



Nelson Mandela
Metropolitan
University

for tomorrow

Port Elizabeth & George

[2007 Annual Research Report

technology innovation

research



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Vice-Chancellor:
Prof Derrick Swartz

In relatively little time Nelson Mandela Metropolitan University (NMMU) has established a positive and rising reputation - especially in the areas of science, business and technology studies - with good labour market synergies.

We host a number of exciting, in some cases pioneering, research and development bodies in key areas such as automotive mechatronics, chemical technology, energy, information and telecommunication studies, and conservation ecology, to name but a few. Our links with industrial and scientific councils are highly acclaimed. Many of our top researchers and postgraduate students are deeply engaged in applied research and technology development projects. These make a major contribution to industry and commerce in the city, province and wider South Africa.

Overall, however, NMMU's research profile is low in relation to its size. There is scope to improve in line with national priorities. The current NMMU strategy to achieve this improvement is, in my view, right on target: we need to seed and intensify our growth.

Our goal is to raise research productivity across the academic spectrum. We will intensify support for building critical mass around key research niches identified in the NMMU Institutional Operating Plan.

A handwritten signature in black ink, appearing to read "Derrick Swartz".

Vice-Chancellor

Introduction

NMMU's Research, Technology and Innovation (RTI) strategy

A formal NMMU Research, Technology and Innovation (RTI) strategy was developed in 2007 in consultation with the NMMU RTI Committee and the Faculty RTI committees. Senate and Council approved the strategy late in 2007 and full implementation will start this year. It follows the vision of the university: to be the leader in optimising the potential of our communities towards sustainable development in Africa. It aims to achieve this vision by:

- ▶ Contributing to the transformation and development of our communities through research, technology and innovative solutions;
- ▶ Empowering our institution, staff, graduates and communities to contribute and compete, both locally and internationally, as researchers of note;
- ▶ Continuing to conduct research projects that relate to society's needs.

Our research strategy aims to create an environment that builds a research agenda through the interaction of researchers, users of knowledge and critical decision makers. It is based on three key principles:

1. The development of a critical mass of academic and student researchers in a limited number of focus areas;
2. The creation of an environment that encourages the development of a research culture and research ethos;
3. The role of the university in promoting transformation and a diversity of experience in terms of race, gender and age to achieve social justice.

The strategy recognises the importance of critical inquiry, as well as the need to address societal challenges in terms of wealth creation and improving quality of life. Its main components are:

- ▶ Developing research and innovation themes that address national, regional and local imperatives underpinning the eight academic focus areas;



*Deputy Vice-Chancellor:
Research, Technology and
Innovation, Prof Mohammed Jeenah*

- ▶ Ensuring that research strategies are spearheaded by research entities – structures established by faculties to pursue research in a focused, multidisciplinary manner;
- ▶ Nurturing human resources for research;
- ▶ Allocating the majority of research resources to research and innovation themes, with incentives to encourage research collaboration and quality;
- ▶ Developing a strong culture of value-adding research support.

Support services and faculties are planning jointly on ways to implement these key components. Progress in implementation will be evaluated by monitoring *inter alia* postgraduate student numbers, publications, patents and licences and the progress of individual researchers, including their NRF ratings.

Selected research highlights



Prof Graham Kerley, NMMU Researcher of the Year 2007

IN THE FOOTSTEPS OF ELEPHANTS

When it comes to understanding these gentle giants, zoology professor Graham Kerley is at the top of his game, with research that is not only influencing government policy but also sparking interest worldwide.

Faced with a challenge, Prof Kerley sees an opportunity. "It's only a challenge because you don't understand it, and science is all about improving your understanding." This he continually seeks to do with a number of research projects, most focusing on the elephants at Addo Elephant National Park. He seeks to shape national government policy and has featured on the pages of the world's most prestigious science journal, *Nature*. Ultimately, he hopes his research will benefit future generations.

Prof Kerley heads up NMMU's Centre for African Conservation Ecology (ACE) and is a non-executive director of the Eastern Cape Parks Board, on which he chairs the conservation committee. He won awards for his efforts last year, including being judged category winner for environmental conservation in the Nelson Mandela Bay's Citizen of the Year Awards.

Although his research interests are many, he concentrates on animal-plant interaction, dealing specifically with mega-herbivores such as elephants and rhino.

In his work on the Addo elephants – one of the world's best-documented elephant populations, with records dating back to 1931 – Kerley has studied two main aspects: elephant biology for effective conservation management, and how the biology of the animal can be linked with its impact on the environment.

For his expertise in elephant management and conservation he serves on the Scientific Round Table, convened by Environmental Affairs and Tourism Minister Marthinus van Schalkwyk. He is lead author of a chapter on elephant impacts for a scientific assessment of elephant management in South Africa, a critical document that will guide future national elephant management policy and practice.

His other current research interests include desertification, the ecological and economic opportunities around private reserves in the Eastern Cape (research which is also being used by government to inform policy nationally) and the reintroduction of predators. Projects in the pipeline include research into the ecological consequences of elephant contraception. "This will present a huge opportunity for students to be involved in cutting-edge science," says Prof Kerley.

Kerley works hand-in-hand with students. "Student involvement is critical. It's what keeps me interested in science: when you work with young people, they challenge you and force you to revise your thinking." His work with both the Eastern Cape Parks Board and the Minister of Environmental Affairs and Tourism ensures his research is linked to real world conservation. "I help them identify problems, and can thus teach the students about real-world issues. This grounds you in reality. You can't be an ivory tower scientist."

In July last year, Kerley and his team hosted more than 1600 international scientists and conservation experts, from 87 countries, at the 21st Annual Meeting of the Society for Conservation Biology, held at NMMU.

GROWING SA'S CHEMICAL INDUSTRY

NMMU's unique Kilo-Lab, launched last year by the university's internationally-recognised Institute for Chemical Technology (InnoVenton), is taking strides to develop South Africa's downstream chemical industry, in line with national government strategy.

The R5m Kilo-Lab is a facility for the scale-up of small-scale, laboratory-developed chemical processes to kilogram quantities. Its capability to prove chemical processes on a kilogram scale bridges a gap that small operations with limited resources cannot. It will enable SMME's (Small Medium and Micro Enterprises) to develop chemical-manufacturing processes in order to prove concept. It will play a major role in attracting project support, so enabling projects that would otherwise not be considered by InnoVenton's Downstream Chemical Technology Station (DCTS).

Dr Gary Dugmore, deputy director of InnoVenton's Technology Demonstration, says: "This clearly illustrates the potential of this facility to rapidly develop and transfer technology to contribute to building a new generation of downstream chemical businesses in South Africa, and particularly in the Eastern Cape."

By the time the Kilo-Lab was launched, it had already completed one product-development project and several small-scale manufacturing contracts. Its next major project is the manufacture of an insect repellent active ingredient, using soon-to-be patented micro-structured reactor technology. The unit also plays an important role in teaching. Postgraduate chemistry students can complete a one-year internship in the Kilo-Lab. Operating within strict industrial standards of health, safety and environment, it prepares graduates for the real world of industrial chemical manufacturing.

InnoVenton director Professor Ben Zeelie says: "My biggest drive and dream is to help our students to discover the inventor in themselves, and to steer each one on his/her own voyage of discovery, guided by his/her own private chart into a world that is all gates, all opportunities."

HOME-GROWN MEDICINES

The Western world tends to be sceptical of the plant brews prescribed by traditional healers, but a collaboration of NMMU researchers delving into the medicinal properties of indigenous plants has yielded surprising results.

Diabetes, cancer and HIV-Aids have been proven to benefit from indigenous plant extracts, which could spell cheaper medicinal alternatives, particularly for impoverished sufferers in rural Eastern Cape areas where the plants grow freely.

Eight years ago, community leader Mike Pantsi asked Dr Maryna van de Venter, senior lecturer in the Department of Biochemistry and Microbiology, to test indigenous plants typically prescribed by traditional healers. What transpired was a working relationship between NMMU and traditional healers, and the establishment of a medicinal garden where the plants cultivated are used for healing and research.

Dr Van de Venter says: "We found that the diseases most commonly treated by traditional healers were diabetes, cancer, sexually-transmitted diseases and HIV-Aids, so we made these our focus. We started screening for anti-diabetic and anti-cancer biological activity; then moved into immune



Prof Ben Zeelie, Director: InnoVenton, the university's internationally-recognised Institute for Chemical Technology



Deputy Minister of Science and Technology Derek Hanekom (centre), Dr Nawaz Mahomed (right) and Nurunessa Molla of his office, visited NMMU's Institute for Chemical Technology, InnoVenton, where they met (from left) Deputy Vice-Chancellor Prof Mohammed Jeenah and InnoVenton staff Dr Gary Dugmore and Prof Ben Zeelie.



Biochemist Dr Saartjie Roux (right) and members of her research team (from left) Dr Trevor Koekemoer, Dr Gill Dealtry, Janine McKenzie and Jacki Mugomba, are thrilled that their research may soon make a positive difference in the lives of diabetics.



Dr Maryna van de Venter, of the Department of Biochemistry and Microbiology, is also part of the same research team above.

modulation and anti-coagulation, which is linked to cancer and diabetes. "We have seen progress in all these fields – it has converted me!"

On anti-cancer screening, she says: "We found that the plants induced apoptosis, where the cancer cells are stimulated to kill themselves – the best method to cure cancer. While the tests were carried out *in vitro* (test tubes), there are indications that the process could also work in humans."

In researching HIV-Aids, biochemist Dr Vaughan Oosthuizen found that an extract from the indigenous plant *Sutherlandia frutescens* inhibited the viral reverse transcriptase enzyme, thereby inhibiting the virus.

Anti-diabetic screening conducted *in vivo* (in rats) has also yielded impressive results, where the same plant (*Sutherlandia frutescens*) was found to decrease insulin-resistance in rats, thereby reversing diabetes. Physiologist Dr Saartjie Roux says, "Diabetes worldwide is growing exponentially faster than forecast predictions. To have one of our own plants yielding positive results is very exciting." The plant was found to be safe in toxicity studies carried out by the Medical Research Council and University of

the Western Cape. The next step was to test interaction of the plant extracts with other medication. Roux is collaborating with researchers in Kenya, who are screening Kenyan plants for anti-diabetic properties.

Biochemist Dr Carminita Frost, working with research associate Ruby-Ann Levendal, has been looking for a combination of anti-diabetic and anti-coagulant properties, as most diabetics die as a result of thrombosis. "We have found positive results using plant extracts, namely *Tulbaghia violacea* (wild garlic), *Leonotis leonurus* (wild dagga) and *Cannabis sativa*, tested *in vitro*. A cannabis extract, tested *in vivo*, decreased the weight of obese rats, improved their glucose levels and showed anti-coagulant properties, mimicking the action of endogenous cannabinoids. These findings indicate that synthetic cannabinoid drugs could be useful to counteract a hypercoaguable state and improve insulin sensitivity in type-2 diabetics.

The research collaboration – involving the departments of Biochemistry and Microbiology, Pharmacy, Biomedical Technology, Botany and the Unit for Applied Business Management – has to date resulted in 14 publications in peer-review journals.

HIGHWAY TO SUCCESS

An innovative partnership between NMMU's School of Engineering and key role players in the automotive industry, both here and abroad, is expected to stimulate the industry in the province.

Students at NMMU's Faculty of Engineering, the Built Environment and Information Technology are able to explore the high-tech world of the car industry thanks to a four-pronged partnership comprising the university, Volkswagen South Africa, the German Academic Exchange Service (DAAD) and the University of Braunschweig/Wolfenbüttel in Germany.

The two-year-old partnership – the VWSA-DAAD International Chair in Automotive Engineering – equips engineers for work in the region's automotive industry with its strong link to global industry and business. It also gives rise to research and development initiatives which serve the industry.

Professor Hinrich Holdack-Janssen from the Institute of Automotive Engineering in Wolfsburg says Port Elizabeth's automotive industry needs well-educated engineers, particularly in the fields of automotive production and manufacturing.

"Well-linked research cooperation with universities is essential to develop new systems and parts, and optimise processes in production and manufacturing. The overall research field is automotive engineering and manufacturing, which integrates systems and controls, materials and physics, as well as production and process engineering."

Research projects include automation and de-automation in production, and quality assurance, including optical measurements and intelligent control concepts for automotive air-conditioning systems. A number of master's and PhD students are involved in combined projects with industry. Undergraduates embark on research with the industry for their final-year projects.

Prof Holdack-Janssen lists among the successes of the partnership an "established and growing automotive (way of) thinking in the university". Another success is the establishment of the Formula Student racing project, to which the university has given the green light. Student racing is a hit in the United States, Great Britain, Germany, Japan, Australia, Italy and Brazil: the students have to build a small racing car to compete against similar cars built by other universities. The university is piloting the project in South Africa and is looking for sponsors. Other faculties, including finance and marketing, are also participating.

Other goals of the VWSA-DAAD International Chair in Automotive Engineering include strengthening international cooperation between the university, German universities and the global automotive industry, as well as establishing new research and development initiatives in energy systems, materials and manufacturing technology.

Although the partnership was formed only in 2006, NMMU has enjoyed an association since 1997 with the Institute of Automotive Engineering in Wolfsburg, Germany, which belongs to the University of Braunschweig/Wolfenbüttel. It has partnerships with other German universities, including Ingolstadt, Oldenburg and Reutlingen, which provide exchange programmes for students and staff.



Prof Hinrich Holdack-Janssen,
Chair: VWSA DAAD International Chair
in Automotive Engineering



NMMU has established a Formula Student racing project in which students have to build a small racing car. The university is piloting the project in South Africa.

Research governance and administration

Research at NMMU is governed by a committee of Senate, the Research, Technology and Innovation (RTI) Committee. The RTI Committee is chaired by the DVC: Research, Technology and Planning and its membership comprises faculty representatives and directors of the relevant academic support services.

The NMMU RTI Committee has three operational research sub-committees:

- ▶ Research Committee,
- ▶ Research Ethics Committee: Human (and Animal),
- ▶ Publications Committee

To allow for greater participation of academic staff members, Faculty RTI committees were established. All Faculty RTI committees report to the faculty board and raise issues of interest to the faculty and university at the NMMU RTI Committee. The Faculty RTI Committee is ultimately responsible to the dean and is chaired by an experienced researcher. Faculties have a large degree of flexibility in managing their RTI activities, including faculty funding models.

Research Support Services

At the time of the establishment of NMMU, a Department of Research Management and Postgraduate Financial Support (RM&PFS) was created under the direction of the DVC: Research, Technology and Planning. Soon it was acknowledged that research capacity development was of such a high priority that it required the establishment of a separate Department for Research Capacity Development (RCD). The RCD Department takes responsibility for most research development programmes, research development funding, bursaries and scholarships (M-level and higher), the research ethics committees, research associates and related policies.

The existing RM & PFS department became the Department of Research Management, which focuses on the needs of established researchers and manages such issues as National Research Funding (NRF) grants, Department of Education (DoE) publication funding, the research entities, internal research incentives and the research information management system. It also became clear that the management and commercialisation of intellectual property and the management of contract research and some external research grants needed to be handled by a dedicated office, which led to the formation of the Department for Innovation Support and Technology Transfer (IS&TT). At the end of 2007, the permanent staff complements were six, five and two for Research Management, RCD and IS&TT respectively.

FINANCE DEPARTMENT

In August 2007 the Department of Finance dedicated four staff members to focus on research-related financial matters. It remains a challenge to incorporate financial management support into a single Research Support Unit which might also render human resources (HR) and contract management support to researchers.

STATISTICAL SUPPORT SERVICES

In 2005 a statistical support services policy available to researchers and postgraduate students was adopted. It makes provision for a Unit of Statistical Support (USC) which gives free support service to postgraduate students and academic staff engaged in academic research. It was decided in 2007 that from 2008 the USC will operate as an independent entity within the Faculty of Science.



Department of Research Capacity Development, Director Dr Shaleen Els (left), with her team (below from left) Delene Gerber, Carla Venter, Sheona Claasen, Belinda du Plooy and Kirsten Longe.



Department of Research Management, Director Dr Pieter van Breda (left), with his team (below from left) Dr Sepi Rouhani, Kevan Johnson, Carmen van Leeve, Nicola Taylor and Visha Coopasamy.



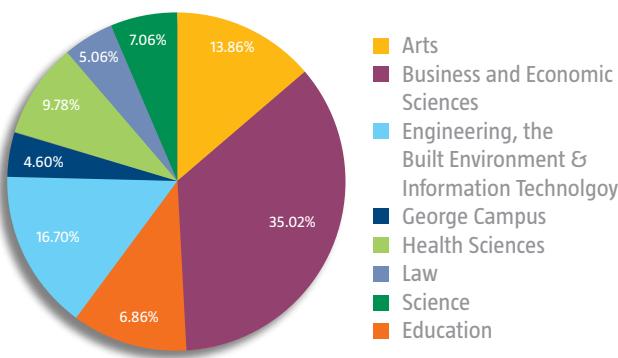
Director Jaci Barnett (left) and Elsa van Wyk of the Office for Innovation Support and Technology Transfer.

Fact file

UNIVERSITY PROFILE

Composition and size of student body

NMMU had 23 726 contact and off-campus students in 2007, compared to 24 334 in 2006. A total of 19 841 contact students registered in 2007, compared to 20 023 in 2006.



The diversity profile of the student body showed only slight changes between 2006 and 2007. African students remained at 60.64% of total enrolments, white students accounted for 24.73%, coloured students 12.10% and Indian students 2.53%. The ratio of male to female students remained at 45:55.

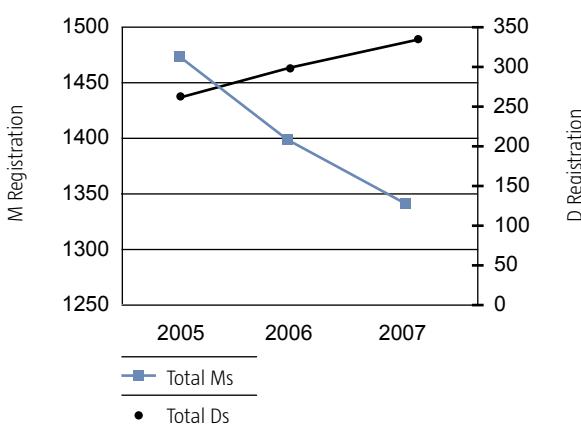
2007 Postgraduate profile (graduating in 2008)

	BTech	Hons	Research master's	Taught master's	Doctoral
Enrolled in 2007	1215	856	435	896	323
Graduates (graduating in 2008)	449	365	143	118	35

In 2007 there were 1215 BTech enrolments, 856 honours, 1342 master's and 323 doctorates.

Trend in enrolments: Opposite trends have emerged for masters' and doctoral registrations since the merger in 2005. While masters' registrations declined over that period by almost 10% (from 1473 to 1331), doctoral registrations increased by 25% (259 to 323).

Registered M and D students: 2005 to 2007
(M on left, D on right)



One possible cause for the growth in doctoral enrolments is that significantly larger NMMU grants have been made available for doctoral scholarships since 2005 (R30 000 per annum as opposed to R7 500); and that all doctoral students, including international students, became eligible for NMMU scholarships.

INTERNATIONAL MASTERS' AND DOCTORAL DEGREES

The university has set itself the goal of raising the number of international students from the current approximately 10%, to 15%. The proportion of international students at postgraduate level for 2007 was 13.9%. At doctoral level, 19.8% of the international students come from two African countries, Kenya and Uganda.

PhD International Students: 2005 - 2007

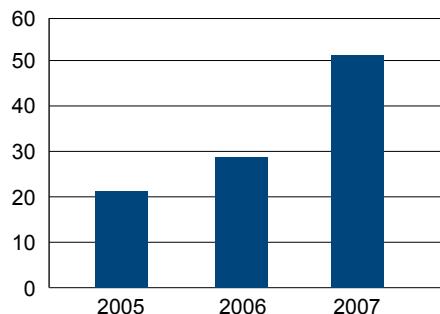


Figure: Adapted from: Melting Pot. Edition 1: Volume 3, Office for International Education

RESEARCH STRENGTHS

A number of clear strengths within the institution's eight institutional academic focus areas have been identified, including:

- ▶ The environment and ecology (including environmental law),
- ▶ Marine and estuary studies,
- ▶ Optic fibres and electron microscopy,
- ▶ Mathematics and science education,
- ▶ Nursing and community health,
- ▶ Architecture and the built environment,
- ▶ Engineering technology (including friction stir processing),
- ▶ Art and design,
- ▶ Chemical technology,
- ▶ IT programming and IT systems support,
- ▶ Academic development (especially for disadvantaged students).

According to the university's strategic research plan, one to three research focus areas will be identified in each faculty in 2008. Most resources will be directed towards these areas, with the aim of establishing a research institute for each research area. Researchers with an A or B NRF-rating or equivalent will head research institutes and sub-structures. Each faculty has developed research and innovation themes to address national, regional and local imperatives underpinning the academic focus areas of NMMU. The themes proposed by the faculties will be consolidated to encourage multi-disciplinary collaboration across faculties. They will be used to focus resources and develop a critical mass of experienced researchers.

Research niche areas

Another home for established researchers is the four NRF-approved Research Niche Areas (RNAs) of NMMU, approved under the NRF's Institutional Research Development Programme.

The following three Research Niche Areas (RNAs) successfully applied in 2007 for research funding in 2008 and were allocated a budget of R2 276 333 by the NRF and NMMU.

These are:



Innovation Batch Chemical Technology for Downstream Chemical Products and Processes are (above from left) Dr Shawn Gouws, Dr Nigel Harmse, Prof Ben Zeelie, Dr Gary Dugmore and (left) Dr Ernst Ferg.



Business Information Risk and Security with team leader Prof Rossouw von Solms and Prof Dalenca Pottas.



Manufacturing Technology with research leaders in the Manufacturing Technology Research Centre, (from left) with team leader Prof Danie Hattingh, Dr Annelize Els-Botes and Prof Theo van Niekerk.



The fourth RNA, building a biodiversity-based economy in the Eastern Cape, was approved by the NRF in 2008, with team leader Prof Graham Kerley and Prof Laetitia Radder.

This new RNA focuses on sustainable development and has two main scientific/technological thrusts: developing a predictive understanding of the structure and functioning of the biodiversity resources currently being utilised for economic benefits in the Eastern Cape, and developing the human skills and tools required for the sustainable use of biodiversity.

Centres of excellence:

Research institutes, centres and units

There are 21 registered research entities, classified into institutes at the highest level, centres, and units at the lowest level. The classification is based largely on the level of activity rather than the number of staff:

- ▶ Three research institutes,
- ▶ Three research centres.
- ▶ 15 research units.

During 2007 the policy governing the establishment, operation and review of entities was further developed. The objective was to create centres of excellence based on NMMU's research and innovation themes. The policy encourages the formation of research networks and groups within the university as well as interdepartmental and interfaculty collaboration. This will enable the development of a critical mass necessary for research excellence.

Please refer to individual faculties for contact lists of the research entities.

NRF evaluation and rating of researchers

The number of NRF-rated researchers grew from 43 in 2002 to 55 in 2007. This constitutes 10.4% of the instruction/research professionals at NMMU and places the university among the top 10 South African universities in terms of NRF ratings in 2007.

2007 NRF-rated researchers per faculty

Faculty	A	B	C	P	Y	L	Total
Arts	-	-	3	-	1	1	5
Business & Economic Sciences	-	-	2	-	2	3	7
Education	-	-	2	-	-	-	2
Engineering, the Built Environment & Information Technology	-	1	2	-	1	-	4
Health Sciences	-	1	1	-	-	-	2
Law	-	-	2	-	2	-	4
Science	1	3	19	-	2	4	29
Higher Education Access & Development Services	-	-	1	-	-	-	1
Sport Bureau	-	-	1	-	-	-	1
Total at NMMU	1	5	33	-	8	8	55

Research Chairs



Prof Reinhardt Botha, Chair in Nanophotonics

The SA Research Chairs Initiative (SARChI) is a strategically-focused knowledge and human resource intervention sponsored by the Department of Science and Technology (DST) and administered by the NRF. Its aim, among others, is to increase the number of world-class researchers in South Africa.

Prof Reinhardt Botha of the Physics Department was awarded a Tier 2 Chair in Nanophotonics in 2007 with an estimated annual budget of R1.5m for five years. The chair will focus on the development of various semi-conducting nanostructures for optoelectronic applications. Two material systems, which will be developed, are the InAs/GaInSb strained super-lattice system, and ZnO.

In December 2007 it was announced that a further three research chairs were allocated to NMMU to be developed in 2008.

Research policies

A number of policies developed by the departments of Research Management and Research Capacity Development give effect to the research strategy and govern research activities at NMMU. These include:

- ▶ Policy on incentives for NRF-rated researchers;
- ▶ Policy, procedures and rules for postgraduate research degrees;
- ▶ Policy on statistical support services available to researchers and postgraduate students;
- ▶ Code of conduct for researchers at NMMU;
- ▶ Policy on management of research, technology and innovation activities at NMMU;
- ▶ Policy for the establishment, operation and review of entities;
- ▶ Framework for support and funding of research activities at NMMU by the RTI Committee;
- ▶ Policy on the division of output subsidy generated at the Department of Education (DoE) through research publications;
- ▶ Postgraduate and postdoctoral student scholarship and bursary funding policy;
- ▶ Policy on research associates;
- ▶ Interim patents policy;
- ▶ Policy on research leave and research sabbatical;
- ▶ NMMU Researcher of the Year Awards;
- ▶ Policy on NRF international travel block grants.

Some of these policies, developed after the merger between the former Port Elizabeth Technikon and the University of Port Elizabeth in 2005, were further developed and refined in 2007.

2007 Researcher of the Year Awards

In recognition of research outputs and excellence in research, awards were made to nine Faculty Researchers of the Year and seven Emerging Researchers of the Year in November 2007. The winners were:

NMMU Researcher of the Year

Prof Graham Kerley, of the Faculty of Science and director of the Centre for African Conservation Ecology (ACE). (See story on page 4)

Faculty Researchers of the Year

- ▶ Prof Helize van Vuuren (Arts)
- ▶ Prof Johan Bosch (Business & Economic Sciences)
- ▶ Prof Tilla Olivier (Education)
- ▶ Prof John Smallwood (Engineering, the Built Environment & Information Technology)
- ▶ Prof Ilse Truter (Health Sciences)
- ▶ Prof Narnia Bohler-Muller (Law)
- ▶ Prof Graham Kerley (Science)
- ▶ Ms Maryna Lehmann (George Campus)
- ▶ Dr Richard Stretch (Support Services)

Emerging Faculty Researchers of the Year

- ▶ Mr Mzikayise Shakespeare Binza (Arts)
- ▶ Dr Elmarie Venter (Business & Economic Sciences)
- ▶ Dr Aletta Delpot (Education)
- ▶ Mr Johan van Niekerk (Engineering, the Built Environment & Information Technology)
- ▶ Mr Gareth Kilian (Health Sciences)
- ▶ Ms Sharlene Govender (Science)
- ▶ Mr Willie Louw (George Campus)
- ▶ No nomination was received from Law or Support Services

Developing research capacity

NMMU qualified for a research development grant of R3.6m from the DoE for 2007.

RESEARCH ASSOCIATES

The practice of encouraging retired staff to remain research active has been formalised through the position of research associate. Research associates are also drawn from former NMMU staff members and students, as well as other researchers who collaborate with academic staff of NMMU. The Research Associates policy was approved at the end of 2007; by March this year, 67 research associates had been appointed. Associates are encouraged to become mentors to young academics and guide them in their research. They also help NMMU in its review of funding proposals, and facilitate workshops on research skills.

ACADEMICS WITH THE POTENTIAL TO BECOME ESTABLISHED RESEARCHERS

While research capacity development is the responsibility of all departments and faculties, the Department of Research Capacity Development, established in January 2007, takes overall responsibility for research development funding and programmes aimed at emerging researchers. Some funds are to help the 36% of academic staff whose highest qualification is at the master's level to obtain their doctoral degrees. Some of these development programmes are:

Phuhlisa programme

Phuhlisa, meaning "to develop", is a mentorship-based development programme started in 2007. It aims to develop the next generation of academic leaders. The first intake in 2007 had 15 participants who are registered for, or have recently completed, their doctoral studies. A further 15 participants are expected to join the programme in 2008 and 2009. The programme focuses on personal, research and teaching skills development. It provides each participant with dedicated mentors, access to a range of skills workshops and, where applicable, financial support for research projects.

The Phuhlisa project has been very successful thus far. Feedback from participants indicates that the skills workshops should be made available to students earlier in their academic careers. This project for academic staff is currently being expanded to include full-time research master's and doctoral students.

Thuthuka programme

NMMU actively encourages and assists young academic staff to participate in the NRF's Thuthuka programme which is aimed specifically at developing researchers. Pre-application workshops are held to help with proposal development. Thuthuka grant-holder numbers have increased from nine in 2004 to 31 in 2007. Of these, 19 were female, and 14 were black. The grant-holders were spread across all faculties, with most (14) from the Faculty of Science.

Research development funds

Academic staff who do not receive external research funding may apply for internal research development funds. Funding is accessed on the basis of a research proposal and associated budget, which is peer-reviewed by two research associates.

Research capacity development workshops

More than 35 workshops ranging from personal skills such as time management through to research skills, like proposal writing, were organised on a monthly basis. Participants in the Phuhlisa and Thuthuka programmes and staff who receive research development funding are invited to attend; thereafter, space permitting, the workshops are opened to all staff and senior students. More than 50 postgraduate students and academic staff participated in a series of workshops conducted between August 2007 and February 2008. The interest generated by these workshops calls for the expansion of the programme in 2008.

Postdoctoral Fellows

Attracting postdoctoral Fellows forms part of the university strategy to acquire new research skills and promote research. Policy on postgraduate and postdoctoral student scholarships and bursary funding was approved in 2005. It defined postdoctoral fellows as "students from other institutions, who, having recently completed a doctoral degree", are invited to conduct research in collaboration with a NMMU staff member(s) for a period of at least 12 consecutive months. The policy differentiated between national and international postdoctoral scholarships, and described the application process.

The postdoctoral scholarship portion of the policy was later extracted, and a postdoctoral scholarship policy approved by the RTI Committee. The Office for International Education plays an important role in recruiting postdoctoral Fellows from NMMU overseas partner institutions.

Research leave and research sabbatical

In addition to the mechanisms for developing the capacity of specific categories of researchers, NMMU has a research leave policy which should allow all academics and certain categories of support staff to take a year's research leave every six years. The present financial constraints have limited the uptake of the leave and have been detrimental to the research effort of the individual and the university. In future the university and faculties will pay special attention to ensure that staff are in a position to take their leave. In 2007, 31 academics went on research leave or took a sabbatical.

South Africa-Netherlands research programme (SANPAD)



Prof Vincent Kakembo, head of the Geosciences Department, successfully applied for funding from SANPAD, a collaborative research programme financed by the Netherlands Ministry of Foreign Affairs since 1997 that has established a learning programme, the Research Capacity building Initiative (RCI), to develop junior researchers. It also provides research grants. In addition to Dr Kakembo, six NMMU academic staff participated in a SANPAD-sponsored supervisor workshop, while eight staff attended the SANPAD Poverty Challenge, hosted in Durban.

Research output

The research output subsidy paid by the DoE is a crucial benchmark of research excellence as it is based on doctoral and research master's students who graduate, and subsidies generated through academic publications. The monetary value of the subsidy from this source increased from R36.4m in 2005 to more than R39m in 2006.

With respect to weighted research publication units, a ratio of 0.4 has been suggested by the DoE as appropriate for comprehensive universities. From 2000 to 2006, NMMU improved its ratio from 0.24 to 0.39. In terms of numbers, DoE-funded publication units increased dramatically from 153 units in 2004 to 209 units in 2005. In 2006 there was a slight decrease to 187.73 units because of merger-related pressures, as well as the fact that the big increase of 38% in 2005 was not sustainable. The table below gives the actual outputs for the period 2004 – 2007.

NMMU DoE research output units for period 2004 to 2007

Year	Journal	Books	Conference	Total
2004	132.80	7.30	12.90	153.00
2005	183.72	2.26	23.30	209.28
2006	172.20	1.71	13.82	187.73
2007	*167.38	**	**	

* Audited submission to DoE

** Available in February 2009

NMMU plans to double the number of articles within the next three to four years as part of its research strategy. A major challenge is to balance quantity with quality and to reward staff for publishing in top quality journals.

INTERNAL RESEARCH FUNDING

In 2006, the RTI Committee had a budget (excluding student bursaries) of R8.6m which increased by 22% in 2007 to R10.3m and was further supplemented by an *ad hoc* allocation of R3.5m for research equipment. For 2008, the RTI budget is R11.8m. A large proportion of these funds is allocated to research incentives by rewarding researchers who publish articles in DoE-subsidised journals. In 2007, for the first time, R80 000 was reserved for staff producing creative outputs not subsidised by the DoE. Funds available for postgraduate bursaries increased from R7.8m in 2006 to R8.3m in 2007. This represented both Council funds and allocations by the NMMU Trust. Most external bursary funding is obtained from the NRF through grant-holder or free-standing bursaries and scholarships.

EXTERNAL SUPPORT FOR RESEARCH AND INNOVATION

Grants: An indicator of research quality and activity at a university is the extent to which external funding is granted for research.

In 2007, the most significant source of external research funding was the NRF, which awarded R22.7m (R16.3m in 2006) to NMMU. The table overleaf summarises the amounts awarded and the number of academics involved in selected NRF funding by type (excluding bursaries). Although some NMMU staff secured support in more than one NRF funding category, just over 70 were grant holders. The single biggest grant was R5m for Prof JR Botha to purchase a Metalorganic Chemical Vapour Deposition Reactor under the National Nanotechnology Equipment Programme.

Selected NRF grant funding received by NMMU in 2007

Type	Amount awarded	Number of academics
THRIP	R2 869 193	7
Thuthuka	R1 885 900	31
Research Niche Areas	R1 707 840	15
Focus Areas	R1 336 200	10
Research Chairs	R1 500 000	1
NLC	R928 000	3
MCM Programme	R524 000	2
SA-Hungary Programme	R80 000	1
SA-Japan Programme	R200 000	1
International travel block grant	R350 000	36
KIC travel grants	R111 750	5
RISP (new equipment)	R6 346 000	3
Conference organisation sponsorship	R100 000	1

Further grants were received from statutory councils such as the Water Research Commission (R401 120) and the Medical Research Council (R69 000).

2007 Technology and Human Resources for Industry Programme (THRIP) Awards

Project leader	THRIP amount	Industry amount
Prof Jan du Preez	R329 000	R470 000
Prof Danie Hattingh	R314 825	R449 750
Prof Andrew Leitch	R280 613	R400 877
Dr Maryna van de Venter	R426 300	R609 000
Prof Ernest van Dyk	R175 438	R175 438
Prof Janet Wesson	R587 017	R838 596
Prof Ben Zeelie	R756 000	R1 080 000
Total awarded	R2 869 193	R4 023 661

Contracts: In addition to external grant funding, 21 contract research projects were externally funded in 2007 to the value of R12.8m. Funding for research from external sources (non-NRF) can come from industry or funding bodies created by the government, such as the Innovation Fund, or internationally, such as the European Union. Since mid-2007, all research-related contracts were managed through the Department of Innovation Support and Technology Transfer. In excess of 40 externally-funded research projects with a total value of over R15m were undertaken in 2007. Key funders were Pebble Bed Modular Reaktor company, Eskom, Telkom, SanParks and Sasol.

The sum of third-stream income from contract research, short courses, non-diploma courses and summer/winter schools was R18.6m (excluding research grants from funding bodies such as the NRF) resulting in income generation of R2.79 from a 15% NMMU levy.

RELATIONSHIPS WITH INDUSTRY AND OTHER INSTITUTIONS

Industry collaboration remains strong, particularly through the two Tshumisano Technology Stations in Automotive Components and Downstream Chemicals. NMMU is the only university that can boast of two technology stations, placing it in a unique position to serve industry through applied research and development.

NMMU has been involved in the development of an Automotive Cluster, and a Downstream and Allied Chemical Industry Innovative Partnership. The latter is the result of a Rapid Appraisal of Local Innovation Systems (RALIS) exercise carried out by NMMU in collaboration with the Department of Science and Technology and the Deutsche Gesellschaft für Zusammenarbeit (GTZ) during November 2007.

The Institute of Advanced Manufacturing and Engineering Research (IAMER) has developed an internationally-recognised expertise group in the field of Friction Stir Processing over the past few years. This process knowledge is now being used for the development of engineering platforms applying the technology to a wide range of applications in the power generation and nuclear industry.

HIGHLIGHTS

- ▶ The Department of Physics has developed expertise in advanced electron microscopy which culminated in a contract for the analysis and characterisation of fuel elements for the proposed Pebble Bed Modular Reactor. Discussions with Sasol are also being held with a view to further strengthen this expertise.
- ▶ A proposal for the Innovation Fund on production of solar grade silicon was written and made it through the pre-proposal stage to the full proposal stage. If successful, this will be the first time that NMMU has taken the lead role in an Innovation Fund consortium.
- ▶ Seed funding for a researcher to visit a European collaborator was granted by the Department of Science and Technology, the first time that an NMMU researcher has accessed this funding. This may lead to participation in a European Union framework programme project for the first time for NMMU.
- ▶ The Institute for Chemical Technology has developed a modelling technology for the discovery of new consumer and industrial product formulations. This was successfully used in an applied research contract with Sasol.



Prof Ernest van Dyk (Physics) and Prof Janet Wesson (Computer Science) are both THRIP grant-holders.

INTELLECTUAL PROPERTY AND THE COMMERCIALISATION OF RESEARCH

The ownership of intellectual property falls under an IP policy. NMMU claims ownership of all intellectual property developed by staff in the course and scope of their employment, as well as that of supervised students. Any income arising from the commercialisation of Intellectual Property (IP) is distributed among the inventors, department and NMMU. Commercialisation of intellectual property generally involves a partnership with an external party. Previously this process had been fairly *ad hoc*, but is now being handled by the Department of Innovation Support & Technology Transfer (IS & TT) which will ensure that there is no conflict of interest and will, with the research, approach external parties to commercialise the research.

INTELLECTUAL PROPERTY COMMERCIALISATION

IP commercialisation can include licensing of patents, creation of spin out companies utilising know-how, or entering into joint ventures with commercial partners to exploit Intellectual Property (IP) or know-how. Discussions during 2007 included the following:

- ▶ Exploitation and development of novel NMMU Intellectual Property (IP) related to a new nano-catalyst which can replace zinc-oxide in the process of rubber vulcanisation.
- ▶ The creation of a joint venture for the exploitation of a novel process for manufacturing of one of the active compounds.
- ▶ The creation of a new company for the development of a novel cut-flower preservation process.
- ▶ Development of a novel battery temperature sensor.

At the end of 2007, NMMU had issued five South African patents, two South African provisional patents, two Patent Cooperation Treaty (PCT) applications and one patent that has entered the international country phase process. Of these, two South African patents are from the Faculty of Engineering, the Built Environment and Information Technology while all the other patents and applications are from the Department of Chemistry in the Faculty of Science. NMMU received R21 892 from the Innovation Fund Patent Support Fund in 2007.

NATIONAL INNOVATION COMPETITION (NIC)

The NIC aims to encourage student entrepreneurs to develop innovative products and services and take the first steps towards commercialisation. The competition takes place in two stages: the first is at an institutional level, where NMMU students compete against each other; the second takes place nationally, where the top students from each institution compete. The winner of the 2007 NMMU institutional phase was Robert Bosch, a chemistry student who, through his doctoral studies under the guidance of Dr Chris Woolard and Dr Kathy Garde, developed a replacement for zinc oxide as an activator in rubber products. The product has been patented and is currently undergoing trials.

Second place went to Sibonelo Sikhosana, a civil engineering student who has developed and patented an interlocking cement building block. The blocks allow a significant cost saving over normal blocks as they require no mortar and fewer skills to build. Third place went to Kobus Jooste, a zoology doctoral student who has developed an artificial still water spawning bed for trout and yellowfish.

In the national phase, NMMU's winner, Robert Bosch, won first prize and R300 000.



PhD Chemistry student Robert Bosch won first prize and R300 000 in the Innovation Fund's National Innovation Competition (NIC) for his Rubber Nano Products Liquid Activation System replacing zinc oxide in vulcanised rubber.



NMMU Civil Engineering student Sibonelo Sikhosana finished in the top ten of the same national competition for his interlocking, cement-free building blocks.

RESEARCH INFORMATION MANAGEMENT SYSTEMS (RIMS)

Almost two-and-a-half years ago, research and IT directors from a number of higher education institutions met to initiate the process to identify a system that would support the management of research and research information within and across research institutions. This led to the establishment of the RIMS consortium, of which NMMU is a member, and the start of the InfoEd Project. The project has grown from strength to strength, evident from the support provided by the DST and other institutions. The InfoEd project was initiated in June 2007 resulting in the national launch early in 2008.

Before the merger, the Port Elizabeth Technikon (PET) had a research information management system that had been developed in-house. Its primary function was to register all research projects, track their progress and record resources allocated to the projects. The research data management system at UPE was developed by an external consultant and it recorded all research outputs, including postgraduate qualifications. After the merger the PET system was terminated, and the former UPE system used to record research outputs generating research subsidy only. Thus, NMMU does not have a comprehensive research data management system at present, which is essential to manage research activities at a large university.

With the introduction of InfoEd early in 2007 and the signing of a contract between the NRF and DST for the NRF to manage the system, NMMU indicated interest in implementing InfoEd in 2008. Funds have been budgeted for the rollout in 2008, continuing into 2009. The national InfoEd licence covers all available modules, including grants and contracts, intellectual property, animal and human studies, and the soon-to-be completed research output module.

RESEARCH WEBSITES

The departments of Research Management (RM) and Research Capacity Development have designed their own websites aimed at providing online access to information and services offered. Access the website at: www.nmmu.ac.za



The Faculty of Arts continues to maintain an excellent research and scholarly record in terms of DoE-accredited journal articles, books, book chapters, national and international research collaborations, supervision of postgraduate research, presentation of papers at national and international conferences, and prestigious editorships.

In 2007, the faculty set as its strategic goal the creation of an environment that is conducive to the development and maintenance of high quality research. The faculty also set out to increase postgraduate enrolments as well as the number of academic staff with doctoral qualifications. Postgraduate enrolments have grown substantially although there is room for further growth in a number of areas. Six doctoral degrees and 24 master's degrees were awarded in 2007. Growth in student research publications has accompanied the growth in postgraduate numbers. Research capacity development is a strategic priority of the faculty and involves primarily mentoring emerging researchers in grant proposal writing, postgraduate research supervision and publishing skills.

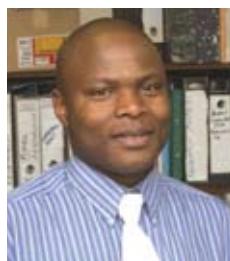
Although NRF ratings continue to be a challenge, there is an increasing awareness that such ratings are important for the profile of the institution as well as the academic standing of staff members. In 2007, two academic staff members received NRF C-ratings.

Staff with valid NRF ratings – December 2007

Faculty	A	B	C	P	Y	L	Total
Arts	-	-	3	-	1	1	5



Prof Thoko Mayekiso, Dean of the Faculty of Arts and Chairperson: Faculty RTI Committee



Mzikayise (Shakes) Binza, Emerging Researcher of the Year

Research themes

The faculty has adopted the following research themes:

- ▶ Creating space and making place for people in South Africa's emerging urban regions,
- ▶ Dynamics of cross-cultural relations,
- ▶ Identity and marginality,
- ▶ Transculturality / transculturism,
- ▶ Performance and practice

Faculty of Arts

Creating tomorrow

Research Entities

Raymond Mhlaba Research Unit

Shakes Binza: 041 504 2256

Unit for the Study of Resolution of Conflict

Dr Gavin Bradshaw: 041 405 2913

Raymond Mhlaba Research Unit

This unit for public administration and leadership provides research and consultancy services to organisations, civil society movements and the business sector in South African and beyond. Mr Binza is increasingly developing a visible research and public intellectual profile. The unit was appointed a service provider to the Nelson Mandela Bay Municipality to facilitate and conduct research on community-based planning.

Unit for the Study of Resolution of Conflict

This unit offers research, training programmes and intervention in conflict. It has been involved in a needs assessment of the situation in Sudan's Darfur province, examining the possibilities for assistance to the people of the region in the form of conflict management interventions, research, academic exchange, and development facilitation.



Prof Helize van Vuuren, Faculty Researcher of the Year

Researcher of the Year

Prof Helize Janse van Vuuren's vigorous contribution to Afrikaans literary studies stems from an approach focused on intertextuality, an awareness of context (particularly the historical, social and literary context of Afrikaans literature) and a strong impetus towards the re-evaluation of the canon. A striking aspect of her work is its impressive range and the apparent ease with which she can produce an overview of a whole oeuvre, historical overviews, theme-oriented explorations of individual work or close readings. Notable in her current research is her work on the interface between San orality and the literary texts of Afrikaans and South African English authors, which impacts not only on Afrikaans but also on South African literature studies.

Emerging Researcher of the Year

Mzikayise (Shakes) Binza is director of the Raymond Mhlaba Institute of Public Administration and Leadership and recipient of the Emerging Faculty Researcher of the Year for the second consecutive year. Mr Binza's research activities include public-purpose research and evidence-based research in public administration and management.

Highlights

- ▶ Mzikayise Binza received the National Research Foundation Award for 2007 as the top researcher in the Thuthuka Programme nationally.
- ▶ Prof Bert Olivier published an article, "The question of an appropriate philosophical response to 'global' terrorism: Derrida and Habermas" in the prestigious international journal *Freiburger Zeitschrift für Philosophie und Theologie* 54 (1/2) 2007.
- ▶ Prof Cleone Cull presented a retrospective exhibition of drawings and paintings from 1977 to 2007 titled *Smoking Mirrors* at the Grahamstown Festival, reflecting a lifelong interest in the magico-religious practices rooted in shamanism, alchemy and mysticism.
- ▶ The School of Architecture hosted the International Conference on Housing with the theme "Communities and the Frontiers of Housing" under the auspices of the International Council for Research and Innovation in Building and Construction from 25 February to 1 March 2007.
- ▶ The Department of Music hosted the National Horn Symposium under the auspices of the South African Horn Society from 15 to 17 June 2007.

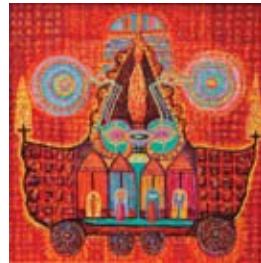
International research collaboration

- ▶ Prof Peter Cunningham, Prof Henk Pauw, David Bogopa and Theodore Petrus of the Department of Sociology and Anthropology, and two postgraduates contributed to international research with the University of Paris on racism and ethnicity.
- ▶ Professors Cunningham and Pauw and a postgraduate student cooperated in international research on intercultural communication and diversity management with colleagues from Rhodes University, University of Applied Science Nürtingen-Geislingen in Germany, California State University and the University of Mississippi.
- ▶ Dr Otto Terblanche was involved in a joint research project with Prof Dr Annick Schramme, Department of Political and Social Sciences and Cultural Management, University of Antwerp, Belgium. This project examines the relations between Belgium (Flanders) and South Africa.
- ▶ Prof Mayekiso is involved in international research collaboration with Dr Larry Icard from Temple University School of Social Administration Centre for Intervention and Practice Research; Profs JB Jemmott and GA Heeren from the University of Pennsylvania, Philadelphia; Dr G Barnes from Temple University, Philadelphia; Dr Z Ngwane from Haverford College, Haverford; and Dr A O'Leary, Centres for Disease Control and Prevention, Atlanta, on men having sex with men.

Capacity building

The faculty hosted a series of capacity-building workshops facilitated by international and national scholars, including:

- ▶ Prof Elias Mpofu, editor of the *Journal of Psychology in Africa*, Professor of Rehabilitation Services, Department of Counsellor Education, Counselling Psychology and Rehabilitation Services at the Pennsylvania State University.
- ▶ Prof Peter Ewang, executive director of the Research and National Development Agency.
- ▶ Dr Khangelani Zuma, a biostatistician at Human Sciences Research Council (HSRC).
- ▶ Prof Kobus Maree, Professor of Educational Psychology, University of Pretoria and editor of *Perspectives in Education and the South African Journal of Psychology*.



Strategies for Survival: The Magician is a photograph reworked with ink and oil paint by NMMU senior lecturer Prof Cleone Cull, whose work was displayed during the 2007 Grahamstown Festival.



Erzuli's Initiation, completed by Cleone Cull in 1999, is a painting from her magical realism period.



Sisi Magagi reads her poem from *Sharp!*, an annual publication that showcases the creative writing, graphic art, photography and fine art talent of NMMU students. The publication is a joint project of the School of Language, Media and Culture and the School of Music, Art and Design.

PUBLICATIONS

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- BOGOPA, D.L. 2007. Challenges facing the initiation schools: The case of Nelson Mandela Metropole in the Eastern Cape. *ACTA Criminologica* 20 (4), pp 55 - 60.
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- BOTHA, M. & JANSE VAN VUUREN, H. 2007. Taal moet weerstand bied: 'n Verkenning van Niggie. *Tydskrif vir letterkunde* 44 (2), pp 119 - 133.
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- KOCH, E. 2007. Critical questions about the new entrance test for higher education. *SA Journal for Higher Education* 21 (1), pp 102 - 111.
- KOCH, E. 2007. Die evaluering van 'n eentalige toelatingstoets wat vir toelating tot hoër onderwys in 'n veertalige konteks gebruik word. *SA Journal of Industrial Psychology* 33 (1), pp 90 - 101.
- KWATSHA, L.L. 2007. A psychoanalytical interpretation of the characters in A.C Jordan's novel "Ingqumbo yeminyana". *Literator* 28 (3), pp 1 - 14.
- MASANGO, R.S. 2007. Role of public opinion in the governance of a democratic state with reference to South Africa. *Journal of Public Administration* 42 (5), pp 109 - 120.
- MAYEKISO, T.V. & MBOKAZI, F. 2007. Maternal response to father-daughter incest: Experience of mothers following disclosure. *Journal of Psychology in Africa* 17 (1), pp 61 - 66.
- NEALER, E. & RAGA, K. 2007. Nature and extent of local governance in South Africa today. *Journal of Public Administration* 42 (05), pp 171 - 182.
- OLIVIER, B. 2007. Beauty, ugliness, the sublime, and truth in art. *South African Journal of Art History* 22 (3), pp 1 - 16.
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- OLIVIER, B. 2007. Ecological art and the transformation of the world. *South African Journal of Art History* 22 (2), pp 24 - 34.
- OLIVIER, B. 2007. Pseudo-communication and the return of the sophist: Thank-you for smoking. *Communicatio* 33 (2), pp 45 - 62.
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- OLIVIER, B. 2007. Postmodernity, globalisation, communication and identity. *Communicare* 26 (2), pp 36 - 55.
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- WOZNIAK, J. 2007. Interpretations of old beliefs and modern lifestyles in a selection of recent South African films in: M. BOTHA (Ed). *Marginal lives and painful pasts. South Africa Cinema after Apartheid*. Genugtig: Cape Town.
- WOZNIAK, J. 2007. Good Bye, Lenin! – Wenn der "reale Sozialismus" zu Unterhaltung wird, muss man subjektiv sein in: U.S WEBER & J. WOZNIAK (Ed's). *Kultur- und Literaturvermittlung. Festschrift fur Werner Krueger*. Sunpress: Stellenbosch.



One of the faculty's chief tasks is to assess the needs of business in the current economy and provide research, both at academic and applied level, which will contribute to the economic development and growth of the region.

By applying rigorous academic research to practical issues, the faculty aims to provide logical insights and solutions to problems. To create the appropriate environment for its researchers, the faculty has set up specific new structures under the leadership of the Faculty Research, Technology and Innovation (RTI) Committee.

The faculty excelled in its research on ethics and governance, family business and entrepreneurship, and economic development issues. Faculty members each published on average 16 articles in accredited journals and received recognition for seven published conference proceedings. Future research will concentrate on similar issues. The faculty also took on external contract research projects worth R7 million.

Staff with valid NRF ratings – December 2007

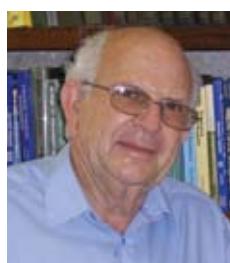
Faculty	A	B	C	P	Y	L	Total
Business & Economic Sciences	-	-	2	-	2	3	7



Prof Niekie Dorfling, Dean of the Faculty of Business & Economic Sciences



*Prof Hendrik Lloyd, Chairman:
Faculty RTI Committee*



*Prof Johan Bosch, Faculty Researcher
of the Year*

Faculty of Business and Economic Sciences

Managing tomorrow

Research Entities

Labour Relations and Human Resources Unit

Mark Anstey / Prof Dave Berry: 041 504 2363

Tourism Research Unit

Hugh Bartis: 041 504 4089

Unit for Professional Ethics

Prof Piet Naudé: 041 504 2339

Unit for Applied Business Management

Prof Johan Bosch: 041 504 2201

Labour Relations and Human Resources Unit

The unit undertook research on labour relations practices for the Coega Development Corporation, the developer and operator for the Coega industrial development, the major part of which is a multi-billion dollar industrial deep-water harbour on the outskirts of Nelson Mandela Bay. With the Unit of Statistical Services, the unit also undertook two research projects assessing the knowledge, attitudes and health practices of employees. The projects are being used to develop a new research instrument.

Tourism Research Unit

The unit undertook consulting work for Ezemvelo, KZN Wildlife, but was without full-time staff in 2007 and will reassess its position this year.



Prof Elmarie Venter, Emerging Faculty Researcher of the Year

Unit for Professional Ethics

The unit's official research project probed globalisation and justice/ethics. Prof Piet Naudé examined the notions of egalitarian justice in the work of social philosopher John Rawls and differential justice as proposed by economist Joseph Stiglitz, as well as the link between justice and human rights. Four articles were published and two accepted for publication in 2008.

This research was an important factor in renewing the curricula at postgraduate level, where the Ethics Unit is responsible for ethics modules in the MBA, MPA, media programmes and professional accounting programmes. Presentations during 2007 included material on global justice and sustainability.

Unit for Applied Business Management (UABM)

This unit acts as the consulting and research arm of the Department of Business Management. It gives effect to the departmental mission statement, which strives to develop high-level human resources by:

Equipping learners with outcomes based knowledge and business skills, being committed to purposeful research and the maintenance of worthy academic structure, and being future-orientated and receptive to the needs of our stakeholders.

Under the auspices of the UABM, the following was achieved during 2007: 19 honours research treatises, one masters' research dissertation, one doctoral research thesis, 10 conference proceedings, two refereed (subsidy-earning) publications, two other refereed publications, eight non-refereed publications, four books/chapters in books and 13 audience presentations.

Researcher of the Year

Prof Johan Bosch has been an academic for the past 40 years, during which time he has published more than 24 refereed research articles (four in international journals), written more than 50 chapters in books and contributed enormously to conference proceedings. His main research area is that of financial management and strategy and investment management, but in the last few years he has extended this to include brand image, service quality, education, e-business and entrepreneurship. Prof Bosch has also been the promoter or co-promoter of eight doctoral theses, 19 masters' dissertations and more than 30 honours treatises, illustrating his commitment to research and mentoring of new researchers. Prof Bosch is a member of the Faculty of Business and Economic Science's RTI Committee and serves as a reviewer of academic articles to be published in national scientific accredited journals.

Emerging Researcher of the Year

Prof Elmarie Venter of the Department of Business Management has published several international and national articles, attended many international and national conferences, co-edited several books and contributed chapters in many other academic books and publications, mainly as a result of her research in the field of family businesses. She is a sub-editor of the *South African Journal of Economic and Management Sciences*, a member of the South African Institute for Management Scientists and the Family Firm Institute, Boston, USA. Her pioneering research on family businesses and succession planning has been particularly well received both at home and overseas. Because of the practical implications of her research, Prof Venter writes for the media and is a regular presenter at business "road shows".

Highlights

SCHOOL OF ECONOMICS, DEVELOPMENT AND TOURISM

Department of Development Studies

The Department of Development Studies (DDS), with its strong emphasis on engagement and development outreach, including the areas of community-led enterprise incubation, is the project manager for two subsistence community-oriented fish processing ventures in the Eastern Cape. It is also implementing a community savings and loan project in the Jeffreys Bay area and has a close partnership with the Kouga Municipality, implementing and re-designing the municipality's Local Economic Development (LED) strategy

and its Small Medium and Micro Enterprises (SMME) strategy.

The new DDS has a growing list of achievements in academic and contract research in the Eastern Cape and elsewhere in the country, and is involved in research on issues such as conflict and security in Africa, and development and anti-poverty policy in sub-Saharan Africa.

Among its contract research projects are:

- ▶ A social evaluation and audit of the Mantis Collection of game reserves and ranches,
- ▶ Street traders in the Nelson Mandela Bay area (for SARS),
- ▶ An examination of the Industrial Development Corporation's community projects in the Eastern Cape, and
- ▶ Cross-cultural management of HIV/TB interventions in South and Southern Africa.

Department of Economics

The Department of Economics continues to be active in water research relating to recreational and use values. The purpose is to provide guidance on the allocation of water in various catchments in South Africa, and the department is involved in valuations at about 40 estuaries. The department also completed projects on cable waste recycling and water treatment in Kampala, Uganda.

SCHOOL OF MANAGEMENT SCIENCES

Department of Business Management

- ▶ Prof Eileen Mazibuko, who is much admired for her insightful research on community-based issues including affordable housing finance, has published in leading publications both in South Africa and overseas.
- ▶ A large number of papers, articles, books and chapters in books were produced by this department in 2007, while 14 presentations were made to businesses.
- ▶ Prof Miemie Struwig is collaborating with an international researcher in updating a textbook on research methods.
- ▶ Shelley Farrington (van Eeden) and Prof Elmarie Venter are developing a conceptual model for owner parents who are planning to hand over the family business to more than one of their children. Their findings have been presented nationally and internationally.
- ▶ Prof Venter chaired a session at the 19th annual conference of the Southern African Institute for Management Sciences at the University of Johannesburg in September 2007. She was also invited to chair a session at the seventh annual International Ifera Conference in Germany at the European Business School, Oestrich-Winkel, in June 2007 and to lecture at the Utrecht University, Holland.
- ▶ Prof Gideon Horn, who works closely with the Automotive Industry Development Centre (AIDC), acted as programme director for the National Automotive Supply Chain Conference in Port Elizabeth in March 2007.

Students in research projects

The department believes that, in a developing society such as South Africa, it has an obligation not only to pursue knowledge but also to improve its academic involvement within development activities. The Department of Developing Studies (DSD) feels that these two aspects will ensure the university's relevance and success within the multi-layered and multi-dimensional environment in which it operates.

It is also vital to ensure that students' involvement in a development activity - where they will play a major role in designing, implementing and documenting the research project material - provides them with the practical understanding of the theoretical knowledge obtained in the classroom.

Thus students under the direction of the Department of Developing Studies are given the opportunity to build effectiveness on several levels. In turn, these students are better able to function and contribute positively within society.

Department of Marketing

The response to Prof Laetitia Radder's research on venison and hunting in South Africa revealed a profound need for information. Consequently Prof Radder made presentations at a number of game ranching, farming and tourism workshops. She was also invited to teach a two-week course on strategic marketing management at the Berufsakademie of the Mosbach University of Cooperative Education in Germany.

BUSINESS SCHOOL

MBA Unit

- 35 students submitted their treatises for examination up to February 2007 and 31 students submitted their treatises at the end of 2007. All treatises submitted at the beginning of 2007 were awarded a pass mark, seven of the 35 with distinction.
- 58 potential students applied for the DBA degree. Of these, 17 (including five international students) attended a four-day DBA workshop in July 2007, 13 submitted their research proposals in November 2007, and seven were approved. These students were allowed to register for the DBA in 2008.
- Dr Margaret Cullen graduated in April 2007 as the unit's first DBA.
- A large number of papers were delivered and articles published during 2007 including two international papers by Prof Cecil Arnolds, for which he was awarded research prizes in the top ten and top five competitive paper categories.
- Prof Kobus Jonker was the conference chairman of an International Business Conference held in Mauritius in August 2007, at which 48 papers were presented. The conference was initiated by BSPN (Business School Partners Network South Africa) and the NMMU Business School was the main organiser.

PUBLICATIONS

ARTICLES IN DOE-ACCREDITED JOURNALS

ARNOLDS, C.A. & VENTER, D.J.L. 2007. The strategic importance of motivational rewards for lower-level employees in the manufacturing and retailing industries. *South African Journal of Industrial Psychology* 33 (3), pp 15 - 25.

ANSTEY, M. 2007. Zimbabwe in ruins: Prospects for mediation in a conflict not yet ripe for resolution. *International Negotiation* 12 (3), pp 415 - 442.

ANSTEY, M. 2007. Modernisation and migration: the transformation of labour relations in the global automobile industry. *African Sociological Review* 10 (2), pp 43 - 71.

BOWLER, J. 2007. The impact and management of HIV and AIDS in manufacturing workplaces of the Nelson Mandela Metropolitan municipal area. *South African Journal of Labour Relations* 31 (1), pp 72 - 96.

HARRIS, C., ROUSSEAU, G.G. & VENTER, D.J.L. 2007. Employee perceptions of diversity management at a tertiary institution. *South African Journal of Economic and Management Sciences* 10 (1), pp 51 - 71.

HORN, G.S. 2007. Black Economic Empowerment (BEE) in the Eastern Cape automotive industry: Challenges and policies. *South African Journal of Economic and Management Sciences* 10 (4), pp 490 - 503.

HOSKING, S.G. 2007. Is there a need to audit CVM applications to the environment? *South African Journal of Economic and Management Sciences* 10 (4), pp 482 - 489.

JOOSTE, L. 2007. An evaluation of the usefulness of cash flow ratios to predict financial distress. *ACTA Commercii* 1 (7), pp 1 - 13.

LLOYD, H.R. & MEY, M.R. 2007. Gender differences in perceptions of workplace progression: An automotive industry case study. *South African Business Review* 11 (3), pp 95 - 120.

NAUDÉ, P.J. 2007. Between humility and boldness: Explicating human rights from a Christian perspective. *NGTT: Ned Geref Teologiese Tydskrif* 48 (1 & 2), pp 139 - 149.

NAUDÉ, P.J. 2007. Theologies in conflict. In dialogue with Hans Engdahl. *NGTT: Ned Geref Teologiese Tydskrif* 48 (1 & 2), pp 414 - 419.

NAUDÉ, P.J. 2007. Would Barth sign the confession of Belhar? *Journal of Theology for Southern Africa* 129, pp 4 - 22.

NAUDÉ, P.J. 2007. In defence of partisan justice – an ethical reflection on "preferential option for the poor". *Verbum et Ecclesia* 28 (1), pp 166 - 188.

STRUWIG, F.W. & PLAATJIES, W. 2007. Developing a framework to investigate the personal financial management knowledge of individuals. *South African Journal of Economic & Management Sciences* 10 (1), pp 21 - 32.

VENTER, E. & BOSHOFF, C. 2007. The influence of organisational-related factors on the succession process in small and medium-sized family businesses. *Management Dynamics*. 16 (1), pp 42 - 55.

BOOKS, CHAPTERS IN BOOKS AND CONFERENCE PAPERS SUBMITTED TO THE DOE FOR SUBSIDY:

ARNOLDS, C.A. & PERKS, S. The causes of unemployment: Managers versus employees. 5th International Conference: *Entrepreneurship and Innovation*: Windhoek, Namibia, 24 - 25 October 2007.

KRÜGER, J. Can the South African e-commerce tourism industry compete globally? 5th International Conference: *Entrepreneurship and Innovation*: Windhoek, Namibia, 24 - 25 October 2007.

PERKS, S. Exploring management fundamentals of very small businesses in South Africa. 5th International Conference: *Entrepreneurship and Innovation*: Windhoek, Namibia, 24 - 25 October 2007.

ROOTMAN, C., TAIT, M. & BOSCH, J.K. Variables influencing the customer relationship management banks. 1st Biannual International conference proceedings: *Strategic developments in services marketing*: Chios, Greece, 27 - 29 September 2007.

ROOTMAN, C., TAIT, M., GRUNDLINGH, R. & SHARP, S. Customer relationship management and service quality in the medical fund aid industry. *Customer relationship management and service quality in the medical fund aid industry*: London, England, 29 May - 2 June 2007.

TAIT, M., DE JAGER, J.W. & SOONTIENS, W. Image and academic expectations of entry-level and senior university students – A South African perspective. 1st Biannual International conference proceedings: *Strategic developments in services marketing*: Chios, Greece, 27 - 29 September 2007.

VAN EEDEN, S. & VENTER, E. The growing importance of sibling partnerships as leadership structures in small and medium-sized family businesses. *Future business leadership challenges*: Johannesburg, South Africa, 19 - 21 September 2007.



The Faculty of Education placed research as a strategic focus for 2007 to improve its research output. One of the initiatives was to hold two writing retreats. At each two-and-a-half-day session, arranged by the Education Research, Technology and Innovation Unit, staff worked in groups on articles for publication. The results were pleasing.

Strategically, focus research areas should coincide with programmes currently offered in the faculty. These are science and mathematics education, special needs education, educational management, curriculum studies, HIV/Aids and initial teacher education.

Staff are encouraged to research their own practice to improve teaching and learning in the faculty. Research Associate Prof Jean McNiff has assisted members through four seminars on action research aimed at improving their practice.

In September we held our annual Research Open Day, at which students showcase research towards their master's and doctoral studies and invite audience comment.

Staff with valid NRF ratings – December 2007

Faculty	A	B	C	P	Y	L	Total
Education	-	-	2	-	-	-	2



*Prof Ana Naidoo, Dean:
Faculty of Education*



*Prof Nonnie Botha, Chairperson:
Faculty RTI Committee*



*Prof Alette Delport, Emerging Faculty
Researcher of the Year*

Research Entities

Faculty of Education Research, Technology and Innovation Unit

Prof Paul Webb: 041 504 4015

Researcher of the Year

Prof Tilla Olivier's impressive *curriculum vitae* speaks for itself. Prof Olivier is dedicated to making a difference. She has completed 14 research projects and is involved in eight others. She has shared her research at 46 national and 26 international conferences, and has published 35 articles in subsidised and international journals.

"I have established an experienced practice of qualitative research that deals with social issues such as sexual abuse and AIDS, psychiatric problems such as Anorexia Nervosa and Tourette's Syndrome, and issues regarding morale and self-efficacy," said Prof Olivier, who in 2002 received the Honorary Medal of the Education Association of South Africa for her contribution to education over ten years.

Making a difference in her own community drives Prof Olivier's research. Two of her own projects, in collaboration with Dr Lesley Wood, exemplify this. The 'I can make a difference' Project in Motherwell seeks to involve parents more in education, despite their poverty. The 'The sky is the limit' Project in Walmer township aims at countering the negative impact of poverty through education.



Prof Tilla Olivier,
Faculty Researcher of the Year



The Faculty of Education held two successful writing retreats as part of its objective to increase its research output.

Emerging Researcher of the Year

Dr Alette Delport combines her passion for music and people with education. She obtained her master's in music education and her doctorate in education, which she uses to influence students who one day will shape the minds of the children they teach.

"Inherent in music and arts education is sensitivity to people, to issues and an aesthetic awareness that addresses the softer side of reality," said Dr Delport, who believes that music and the arts can contribute to a better society.

Her research concentrates on educational and social transformation, music and arts education, and curriculum implementation. It positions her at the inner, infra-structural level of society where she seeks continually to raise awareness. One of her major achievements as a result of her research is a book, *Emotions, Social Transformation and Education*, based on her doctoral thesis, which will be published by Unisa Press. She said, "I hope that the kind of research that I am doing will remind people of the complexity of true social transformation at an external as well as a personal level."

Highlights

- The faculty presented nine local and 12 international conference papers and produced 32 local and six international journal articles.
- It applied for funding from the Deutscher Akademischer Austauschdienst (DAAD) for a subject-related partnership between the Carl von Ossietzky Universität Oldenburg and NMMU. The project, Teacher Education and Research, is primarily to benefit disadvantaged learners. The intention is to build a network of lecturers and teachers in educational research and module development, aiming to improve teaching in selected subject fields for the disadvantaged.

Faculty of Education Research Technology and Innovation Unit (FERTI)

FERTI was created to promote research in the faculty in addition to the work done by the faculty's research committee.

Some of the projects within this unit are:

- Amathole cluster schools development project,
- Mathematics project in Port Elizabeth, Sedgefield and East London,
- HIV/AIDS prevention programme,
- Motherwell project,
- North-west cluster schools project,
- Science and Mathematics in Schools (SMIS) Project,
- Ripple programme and
- Teaching Speakers of Other Languages English (TESOL).

Publications

ARTICLES IN DOE-ACCREDITED JOURNALS

- AUSTIN, P. & WEBB, P. 2007. Developing inquiry-based teaching and learning in family maths programme facilitators. *Pythagoras* 66, pp 52 - 63.
- BLIGNAUT, S.E. 2007. The policy-practice dichotomy: Can we straddle the divide? *Perspectives in Education* 25 (4), pp 49 - 61.
- BOTHA, M.M. 2007. Africanising the curriculum: an exploratory study. *South African Journal of Higher Education* 21 (2), pp 202 - 216.
- FOX, T.D. VOS, N.B & GELDENHUYSEN, J.L. 2007. The experience of cross-cultural peer teaching for a group of mathematic learners. *Pythagoras* 65, pp 45 - 52.
- GELDENHUYSEN, J.L. & DE LANGE, N. 2007. Career identities of first-year female coloured students. *South African Journal of Education* 27 (1), pp 117 - 137.
- JORDAAN, C.A.G. 2007. Sex, sexuality and communication: A thematic analysis of the perceptions of young South African adults. *Communitas* 12 (2007), pp 51 - 68.
- MESTRY, R. & SINGH, P. 2007. Continuing professional development for principals: A South African perspective. *South African Journal of Education* 27 (3), pp 477 - 490.
- MCNIFF, J. & NAIDOO, A. 2007. How do we develop inclusional epistemologies for a new scholarship of democratic educational enquiry? *Journal of Education* 41, pp 43 - 58.
- OLIVIER, M.A.J. & WOOD, L.A. 2007. Eastern Cape teacher's views on their ability to equip learners to cope with life after school. *Acta Academica* 39 (2), pp 208 - 227.
- OLIVIER, M.A.J. & WOOD, L.A. 2007. Inspiring teachers to discern and enrich gifted learners in a disadvantaged environment. *Gifted Education International* 23 (2), pp 160 - 172.
- SINGH, P., MANSER, P. & MESTRY, R. 2007. Importance of emotional intelligence in conceptualizing collegial leadership in education. *South African Journal of Education* 27 (3), pp 541 - 563.
- WOOD, L.A., MORAR, T. & MOSTERT, L. 2007. From rhetoric to reality: the role of living theory action research in transforming education. *Education as change* 11 (2), pp 67 - 80.
- WOOD, L.A. & OLIVIER, M.A.J. 2007. Increasing the self-efficacy beliefs of life orientation teachers. *Education as change* 11 (1), pp 161 - 179.

CONFERENCE PAPERS SUBMITTED TO THE DOE FOR SUBSIDY

- WEBB, P. Teachers' understanding of the nature of science. *The episteme reviews: Research trends in science, technology and mathematics education*. Vol 2: Mumbai, India, 12 - 15 February 2007.

