Although the information in this publication has been compiled as accurately as possible, the University accept no responsibility for incorrect data that may appear in it. Please consult the Calendar of each faculty to familiarise yourself with specific modules and rules.
NORTH-WEST UNIVERSITY

POSTGRADUATE PROSPECTUS
2015

It all starts here ®
Within the South African Higher Education landscape, with 25 public higher education institutions (following the establishment of the Sol Plaatje University in Kimberley in the Northern Cape), the NWU is the second-largest. It came into being on 1 January 2004 as part of the process of transformation of the higher education landscape. The NWU has three campuses (Potchefstroom, Mafikeng and the Vaal Triangle) as well as an institutional office located in Potchefstroom. There are 15 faculties across the entire institution.

The vision of the University is to be a “pre-eminent university in Africa, driven by the pursuit of knowledge and innovation”. While the University as a whole is striving to become a balanced teaching-learning and research university, and to implement its expertise in an innovative way, the Potchefstroom Campus has refined its focus and strives to be a research-directed campus.

The University has a policy of functional multilingualism, and in order to promote access introduced some ten years ago academic interpreting services for students. This service is mainly available in Potchefstroom, with about 25-30% of all modules being interpreted into English from Afrikaans, but also from Afrikaans into Setswana for some education students.

The University has also reached out to the betterment of the qualifications of especially teachers and nurses but also students in theology, by developing the second-largest open distance learning programme in the country. This programme, running mostly from the Potchefstroom Campus, reaches between 25 000 and 28 000 students annually. In total the Potchefstroom Campus has an enrolment of over 43 000 students, of which about 16 500 are on campus on a contact basis.

The University is serious about developing students and staff across all the traditional pillars of the university, viz. teaching-learning, research and community engagement. To this end the Potchefstroom Campus has, in addition to the traditional research and teaching foci, developed a wide-ranging programme of community engagement. The Students’ Rag Community Service section of the Students’ Representative Council is the largest entity of its kind in the world.

As a further development in terms of taking research outputs into industry, the University has also developed a significant programme in terms of Research and Development, culminating in a wide range of patents, spin-off companies and other forms of commercialization of expertise.
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Quality in Nursing and Midwifery (INSINQ) (Dr Karin Minnie)
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Centre for Applied Risk Management (UARM)
Serious Games Institute - South Africa (SGI-SA)
PoSER (Understanding Poverty and Socio-Economic Challenges)
Generation Y Research (ProGenY)
Faculty Humanities
Integrative Multidisciplinary Research (IMD) on the Eco-health & Wellbeing of Local and Regional Communities & Regional (history) studies.
Research group in the Cultural Dynamics of Water (CyDyWat)
Research group Political Development and Constitutional Application (PODCA)
Public Affairs Research for Service Delivery (PARSED)
Ancient Texts (AT)
Mine Water Research Group (MWRG)
Mafikeng Campus hosts the following centres:
Indigenous Knowledge Systems (IKS) Centre
Centre of Applied Radiation, Science and Technology (CARST)
Dale Beighle Centre for Animal Health Studies
Community Law Centre

Commercial Research Entities (Potchefstroom Campus)
Centre for Pharmaceutical and Biomedical Services (Prof Banie Boneschans)
Business units within CPBS
The Research Institute for Industrial Pharmacy (RIIP®) incorporating the Centre for Quality Assurance of Medicine (CENQAM®)
The Clinical Pharmacokinetics Laboratory (CPL)
The World Health Organisation (WHO) Collaborating Centre for Quality Assurance of Medicines
The PEPFAR project
Cosmetic Efficacy Laboratory (CEL):
The tdi Centre for Advanced Manufacturing (Mr Danie Vorster)

Other hosted entities
South Africa Research Chair Initiative (SARChi)
Nuclear Engineering (Prof Pieter Rousseau)
Astrophysics and Space Physics (Prof Markus Boettcher)
Early Detection and Prevention of Cardiovascular Disease in Africa (Prof Alta Schutte)
Coal Research (Prof John Bunt)
Biofuels Research (Prof Sanette Marx)
Eskom Chair - Emission Control (Prof Stuart Piketh and Prof Ray Everson)

Support structures
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Internationalization

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NWU - background

Following the merger leading to the establishment of the North-West University, the University adopted a strategy of being a balanced teaching-learning/research university. As time went on and the campuses diversified to some extent and developed new foci, and each campus developed its own foci, while supporting central research focus of the NWU.

The University has a number of significant strengths which all in some way contribute to the success of the North-West University as a whole.

The University has also in the context of the highly competitive nature of sport nowadays created a number of sports structures to enable the students to compete at a high level. Thus there is a Rugby Institute on the Potchefstroom Campus, as well as academies for hockey and tennis, with a soccer institute on the Mafikeng Campus, and a cricket academy on the Vaal Triangle Campus. There are superior and very functional facilities for the many major and minor sports codes that are practised on the campuses. All these initiatives have led to the University performing very well in the various Varsity Cup competitions.

To capacitate students in terms of communication, there are also radio stations and campus newspapers run by the students themselves.

There are in total fifteen faculties across the entire University. All campuses have the generic faculties such as Arts, Humanities, Economics, Natural Sciences, Education and so forth, while some specialized faculties are located on certain campuses only, such as Engineering, Law, Animal Health, Pharmacy, etc.
The Faculty of Arts is the oldest of the faculties of the University. It was effectively created in 1877, following the establishment of the Theological Seminary at Burgersdorp in 1869 – a seminary which would in time evolve into the Potchefstroom University for CHE, and migrate to Potchefstroom after the Anglo-Boer War.

The Schools within the Faculty are the traditional humanities schools, such as Languages (Afrikaans, English, Setswana, German, French and Translation Studies), Music, Philosophy, Social and Government Studies, Communication Studies (including Graphic Design and Art History) and the ATKV School for Creative Writing. The Faculty offers a wide range of curricula, and it is possible to range outside a subject discipline and include other disciplines in an honours programme. Please visit the website to determine the names of the School Directors and make direct contact.

The Dean of the Faculty is Prof Jan Swanepoel.

The Faculty of Natural Sciences

The Faculty of Natural Sciences was the second faculty to be established at the University after it was relocated to Potchefstroom in 1905, and includes the School of Physical and Chemical Sciences, the School of Biological Sciences, the School of Computer, Statistical and Mathematical Sciences and the School of Geo-Spatial Sciences. It is also home to the Centre for Business Mathematics and Informatics, as well as the Centre for Environmental Management and the Centre for Human Metabonomics.

The Dean of the Faculty is Prof Kobus Pienaar.

The Faculty of Economic and Management Sciences (incorporating the Potchefstroom Business School)

The Faculty, established in 1941, houses, apart from the Potchefstroom Business School, also the Schools of Accounting

In this Faculty there is a strong emphasis, apart from theoretical work in Economics and the other schools, on the training of students for the profession of chartered accountancy, and especially also forensic accountancy. The Faculty also does wide-ranging work in human resources and tourism studies.

The Dean of the Faculty is Prof Susan Visser.

The Faculty of Theology

This Faculty, which grew out of the seminary established in Burgersdorp in 1869 for purposes of training ministers, in conjunction with the Theological School of the Reformed Church of SA, has as primary responsibility the training of ministers for the Reformed Church, and as such holds an important historical place, having been the origin of the University in 1869. However, the activities of the Faculty have expanded considerably and the Faculty now reaches many students in South Africa and abroad.

The Schools in the Faculty are the School of Biblical Counselling and Church Ministry, the School of Ancient Language and Test Studies (Greek, Latin, Aramaic, Hebrew), the School of Ministers’ Training and the School of Continuing Theological Studies. The Faculty is also home to the UK-based Greenwich School of Theology, which only does post-graduate training in Theology.

The Dean of the Faculty of Theology is Prof Francois Viljoen.

The Faculty of Education

This is a huge Faculty, in existence since 1919, and it also carries the academic responsibility for the extended programme in Open Distance Learning, or ODL, which has students across the country and also significant numbers in Namibia and other African countries. The post-basic training provided to these students is of crucial importance in addressing skills shortages among teachers in South Africa.

The schools in the Faculty are Education Sciences, Natural Sciences and Technology for Education, and Human and Social Sciences for Education as well as Research in Education Sciences.

The Dean of the Faculty of Education is Prof Robert Balfour.

The Faculty of Law

The Faculty of Law, established as an independent faculty in 1966, has one school, the School of Law, and offers the basic four-year LLB qualification for students intending to become lawyers in the various fields of practice. There are also students who prefer to do a three-year degree (such as BA or BComm and then complete the final two years of LLB) to have a broader-based training.

However, the work done is the Faculty is very wide-ranging, especially in the field of research (see under the research entities). The Faculty is also home to the Potchefstroom Law Clinic, a community project.

The Dean of the Faculty is Prof Nicola Smit.
The Faculty of Health Sciences

The NWU does not have a medical faculty, but offers a wide range of health-related programmes located within the Faculty of Health Sciences, created in 1990. The schools within the Faculty are the School of Nursing Science, the School of Psychosocial Behavioural Sciences, the School of Biokinetics, Recreation and Sports Science, the School of Pharmacy and the School of Physiology, Nutrition and Consumer Sciences.

There are also various institutes involved in pharmaceutical and other research located in the Faculty.

The Dean of the Faculty is Prof Awie Kotzé.

The Faculty of Engineering

This Faculty, after being approved in 1981, was originally located on the Vaal Triangle Campus, but relocated to Potchefstroom in the late eighties.

The Schools in the Faculty are the School of Chemical and Minerals Engineering, the School of Electrical, Electronic and Computer Engineering, the School of Mechanical and Nuclear Engineering, the School of Electromechanical Engineering and the School of Industrial Engineering. The Faculty is also involved in a wide range of technological and other developments, such as the JS Glider and the solar-powered car.

The Dean of Faculty is Prof LJ Grobler
FACULTIES
VAAL TRIANGLE
CAMPUS
Faculty of Humanities

The Faculty of Humanities continually strives to be a training facility for first-class, adaptable and pioneering students. The Humanities family pride themselves to continually deliver world class teaching and learning practices, to vest and cultivate sound value systems, promote inventive thinking and to spark passion for social sciences. The broad range of disciplines falling within the Faculty of Humanities are particularly rich in insights, context, and ideas that apply directly to some of the most worrying and puzzling developments of our time.

The Faculty of Humanities consists of four academic schools, viz. the School of Education Sciences, the School of Languages, the School of Behavioural Sciences and the School of Basic Sciences

Executive Dean: Prof Tinie Theron.

Faculty of Economic Sciences and Information Technology

The Faculty of Economic Sciences and Information Technology is one of the first faculties in the world to combine Business Sciences and Information Technology. This unique pairing helps to prepare students for the dynamic and fast-growing world of the financial services industry, information technology, business mathematics, informatics, accounting, chartered accountancy, economics, business management, marketing and sport science. In short: a powerhouse of academic activities, innovative technologies and ground-breaking research.

The Faculty of Economic Sciences and Information Technology consists of three academic schools, namely, the School of Accounting Sciences, the School of Economic Sciences, and the School of Information Technology

Executive Dean, Prof Herman van der Merwe.
The Faculty of Agriculture, Science and Technology (FAST)

The Faculty of Agriculture, Science and Technology (FAST) is made up of 4 schools; namely the School of Agricultural Sciences, the School of Environmental Sciences, the School of Mathematical and Physical Sciences, and the School of Research and Postgraduate Studies.

The Faculty also hosts three centres; namely, the Centre for Animal Health Studies, the Centre for Applied Radiation Science and Technology (CARST) and the Centre for Indigenous Knowledge Systems (IKS).

Faculty of Commerce and Administration

The Faculty of Commerce and Administration consists of the Graduate School of Business and Government Leadership, the School of Management Sciences, the School of Accounting, the School of Economic and Decision Sciences, the Centre for Business and Management and Municipal Leadership Training Academy.

The Dean of the Faculty is Prof Sonia Swanepoel.

Faculty of Education and Training

The Faculty of Education and Training consists of the School for Teacher Education and Training, the School for Educational Leadership and Development and the Centre for Teacher Development.

The Dean of the Faculty is Prof D Greeff.

Faculty of Human and Social Sciences

The Faculty of Human and Social Sciences consists of the School of Human Sciences (including Programmes in Theology), the School of Social Sciences and the School of Postgraduate Studies and Research.

Faculty of Law

The Faculty of Law consists of the School of Undergraduate Studies, the School of Postgraduate Studies and the Community Law Centre.

The Dean of the Faculty is Prof Melvin Mbao.
The NWU has a functional and multilingual language policy. This policy was implemented to ensure that every student has access to the NWU. The NWU is a pioneer in the field of educational translation within its various programmes. The aim of this is to ensure inclusivity. Each campus applies this multilingual language policy according to its own student profile.

As indicated above, a postgraduate course of study starts immediately after completion of a first degree. This means that an honours degree, which is the normal progression after a three-year degree, is pursued within the faculty where the original degree was completed, although it is possible to migrate to other faculties and to do trans-disciplinary studies in certain areas. For purposes of the ordinary honours degree, however, the student will remain in the faculty where she/he completed the first degree (BA, BSc, BComm, etc.). Following the honours degree, the student will then migrate to a research entity (see below) for purposes of enrolling for the master’s degree. Students who complete a four-year degree are in most cases eligible to enrol for a master’s degree immediately.

Some faculties also have centres and institutes offering short courses, other types of skills development and various community and commercial services (see the section on commercial exploitation of research results below).

The language policy of the University, and especially the application of the policy on the Potchefstroom Campus and to some extent on the Vaal Triangle and Mafikeng Campuses is of crucial importance.

The University has adopted a flexible, functional multilingual language policy, which is interpreted on the Potchefstroom Campus as meaning that the majority of classes at the undergraduate level on the Campus are offered in Afrikaans, as the majority of undergraduate students are Afrikaans-speaking. However, so as to enhance access, and also success for students of other language groups, a large number of especially strategically important courses are interpreted into English – the University has developed a highly-effective simultaneous interpreting service, which not only renders a service for students in classrooms, but also for other meetings and gatherings. This service has even been extended to other Universities and some schools.

When it comes to postgraduate study, the language of instruction is mostly English, and because of the relatively small sizes of some classes in the honours programmes, it is possible to accommodate the wishes of students.
The Potchefstroom University for Christian Higher Education throughout its long history always prided itself on the high quality of teaching that was done at the institution. Prior to the late nineties there had been very good research done at the university, but it was not focussed, and there were pockets of excellence, where Potchefstroom researchers were considered among the best in the world, but in general the mind-set was not geared to research excellence. This changed in the course of the nineties with a conscious decision being made by the then rector of the Potchefstroom University for CHE, Prof Carools Reinecke, to engage in a focussed process to improve research outputs and to inculcate a mind-set aimed at achieving good research results and position the University more favourably among the ranks of the great research universities in the country.

A very focussed process called formatting was engaged in. Consultants from universities in Europe were called in and the result was that twelve research entities called research focus areas were created, accommodating all the faculties on both the Potchefstroom and the Vaal Triangle Campuses of the PU for CHE.

This necessitated an entirely new approach to academic management, and while the concept of a faculty remained the single most important management unit in the university, research focus areas and schools came into being. Schools were composites of cognate subjects, for example a school of languages, and school of environmental sciences, etc. The intention with the schools was to simply management and to create large management units – some departments, that had been now collapsed into schools, had become too small to be viable. Schools remained the domain of teaching and learning, and honours courses, while being post-graduate in the strict sense of the word, were taught in schools. Focus areas were cross-cutting across schools and faculties, and were managed in such a way that researchers could work in one school but more than one focus area. The emphasis in the focus areas was on bringing alignment and focussing resources. The system was refined through a number of initiatives, the most important probably being the introduction of internal and external reviews – the external reviews are crucial for the developmental path of a research entity, and are important for profiling purposes.

While the whole focus area process took some time to settle properly, the concept has since been expanded dramatically, as outlined below, and the results have been more than gratifying – the astronomic increase in research outputs across the whole of the North-West University, but especially the Potchefstroom Campus, can be ascribed to the creative process of focussing research, and allocating manpower and resources to well-defined and creative areas of research. The application of human resources has similarly been optimized – a structured system of performance management has led to better outputs, more focussed work and a very good system to incentivize academics. Academics structured their work according to a 40:40:20 principle – research, teaching, and other activities required of academics. This system does allow for flexibility in individual cases.
The increase in research outputs can thus be attributed, as can be seen in the table below, to the system of creating focus areas, to a time management scheme for academics, a replanning of the academic year, a constructive system of incentives, greater emphasis on international involvement, and the introduction of a post-doctoral fellows’ programme.

Below is a visual presentation of the growth in research outputs because of the emphasis on focus since 1988. This graph has been developed by Prof Frikkie van Niekerk, DVC Research in the Institutional Office and shows the growth in the number of article equivalents. It represents the research vision of the entire University – the vision of the Potchefstroom Campus is to be a research-directed campus, and this is being realized.
Following the development of the focus areas, it soon became clear that the focus areas were often too large and could not accommodate the complexity and variety as well as the levels of excellence of the academics involved in them.

A subsequent process saw the introduction of the notion of developmental growth in research entities. This has evolved into the process where a new grouping or subject can be developed in a context of a research niche, with some financial and administrative support, grow and be assessed and develop into a research focus area, and from there progress to being a research unit and ultimately a Centre of Excellence, which represents the highest level of excellence for a research group at the University. As an entity develops, the requirements become far more stringent, until what is done in a Centre of Excellence has to comply with the highest international standards.

The whole developmental trajectory of the research entities has also been accompanied by a renewed emphasis by the University on having academics achieve National Research Foundation (NRF) ratings. A rating by the NRF is a largely peer-based process, and is the ultimate achievement of a researcher in terms of his/her standing as an academic. There are a number of ratings categories (see below) and the University has over the last decade or so worked hard on providing resources for academics to enable them to achieve appropriate ratings.

Working within a research entity, and in a group headed by a prestigious rated scientist is of great importance for a PhD candidate – it is a guarantee in advance that quality has been and is being ensured.

NRF ratings are a very important benchmark of the quality of the researchers working at a university. These ratings, which are done on a peer assessment basis, range from assessments of young researchers (Y and the sought-after P) through a range of assessments for academics up to the level of the prestigious A and B ratings.
Hosted entities, platforms, centres

The DST/ NWU Preclinical Drug Development Platform (Prof Anne Grobler)

The DST/NWU Preclinical Drug Development Platform has at its heart the development of the pharmaceutical sector in South Africa, which forms part of strategic vision of South Africa, as stated in the Ten-Year Innovation Plan (2008-2018) of the Department of Science & Technology (DST). This plan for 2008 to 2018 proposes a vision for South Africa in relation with the identified “grand challenges” the first of which is to be one of the top three emerging economies in the global pharmaceutical industry, based on an expansive knowledge and innovation system. This aim is also described in the industrial development plan (IPAP) of South Africa.

The PCDDP is home to three different activities: (i) Preclinical evaluation of new therapeutic molecules, medicines of formulations; (ii) the use and pilot scale manufacture of drug delivery systems that may be used to enhance the efficacy of medicines and (iii) the development of a rapid cost effective point-of-care diagnosis for tuberculosis.

Preclinical testing is a crucial step in the development of medicines as it forms part of the development and registration of any therapeutic product. Preclinical drug development is a scarce and critical knowledge field in South Africa and the preclinical platform at the NWU is meant to serve all researchers and companies involved in drug development in South Africa and beyond. The processes and resources necessary for the establishment of this platform required institutional commitment, training of staff at international pharmaceutical industries, substantial funding but most of all energy and dedication from the group of people that established this platform.

A functional state of the art, world class preclinical facility for small animals has been constructed and concomitant expertise has been developed. The development of drugs for infectious and chronic diseases relevant to our South African society is challenging within the current financial milieu and requires that novel pharmaceutical and
biological products such as vaccines are developed and manufactured locally. Each new vaccine must be tested for its safety and potency before use in humans. Such evaluation is currently performed at the PCDDP for international vaccine producers.

In conjunction with Necsa and the University of Pretoria a microPET imaging system is now used to obtain images of the body distribution of radiolabeled medicines. Preclinical and clinical drug development research requires bioanalysis of biological samples. A functional bio-analytical laboratory with LCMS/MS capability has been established to enable analysis of the blood samples. This facility was used for the pharmacokinetic analysis of clinical (human) and preclinical (animal) studies of such molecules as tenofovir and the catechins, the last which was a collaboration between the NWU and the US company Plandai Biotech.

**Pheroid technology** is a proprietary platform drug delivery technology (DDT) that is being commercialised out of North-West University. The DDT in question allows the entrapment or encapsulation by Pheroid of the active ingredient/s in a bio-nano or micro-transporter system that minimise toxicity and maximises bioavailability through the precision delivery of drugs to relevant sites in the body. To place the value and benefit of DDTs into context, they are increasingly important as a component of drug development since few new small molecule drugs have high solubility and permeability required for oral delivery. In fact, an FDA survey found that only 9% of the 99 new small molecule drugs introduced between 1995 and 2001 had the required solubility and permeability (Class I) to be used in conventional oral delivery. The value proposition of the Pheroid technology is (i) its technological and market maturity, (ii) its ease of formulation, and (iii) its cost effectiveness. Since the Pheroid-encapsulated active ingredients can allow for greater bioavailability of the actives in the human or animal body, the benefits realised are improved product performance, lower product cost and lower toxicity. A number of Pheroid-based products in the pharmaceutical, cosmeceutical, nutritional, animal health and general supplement market are less than 1 year from the market.

Each Pheroid-based product opportunity needs to be considered on its own and unique merits; the use of Pheroid has obviously to make sense from the economic and competitive advantage perspectives (assuming no safety and formulation issues). A useful comparison is the delayed or sustained release technology that is used in oral medication.

Owing to the flexibility of Pheroid technology in terms of the diversity of applications, the target markets could be many and diverse. Companies that have recognised the benefit of incorporating the Pheroid technology with their existing or new products and current sectors interested in making use of this technology are manufacturers or distributors of branded pharmaceuticals, including radiopharmaceutical products, animal health products, complimentary medicines, nutraceutical and cosmeceuticals products. The potential for research and product development are enormous.

**A rapid low cost sensitive tuberculosis (TB) diagnostic for resource poor settings**

The tuberculosis (TB) burden facing South Africa is tremendous. Due to the absence of effective new drugs on the market, current first and second line therapies has to be used optimally. Furthermore, rapid, affordable, accurate and (geographically) accessible TB diagnosis is urgently needed. Urdea et. al. (2006) states that a rapid TB diagnostic test
requiring no laboratory infrastructure, with high sensitivity and specificity could save approximately 400,000 lives annually. However, even the most promising diagnostic test will have only limited impact if it does not reach the patients who need it. We similarly believe that the tuberculosis epidemic can only be controlled by a combination of highly sensitive, highly specific early diagnosis of Mycobacterium tuberculosis (M.tb) followed by the correct and effective treatment. This was then the basis for the development of a point-of-care nucleic acid amplification based diagnostic system: a rapid, more affordable, accurate and geographically accessible diagnostic system.

Only with a system developed specifically to meet the needs of South Africa and with molecular epidemiology data in mind, shall we be able to achieve the desired disease control outcomes. Such molecular epidemiology data for South Africa is still limited but the basic science output on tuberculosis is growing and will ultimately provide more accurate genetic data about the local mycobacterial population.

As a starting point, we defined the criteria of a point-of-care diagnostic for TB. The implementation of any new diagnostic strategy for tuberculosis should comply with the following:

i. A point-of-care device and assay with high sensitivity and early diagnosis, based on the use of multiple DNA diagnostic parameters.

ii. Testing for at least one form of drug resistance must be possible, using the same system, also in a point-of-care setting.

iii. Since DNA can circulate in the blood and be present in sputum and lungs for months after death of micro-organisms, there should preferably be the possibility of distinguishing between dead and live microorganisms. This was the real advantage of culture diagnostics and the absence of such capability in nucleic acid based systems results in false positives and low specificity.

iv. The system should preferably be flexible so that it can easily be applied to epidemics other than tuberculosis.

The global diagnostic market is highly competitive and dynamic. The NWU diagnostic system is comparable to most of the systems in the pipeline and better than some already on the market. Our ability to locally attempt to address our own national problems cannot be over-emphasized, especially when future and downstream benefits are taken into account.

We foresee the following impact of the use of our system on SA’s socio-economics:

- Decreased mortality, morbidity and illness-related costs due to the late or ineffective TB diagnosis;
- Faster onset of therapy for TB, including latent and drug resistant TB;
- Product patents;
- Revenues from transfer of technology and translation to other disease states;
- Strengthening of the local diagnostic industry;
- Revenues from local manufacturing of the components of our system;
- Possible export opportunities;
- Critical skills development and strengthening.

It is expected that the PCDDP will produce the following outcomes: 1) A complete value chain in the preclinical development of medicines; 2) the development of medicines with improved efficacy based on Pheroid technology; 3) improved diagnosis of tuberculosis in resource poor settings.
The expansion of the expertise in preclinical drug development and low cost DNA-based diagnostics can be of great benefit to South Africa. We have the capacity, and hence the opportunity to be a leader in preclinical drug development and specifically safety pharmacological and pharmaceutical assessments. There is no doubt that the PCDDP will enhance the capability of South Africa to participate in cutting edge science and this will increase our competitiveness in science, technology and innovation.

Director, Hosted Platform, Prof Anne Grobler,
+27 18 299 4467, anne.grobler@nwu.ac.za

TIA Centre for Human Metabonomics
(Prof Chris Vorster)

The Mitochondria Research Laboratory focuses on three research topics:
1. The identification and characterisation of inherited mitochondrial disorders in the South African population;
2. Cell biological responses in mitochondrial energy deficiencies;
3. The relationship between oxidative stress and the metabolism of energy in diseases such as diabetes, hypertension and cardiovascular diseases. These research topics are structured around the involvement of the mitochondrial oxidative phosphorylation (OXPHOS) system in human diseases. Defects in the mitochondrial energy metabolism (OXPHOS system) make up the largest group of congenital metabolic defects in humans, and it also contributes to the pathology of various other degenerative diseases like cardiovascular diseases, diabetes mellitus, neurodegenerative diseases (Alzheimer’s and Parkinson’s disease) and the progression of AIDS. This type of research is critical in South Africa because the clinical and biochemical profiles of the heterogeneous South African population differs from that of more well studied homogenous (Western) populations.

TIA Centre for Human Metabonomics, Prof Chris Vorster,
+27 18 299 4196, chris.vorster@nwu.ac.z
HySA Infrastructure has taken the first steps towards developing innovative applications and solutions for small and medium-scale hydrogen production, storage and distribution in South Africa. This will enable the country to use its wealth of solar and platinum group metal resources to generate high-quality, cost-effective hydrogen from renewable energy sources.

HySA consists of three competency centres – HySA Infrastructure, HySA Catalyst and HySA Systems.

This centre is tasked with developing hydrogen production, storage and distribution solutions, as well as relevant codes and standards within the framework of the DST’s strategic objectives and Ten-Year Innovation Plan for South Africa.

PGM-based technologies for fuel cells and hydrogen production and associated hydrogen infrastructure represent an exciting new market which could drive growth for platinum and spark significant new opportunities for South Africa.

Benefits of developing hydrogen infrastructure and the fuel cell market in South Africa include the ability to meet the increasing demand for energy, reduce the carbon footprint, create a platform for beneficiation, establish opportunities for job creation, and stimulate demand for PGMs (Platinum Group Metals).

In the next five years, the centre will be focussing on developing technology and creating partnerships with relevant stakeholders in South Africa and internationally, with the aim of establishing competitive and market-related South African technologies.

Director, DST Hydrogen Infrastructure, (HySA Infrastructure), Dr Dmitri Bessarabov, +27 18 299 1366, Dmitri.bessarabov@nwu.ac.za
Centre of Excellence for Nutrition
(Prof Johan Jerling)

The vision of the Centre of Excellence for Nutrition is to be leaders in developing scholars in nutrition in Africa. The Centre was established in 2008 and conducts training and research relevant to the prevailing nutritional problems in South Africa, the rest of Africa and also globally.

CEN has a diverse base of expertise, an extensive national and international network and a prominent international profile. We have an excellent track record of project delivery and have struck a good balance between global competitiveness and local relevance. The research approach adopted, “from molecules to society”, enables us to contribute on all levels of nutrition-related health issues. In addition to a strong transdisciplinary research focus, members implement their expertise internationally.

Under the leadership of CEN a multi-centre international project to standardize fibrin network permeability measurement was published. Our research on nutrient profiling and on salt in foods and its role in non-communicable disease in South Africa is now being incorporated into national food legislation.

Our work in collaboration with the United Nations Children’s Fund (UNICEF) is an important breakthrough in our decision to do research that an immediate policy implication. A formal collaboration was agreed upon between Wageningen University, NWU and ETH Zürich Switzerland as part of a European Union-funded staff exchange programme. In 2012 it was a strategic priority to have a large presence at the Nutrition Congress Africa, where CEN members and students won prizes in every category. Another highlight was the upgrading of our research facilities and commissioning of new equipment which complements our success in attracting significant funding from a variety of international organizations.
Research partnerships are of strategic importance and assist in bilateral capacity building, exchange of research ideas, exploring new funding opportunities and extending networks. A number of postgraduate students have benefited from these collaborations. In 2012, several team members spent a significant amount of time in other countries in the context of partnerships. Publishing is also done in collaboration with postgraduate students and post-docs, which is, of course, invaluable for such upcoming academicians.

Members of CEN have a high standing internationally, and this contributes to the value that they can impart to the students enrolled in their research entity. These academics include Professors Esté Vorster, Marius Smuts, Johann Jerling, Salome Kruger and Dr Namukulo Covic.

**Director:** Prof Johan Jerling, Centre of Excellence for Nutrition, 
+27 18 299 2481, johan.jerling@nwu.ac.za

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**Centre of Excellence for Pharmaceutical Sciences**  
(Prof Jeanetta du Plessis)

The researchers working in this field work on trying to address community diseases prevalent in South Africa, such as tuberculosis and malaria, while also publishing high-impact research in the fields of neuropharmacology and nanotechnology. The work being conducted here spans all areas necessary for medicines development, including pre-formulation, analytical science, product characterization and product evaluation. Most of the research is conducted within the unit itself, although our researchers and research groups also have meaningful collaborations with local and international partners. Local partners include the University of Cape Town, the Nelson Mandela Metropolitan University, the University of the Western Cape and the Tshwane University of Technology. The Centre also has various international partners in Europe, Asia and the USA. Apart from purely academic work, the Centre also engages in development of products, and the number of patents registered based on the work done in the Centre, has increased dramatically. The Centre has a large number of MSc and PhD students and the Centre has also started appointing full-time researchers in recent years, which has added to the capacity for research outputs and research support. The Centre also has 12 NRF-rated researchers.

In terms of special projects, a very successful initiative, Pharmacology for Africa (PharfA) was started – this is an initiative of the South African Society for Basic and Clinical Pharmacology and aims to promote the sustainable development of Pharmacology on the African continent. Another exciting initiative has been the upgrading of the vivarium to a world-class facility, to accommodate the DST/NWU National Platform for pre-clinical drug development. At present a wide-ranging expansion of facilities is underway. The Centre has a young and focussed staff corps, and has been very successful in attracting funding for the research being done in the Centre. This is of enormous importance for any prospective postgraduate or post-doc candidate.

**Director:** Prof Jeanetta du Plessis, Centre of Excellence for Pharmaceutical Sciences  
+27 18 299 2274, jeanetta.duplessis@nwu.ac.za
Members of the Centre for Space Research are involved in various internationally relevant research projects in Astronomy, Astrophysics and Space Physics. These include involvement in Southern African Large Telescope (SALT), the Square Kilometre Array (SKA), the MeerKAT radio telescope and the extremely successful High Energy Stereoscopic System (HESS) telescope, designed to observe the university in very high-energy gamma rays. South Africa also supports Namibia’s bid to host the Cerenkov Telescope Array (CTA) through the participation of members of the Centre for Space Research.

Some of the members of the team are considered world leaders in Heliospheric Physics, and are active in international collaborations. The government has established a National Space Agency (SANSA), which has already started a drive to increase the number of highly-trained space physicists. The Centre for High Performance Computing, is continually expanding to meet the national computational challenges of South Africa’s research community (including the Centre for Space Research).

World-class research is not done in isolation, and the international links that the Centre has with international research bodies contribute to the excellence of its research outputs. At the Centre for Space Research, healthy scientific competition is encouraged, because we strive to be excellent as individual researchers, but we also encourage good co-operation and teamwork, because we want the Centre to be among the best in the world, and to provide a stimulating environment for postgraduate and post-doc candidates.

The entity is home to a number of NRF rated scientists, including two A-rated researchers.

**Director:** Prof Stefan Ferreira, Centre for Space Research,  
+27 18 299 2412, stefan.ferreira@nwu.ac.za
Unit for Languages and Literature in the South African Context
(Prof Attie de Lange)

This research unit, one of the oldest on the Campus, combines basic research in linguistics, applied linguistics and literature in five languages (Afrikaans, English, German, French and Setswana) as well as research and development in the expanding field of language technologies. Significant work is done in the field of text editing, which is being expanded into more languages. Research and development within the Centre for Text Technology (CtexT®) led to the demonstration of Autshumato translation software at the Hansard section of the South African Parliament in March 2012. The Autshumato Terminology Management Solution (TMS) was implemented at the National Language Service of the Department of Arts and Culture in Pretoria. After years of development, a beta version of Markwrite (software to assist with grading of electronically submitted student tasks) was made available for use on the Potchefstroom Campus. The research programmes are:

**Language Technology**

This programme is run in collaboration with the Centre for Text Technology (CtexT) and focuses on:
- Machine translation aimed at the official languages of South Africa
- Natural language processing
- Resource development

CtexT established the Resource Management Agency (RMA) sponsored by the Department of Arts and Culture. This project entails the management and distribution of reusable digital text and speech resources for all the official languages of South Africa.

**Literature**

This programme has as overarching theme Literary textuality: products and processes. The program includes the following sections:
- Thematic research: identity, space, borders, hybridity, liminality and cultural aspects of literary texts.
- Theoretical research: postclassical narratology, poetry theory, cognitive poetics, iconicity, semiotics, literature and media, transmedial textuality, practice-based research/creativity.

**Linguistics**

This programme focuses on the following themes:
- Grammatical description of the Southern African languages
- Phonetics and phonology of the Southern African languages
- Language variation and Language planning

**Applied Linguistics sub-programme**

The focus of the sub-programme in Applied Linguistics is on projects and research that are
locally relevant and internationally germane. The overarching aim of this sub-program is to investigate and design solutions to social problems associated with language. It includes theoretical and empirical investigations of actual and contemporary matters in which language is a central issue. These form the basis for responsibly designed solutions to enhance reciprocity between theory and practice.

In keeping with the above aim of responsible, appropriate and adequate designs, relevant to the South African context, the title for the sub-program is: Applied linguistics: Designs for language in use. This then leads to three nodes of focus: (i) Educational linguistics, (ii) Language management, and (iii) Language practice. Each of these again subdivides in specific projects. The research unit shares the staff of the School of Languages – eleven of the researchers are NRF-rated with a near equal distribution between language and literature.

**Director:** Prof Attie de Lange, Unit for Languages and Literature in the South African Context
Attie.deLange@nwu.ac.za, +27 (0)18 2991485

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**Unit for Business Mathematics and Informatics**
(Prof Magda Huisman)

What makes this Unit such a formidable force is the diversity of its members’ disciplines. Some are abstract mathematicians, while others are applied mathematicians, statisticians, computer scientists, information technologists, actuaries and financial statisticians. All these skills are important for the success of our basic, applied and directed research and student training. The research of the UBMI is conducted in six programmes, viz. Applied Mathematics and Modelling, Mathematics, Statistics, Informatics and Operations Research, Foundations and Ethics and Risk and Reward Analysis.

Students can enrol for M and D programmes in basic and applied research, and can also work in programmes involving industry partners. Most students are on the industry-directed programmes.

The Unit is very successful in attracting industry partners, and this is of course of great value in terms of funding and of finding placements for successful students. The Unit does work in Risk Research in collaboration with DST/ABSA and some other universities, and also obtains significant external funding for students and programmes from Telkom and ABSA. A new M-programme in Business Analytics, which promises to be very exciting, has also been introduced.

The Unit has a wide range of international contacts, and this provides the members of the Unit the opportunity to work with the best researchers nationally and internationally. The publication output of the Unit is also strong.

A joint PhD agreement has been entered into with the Vrije Universiteit in Amsterdam. However, the strongest point of the Unit is its wide range of industry partners and collaborators - the Unit benefits from the financial input of the partners in its research programmes and helps to solve research problems that exist in industry.

**Director:** Prof Magda Huisman, Unit for Business Mathematics and Informatics,  
+27 18 299 2537, magda.huisman@nwu.ac.za
Unit for Environmental Sciences and Management
(Prof Nico Smit)

Environmental Science and Management as a field of research has the broad aim of developing expertise and a fundamental understanding of how our national world functions. The unit supports the optimal utilization of natural resources within the limitations of the resilience of ecosystems. This approach takes into account the environmental and financial implications of the restoration or remediation of disturbed sites or waterways. To ensure long-term relevance, the unit seeks a balance between fundamental academic research and applied, market-oriented research.

The Unit has a very good research output in terms of publications, completed masters’ and doctoral degrees and also has 19 NRF-rated scientists.

The Unit has a strong focus on Air Quality Research within which Prof Stuart Piketh has been appointed to the Eskom-funded chair on Emission Control.

A further addition to the ranks has been the appointment of Dr Charlotte Mienie, a biotechnologist trained in the genotyping of grain crops with molecular markers. Prof Klaus Kellner from the Remediation and Sustainable Management research programme is on the roster of experts for the United Nations Convention for Combating Desertification – a crucial field of study for Africa south of the Sahara.

The Unit has a significant number of formal international collaborations, and regularly hosts international academics, making it a good environment for post-graduate students to function in.

In terms of special projects, two projects stand out – a community, pro bono project where students work on 16 projects around the North West Province to assist communities in environmental management. The second project is the Woodchip project where the University collaborates with Impala Platinum allowing them to use the University patent in this regard for manufacturing materials and equipment used in their operations. A composting project is also being undertaken with the City Council entailing the composting of sewage and green waste within the municipal boundaries.

The Unit’s work lies strongly in water management and impact assessment aimed at helping the province and country address the environmental challenges facing them.

Prof Nico Smit, Director, Unit for Environmental Science and Management,
+27 18 299 1542, nico.smit@nwu.ac.za

Unit: Development in the South African Constitutional State
(Prof Willemien du Plessis)

The various projects in the Unit deal with cutting-edge and cross-cutting issues pertaining to both the public and the private sectors, such as trade and development, land issues, poverty alleviation, environmental governance, the realization of socio-economic rights, religion and culture.
South Africa functions within the context of the Southern African Development Community (SADC), the African Union and international law, and so several of the projects investigate this relationship. What makes the research unit unique is that its research projects all relate to the government’s priority service delivery areas.

The Faculty of Law and five other universities received a grant from the European Union to the development of a joint doctoral degree in Law and Development. The other universities are Tilburg (Netherlands), Edinburgh (Scotland), Oslo (Sweden), Tartu (Estonia) and Deusto (Spain). This grant will allow doctoral students from Europe and Africa to study and do research on both continents and to receive instruction at various universities. The Faculty has a strong focus on attracting post-graduate students from other countries in Africa and further afield. There is also a Student Law Journal that is being run by post-graduate students. The Unit is home to nine NRF-rated scholars, with the most prestigious being Prof Louis Kotzé who holds a P-rating – NRF Prestigious Awardee. Members of the Unit participated in a wide range of national and international conferences and seminars. The Faculty also hosts a number of summer schools and exchange activities to encourage international engagement among staff and students. Two important projects are the DAAD-funded project on Transboundary Protection of Biodiversity Project and there is also the Academic Partnership for Environment and Development in Africa – a joint project with Justus Liebig University, Polytech Namibia, Makerere University in Uganda and Hawassa University in Ethiopia. All these activities are aimed at engaging and involving post-graduate students, with staff, in work of high standard.

**Director:** Prof Willemien du Plessis,  
**Unit:** Development in the South African Constitutional State,  
willemien.duplessis@nwu.ac.za, +27 18 299 1970

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**WorkWell: Research Unit for Economic and Management Sciences**  
(Prof Jaco Pienaar)

WorkWell conducts original, interesting and rigorous research aimed as a broader scientific understanding of the world of people’s work. The unit transfers knowledge derived from that research through post-graduate training and through sharing expertise with communities, organizations and government.

Ultimately, WorkWell contributes to the development of policies, measures and decision-support methodologies that optimize the utilization of information, people, finances and management, while maintaining a focus on diversity and the challenges of a developing economy.

The unit’s research therefore focusses on the study of work as it related to the people performing it (Work Wellness research programme), how business should be managed and developed to ensure such success (Marketing and Business Management), and lastly how finances can be managed to achieve these aims (Corporate Resilience).

Members of the Unit have been rated as scientists, and a number of the researchers in the group have
had their ratings improved, which is a very positive step for the Unit. The research outputs of the Unit increased significantly from previous years and the ratio of international journals to national journals showed a very positive growth. During 2012 and 2013, this entity was recognized as the most productive research entity in the University.

WorkWell has a strong portfolio of international collaborations. This includes links with universities and other organizations from the Netherlands, Sweden, Scotland, Belgium and Australia. Visiting scholars came from London, Tilburg University, Stockholm University, Glasgow Caledonian University, Gent University and the University of New South Wales. These visits involve lectures or workshops and can therefore be seen as strongly supportive of research development within the Unit. New ventures involve academics from Monash University in Australia, and the University of Babes Boyoi in Romania.

**Director:** Prof Jaco Pienaar,  
**WorkWell:** Research Unit for Economic and Management Sciences,  
+27 18 299 1369, jaco.pienaar@nwu.ac.za

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**Unit for Reformed Theology and the Development of the South African Society**  
(Prof Fritz de Wet)

The Unit’s mission is to make a scientific contribution to important debates in South Africa, especially those that explicate the Bible and its use in the development of the South African society.

The aim is to contribute to and provide guidelines for a healthy and responsible society, and for the efficient functioning of Christians in society. From a Reformed Theological perspective, the Unit strives to influence the discourse of international theological matters and aspects that relate to the South African society.

There are 19 permanent participants in the Unit, of which three have NRF ratings. The Unit has a strong presence of post-graduate students and this reflects the research focus of the Faculty of Theology. The Unit has the highest rate of publication per staff member at the North-West University.

Significant strides have been made in establishing national and international collaboration. Post-graduate programmes are offered through co-operation agreements with Greenwich School of Theology (United Kingdom), Instititio Biblico Portugues (Portugal), George Whitefield College (Cape Town), the Bible Institute of South Africa (Kalk Bay), Auckland Park Theological Seminary (Johannesburg), Taberna Dei (Polokwane) and the Baptist Theological College (Randburg).

Co-operation agreements for students and staff exchange and reciprocal visits are in place with the following institutions: Forschungszentrum Internationale und Interdisziplinäre Theologie (Heidelberg, Germany), University of Miami (USA), Theologische Universiteit Apeldoorn (Netherlands), MacKenzie Presbyterian University in Sao Paulo (Brazil), the Evangelische Theologische Faculteit (Belgium) and the Reformed Theological Seminary in Sárospatak (Hungary).
The following 6 sub-programmes are the homes for projects and research by students and staff:

- Bibliological perspectives
- Ecclesiological perspectives
- Ecumenical perspectives
- Missiological perspectives
- Moral renewal of society
- Practical-theological perspectives

**Edu-HRight**
(Prof JP Rossouw)

The Education and Human Rights in Diversity (Edu-HRight) Research Unit was established in 2013 in the Faculty of Education Sciences of the NWU Potchefstroom Campus. The central scholarly focus of the Unit is on human rights praxis and implementations in education, with a variety of sub-foci as portrayed by the five project groups, each with 2 to 5 staff members within the faculty:

- Human Rights Education in Diversity;
- Social Justice in Education: Religion and Spiritual Capital;
- Innovative curriculum inquiry in (post)conflict societies;
- Legal perspectives in education;
- Social justice praxis

**Focus** Within the Unit, innovative knowledge constructs are theorised in the pursuit of social justice and democratic values to create enabling spaces for praxis. Transformation transpires through scholarly enquiry and the translation of peoples’ experiences in diverse environments, from philosophical and sociological perspectives underpinning curriculum, education law, and human rights implementations in education. Human rights implementations investigate further the extent and impact of the realisation of human rights praxis underpinned by social justice and values and how praxis is internalised and balanced in diverse education and educational contexts.

**Objectives** The overall objectives of the research in the unit finds its logic in diverse education contexts and aim to: initiate new knowledge regarding education and human rights in diversity; theorise innovative knowledge constructs in the pursuit of social justice and democratic values to create enabling spaces for praxis; support scholarly transformation of and enquiry into social capital; engage, explore, understand and explain philosophical and sociological perspectives, transformative praxis and legal constructs, and embrace (post)conflict and (post)struggle epistemologies as part of our investigative purposes and further the extent and impact of the realisation of human rights praxis.

Part of the Edu-HRight Research Unit are a number of special researchers contracted for research within the Unit, visiting professors, post-doc fellows, research assistants and international collaborators. Members of the Unit play their part in national and international associations, are engaged in research fellowships at international institutions, and several
of the project groups and individual members within the unit are active on national and international level.

**The Unit for Engineering Research**  
(Prof Liezl van Dyk)

The Unit for Engineering Research focuses on research that is relevant to society, the environment and the country. We address national strategic goals and contemporary issues through engineering solutions that meet industry needs, while maintaining a balance between basic and applied research.

Previously being the Unit for Energy Systems, a substantial amount of research projects are directed towards energy challenges. The unit hosts SANERI chairs in Clean Coal Technology and Biofuels (SANERI) as well as a SARChI in Coal Research and a DTI Chair in Nuclear Energy. Energy systems research are conducted through five sub-programmes, namely Nuclear Energy, Hydrogen Energy, Fossil Energy; Renewable Energy and Energy Management.

This research unit is furthermore a major participant in the THRIP programme, an industry support instrument of the DTI designed to enhance industry competitiveness and production capacity, through the application of new technologies such as advanced and additive manufacturing, thermal-fluid systems, material science, aeronautical engineering and mechatronic engineering. Technology solutions also include telecommunications, data networks, information security, and associated applications as well as solutions to problems that are characterized by complex operations reflected by large data sets. The relevance and sustainability of the research programmes are ensured through close ties with key role players in the industry, as well as with the main research funding bodies and other NWU research entities, such as the Unit for Business Mathematics and Informatics, AUTHeR, WorkWell, Chemical Resources Beneficiation, MUSA and TRADE.

**Director:** Prof Liezl van Dyk,  
**Unit for Engineering Research,**  
+27 18 285 2638, liezl.vandyk@nwu.ac.za
The vision of the Hypertension in Africa Research Team is to be the premier centre for research in cardiovascular diseases in Africa. HART conducts dynamic and focussed research on the development of hypertension, especially in the black South African population. The aim of the group is not only to improve cardiovascular health in South Africa, but also internationally, since cardiovascular disease remains the number one cause of death worldwide.

Globally and especially in sub-Saharan Africa, there has been a visible increase in the prevalence of hypertension and cardiovascular disease contributing to the burden of death and disability, making it a critical area requiring specific focused research. There are research groups in South Africa investigating the genetics of this and others who actively provide population statistics on the severity of standings. However, little clinical research is being done regarding the early functional- and structural changes taking place in the cardiovascular system leading up to the development of hypertension and cardiovascular diseases. Our highly dedicated group significantly contributes to the understanding of the mechanisms involved with the ultimate goal to enhance population health. The HART group is actively busy with five running projects in conjunction with many collaborators and other research entities.

The largest study is the **African-PREDICT study** (African Prospective study on the Early Detection and Identification of Cardiovascular disease and hypertension), which is a longitudinal study that started in 2013, and is expected to continue for 12+ years. A total of 1200 young and healthy, normotensive black and white participants (aged 20-30 years) are included to track early cardiovascular deterioration and hypertension development. The National Department of Science & Technology (DST) and National Research Foundation funded Research Chair (South
African Research Chair Initiative - SARChI was awarded within the scope of the African-PREDICT study. Funding was obtained from several grants from the Medical Research Council (including MRC Flagship Seed Funds), NWU Strategic Funding, and international collaborators. Located within the Focus Area is the South African Research Chair (SARChI) in the Early Detection and Prevention of CVD in South Africa, and the chair is held by Prof Alta Schutte (who was also the recipient of the Meiring Naudé Medal from the Royal Society of South Africa and the AU-TWAS Award) and currently holds the Director position of the Medical Research Council: Extramural Research Unit for Hypertension and Cardiovascular Disease.

The group has a good research output, both in terms of publications and post-graduate students. They have strong links with collaborators on the provincial level and with academics from international institutions.

**Director:** Prof Hugo Huisman, Focus Area Hypertension in Africa Research Team (HART), +27 18 299 2439, hugo.huisman@nwu.ac.za

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**Self-Directed Learning (SDL), (Prof Elsa Mentz)**

The Vision of the research entity in the field of Education Sciences is to promote self-directed learning that will lead to lifelong learning in all education sectors through excellent research.

The Mission of the entity can be described as follows: to do relevant research about strategies and contexts that contribute to the development of self-directed learning skills; to optimise the quality of research outputs and to publish and make known the results of the research national and internationally; to support academic staff to develop appropriate expertise and to gain national and international recognition; to provide quality postgraduate training which will help build capacity to promote research in self-directed learning in all sectors of education; and to make our expertise available in the service of self-directed teaching/learning practices.

The sub-programmes in the Research Focus Area will be the following: Blended Learning to support SDL; Cooperative Learning to enhance SDL; Metacognition to enhance SDL; Project- and problem-based learning to enhance SDL; Assessment to support SDL; The Affordances of indigenous knowledge for SDL; and Towards a theory for SDL.

These sub-programmes form an integral matrix which enables close collaboration between and liaison with the research in the different sub-programmes. The sub-programme leaders are senior and experienced researchers.

**Director:** Prof Elsa Mentz, Faculty of Education Sciences, +27 18 299 4780, elsa.mentz@nwu.ac.za / SDL@nwu.ac.za
Africa Unit for Transdisciplinary Health Research (AUTHeR)
(Prof Annamarié Kruger)

AUTHeR is structured to include four disciplines from three schools in the Faculty of Health Sciences, viz. Social Work and Psychology from the School of Psychosocial Behavioural Sciences; Nursing Science from the School of Nursing and Consumer Sciences from the School of Physiology, Nutrition and Consumer Sciences. The Unit has a high publication output in terms of post-graduate students and articles and has a proud record of capacitating young researchers.

Research within AUTHeR (Africa Unit for Transdisciplinary Health Research) focuses on transdisciplinary health promotion centred within the Social Sciences. We positioned ourselves explicitly within the World Health Organization’s (2007) definition of health in which it is stated that “Optimal health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”. This implies that we approach health holistically taking cognisance of the physical, mental, social and contextual dimensions and that we conceptualize health on a continuum from pathology to thriving.

Currently AUTHeR has two main sub-programmes combining MODE 1 and MODE 11 principles. Each of the two sub-programmes consists of several large funded projects or programmes with individual studies to accommodate our large number of post graduate students. With these two sub-programmes the integration between the different disciplines as well as our research over the broad health continuum (pathology to thriving) becomes functional. Many of the large projects/programmes within each of these two sub-programmes developed from one another, for example basic and epidemiological studies (programme 1; MODE 1 principles) lead to applied research with implementation and evaluation of interventions (programme 2; MODE 11 principles), leading back to basic research on identified issues in the process. This interaction is indicated by arrows in the diagram below.

**SUB-PROGRAMME 1:*** Epidemiology, prevalence and identification of problems and strengths over the continuum of health (pathology to thriving) as well as the dynamics of behaviour in various contexts. Large funded projects/programmes in this sub-programme are: PURE, FORT, QOLPLPH, DCS, CON-WEL, Forensic Social Work and OPQUAL.

**SUB-PROGRAMME 2:*** Interventions to enhance health and quality of life in various contexts at the individual, community, social and systems levels. Large funded projects/programmes in this sub-programme are CENPOLL, HOLDING HANDS THROUGH LIFEPLAN, EBPOL.

The Unit has various national and international collaboration agreements to help in their work which focuses on problems and opportunities particular to Africa and other developing countries where health is affected by HIV and AIDS and where the empowerment of people and human capacity-building is a high priority. As a transdisciplinary research entity in Africa, the members of the Unit are excited about the opportunities to share ideas and results in order to integrate knowledge towards a better, more holistic understanding of health needs and problems that could benefit the people of Africa.

**Prof Annamarie Kruger, Director, Africa Unit for Transdisciplinary Health Research (AUTHeR), +27 18 299 2095, annamarie.kruger@nwu.ac.za**
Physical Activity, Sport and Recreation (PhasRec)
(Prof Hanlie Moss)

The strategic aims of PhASRec are two-fold, firstly to generate new knowledge in physical activity health, sport and recreation through relevant and focussed research in order to address challenges faced by the community, the country, the continent and the world, and secondly to implement the expertise and knowledge of physical activity, health, sport and recreation gained by research for the benefit and improvement of the quality of life of the province, the region, the continent and the world.

The focus area therefore aims to enhance understanding of the role of human movement in the health, wellness and sports performance of South Africans of all ages. The research contributes, among others to the early identification of risk factors related to non-communicable diseases, delays in motor development, physical inactivity, sports injuries and sports performance. There is also a focus on the role of recreational activities in the health and wellness of the population, and the management of recreational centres. These research findings are then incorporated into the training of professionals in Biokinetics, Kinderkinetics, Sports Science and Recreational Management. Communities are also educated and informed about physical activity for health and sports participation over the entire human life span.

PhASRec has been the most productive research entity within the Faculty of Health Sciences in 2015 with one-fifth of the Doctorandi of the Faculty of Health Sciences from PhASRec. Our Alumni play an important role in South African sport and private health care as professional practitioners contributing much-needed expertise in terms of the development of children, the prevention and treatment of non-communicable diseases and participation in sport.

Collaborations have been established with international organizations and universities, such as the Vrije Universiteit in Amsterdam and Barry University in the USA. More recently collaborations have been established with the Universities of the Sunshine Coast and the Australian Catholic University, both in Australia. Further networks are in process with universities in the USA, Poland and Switzerland.

Director: Prof Hanlie Moss, Physical Activity, Sport and Recreation (PhASRec), +27 18 299 1821, hanlie.moss@nwu.ac.za

Tourism Research in Economic Environ and Society (TREES)
(Prof Melville Saayman)

This is the leading tourism research entity in South Africa, with strong links to the private and international sectors and the largest database of travel and tourism behaviour on the continent. The Research Unit has a clear focus on economic, environmental and community research, covering five areas of expertise: economic impact and forecasting, social impact, environmental analysis (hunting, ecotourism and game farm management), quality of life and event management.
The research outputs of the Unit are high, both in terms of publications (with a ratio of 3 articles per researcher, well above the University benchmark) and post-graduate students. Researchers in the Unit received awards for: the most productive senior researcher (2011 and 2012) and most productive junior researcher (2013 and 2014) of the University, Women in Social Science awards from the Department of Science and Technology (2011 and 2013).

Projects undertaken include the following clients: Big Concerts, SANParks, several arts festivals (Innibos, Joy of Jazz, Cape Town Jazz Festival, etc.), Sports events including the Argus and Comrades, South African Tourism, Northern Cape and North West Province Tourism Departments.

TREES has a strong base of expertise, good collaborative relationships and a good track record, involving international collaboration with several universities and is currently part of a research consortium funded by the European Union (Green Bubbles).

**Director, Prof Melville Saayman, Tourism Research in Economic Enviroms and Society (TREES),**
+27 18 299 1810, Melville.saayman@nwu.ac.za

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**Social Transformation**  
*(Prof André Duvenhage)*

The social realm is where all human interaction takes place, and as such represents an important aspect of human life that deserves systematic scientific scrutiny. The Focus Area – Social Transformation is driven by its aim of creating new knowledge pertaining to the social realm, in particular the interactions between actors and the social dynamic that emerge as a result. The Focus Area facilitates multi-disciplinary research, evaluating the developmental roles and social responsibilities of government, the private sector, and communities in the context of the developing world, which includes South Africa. Accordingly, the mission of the Focus Area is to contribute towards the improvement of a sustainable quality of life and the transformation of communities in the developing world, and that of South Africa in particular. Since its inception, the Focus Area has established itself as a leading research entity within the NWU and contributed significantly to enhancing the research profile of the Faculty of Arts and the Potchefstroom Campus through research articles, project research and postgraduate enrolments. The research activities of the Focus Area are structured according to eight interdisciplinary research programmes, namely Public Administration; Politics; History and Heritage Studies; Modernity and Coloniality; Corporate Social Responsibility (incorporating the Bench Marks Centre for CSR); Foundational Studies; Communication in Changing Contexts; and Disaster Risk Studies (incorporating the African Centre for Disaster Studies). Thus, the Focus Area offers prospective postgraduate students the academic space to pursue solutions for the pressing societal issues of the contemporary developing world and South Africa in particular.

**Director: Prof André Duvenhage, Social Transformation,**
+2718 299 1750, andre.duvenhage@nwu.ac.za
Chemical Resources Beneficiation (CRB) in the Faculty of Natural Sciences aims to add sustainable value to the South African national mineral and chemical resources base and is geographically well-positioned to do so. The two provinces in which the NWU is situated, North West and Gauteng, and two neighbouring provinces, Free State and Limpopo, are all rich in metals and carbon-based resources. Metal-based resources include the platinum group of metals and chromium, while the carbon-based resources, such as petrochemicals, mainly come from coal.

The staff working in the CRB come from different faculties and schools, viz. the Schools of Physical and Chemical Sciences, and Chemical and Minerals Engineering. Within this context the work of the CRB is done within the Electrochemistry for Energy and Environment Research Group, the Membrane Technology Research Group, the Coal Chemistry Research Group, the Chromium Technology Research Group, the Catalysts and Synthesis Research Group. Emission control research and training is conducted by the Eskom Research Chair in Emission Control with joint chair holders Professors Stuart Piketh and Hein Neomagus.

The CRB houses the Laboratory for Analytical Services (with modern mass spectrometers, a single crystal X-ray diffractometer and a nuclear magnetic resonance spectrometer), the Laboratory for Electron Microscopy (with new modern scanning and transmission electron microscopes) and the Laboratory for Applied Molecular Modelling (LAMM).

The research outputs of the Focus Area are good in terms of publications and post-graduate students.

The Focus Area has a number of strategic alliances internationally (Finland, Norway, Canada, the Netherlands, Belgium, UK, USA, Germany and Romania), and national alliances with institutions like Eskom, Sasol, the Nuclear Energy Council of South Africa (Necsa), Mintek, the CSIR, Anglo-Platinum, Xstrata, Samancor, DST-NRF Centre of Excellence in Catalysis and the NRF (THRIP).

With South Africa a world leader in the production of the platinum group metals, the CRB makes a strong contribution to these and related industries - the researchers in the group are considered to be among the leaders in the field and this ensures a competitive advantage in providing research expertise and highly-skilled manpower to industry.

**Director:** Prof Manie Vosloo, Chemical Resources Beneficiation, +27 18 299 1669, manie.vosloo@nwu.ac.za

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**Trade and Development (TRADE)**

(Prof Wilma Viviers)

This research focus area, established in 2012, is making both a scientific and practical contribution to the fields of international trade and economic development by delivering well-grounded graduates and relevant, high-quality research.
In 2014 a prestigious World Trade Organisation Research Chair was awarded to Prof Viviers and the TRADE team in acknowledgement of the focus area’s and the university’s growing stature in international trade teaching and research circles.

TRADE’s research agenda comprises four research programmes, namely export diversification and competitiveness, economic development, agriculture, and Foreign Direct Investment (FDI) in Africa. While TRADE has grown and diversified its traditional research outputs, it has also been attracting growing interest in its Decision Support Model (DSM), which is an instrument that scientifically evaluates markets for potential export opportunities – at country, industry or firm level.

TRADE enjoys formal alliances with a number of international bodies. For example, it is a member of the Virtual Institute of the United Nations Conference on Trade and Development (UNCTAD) as well as the International Association of Trade Training Organisations (IATTO), thus enabling the focus area to stay abreast of the latest developments in the international trade education and development arenas.

TRADE has also entered into collaboration agreements with a number of local and international entities. At a national level, TRADE has signed memoranda of understanding with the Department of Agriculture, Forestry and Fisheries (DAFF) and the Department of Finance, Economy and Enterprise Development (FEED). In addition, members of the focus area serve on the boards of entities such as Trade and Investment KwaZulu-Natal and Economic Research Southern Africa. At an international level, TRADE has signed memoranda of understanding with the Maastricht School of Management in the Netherlands and the International College of the National Institute of Development Administration in Bangkok, Thailand.

For more details on TRADE and its various activities, see www.nwu.ac.za/trade and follow us on Twitter: @NWU_TRADE

Director: Prof Wilma Viviers, Trade and Development (TRADE), +27 18 299 1445, wilma.viviers@nwu.ac.za
MATERIAL SCIENCE INNOVATION and MODELLING (MaSIM) was approved towards the end of 2012. MaSIM aims at becoming a leading research and development centre in the area of materials, metal initiatives and nanotechnology initiatives for solving problems not only in the province but nationally and regionally. The strategic aim is to create an enabling environment for the realization of strategic objectives of the South African government by supporting long-term advanced materials, Nano science, nanotechnology and renewable energy/modelling research; developing human capital and supporting infrastructure in the province. This will be achieved by conducting fundamental and applied trans-disciplinary research and developing innovative methods. This entity intends to achieve the following: (a) bring about maximum human capital, sustainable economic growth and improved quality of life; (b) enhance South Africa’s knowledge generation capacity in order to produce world class research outputs and assist in turning some of the advanced findings into innovative products and processes; (c) develop appropriate human capital for science, technology and innovation to meet the needs of the society and (d) to build and train the next generation of researchers and enable technology development and transfer as well as knowledge interchange.

Staff and students work in the following research groups/subthemes:

• **Subtheme (a):** Electrochemistry, kinetics, adsorption, thermodynamics of corrosion prevention in materials – extensive researches on corrosion inhibition in different media using electrochemical, weight loss, hydrogen evolution and thermometric methods will be investigated. Chemistry and Physics of Materials, Colloids and Surface Chemistry (Naturally occurring colloids-exudates gums), novel aspects of solid state chemistry and material science majoring in thin film deposition of materials / compounds with electronic/spintronic application like manganates, cobaltates and double perovskites using nebulized spray pyrolysis and advanced thin film deposition techniques and characterization using XRD, EDAX, SEM, resistivity, magnetization and magneto resistance studies.

• **Sub-theme (b):** Biomaterials, synthesis and application of nanomaterials / nano-particles and sensors in corrosion prevention and water purification / treatment. Electrochemical sensors and detection of drugs.

• **Subtheme (c):** Renewable energy resources e.g. solar energy applications on materials. The system that has been under development consists of a Solar Energy monitoring Unit (SERMU), a Solar Energy Concentrating Unit (SECU), a Solar Energy Receiver Unit (SERU), a Thermal Energy Storage Unit (TESU) and a Thermal energy Utilization Unit (TEUU). Although our initial focus had been on the development of small scale concentrating solar thermal energy systems with heat storage for domestic food preparation, the sustainable energy experimentation laboratory (SEEL) will provide a test-bed for multidisciplinary studies. Additionally, SEEL can be used in
outreach programmes to the local and academic community aware of Sustainable Energy studies.


Prof Eno Ebenso, Acting Director: MaSIM, +27 18 389 2050/2051, Eno.Ebenso@nwu.ac.za

### Population and Health Research Focus Area

The Research Focus Area ‘Population and Health’ was established in 2008. It comprises the five programmes Demography and Population Studies, Development Studies, Psychology, Social Work, and Sociology within the Faculty of Human and Social Sciences. The niche area is devoted to the discovery of new knowledge, insights, and forms of expression through significant innovative research and analysis and synthesis of existing knowledge. It therefore aims at accomplishing its research and postgraduate mission by building on existing programme strategies by fostering effective, cross-disciplinary approach and by contributing to the resolution of socio-economic and cultural challenges facing the North West province in particular and South Africa as a whole. The niche area functions under two sub-programmes, namely ‘Household Health and Population Change’ and ‘Fertility, Poverty and HIV/AIDS’. Members and postgraduate students are encouraged to do research under these two sub-programmes.

Director: Prof M Palamuleni, +27 18 389 2502, Martin.Palamuleni@nwu.ac.za
OPTENTIA – Enabling Optimal Expression of Individual, Social and Institutional Potential

Why do some individuals, institutions and societies flourish while others do not, even in similar circumstances? This is the fundamental question that OPTENTIA seeks to address. OPTENTIA, based on the Vaal Triangle Campus of the North-West University, develops and organizes knowledge for the optimal expression of individual, social and institutional potential. It has a specific interest in the African context.

The OPTENTIA research focus area has seven sub-programmes:

- **Flourishing in institutions**
  This sub-programme aims to research flourishing and virtuousness in life, work and institutions. The sub-programme investigates satisfaction with life (and various life domains), positive emotions, strengths and virtues, engagement, self-determination, meaning and purpose, positive relations, harmony, positive leadership, a positive lens on problems and challenges, as well as positive leadership and institutions. (Sub-programme Leader: Prof S (Ian) Rothmann, ian.rothmann@nwu.ac.za.)

- **Pathways to resilience and post-traumatic growth**
  This sub-programme explores how and why some South African children, youths, and adults adjust well to adversity, and flourish following experiences of trauma. We are particularly interested in how culture, gender and evidence-based interventions shape resilience and post-traumatic growth processes. Much of our work involves innovative, visual methodologies that involve participants as co-researchers. We are involved in four multi-disciplinary research projects, namely: the five country, ICURA- and IDRC-funded Pathways to Resilience (see www.resilienceproject.org); Read-me-to-Resilience (SANPAD funded), Retrospective Reflections on Resilience (NRF-funded), and Psychological & Social Work Interventions towards Resilience and Post-traumatic Growth.
(Sub-programme Leader: Prof L.C. (Linda) Theron, Linda.theron@nwu.ac.za)

• **Psychosocial well-being and communal thriving**
  This sub-programme aims to study the measurement and promotion of psychosocial well-being on three related levels, namely across a life-course, across life domains, and across cultures. Psychosocial well-being is conceived as a multi-dimensional and faceted construct which includes individual, social and community well-being.
  (Sub-programme Leader: Prof T. (Tumi) Khumalo, Tumi.khumalo@nwu.ac.za)

• **Ageing and Generational Dynamics**
  This sub-programme aims to explore ageing across the life-course as well as the relationships between and within generations on both the familial and societal levels. Contextualised within the diverse realities of Africa, researchers focus amongst others on discourses and realities of ageing and family /intergenerational relationships; the contemporary culture of social and health care at the nexus of informal and formal care systems; and trends in inclusion/exclusion of generations in relation to each other and the impact of these trends on their survival and citizenship.
  (Sub-programme Leader: Prof J. (Jaco) Hoffman, Jaco.hoffman@nwu.ac.za)

• **Unlocking potential in educational processes**
  This sub-programme focuses its research on unlocking potential in educational processes, including educational management and leadership, school governance and parent involvement, school infrastructure, facilities, safety and security, curriculum delivery and assessment (teaching and learning) as well as inclusive education.
  (Sub-programme Leader: Prof I. (Isaac) Xaba, Ike.xaba@nwu.ac.za)

• **Holistic learner development in diverse contexts**
  Built on the premise of caring, this sub-programme focuses on the enhancement of teachers’ ability to respond to a diversity of learning needs, thus developing a school’s enabling component. The sub-programme aims to increase a teacher’s repertoire of strategies for working with a wide range of individual differences among learners and creating a caring context where learners receive nurturance, support and empathy in order to master learning outcomes.
  (Sub-programme Leader: Prof M (Mary) Grosser, http://marygrosser.co.za)

• **Optimising Talent**
  The purpose of the Optimising Performance sub-programme is to research factors associated with the optimisation of institutional (individual, team, organisational, community and societal) performance. We are particularly interested in understanding (a) how optimal performance should be conceptualised, defined and measured, (b) the individual, team, organisational and societal factors associated with, leading to and impacting on institutional performance, and (c) how optimal performance could be developed/achieved within applied contexts.
  (Sub-programme leader: Prof Llewellyn van Zyl, Llewellyn.vanzyl@nwu.ac.za)

**Director:** Prof S (Ian) Rothmann
ian.rothmann@nwu.ac.za
Understanding and Processing Languages in Complex Settings (UPSET)

UPSET is a research focus area that investigates the understanding and processing of language in complex settings. Language practice (translation, editing, subtitling, interpreting and even more) is one of the complex settings in which the focus area works. Researchers want to know how texts travel from one environment and in one code to another, while making sense (or not), and how these various texts that are transmitted enable people to participate in society and academia with greater ease.

UPSET embraces the multilingual nature of South African society, and assume that most societies are multilingual. Therefore, any applied linguistic investigation has to be embedded in the authentic context of the linguistic reality in which we live. The research on language acquisition, maintenance, policy, teaching, reading and writing and academic literacy is embedded in the multilingual context in which we live. South Africa provides an excellent laboratory of language contact settings in which indigenous and colonial languages come into contact, and influence one another. UPSET investigates the linguistic consequences of ongoing language change, especially looking at English and Afrikaans as they formed and changed in the past two centuries in South Africa. This is done by collecting corpora and interpreting the data from usage-based perspectives.

The ultimate aim of UPSET is to deepen understanding of the interdependence of language and human cognition. UPSET’s approach is to explore from a psycholinguistic angle how language is understood and processed in two subfields of linguistics. The first is language practice, referring to editing, proofreading and translation, as well as audio-visual translation. The second subfield is multilingualism, which is broadly based on sociolinguistics. UPSET capitalizes on the unique blend of languages in South Africa and the interaction between speakers of these languages.

Research in UPSET is organised in two sub-programmes, and within these sub-programmes,
in various research projects. The sub-programme Applied Linguistics is led by Susan Coetzee-Van Rooy, and focuses on two themes, multilingualism and academic literacy. The sub-programme Corpus Linguistics and Language Practice is led by Bertus van Rooy, and focuses on corpora, including translation and editing corpora, together with other applications in language practice, such as subtitling and interpreting.

The sub-programme Applied Linguistics focuses on the multilingual settings in South Africa, and explores the implications thereof for the choice of languages and the challenges that ordinary language users have to face in their daily lives, including the part of their lives spent as students at universities.

In the multilingualism project, the choice between languages in different domains is investigated, together with changes over time in these choices. The languages include the official languages of South African, but also the languages brought by immigrants to South Africa and languages such as Fanagolo that are associated with specific domains. In the academic literacy projects, the academic reading and writing skills of students, as well as appropriate methods to test these skills are investigated.

The sub-programme Linguistics and Language Practice investigates real language data drawn from a range of settings: ordinary writing and speech, corpora of historical writing, translated and edited texts, in comparison to untranslated and unedited texts, subtitles and interpreting. The Constrained Language project conducts comparative linguistic research on written, spoken, translated and edited language in order to develop models of language structure and language use that account for the properties of language across such a range of contexts. Projects in language practice, which include a focus on interpreting and subtitling aim to offer guidelines for improved training and practices, beside descriptive and theoretical goals.

Director: Prof S. Coetzee-Van Rooy; Bertus.CoetzeeVanRooy@nwu.ac.za, 016 910 3422
**Niche areas - Potchefstroom Campus**

**Medicine Usage in South Africa (MUSA)**
(Prof Martie Lubbe)

This research niche seeks to understand the factors that influence the appropriate use of medicine by patients in the Southern African healthcare environment.

The challenges encountered in this field include rapid growth in healthcare expenditure, particularly medicine costs, lack of access to essential medicines, misuse or irrational use of medicine, and the burden of chronic disease and pandemics such as HIV/AIDS, tuberculosis and sexually transmitted diseases. Other challenges include the implementation of the National Department of Health’s Strategic Plan for 2010/11 to 2012/13. This plan refers to the establishment of National Health Insurance, the need to improve the quality of health services to comply with the National Core Standards and a review of the National Drug Policy. MUSA aims to help to find solutions for these challenges by conducting research in two sub-programmes, namely Medicine resource research and Medicine outcomes research.

MUSA has been active in a study in the public health sector in the North West Province, Assessment of the District Health Information System in the Dr Kenneth Kaunda and Bojanala Platinum Districts and also developed a grading system for registered pharmacies in South Africa based on compliance with the Good Pharmacy Practice Standards. A small but productive group of researchers work in conjunction with a strong group of post-graduate students. They have established a number of ongoing collaborative partnerships, such as with the North West Department of Health and Social Development, the Namibian Health Plan, the Management system for Health (Namibia), and Mediscor PBM (Pty) Ltd.

**The research in the niche area is organized into two sub-programmes, viz.**
**Medicine Resource Research**, concentrating on an investigation of all health system, processes and resources related factors that influence appropriate medicine usage at individual patient, community and health system levels, and

**Medicine Outcomes Research**, which is applied clinical and population-based research that seeks to study and optimize the outcomes of medicine therapy in terms of benefit to the patient and society.

**Leader**: Prof Martie Lubbe, Medicine Usage in South Africa (MUSA),
+27 18 299 2299, martie.lubbe@nwu.ac.za.

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**Quality in Nursing and Midwifery (INSINQ)**
(Dr Karin Minnie)

INSINQ, a new focus area coming into being in 2013, is taking the lead in South Africa by being the first stand-alone entity focussing on nursing research. The mission of INSINQ is to improve the quality of nursing and midwifery through focussed research and innovation to improve the health outcomes for individuals, families and communities locally, regionally and internationally with the vision to be recognized as the most prominent research entity in nursing and midwifery in the African region.

The overall theme is Research to advance quality of nursing and midwifery, and the sub-themes are:
- Health systems for quality;
- Advancing quality through evidence-based practice, and
- Advancing quality through clinical research.

There are currently eleven PhD research programmes fitting under these sub-themes.

Even though it is a new entity, there is a strong PhD and masters’ programme, and the publication outputs are promising. The entity has also established a number of international links and collaborations with countries such as Belgium, Canada, the EU and other African countries. The entity also collaborates with other research entities on the Campus such as AUTHer, HART, Cen and WorkWell.

Good levels of funding have also been obtained. INSINQ is a newly-established entity with great potential.

**Director**: Dr CS Minnie, Quality in Nursing and Midwifery,
+27 18 299 1836, Karin.Minnie@nwu.ac.za

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**Visual narrative and creative outputs through inter-disciplinary and practice-led research**
(Prof Rita Swanepoel)

The research niche area for the visual arts came into being officially in January 2014 to fill the gap in terms of the need to investigate the unique research and creative outputs within the subject
groups art history, graphic design and creative writing. The members of the research niche work towards expanding a research culture within the relevant subject groups, improving the post-graduate qualifications of the personnel, publish more articles in accredited journals, co-operate in the effort to have creative outputs acknowledged as legitimate research, supervising post-graduate students in the subject groups art history and graphic design as efficiently as possible within the framework of the NWU and to promote national and international co-operation and collaboration with other tertiary institutions.

There are three sub-programmes with the following leaders:

- Practice-led research and creative processes – triennial projects under the guidance of the specific project’s leaders;
- Reading and interpretation of visual narratives, creative outputs and cultural artefacts in the South African context under the guidance of Rita Swanepoel (convenor) and art history personnel
- A reflection on theory and methodology in Art History and Graphic Design, under the guidance of Rita Swanepoel (convenor).

Leader: Prof Rita Swanepoel, Visual narrative and creative outputs through inter-disciplinary and practice-based research, + 27 18 299 4095, rita.swanepoel@nwu.ac.za

Musical Arts in South Africa: Resources and Applications (MASARA)
(Dr Liesl van der Merwe)

This niche research area in music was founded in 2008 by Prof Hetta Potgieter. It comprises a dynamic group of people who treasure a cooperative work ethic.

MASARA contributes towards research on music and well-being in the social sciences, humanities, performing arts, education and community engagement. MASARA’s sub-programmes accordingly focus on music education, ethnomusicology, music in religious life, creative applications (composition), community projects as well as the most recent addition, performance and research.

MASARA is unique in South Africa in that it is the only tertiary project that conducts focused research in music. It is developing a vibrant publishing culture, with a good output in journals, as well as of post-graduate students. At the recent May 2015 graduation, 2 doctoral and 9 masters’ students graduated by means of MASARA. Seven of the latter graduated cum laude. Research output contributions are made by staff, students, post-doctoral fellows, research fellows and an extraordinary professor.

The NWU Choir Academy (NWUCA®) is also situated within the niche area and offers short learning programmes and workshops in choral conducting. The activities of the NWUCA® have enabled participants to partake in national and international conferences and workshops, as well as research activities.

MASARA collaborates with a number of international institutions. The North-North-South Project is
funded by the Centre of National Mobility (CIMO) at the University of Jyväskylä in Finland, and involves three South African and three African universities. The Linnaeus-Palme Exchange Programme with the Royal College of Music in Stockholm in turn is funded by SIDA.

MASARA aims to support postgraduate students to complete their studies, prepare its members for NRF rating and harness the diverse skills of all staff members in the School of Music into effective sub-

programmes that connect the numerous prestigious performance and composition outputs of staff. In this way, music is approached as a living art that reminds the team why we carry out research, and also shapes the ways we think and contribute to our general well-being.

Leader: Dr Liesl van der Merwe, Musical Arts in South Africa: Resources and Applications, +27 18 299 1689, liesl.vandermerwe@nwu.ac.za

COMPRES (Community Psychosocial Research)

The vision of the research focus area Community Psychosocial Research (COMPRES) is to conduct high quality, scientific and evidence-based research on community psychosocial wellness in appropriate South African contexts, with the aim to prevent pathology and improve psychosocial wellbeing.

In addition, we want to establish ourselves as leading role players in community psychosocial research in the wider Southern Africa region, and in doing so develop and provide appropriate models for understanding and addressing community psychosocial adversity and wellbeing within a developing context.

Community Psychosocial Research (COMPRES) is a research focus area within the Faculty of Health Science and is the research home for researchers from the School of Education Studies, the School of Psychosocial Behavioural Sciences and the Centre for Child, Youth and Family Studies. It officially opened its doors in January 2015.

Community Psychosocial Research (COMPRES) also represents community presence where there is a visibility of what we stand for within the different communities and where not only the researchers, but also community members, who are invaluable and who play an active role in the research projects, feel at home.

Prof Herman Grobler, Herman.Grobler@nwu.ac.za, +27 18 285 2271

Occupational Hygiene and Health Research Initiative (OHHRI)

Occupational hygiene as a discipline is responsible for the anticipation, recognition, evaluation and most importantly, control of stressors (i.e. chemical, physical, biological and psycho-social) posing a risk to the health of workers in the workplace with the objective of promoting worker health and well-being and safeguarding of the community at large. In short, it enables creation of workplaces that
is not detrimental to the health of workers. This fits into the international priorities of the United Nations, World Health Organisation, International Labour Organisation, International Occupational Hygiene Association, and the International Congress on Occupational Health, while nationally with that of the Department of Labour (representing general industry), the Department of Minerals and Resources (representing the mining industry) and the Southern African Institute for Occupational Hygiene.

The Niche Area OHHRI was established in 2015 and aims to conduct relevant and focused occupational hygiene research of high quality in South Africa whilst improving worker health.

Our research in occupational hygiene is distinctive in that other South African universities conduct predominantly occupational health, public health and environmental health research. Furthermore, the NWU is the only South African university offering MSc and PhD degrees in occupational hygiene. The structured MSc degree is highly acclaimed and graduates are highly sought after.

Research collaboration with industry, in particular the platinum mining industry, which has a significant footprint in the North West Province, is one of our primary strengths. Nonetheless collaboration with other research entities of the NWU (e.g. HART, Pharmacen) and other national (e.g. Medical Research Council) and international (e.g. the National Institute for Occupational Safety and Health, USA) research organisations are well established. In addition to generating outputs in the form of scientific publications and delivering postgraduate students, the translation of research into practice by influencing national policy, programmes, legislation and occupational hygiene practices is of importance. At present this is already evident in workplaces and national occupational health legislation under revision.

Prof Johan du Plessis, Niche Area Leader: Occupational Hygiene and Health Research Initiative (OHHRI),
+27 18 299 2434, johan.duplessis@nwu.ac.za
Computer systems that can listen and speak to humans are becoming more and more common. Such systems answer telephones, provide requested information, type dictated documents, and assist people in many different ways on a daily basis. In the USA alone, several million customers of banks, airlines and search companies are served by speech recognition systems every day. But what if the languages spoken are not English, but rather, one of the 3,000 languages spoken in Africa?

This is where the MuST research group focuses its efforts. We create speech technologies for the less-resourced languages of the world, and try to find new ways of doing this quickly and cost-effectively. In order to be able to build these systems, we have to answer many questions: How can our systems be made to understand the many different accents within a single language? How do people pronounce proper names they have never heard before? How can we capture and understand the essence of a language from a limited set of speech samples?

Multilingual Speech Technologies (MuST) is a research niche area of the Vaal Triangle Campus of the North-West University, consisting mainly of engineers and computer scientists actively involved in speech technology and pattern recognition research. The research group collaborates in various local and international research projects, working with partners and clients from industry, government and NGOs.

At MuST we create and apply speech technologies within a multilingual context. We provide a focused, project-oriented learning environment to younger researchers, and provide senior researchers with significant freedom in choosing how they contribute to the group’s activities. Initiated from the Faculty of Economic Sciences and Information Technology, Vaal Triangle Campus, our research activities include a small student presence.
at the CSIR in Pretoria, as well as a satellite research office in Hermanus, where group members and visiting scientists can spend time away from it all, in an environment that is conducive towards focused research. Our core research group is small, but collaborates widely with international researchers active in our field. This allows us to provide a focused, project-oriented learning environment, creating opportunities for young researchers to collaborate on international projects with world-class researchers.

This calls for work at very different levels:

- We continuously work towards a better understanding of the essence of pattern analysis (learning from data). This work touches on many interesting disciplines, from machine learning to linguistics, and has the potential to impact the world far beyond speech technology.
- We build tools that can be used to collect and analyse samples of a language quickly and effectively. (In collaboration with the CSIR, we recently completed the first large (600-hour!) data set, containing carefully marked samples in all of South Africa’s 11 official languages.)
- We build and test real-world systems and applications that use speech recognition in practical ways. For example, we are currently working on systems that can be used to transcribe lectures in real time, which will hopefully be of great benefit for students in our multilingual university environment.

The development of speech technology for the under-resourced languages is not simply a recapitulation of the steps taken for well-resourced languages (such as English), for a number of reasons:

- Conventional speech technology is highly resource intensive. Scarcity of existing electronic resources forces us to be much more resource-efficient in the creation of speech technologies for under-resourced languages.
- The availability of vast amounts of linguistic research in the world languages has supported a staged approach in those languages: technology is developed based on existing scientific knowledge. For the under-resourced languages, in which detailed linguistic knowledge is limited or absent, the interaction between linguistic research and technology development is likely to be much closer.
- Most existing speech technology systems are monolingual in nature, but the environments in which under-resourced languages occur are often linguistically complex, requiring significant attention to multilingual phenomena such as a dynamic set of loan words, code switching, or multilingual names produced across languages.

**Director: Prof Marelie Davel, +27 28 312 1907, marelie.davel@gmail.com**
Niche Area on the Diseases of Lifestyle

The Niche Area on the Diseases of Lifestyle was approved in 2014. This niche area shall embrace disciplines across Interprofessional education and practice of Health Sciences, Nursing, Agricultural Sciences and Technology, Human and Social Sciences.

Sub-Theme (1): Non-communicable Diseases
Lifestyle related conditions are largely preventable. Unequivocal evidence exist that the combination of health policy at the societal level and health education at the individual and family level related to smoking cessation, optimal nutrition, weight control and physical activity and exercise, optimal sleep and stress management would largely prevent, manage, and some cased reverse these conditions (Dean et al 2011). NCD are significant contributors to the increased morbidity and mortality of South Africans.

Sub-Theme (2): Violence, Injuries, Trauma and Psychological Intervention.
Violence against women and girls is a significant public health problem globally. Global statistics suggest that 1 in 3 women in their lifetime experience some kind of assault such as sexual, physical or psychological (UNFPA, 2000). Globally, 20%-40% of women have experienced sexual assault by men other that their partners during their lifetime.

Sub-Theme (3): Social Aspects, Management of Disability and Inter-professional Care.
The management of HIV and AIDS seldom focus on the Inter-professional Care and the management of the social aspect of HIV and AIDS. The social aspect will be management through the assessment and quantification of health related quality of life of people living with HIV and AIDS.

Prof U Useh, Niche Area Leader,
+27183892531,
Email: ushotanefe.useh@nwu.ac.za
Food Security and Safety in the North-West Province

The niche area Food Security and Safety in the North West Province, is a research entity consisting of multi-disciplinary research expertise in Agriculture, Biological Sciences, Environmental Sciences and Indigenous Knowledge Systems. The aim of the niche area is to harness research that contributes to improved food security (availability, access and utilization) and safety among the people in the North West province. A research activity in this entity focuses on the contribution of, especially, smallholder agricultural systems (production, marketing, processing and value adding, technology, consumption) to household food security. The Niche area also collaborates with the Department of Agriculture Forestry and Fisheries (DAFF) and the Department of Rural Development (DRD) on issues and projects aimed at addressing food security and safety in the North West province. The entity is composed of five sub-programmes namely: Plant Food Production, Livestock Production, Animal Health, Agricultural Economics & Extension and Environmental Science. These five programmes are headed by five established researchers in the respective areas. Post graduate students usually play a major role in the research activities of the Niche Area.

Niche Area Leader, Prof V Mlambo,
Tel: +27 18 389 2741

Theology - this science brings you to the Source of all things and thoughts:
“In thy Light we see the light!”

Prof Fika Janse van Rensburg - Vice-Rector, Research and Planning, Potchefstroom Campus
The Centre for Applied Risk Management (UARM) is a centre for qualitative post-graduate risk management education. UARM focuses on the application of risk principles in practice, applied qualitative risk education and on behavioural risk research. UARM was established in 2012 in the Faculty of Economic Sciences and Information Technology of the North-West University, Vaal Triangle Campus, to address the current gap in postgraduate qualitative risk education. Business and risk managers play complementary roles in the processes of setting and achieving an organisation’s objectives. In practice however, a lack of knowledge and understanding of the interconnectedness of these roles can create misunderstanding and conflict between these role players. The vision of UARM is to empower senior risk stakeholders to better understand and manage risk. We have a close working relationship with our partners to provide innovative solutions across sectors. We focus on education and applied research at senior, executive management and board levels. UARM offers the following products and services: Master classes, Master’s degree programme in applied risk management, and research. Master classes cater for the continuing professional education needs of risk stakeholders.

There are currently two master classes on offer: project risk mitigation, and applied risk management. The Master’s degree programme in applied risk management follows a qualitative approach to risk management with emphasis on risk management as an applied discipline. The UARM research programme focuses on behavioural risk management. Behavioural risk investigates the impact of human behaviour, biases and uncertainty on decisions.
involving risk. It is an inter-disciplinary field that combines fields such as organisational psychology and immersive training to solve risk-related issues. For more information and to contact UARM, please visit www.nwu.ac.za/uarm/home

Manager: Prof Hermien Zaaiman, Hermien.zaaiman@nwu.ac.za

Serious Games Institute-South Africa (SGI-SA)

The Serious Games Institute-South Africa (SGI-SA) seeks to reshape preconceptions as it pushes the boundaries of innovation in the ever-evolving world of serious games. Through merging reality with virtual environments, SGI-SA strives to bridge the gap between learning and fun. SGI-SA is at the forefront of a new learning era which blends virtual reality with the development of real-life skills through games. Serious games blend learning with the enjoyment of games through the simulation of real-life situations in virtual worlds. Virtual worlds provided a risk-free training ground for learners to experiment within otherwise dangerous environments. Without realising it, players learn concepts and ideas as they progress through each level. These concepts and ideas can then be applied when needed in real life situations. Skills developed within serious games can range from mathematics to blood typing. SGI-SA is continuously developing material that serves to further push the boundaries of game-based learning through the use of cutting edge technologies. The possibilities are seemingly endless.

Manager: Werner Ravyse, werner.ravyse@nwu.ac.za

PoSER (Understanding Poverty and Socio-Economic Challenges)

The PoSER (Poverty and Socio-Economic Research) faculty research group focuses on economic development and socio-economic issues, with specific interest in micro/house hold-based studies. The research group seeks to build knowledge and gain expertise in the intricacies of life in low income neighbourhoods particularly with regard to poverty and its associated challenges. The research group’s aim is to deliver research of high quality that will provide stimulus for critical thinking in order to give a voice to prevailing challenges within our communities. The proposed entity is in line with the South African National Development Plan’s strategic intent, which is to develop interventions informed by an understanding of the socio-economic challenges arresting many citizens in South Africa. PoSER has taken up the gauntlet to map every facet of poverty in its constituent communities. As a key driver in the collection and dissemination of household level data, PoSER is well-situated as one of the main sources of information for the Vaal region and neighbouring areas. PoSER resides in the school of Economic Sciences field of research entails poverty studies and economic development. Assistant leaders include Dr Steve Dunga, Mr Paul Muzindutsi and Dr Danie Meyer, lecturers in the faculty of Economic Sciences and IT, whose fields of research span economic development, poverty studies, econometric analysis and local economic development. The group also consists of a number of staff members and postgraduate students in the School of Economic Sciences. Research fields covered by the entity include poverty, the multidimensionality of poverty, economic
ProGenY (Generation Y Research)

We find ourselves in a rapid changing and fast paced world full of new technologies, fashion and products. When listening to stories told by our parents, grandparents and even teachers we frequently hear the phrase - ‘In my generation’. But what does this phrase really mean? Is there really such a gap between different generations? And is it truly important to know who these different generations are and what makes them tick? What makes the likes of Zahara, Kim Kardashian, Jessica Simpson, Jessica Alba, Kate Middleton, Zac Efron, Adele, Rihanna, Emma Watson and Justin Bieber so different than the generations before them?

Generation Y is the first generation to grow up in the digitally connected world of the Internet, virtual social networking, mobile telephony, reality TV and global news channels. Having been bombarded with marketing messages from a young age, they have developed a certain scientism towards marketing hype. Added to this, the development of new media platforms and other technological advancements has meant that marketers have had to relook at the ways they used to reach this segment.

As such, it has become a challenging market for many businesses to successfully market to them and understanding their unique needs and ways requires extensive research. With approximately 38% of the South African population regarded as members of the millennial generation (born during 1986 and 2005), this generation represents a very important consumer segment. It is also important to remember that this generation is growing not only in age but also in purchasing power, making them more influential. When taking into account that Gen Y-ers have been shaped by the technological revolution that occurred throughout their youth, it comes as no surprise that they are used to getting information fast and being connected 24/7, 365. It can therefore be very clear why it is important to understand the millennial generations and to know what makes them tick. To stay relevant, companies must not only understand the generation’s personal values and consumption patterns, but also accommodate their marketing and product approaches to fit these characteristics and successfully reach these new consumers. The Faculty of Economic Sciences and Information Technology is blazing a trail of excellence in the field of Generation Y research. ProGenY is led by Professor Ayesha Bevan-Dye, who started the group in 2010.

The research done by the ProGenY research group not only sheds light on the consumer behaviour patterns of Generation Y but also on uncovering more tailored ways of appealing to their unique needs and wants. The research group specifically focuses on the student portion of the cohort given that a tertiary qualification is typically associated with a higher future earning potential and a higher social standing within society. This research group is involved in several exciting research projects concerning Generation Y students’ attitudes and perceptions concerning Facebook marketing, mobile advertising, consumer socialisation, Web
advertising, status consumption, national sport team marketing, online piracy and the like.

Research Leader: Professor Ayesha Bevan-Dye, Ayesha.bevandye@nwu.ac.za

Faculty Humanities

Integrative Multidisciplinary Research (IMD) on the Eco-health & Wellbeing of Local and Regional Communities & Regional (history) studies.

- Exploring integrative research methods and science communication.
- Mapping the health and wellbeing status of communities in local areas and regions.
- Focusing on traditional and modern ways of doing regional history research.

Prof Elize van Eeden, Elize.vanEeden@nwu.ac.za

Research group in the Cultural Dynamics of Water (CyDyWat)

- Transdisciplinary research strategies for solutions to everyday water problems.
- Water and sanitation service delivery in South Africa.
- Human interactions with water.
- Water politics.

- The environmental history of water in Southern Africa.

Prof Johann Tempelhoff, Johann.Tempelhoff@nwu.ac.za

Research group Political Development and Constitutional Application (PODCA)

- To engage in research in the development of politics in South Africa and the practical application of the Constitution of the Republic of South Africa with reference to international dimensions.

Dr Herman van der Elst, herman.vanderelst@nwu.ac.za & Adv Erika Serfontein, Erika.serfontein@nwu.ac.za

Public Affairs Research for Service Delivery (PARSED)

The focus of PARSED is to conduct research on regular problems that the government is facing.

Prof Mpedi Madue, Mpedi.madue@nwu.ac.za
Ancient Texts (AT)

Discovering how and why texts from the ancient world influence people:
• Hermeneutics – how we think we understand
• Philosophy of Religion – how texts reveal ancient thought patterns
• Hebrew Bible / Old Testament – how and why specific texts remain influential in society
• Ancient World – how ancient legal traditions informed modern legislation.

Prof Hans van Deventer,
Hans.vanDeventer@nwu.ac.za

Mine Water Research Group (MWRG)

• Mine closure preparation, mine water related risk analysis (flooding, acid mine drainage)
• Health Effects of uranium, risk assessments, epidemiological studies
• Remediation of (radioactively) polluted mine legacy sites
• Environmental fate and mobility of waterborne uranium
• Hydro GIS (Geographical Information Systems) and VGE (Virtual Geographic Environments), risk mapping, remote sensing
• Karst hydrology and impacts of deep level mining
• Geo-ecological water research on fluvial processes and waterborne transport of contaminants
• Pearland hydrology and filler functions
• Development of sustainable post-mining solutions

The Faculty of Natural Sciences is research-directed, and postgraduate students are important partners in the research endeavours of the Faculty.

Prof Kobus Pienaar - Dean: Natural Sciences, Potchefstroom Campus
Mafikeng Campus hosts the following centres:

**Indigenous Knowledge Systems (IKS) Centre**

The IKS centre launched the first SAQA accredited inter- and multi-disciplinary Bachelor of IKS (BIKS) which is a four-year professional degree. The programme curriculum has specialisation options in Agriculture, Science and Technology (S&T), Health, and Ethnomedicine from where research programmes for both Master’s and Doctorate degrees evolve. The IKS centre collaborates with the DST and SAQA on an initiative to champion the Accreditation of Traditional healers.

The Centre hosts a NEPAD/SANBio Regional IKS Node and coordinates IKS network activities initiated and supported by NEPAD in the region. The centre implemented a NEPAD/SANBio project titled ‘Integrating IKS in Biosciences-An Initiative for Capacity Building and Networking in the Southern African Region’ which covered five countries in the region for the period 2010-2013. The centre is one of the five South African partner institutions forming the DST-NRF Centre in Indigenous Knowledge Systems.

**Centre of Applied Radiation, Science and Technology (CARST)**

CARST is a pioneer in applied radiation studies. The Centre is mandated to carry out research and build capacity for the Nuclear Industry in South Africa. CARST endeavours to achieve these objectives by offering the Programmes both at Honours and Master’s level. CARST is authorized by the National Nuclear Regulator (NNR) of South Africa Certificate of Registration (CoR 261) to carry out activities in the Mining Facilities to improve radiation safety, protection and nuclear wastes minimization and management.
Dale Beighle Centre for Animal Health Studies

The Dale Beighle Centre for Animal Health Studies on the Mafikeng Campus offers two qualifications that are unique within the School of Agriculture. These are the only full-time BSc Agric (Animal Heath) programmes and the only residential programme for a Diploma in Animal Health recognised for registration by the South African Veterinary Council. The large Animal Health complex houses amongst others a modern animal clinic to enhance the undergraduate teaching programme, and large diagnostic and research laboratories to facilitate postgraduate studies.

Community Law Centre

The Faculty of Law prides itself as a regionally competitive centre of legal teaching and learning, research and community engagement in quest of justice and democracy. These strategic objectives are reflected in our undergraduate and postgraduate programmes. Our LLB programme is very popular in the SADC region and beyond, with learners coming from as far afield as Botswana, Cameroon, Nigeria, Zimbabwe and Zambia.

One of the key cogs in our mission to be relevant and responsive to the needs of our community is the provision of legal aid and assistance to the indigent. Apart from providing clinical and problem-based education to law students, our Community Law Centre offers free legal aid and assistance to those in our surrounding communities who would otherwise be denied access to justice because they cannot afford services of legal counsel. We take up cases in almost every dispute such as domestic violence, matrimonial claims, divorce, maintenance, small claims sounding in money and property. The faculty also conducts community advocacy programmes on community radio stations by way of engaging and educating local communities on topical issues such as Gender-Based Violence, Consumer rights and protection and human rights in general.

We promise the sustained provision of an excellent, ethical legal education, backed by and imbued with the outcomes of topical, forward-looking research

Prof Nicola Smit - Dean: Law, Potchefstroom Campus
The Centre for Pharmaceutical and Biomedical Services (CPBS) is a centre within the Faculty of Health Sciences responsible for the managing of all pharmaceutical and biomedical and associated commercial services. The various services are managed as independent business units responsible for selling laboratory-, clinical-, training-, consultation- and associated services for profit to clients. Although CPBS is service oriented and seeks to address the pharmaceutical and biomedical needs of national and international communities, CPBS also acts as a vehicle for generating external income for the Faculty of Health Sciences and North-West University (NWU). The client base of the CPBS comprises various national and international pharmaceutical companies, the cosmetic industry, procurement organisations, medicine regulatory authorities, private medical practitioners, pathology practices and the Department of Health.

Mission of the CPBS: The CPBS seeks to commercialise pharmaceutical and biomedical expertise, services and innovation profitably, sustainably and in an entrepreneurial manner. This is achieved by utilising resources optimally, managing effectively, remaining strategically positioned, and being quality driven at all times.

Business units within CPBS

The Research Institute for Industrial Pharmacy (RIIP®) incorporating the Centre for Quality Assurance of Medicine (CENQAM®):

Historically the RIIP® and CENQAM® provided pharmaceutical
and associated services the pharmaceutical industry and medicines regulatory authorities respectively. The two laboratories have since being consolidated and are known as RIIP®/CENQAM®.

The facility is the biggest, most modern and best equipped pharmaceutical service provider in South Africa. RIIP®/CENQAM® is trademarked and registered with the South African Department of Trade and Industry as well as accredited by the South African National Accreditation System (SANAS) as ISO 17025 compliant. It provides analytical, training and consulting services to the pharmaceutical- and cosmetics industries, non-governmental organisations, procurement agencies as well as medicines regulatory authorities.

The Clinical Pharmacokinetics Laboratory (CPL)

The CPL services extend to medical practitioners, private laboratories, national state laboratories (e.g. National Health Laboratory Services) and hospitals. The CPL has extensive experience in drug blood level monitoring of anti-epileptic medicines in particular and supplemented by the services of a pharmacokineticist, the CPL provides Therapeutic Drug Monitoring (TDM) services on request to add value to anti-epileptic therapy by enabling the physician to adjust or change medication meaningfully.

The World Health Organisation (WHO) Collaborating Centre for Quality Assurance of Medicines

The Centre provides pharmaceutic analytical and consultation services to the WHO and its member states. The collaborating centre makes an exceptional contribution to the quality assurance of medicine, particularly in the Africa region, through both analytical and training services that are provided at the request of the WHO.

The PEPFAR project

Less than 10 years ago, the world was facing a global AIDS crisis. On the African continent alone, some 30 million people were infected with HIV, but only 50,000 had access to treatment. It was in this context that the American President, George W. Bush, announced the establishment of the President’s Emergency Plan for AIDS Relief (PEPFAR), the largest international health initiative ever by one nation to address a single disease. As a preferred service provider to the PEPFAR initiative, North-West University (NWU) through its CPBS offers world-class, risk-based quality assurance analysis, sampling, testing, regulatory consultancy services as well as vendor prequalification and performance auditing to ensure the quality of pharmaceuticals are procured for the countries benefitting from the PEPFAR initiative.
Cosmetic Efficacy Laboratory (CEL)

CEL is an independent clinical cosmetics testing laboratory managed within the CPBS at North-West University. The laboratory possesses state-of-the-art non-invasive electronic measuring equipment for the evaluation of skin parameters associated with cosmetics efficacy claims.

Centre for Pharmaceutical and Biomedical Services
Prof Banie Boneschans,
+27 18 299 2280/83,
banie.boneschans@nwu.ac.za

The tdi Centre for Advanced Manufacturing (Mr Danie Vorster)

The Centre of Excellence (CoE) at the North-West University in Potchefstroom offers a professional and efficient advanced manufacturing support service to develop South African enterprises’ competitiveness both locally and internationally. This service includes:

- Advanced manufacturing;
- Processing for the food industry;
- Specialised machine and equipment development;
- Specialised tool- and die-making service;
- Product and process development;
- Filled polymers compounding and profiling; Injection moulding.

We provide a comprehensive enterprise development service to micro-, small- and medium-sized enterprises, from conceptualisation, product development and testing, establishing manufacturing plants to developing business designs. Our expert staff members are also pleased to assist industry with training, maintenance and advice on manufacturing best practice. Our work is underpinned by advanced manufacturing research innovatively applied and implemented in industry. The Centre works closely with The Department of Trade and Industry (The dti), Small Enterprise Development Agency (SEDA) and the Industrial Development Corporation of South Africa (IDC) to identify suitable locations and stakeholders for manufacturing plants. We aim to involve business partners that will enter co-operatives with communities and local stakeholders. Industry partners, such as CFAM Technologies, Sasol ChemCity and the Vaal University of Technology (VUT), provide their specialist input in projects. Expertise centres available to the CoE. Centre of Advanced Manufacturing; AMTS FabLab.

The tdi Centre for Advanced Manufacturing
Mr Danie Vorster,
+27 18 299 1536, danie-vorster@nwu.ac.za

Other hosted entities

- South Africa Research Chair Initiative (SARChi)
- Nuclear Engineering (Prof Pieter Rousseau)
- Astrophysics and Space Physics (Prof Markus Böttcher)
The Faculty of Education sees its task as expanding the frontiers in and through education.

Prof Robert Balfour - Dean: Education Science, Potchefstroom Campus
Potchefstroom Campus: 
Ferdinand Postma Library, Research Commons

Where is it and why?

The North-West University strives to deliver focused research of high quality. By establishing an exclusive research and honours commons in the Ferdinand Postma building, the Library Services is contributing towards accomplishing this goal. The Research Commons is situated in the north-western wing on the third floor of the existing library building and next to the Honours Commons.

What is on offer at the postgraduate commons?

Exclusive access to all honours, master, doctoral and post-doctoral students as well as academic and research staff; the latest computer technology and applicable software; a luxurious conference facility and a lounge.

Exciting opportunities to get acquainted with world-class products, techniques and methods will be offered on a regular basis. Researchers in different fields of study will be given the opportunity to rub shoulders and by doing so, ensure the interaction between disciplines.

What does it look like?

Plush carpeting covers the floor and the furniture is in light-coloured wood. Glass screens are used to create an impression of transparency and space. The ergonomic desk and visitors’ chairs are in modern upholstery and a comfortable leisure area is equipped for resting weary legs and minds over a cup of coffee. Our unique Africana collection is exhibited alongside and may be viewed through a glass wall.
Which facilities are there?

- Exclusive access to the Research Commons for master’s and doctoral students, post-doctoral associates, academic and research staff
- The Honours Commons offers admission to honours students only
- Spacious computer workstations
- Individual laptop stations
- Single person study cubicles
- Group seminar rooms for group discussions
- Print, copying and scan facilities
- A modern technologically equipped conference venue with interactive white board, sound and lighting facilities for the Research Commons
- Experienced information staff is available to assist researchers and to refer them to subject librarians if necessary. After hours the facility will be run by postgraduate students
- A core collection of basic reference works on research methods
- A comfortable leisure area with DSTV (limited channels, no audio)
- The Research Commons also boasts a coffee machine

Internationalization

The University has embarked on an ambitious programme of internationalization which is developing well (check the website: www.nwu.ac.za/nwu/students/int.html). The most important aspect of internationalization in terms of research is probably the issue of post-doctoral fellows and the role that they can play in the expansion of the research project of the University.

Preamble: The philosophy underlying the post-doctoral programme

As part of the crucially important component of research within the context of tertiary education, the University has had to put into place a number of initiatives to promote and support this important focus. Apart from initiatives such as the structured development of research entities within the framework of growth from a niche through to a research focus area to a research unit and finally to a centre of excellence, and generous incentives to researchers publishing in indexed and highly-regarded journals, it was decided to embark on a specialized research initiative through the attraction and employment of post-doctoral fellows.

The decision to market this initiative very actively is based on the premise that investment in a post-doctoral fellow is a very sound investment. The post-doctoral fellow has completed a PhD, most probably comes from a highly-regarded academic institution (preferably international, but also local where appropriate) and brings with him/her newly-acquired academic expertise and new insights as well as valuable findings derived from the work completed for the PhD. Such a fellow would be able to slot in with an appropriate existing research entity and infuse in it the knowledge and expertise gained in a recently completed PhD. The fellow would be able to work independently, but also work in concert with the members of the research entity, thereby strengthening profile of the entire entity.

A post-doctoral fellow is therefore important within the entire context of research at the University, and support for the postdoc is of crucial importance. Of equal importance is the proposed contribution that the postdoc is going to make, and for this reason this
The purpose of the fellowship is to make funding available to attract recently-qualified researchers to the NWU, to enable them to develop their own research skills as an introduction to a full-time academic career. At the same time, the aim is to promote and stimulate research activities, including postgraduate supervision and education within the Entity/Faculty.

This means that a post-doctoral fellow will work under the leadership of a Supervisor within a research entity or Faculty. The post-doctoral fellow will participate fully in the research programme of the entity, and will collaborate with researchers working in that entity. Fellows will also interact with postgraduate students in the research entity, and can even in some cases be expected to act as co-supervisors for research masters and doctoral students.

Furthermore, post-doctoral fellows must not simply be selected for their ability to improve the research output of the research entity or faculty. Their main purpose is to stimulate research; they must hence be selected for their ability to contribute in terms of new and stimulating ideas, and their ability to share this within the research entity.

**General process of research for postgraduate students**

The Manual for Postgraduate Studies was approved by the Senate of the North-West University for use by postgraduate students at all NWU campuses. The manual is a binding policy document, and provides guidelines regarding the different policies and processes involved in postgraduate study at the North-West University.

We strongly advise all prospective students and registered students to read through the different rules, processes and policies referred to in this document. All these documents are available on the website of the University. The rules and policies to be studied in line with this document include the following:

- Academic Rules for Master’s and Doctoral Students at North-West University (“The A Rules”)
- Different rules and regulations of NWU faculties
- Rules for the Classification of Theses and Dissertations
- Rules for the Ethics Regulatory Committee (RERC) of the North-West University
- NWU Financial Rules
- Guidelines for Applicants – Campus-relevant
- Guidelines for Foreign Applicants
- Institutional Language Policy of the NWU
- Library rules for writing master’s dissertations and PhD theses
- Institutional M and D template for completing the thesis/dissertation
- Institutional Plagiarism Policy

A thorough study of these documents will serve an indispensable purpose, as it will familiarize you with the entire process, and contribute towards making the entire study process a fulfilling and worthwhile experience.

The content of the Manual for Postgraduate Study,
as can be seen below, is highly relevant and will make your study hassle-free to the largest extent. The basic outline of the content of the Manual is provided below.

The Manual starts off with the basic procedures with respect to master’s and doctoral studies. This section includes the introduction, an outline of the life-cycle of the process of senior post-graduate study. It refers to the essential points of the application process, from application to registration (as a student) which outlines your responsibilities in terms of registration on an annual basis until you have completed your studies. Minimum and maximum periods of registration are also provided. Registration of your title, the appointment of the supervisor or promoter and finally formulating the title of the research project are all issues that are dealt with here. The submission process and the examining procedure are also dealt with, as the candidate has a cardinal role to play here, and where trust between supervisor and candidate is even more important.

A crucial outcome of especially a doctoral study is publication or co-publication with the supervisor/promoter – this requires a high degree of trust and good ethics from both partners.

It will by now have emerged that the issue of working with a supervisor/promoter is a highly charged one, and a whole section is devoted to code of conduct for supervisors and promoters – including the candidate himself or herself. Therefore the chapter on the code of conduct for supervisors and promoters in terms of their relationships with each other is of crucial importance. The following issues are addressed: 1) The research process; 2) relevant and applicable expertise in the research field; 3) relevant expertise on the methodology of research; 4) the crucial issue of the relationship with the student; 5) the assessment of submitted work (and the moral and other responsibilities of both parties in this context). The general issue of research management in general is also drawn into this discussion.

The technical details involved in the actual construction of the research report (mini-dissertation, dissertation or thesis) are outlined in great detail – this should be kept in mind throughout the process of writing as this will be invaluable when the actual document is being written.

Keep in mind that you should engage a reputable language editor in good time, as language editing is crucial and cannot be rushed. Please consult the University list for names of reputable editors.

A very crucial consideration in writing an academic paper of any kind is the issue of plagiarism. The University is very serious about the importance of this issue, and different programmes are available to help you ensure that you have complied strictly with requirements about the acknowledgement of sources.

This brings one to the further very important issue of research ethics. In many disciplines ethics are
crucially important, especially where experimental work involving people and animals is involved. This Section of the Manual contains all the information that you need – from the basic guidelines underlying ethical behaviour in research to the specific guidelines of the University, and the procedures to be followed in obtaining ethical clearance for a project.

Keep in mind that this cannot be done after a project has been completed – it is therefore crucially important to discuss it fully with your study supervisor/promoter before a study is undertaken. Apart from South African consideration, the Manual also refers to important international ethics guidelines, such as the Helsinki Declaration, the Belmont Report and the Nuremberg Code.

Fees for 2016 not available yet – please contact the Financial Support Services Office (see below)

FINANCIAL SUPPORT SERVICES

Contact us

General Enquiries

Postal Address:
North-West University
Potchefstroom Campus
Private Bag X6001
Potchefstroom
2520

Ms Elsabe Bosman
+27 (0)18 299 2045
elsabe.bosman@nwu.ac.za

Physical Address:
North-West University
Potchefstroom Campus
4 Hoffman Street
Building F19
Potchefstroom
2531

Ms Eurika Williams
+27 (0)18 299 2046
eurika.williams@nwu.ac.za

Where to find the NWU Potchefstroom Campus:

Bursaries and funding

The NWU provides generous bursary funding for postgraduate study. Visit the following web address for more detailed information. Web address for application forms:
www.nwu.ac.za/content/postgraduate-bursaries
The NWU postgraduate bursary scheme aims to provide financial support to promising postgraduate students who cannot afford tertiary education and to give recognition to students who perform well academically. The NWU postgraduate bursary scheme is in line with the strategic objectives of the University as explained in the Institutional Plan.

NB: ORIGINAL APPLICATIONS AND E-MAILS

Honours Bursaries

Bursary Conditions

1. The bursary is available only to postgraduate students who register for a first, prescribed Honours course unit.
2. Application for the bursary must be done on the prescribed application form on or before 30 November of the year preceding the intended study.
3. The student must be registered as a FULL-TIME honours student. Part-time students and working students (defined as students who work for an employer for more than 15 hours per week, earning a salary and where study isn’t the main activity) don’t qualify.
4. The bursary is valid for one (1) year only. Bursary holders must complete the Honours degree within a grace period of one (1) year.
5. Bursaries from Statutory Councils such as the NRF and other outside institutions must be declared in Section E of the application form. A student receiving bursaries from another sponsor may apply for a top-up Honours bursary up to but not exceeding the maximum of R60 000 subject to the bursary amounts specified below. The University reserves the right to cancel or adjust the honours bursary if the amount of R60 000 is exceeded.
6. The bursary amount is repayable if a student fails to comply with any of the conditions, terminates studies or does not complete the course within the prescribed period.
7. The University reserves the right, should circumstances be justified, to alter the guidelines, conditions and values of the bursary without prior notice to the applicant.

A. R16 900 FOR SCARCE SKILLS COURSES (BCom and BSc with the exception of BA Tourism)

To qualify applicants must have achieved an average of at least 65% in the final year modules/subjects of the preceding completed degree.

Academic records of the previous completed degree must be attached – certificate of degree only is not acceptable.

ONLY. No faxes will be accepted. Incomplete and late applications will not be considered

The bursary application must NOT be submitted with your application for admission to the postgraduate course.

Closing date: 30 November
IDENTIFIED SCARCE SKILLS

Accounting  Computer Science  Physics  Actuarial Sciences
Financial Management  Statistics  Agricultural Sciences  Geology
Tourism (BA)  Auditing  Information Systems  Biotechnology
Mathematical Sciences

B R14 400 for non-scarce skills courses

To qualify applicants must have achieved an average of at least 70% in the final year modules/

Identified non-scarce skills

<table>
<thead>
<tr>
<th>FACULTY</th>
<th>DEGREE</th>
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<tbody>
<tr>
<td>Economic and Management Sciences</td>
<td>B.Com Industrial Psychology, BCom Labour Relations and BCom Human Resource Management</td>
</tr>
<tr>
<td>Arts</td>
<td>BA</td>
</tr>
<tr>
<td>Education Sciences</td>
<td>Bed (NPDE qualifies for 50% of the bursary)</td>
</tr>
<tr>
<td>Theology</td>
<td>BTh</td>
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NWU Master’s bursary

Bursary Conditions

1. The bursary is available only to postgraduate students who register for a first, prescribed Masters’ course unit.
2. Application for the bursary must be done on the prescribed application form on or before 30 November of the year preceding the intended study.
3. Masters students are allowed to receive bursaries from one or more sources. There is no limitation on the amount of the Masters bursary.
4. The bursary amount is repayable if a student fails to comply with any of the conditions, terminates studies or does not complete the course within the prescribed period.
5. The University reserves the right, should circumstances be justified, to alter the guidelines, conditions and values of the bursary without prior notice to the applicant.
6. The bursary will be awarded as follows:
6.1 To qualify applicants must have achieved an average of at least 60% for all modules/subjects during the preceding completed Honours degree. Students who have obtained a four-year B degree in B Eng, BPharm or BArt et Scien in Town and Regional Planning also qualify for the Masters bursary but must have achieved an
average of 60% for all subjects/modules in the final year of the preceding degree. Academic records on the previous completed degree must be attached – certificate of degree only is not acceptable.

6.2 Part-time students and working students (defined as students who are employed for more than 15 hours per week, earning a salary) may apply for a 50% allocation of the NWU postgraduate bursary.

6.3 The bursary is valid for two (2) years only. R18 500 per year will be awarded. The total bursary value over 2 years is R37 000.

6.4 The student must apply annually for the remainder of the renewal bursary. The Progress Report (P2, Sec 3 of the application form) must be completed and signed by the study leader to approve the renewal application academically after the first year and every following year of study thereafter.

6.5 If a Masters student, after completing the degree, immediately enrols for Doctoral studies, R18 500 will be carried over to the first year of Doctoral studies. If the student does not enrol for Doctoral studies the bursary value remains only R18 500.

6.6 Bursary holders must complete the Masters’ degree within a minimum grace period of three (3) years.

Doctoral bursaries

Bursary Conditions

1. The bursary is available only to postgraduate students who register for a first, prescribed Doctoral course unit.

2. Application for the bursary must be done on the prescribed application form on or before 30 November of the year preceding the intended study.

3. Doctoral degree students are allowed to receive bursaries from one or more sources. There is no limitation on the amount of the doctoral bursary.

4. The bursary amount is repayable if a student fails to comply with any of the conditions, terminates studies or does not complete the course within the prescribed period.

5. The University reserves the right, should circumstances be justified, to alter the guidelines, conditions and values of the bursary without prior notice to the applicant.

6. To qualify applicants must have achieved an average of at least 60% for all modules/subjects during the preceding completed Masters’ degree. Academic records on the previous completed degree must be attached – certificate of degree only is not acceptable.

6.2 Part-time students and working students (defined as students who are employed for more than 15 hours per week, earning a salary) may apply for a 50% allocation of the NWU postgraduate bursary.

6.3 The bursary is valid for three (3) years only. R22 000 per year will be awarded. The total bursary value over 2 years is R66 000.

6.4 The student must apply annually for the remainder of the renewal bursary. The Progress Report (P2, Sec 3 of the application form) must be completed and signed by the study leader to approve the renewal application academically after the first year and every following year of study thereafter.
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6.5 Bursary holders must complete the Doctoral degree within a minimum grace period of five (5) years.

The NWU Postgraduate Academic Merit Bursary

The NWU Postgraduate Academic Merit Bursary is supplementary to all other postgraduate bursaries and is awarded for academic achievement.

Bursary Conditions

1. The bursary is available only to postgraduate students who register for a first, prescribed Masters' course unit.
2. The bursary will be awarded only once in the first year of the post-graduate course unit.
3. The Academic Merit Bursary for registered students is automatically calculated and awarded each year. The Academic Merit Bursary for students from other universities is not automatically calculated and awarded – these students must apply for the bursary on the prescribed form on or before 30 November of the year preceding the year of intended study.
4. The bursary amount is repayable if a student fails to comply with any of the conditions, terminates studies or does not complete the course within the prescribed period stipulated for the NWU Postgraduate Bursary Scheme.
5. The University reserves the right, should circumstances be justified, to alter the guidelines, conditions and values of the bursary without prior notice to the applicant
6. The bursary will be awarded as follows:
   6.1 To qualify applicants must have achieved a minimum average of 75% for all final subjects/modules during the preceding completed degree. Academic records of the previous completed degree must be attached – certificate of degree only is not acceptable.
   6.2 Bursary holders must complete the postgraduate degree within the minimum grace period stipulated by the NWU Post-graduate Bursary Scheme for the applicable degree.
MERIT BURSARY VALUES

<table>
<thead>
<tr>
<th>Average percentage</th>
<th>Bursary value in R</th>
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</thead>
<tbody>
<tr>
<td>95-100</td>
<td>5 000</td>
</tr>
<tr>
<td>90-94.99</td>
<td>4 500</td>
</tr>
<tr>
<td>85-89.99</td>
<td>4 000</td>
</tr>
<tr>
<td>80-84.99</td>
<td>3 500</td>
</tr>
<tr>
<td>75-79.99</td>
<td>3 000</td>
</tr>
</tbody>
</table>

APPLICATIONS and must be submitted separately, each with an academic record. Send application and direct your bursary enquiries to your campus of registration:

FINANCIAL SUPPORT SERVICES OFFICE
POTCHEFSTROOM
Susan vd Westhuizen
TEL: +27 18 299 2051
FAX: +27 18 299 2044
EMAIL: susan.vanderwesthuizen@nwu.ac.za

Private Bag X6001, POTCHEFSTROOM, 2520
Building F19, Room G01

STUDENTS MUST APPLY ANNUALLY BEFORE THE CLOSING DATE

The NWU Postgraduate Bursary Scheme and Academic Merit Bursary are TWO SEPARATE
The application and registration process for postgraduate students

Students wishing to enrol for postgraduate courses (M and D) will as a preliminary step first contact the research entity of their choice and discuss the possibilities of enrolling for a post-graduate course in the field of their choice. The director of the entity, in conjunction with the subject specialists, will determine whether the field of study is appropriate, and will also ensure that there is capacity for postgraduate supervision in the required field. At this stage there is not yet a requirement for a proposal, as study supervision, including the writing of a proposal, can only take place once the student has been admitted as a student.

The student will then embark on the formal application process. In order to proceed with this, the student will require certain documents.

In the first place, students who completed their previous qualification at the NWU within the last three years need only to produce a valid ID. The system will provide all the other information pertaining to academic transcript and so forth. Such a student also does not need to pay the application fee.

Students who had studied at the NWU more than three years ago must produce a valid ID and pay the application fee. Their academic transcripts will be drawn from the system.

Students from other South Africa institutions must provide a valid SA ID, the full academic record and certificate of good conduct from the relevant university, and pay the R150 application fee.

Students from universities outside South Africa must provide a valid passport, as well as the relevant study permit. They must pay the application fee of R550 and submit a complete certified academic record from the relevant institution. New international students have to have a SAQA certification of their academic qualifications.

With all these in place, the student can now start the application process.
The first step is to complete and submit the relevant application form (from the web), with all the required documentation, and the required payment (where applicable). Upon submission of the documents, the student will receive a university number (former NWU students retain their student numbers).

The completed application is processed and sent through to the Faculty for evaluation and formal acceptance. The signature of the research director is crucial for formal acceptance.

The result of the evaluation is captured on the system. The student is informed about the result of the evaluation via sms. If the evaluation is positive, the student will be sent a letter and a registration form. The student is registered as a 2016 (new) student as soon as registration form and required receipts have been submitted.

The student is now registered AS A STUDENT. Registration of the title and the proposal must be done via the research entity, and is an entirely different process, about which the student will be fully informed by the allocated supervisor and the director of the research entity.

Students have to observe the deadlines for registration AS STUDENTS – a student has to re-register each year until the study has been completed. Students have to read the A-rules and the Faculty rules to ensure that they comply with all formal requirements and must make sure that they understand the rules with regard to minimum and maximum study periods for each post-graduate qualification.

### For M and D Admissions

<table>
<thead>
<tr>
<th>Name</th>
<th>Office</th>
<th>Phone Number</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eric Swanepoel</td>
<td>Office F1-224</td>
<td>+27 18 285 2364</td>
<td>Coordinator</td>
</tr>
<tr>
<td>Mandie Jansen van Vuuren</td>
<td>Office F1-214</td>
<td>+27 18 299 4274</td>
<td>Arts and Theology</td>
</tr>
<tr>
<td>Melleney Campbell-Jacobs</td>
<td>Office F1-216</td>
<td>+27 18 299 2629</td>
<td>Economic and Management Sciences and Law</td>
</tr>
<tr>
<td>Elize Harber</td>
<td>Office F1-228</td>
<td>+27 18 299 2465</td>
<td>Engineering and Natural Sciences</td>
</tr>
<tr>
<td>Farzana Hussain</td>
<td>Office F1-214</td>
<td>+27 18 299 4249</td>
<td>MBA, PhD in Business Administration and</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Education Sciences</td>
</tr>
<tr>
<td>Margaret Kruger</td>
<td>Office F1-222</td>
<td>+27 18 299 4044</td>
<td>General Enquiries</td>
</tr>
<tr>
<td>Claudia Howard</td>
<td>Office F1-216</td>
<td>+27 18 299 4049</td>
<td>Health Sciences and Post Doc</td>
</tr>
</tbody>
</table>

### For M and D Records

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Phone Number</th>
<th>Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinator</td>
<td>Marietjie Ackermann</td>
<td>+27 18 299 2621</td>
<td>F1-219</td>
</tr>
<tr>
<td>MBA and PHD MBA</td>
<td>Nauma Pretorius</td>
<td>+27 18 299 4043</td>
<td>F1-212</td>
</tr>
<tr>
<td>Engineering</td>
<td>Yolandie Combrink</td>
<td>+27 18 299 4124</td>
<td>F1-223</td>
</tr>
<tr>
<td>Natural Sciences</td>
<td>Maria Raubenheimer</td>
<td>+27 18 299 2656</td>
<td>F1-220</td>
</tr>
</tbody>
</table>
The Faculty focuses on research that is relevant to society, the environment and the country. It is important for us to make a difference through addressing strategic goals and contemporary issues through engineering solutions.

Prof LJ Grobler - Dean: Engineering, Potchefstroom Campus
It all starts here ®
POSTGRADUATE