entrepreneur(s), to exploit IP by means of the establishment of a spin-out company, it will be done by establishing a separate enterprise. The UFS, the creator(s)/inventor(s) or entrepreneur(s) and other possible partners will own shares or members' interests in such an enterprise according to a division that is agreed upon beforehand. In the setting up of such spin-out companies, special attention should be given to broad-based black (BBEEE), as defined in Section 1 of the Broad-Based Black Economic Empowerment Act, No. 53 of 2003. Specific rules and regulations are also in place regarding staff members and students of the UFS being involved in any other private companies, close corporations or other separate entities or enterprises that compete with the UFS, without prior authorisation from the UFS. The full potential of the innovation process is often not embraced by academics at South African universities as they are uncertain whether to pursue increased publication outputs for career progression, or to factor the innovation and commercialisation process. Often the lack of appropriate administrative and policy support are cited as significant obstacles in fostering a culture of research and innovation. However the main challenge remains the development of an appropriate system and structure that would best stimulate an environment for enhancing research, innovation and entrepreneurship. Appropriate systems, structures and constraints associated with a technology transfer office at the UFS must be examined in order to develop and support a culture of research and innovation.
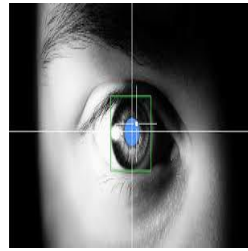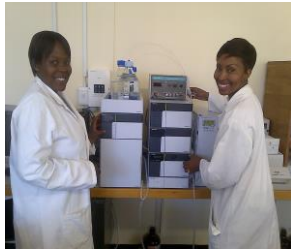
Monitoring and Evaluation (M&E)

Tracking our progress and monitoring each programme, project and intervention identified in the Research Strategy is an essential at and must be at the heart of evidence-based programme design, and holding ourselves accountable. M&E is essential for measuring progress and impact and demonstrating whether our plans are being effective. Understanding this is essential to improving our Strategy.

A detailed M&E plan is required to serve as a functional structure to monitor and review key areas, projects, initiatives and plans identified in the Research Strategy. Such a plan will be developed in consultation with key stakeholders, and is necessary for, *inter alia*:

- Evidencing outputs and outcomes;
- Enabling progress monitoring against KPAs, milestones and targets; and
- Informing funding requirements.

The plan, while setting KPAs and targets, will be flexible and organic, and will continually serve to redefine, revise and improve priorities and targets.

We will develop a clear implementation plan, and a detailed monitoring framework to measure progress against our strategy. In particular, we will align performance measures with the strategic aims outlined in this strategy.

Faculties, Departments, Centres and Institutes will be required to develop their own research strategies that are aligned with the University Research Strategies.

As well as more detailed performance measures, we have identified a set of broad institutional indicators to gauge overall progress and achievement. These will operate as our overall 'dashboard' to monitor progress.
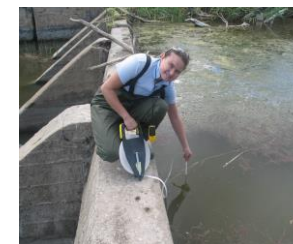
MEASURES OF SUCCESS:

- Increase the number of research-leading staff and sustainable critical mass in research in targeted areas
- Increasing our research income by 50%
- Establishing Centres of Excellence in each faculty.
- Doubling the number of Postdoctoral Fellows
- Increasing the number of doctoral degree graduates by 40%
- Increasing the number of master's degree graduates by 50%
- Increasing the percentage of academic staff with a doctoral degree to 50%
- Doubling research output in terms of publications
- Increasing the number of rated researchers by 20%.
- Establishing 2 spin-out companies
- Increasing the volume and value of collaborative research

KEY TARGETS

By 2019:

- We will have improved our national ranking.
- We will be recognised as a research-intensive university.
- Our resources will be aligned with our research strategy.
- Our multidisciplinary and cross-sectoral research and innovation in our Centres of Excellence will be recognised for their relevance and impact.
- Our partnerships with external organisations will be generating joint initiatives and enhancing research and enlarging our research capabilities.
- Superior governance, budget and support systems, and research infrastructure will be helping to drive research of excellence and impact, and minimising impediments to research excellence.
- Researchers graduating from the UFS will be well-rounded, prepared for diverse careers, and in demand globally.
- Internationally recognised for successfully commercialising our research outputs.