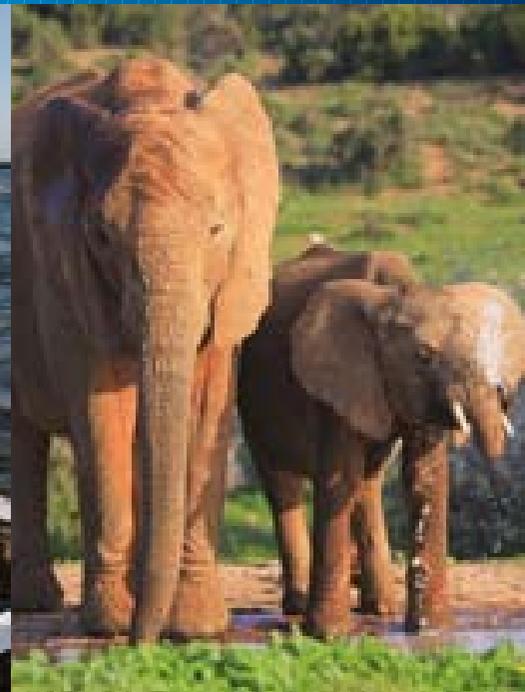


NMMU Research and Innovation Report 2010



VISION 2020

To be a dynamic African university, recognised for its leadership in generating cutting-edge knowledge for a sustainable future.

VALUES

Ubuntu

Integrity

Excellence

Taking responsibility

Respect for diversity

Respect for the natural environment

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Message from the Vice-Chancellor



**Prof Derrick Swartz,
Vice-Chancellor**

Today, the challenges of overcoming the legacies of centuries of colonial and apartheid rule, with the view to build a more equal and democratic South Africa, have to be increasingly forged in the context of a global economic and political system, which itself is under tremendous pressures. In South Africa, we have distinctive challenges born from our unique history: racially-defined patterns of educational success, employment, wealth distribution, healthcare and social stability. Universities, through their role as sources of knowledge production and education have to play a key role in tackling these existential challenges.

Yet, these national challenges have to be tackled in the context of a world itself in crisis - at a crossroads: rapid expansion of the human population (seven billion people) in the context of unequal and unsustainable food, education and healthcare systems; major pressures on our natural resources and biological systems as a result of sharp increases in global industrial output; compelling evidence of the increasingly destabilising impact of human (anthropogenic) footprint on global climate and earth systems; uncertain implications of new technological innovations in communications, materials science, biology and cognitive sciences on societies and our conceptions and very way of life - culture, traditions, and forms of community; and, our inability to overcome growing levels of social inequality between rich and poor on a planetary scale.

Universities, through their role as sources of knowledge production and education have to play a key role in tackling these existential challenges.

Our University has made an active commitment to make a pioneering and critical contribution - through the production and dissemination of knowledge - to tackling these challenges, in partnership with government, civil society and industry. This commitment is captured in NMMU's Vision 2020, in which it seeks to become 'a dynamic African university, recognised for its leadership in generating cutting-edge knowledge for a sustainable future'.

The 2010 NMMU Research Report chronicles some of the most important research contributions made by the NMMU research community towards this end. Our researchers, as we hope you will see, have been actively engaged in a wide field of highly innovative research projects - cutting across, and often combining

in interesting ways, the confluence of natural sciences and social sciences, and fundamental and applied research fields. We believe that NMMU's distinctive intellectual constitution as a 'comprehensive type' university - bringing together basic and applied, and theoretical and experimental types of scholarship - provides us with a unique opportunity to generate knowledge that can make a life-changing contribution to the challenges facing the social and natural worlds.

In broad terms, NMMU's core research strategy is premised on the imperative to grow critical mass in a specifically-targeted set of cognate disciplines and cross-disciplinary domains directly linked to our critical strengths, whilst at the same time also raising the general floor of research productivity across the University. This strategy, which is in its second year running, is already beginning to show encouraging results, as outlined in the Report.

Immediately following the merger that formed NMMU in 2005, our efforts have focused on creating the right institutional conditions for research to take off.

Firstly, 2010 has seen positive growth in staff holding PhD's, though our staff doctoral programme has to be further stepped up in the coming years. Secondly, the Report also shows steady growth in the number of rated National Research Foundation (NRF) rated researchers and NMMU reaching into the upper tiers of the NRF rating system. Thirdly, the Report also shows double-digit increase in internal investment in research and development spent, which we hope to sustain in years to come. Fourthly, 2010 has also seen increased investment in postgraduate bursaries and scholarships to boost Master and Doctoral level outputs. All these interventions form part of a ten-year (10) Research and Development Strategy underpinned by Vision 2020.

Immediately following the merger that formed NMMU in 2005, our efforts have focused on creating the right institutional conditions for research to take off. This included a stimulating research policy environment, positive investment strategy targeting people, research infrastructure and equipment, acquisition and retention of top research talent, and a clear set of research goals. We believe these conditions have now been largely put into place. What remains to be done is to systematically drive this strategy over the next decade.

Prof Derrick Swartz
Vice-Chancellor

Message from the Deputy Vice-Chancellor:

Research and Engagement

A Year of Consolidation and Growth



**Prof Thoko Mayekiso,
Deputy Vice-Chancellor:
Research and Engagement**

The Research and Innovation Strategic Priority is to create and sustain an environment that rewards a vibrant research, scholarship and innovation culture. This is underpinned by four strategic goals:

- To conduct research that contributes to local, regional, national and global sustainability.
- To create and support an environment that fosters research quality and productivity.
- To develop and sustain the research capacity of staff and students, and
- To promote a broad conceptualisation of research, scholarship and innovation.

The Research Report under consideration is a product of many contributors and a culmination of efforts from various quarters. Among a host of factors, the following are key for its fruition and realisation:

- A ring-fenced allocation from the University Council - this being a notable enabler of our research drive, and the attainment of Vision 2020 strategic goals.
- An enabling policy environment, which saw research leave being granted in new and innovative ways to ensure that time is freed for researchers to focus on research and higher degrees.
- Pursuit of the transformation agenda, as non-traditional beneficiaries enter the research cohort.
- Improving the qualifications profile of staff at the Doctoral level.
- Committed and dedicated staff who went the extra mile to ensure that the strategic objectives set out for the Research and Engagement Portfolio are attained.
- Strategic partnerships, collaborations, networks and linkages nationally and internationally, and
- Research leadership at departmental and faculty levels.

The year under review has been marked by both consolidation and growth. NMMU's research outputs have continued to increase steadily over the past three years with an increasing number of articles in ISI (Institute for Scientific Information) indexed journals. Research collaboration has increased and diversified as demonstrated by the greater number of peer-reviewed scientific journal articles with external authors and emerging researchers. There is also a gradual increase in the number of NRF rated researchers. Another pleasing development is the increase in the number of research active staff as a result of the research capacity

development initiatives that were implemented at both faculty and institutional levels, including writing retreats and mentorship programmes.

One of the highlights in 2010 was the increase in Doctoral graduates from 39 in 2009 to 64 in 2010.

We are particularly pleased by the number of academic members of staff who completed their PhDs in 2010. This will allow us to increase enrolment of PhD students due to enhanced supervisory capacity and maintain the upward trend in the number of doctoral graduates. One of the highlights in 2010 was the increase in Doctoral graduates from 39 in 2009 to 64 in 2010. Our target is to graduate 100 Doctoral students annually by 2015.

The research achievements briefly sketched in this foreword and described in more detail in the Annual Report could not have been realised without the guidance, unwavering support and vision for excellence of the University Council and Management.

On behalf of the Research Office, I would like to extend to the NMMU community our heartfelt gratitude for your support during 2010.

Siyabulela, nangamso.
Baie dankie.
Thank you.

Prof Thoko Mayekiso

Deputy Vice-Chancellor: Research and Engagement

Our Distinctive Knowledge Paradigm



In responding to the opportunities that arise from being a comprehensive university, NMMU has adopted a distinctive knowledge paradigm characterised by the following principles:

- An open-ended, discursive paradigm based on critical thinking, open-endedness, the primacy of rational discourse in the disputation and scrutiny of all ideas, and the provisional nature of all truth claims.
- The idea of the university as an 'open society' of scholars committed to the production and dissemination of knowledge that can have a liberating effect on our world.
- A commitment to the application of knowledge to advance democracy, social justice, public good and liberation of the human condition from all forms of discrimination and injustice.
- Freedom of expression and thought in speech, writing and all art forms.
- Advancement of strong disciplinary knowledge whilst aspiring to foster trans-disciplinary thinking in our scholars and students.
- A commitment to ethical knowledge, neither harmful to the natural nor the social environment, such that it promotes a sustainable future for our planet and all its inhabitants.

Our Educational Purpose and Philosophy

- We provide transformational leadership in the service of society through our teaching and learning, research and engagement activities. To achieve this we are committed to developing the human potential of our staff and students in the full spectrum of its cognitive, economic, social, cultural, aesthetic and personal dimensions in the pursuit of democratic citizenship.
- We adopt a humanising pedagogical approach that respects and acknowledges diverse knowledge traditions and engages them in critical dialogue in order to nurture a participative approach to problem posing and -solving, and the ability to contribute to a multi-cultural society.
- We inspire our stakeholders to be passionate about and respectful of an ecologically diverse and sustainable natural environment.
- We will be known for our people-centred, caring, values-driven organisational culture that will encourage all members of the University community to contribute optimally to its life.

Vision 2020 Research and Innovation Plan



Strategic Priority:

To create and sustain an environment that encourages, supports and rewards a vibrant research, scholarship and innovation culture.

Strategic Goal 1:

To promote research and innovation, which contributes to local, regional, national and global sustainability.

Strategic Objectives

- 1.1. To establish and expand research and innovation partnerships, collaborations, networks and linkages nationally and internationally.
- 1.2. To identify and develop institutional research themes.
- 1.3. To promote the commercialisation of research outcomes in the form of products, processes and services.

Strategic Goal 2:

To create and support an environment that fosters research quality and productivity.

Strategic Objectives

- 2.1. To provide an enabling policy and funding framework to improve research quality and productivity.
- 2.2. To increase and diversify external and internal financial resources available to support research-related activities.

- 2.3. To provide appropriate research and innovation infrastructure and support.
- 2.4. To promote, recognise, and reward research and innovation excellence.

Strategic Goal 3: To develop and sustain the research capacity of staff and students.

Strategic Objectives

- 3.1. To attract, nurture and develop research potential.
- 3.2. To attract and retain research talent.
- 3.3. To provide support to emerging researchers, postgraduate students and Postdoctoral fellows to become research active.
- 3.4. To create a culture of research in undergraduate students.
- 3.5. To enhance and improve the equity, gender and age profile of researchers.
- 3.6. To grow the pool of rated researchers.

Strategic Goal 4: To promote a broad conceptualisation of research, scholarship and innovation.

Strategic Objectives

- 4.1. To enhance and foster the scholarships of teaching, learning and engagement.
- 4.2. To enhance and promote research responsiveness.

Department of Research Management



**Dr Pieter van Breda,
Director: Department of
Research Management**

The Department of Research Management's primary function is to support established researchers and to manage research information management systems.

During 2010, various research strategies aligned to NMMU's Vision 2020 were rolled out. These included the formalisation of institutional research themes, which have become important tools in managing research activities and allocating resources. In this regard, grants were approved in the following internal support categories: Research Themes Grant, Transformation and Equity Research Grant and incentive funding.

One of the objectives of Vision 2020 is to increase the number of research chairs and research entities to spearhead research themes. In 2010, an NRF/DST FirstRand Mathematics Education Chair was approved bringing the total number of research chairs at NMMU to five. The number of research entities increased to 30 after the formal registration of a new Centre for High Resolution Transmission Electron Microscopy and the Units for Lean Process Development and Family Business.

Positive trends were also noted regarding the Vision 2020 objectives to increase the amount of funding available for research. The Council contribution towards the research budget (excluding student bursaries and scholarships) was R11 553 530. Externally, the NRF remained by far the biggest funder of research at NMMU. They contributed R49 643 498, which benefitted 89 staff members as grant holders. It, however, remains a challenge to attract bigger grants from other funding agencies.

Established researchers managed to further enhance their national and international standing. The number of NRF rated researchers increased from 57 in 2009 to 64. Included in this group were six persons rated for the first time and three successful re-evaluations. As a result of this, NMMU managed to maintain its place amongst the top ten universities in terms of NRF rating.

Compared to 2009, the Department of Higher Education and Training (DHET) subsidy units for articles in journals increased only marginally. This should be viewed in a positive light, as it demonstrated that the dramatic increase of 26% during the previous year was sustainable.

Department of Research Capacity Development



**Dr Blanche Pretorius,
Director: Department
of Research Capacity
Development**

The Department of Research Capacity Development (RCD) focuses its activities around the development of researchers, and provides financial support to emerging researchers and postgraduate students. The NMMU places a high premium on the development of its young and emerging researchers. This position is clearly articulated in the University's Vision 2020 strategic document, which foregrounds the importance of creating an enabling environment for research that supports staff and students to develop to their full potential.

During 2010, the Department of Research Capacity Development aligned its activities more closely with the NMMU's strategic Vision 2020, and ensured that the presenting of research development programmes and support to emerging researchers was prioritised. The budget allocation for these activities grew by 12% and enabled the Department to develop the research skills of staff and postgraduate students and provide mentorship to early career researchers.

The NMMU places a high premium on the development of its young and emerging researchers.

During 2010, the activities within the Department of Research Capacity Development were aimed at consolidating the NMMU's transformational efforts namely, growing the next generation of academics and growing the research productivity of our emerging researchers. The latter initiatives included an increased focus on writing for publication skills and writing retreats, and the introduction of the Teaching Replacement Grant. With regard to growing the next generation of academics, increased attention has been given to accessing external opportunities that support staff pursuing PhD studies, in order to augment internal funding streams that have been created by NMMU. The Department of Research Capacity Development has offered tailored support to potential applicants to ensure increased participation of staff in the NRF's Thuthuka Programme.

Department of Innovation Support and Technology Transfer



**Ms Jacqueline Barnett,
Director: Department of
Innovation Support and
Technology Transfer**

The Department of Innovation Support and Technology Transfer manages and commercialises the NMMU's Intellectual Property (IP), and assists academics with external, research-related grants and contracts.

The proclamation of the Intellectual Property Rights from Publicly Financed Research and Development Act in August 2010 will change the face of technology transfer (IP management and commercialisation) at all publicly funded higher education institutions, and the NMMU is no exception. Essentially the Act obliges the University to identify, protect and commercialise Intellectual Property from publicly financed research and development for the benefit of the people of South Africa. This is a noble ideal, but is (as with most noble ideals) a long and arduous journey in practice.

The NMMU has made great strides on our innovation journey in 2010.

In addition, the issues of technology transfer cannot be divorced from other broader innovation issues: how to create innovation systems that work together for economic development locally and regionally; the role of science and technology parks in innovation; the social impact of innovation and how to best serve our community - these are all issues that must be considered a part of the whole.

The NMMU has made great strides on our innovation journey in 2010. Internally, there was an increasing awareness of Intellectual Property, as well as an increased understanding of the need for commercialisation as one form of research dissemination. A new IP Policy was developed, we created an Innovation Committee and approved Innovation Awards. Regionally, we championed the creation of a Regional Innovation Forum and the creation of a Regional Technology Transfer Office. Nationally, we have played a major role in the Southern African Research and Innovation Management Association. These activities have not been without their challenges and challengers, but the NMMU is making, and will continue to make, a contribution to the innovation space for the benefit of our broader society.

I am overwhelmed by the support and commitment of NMMU management and researchers, as well as the assistance of the Department of Science and Technology. This is truly an exciting time to be part of the innovation space in South Africa.

Research Overview



NMMU continues to make significant progress in its drive to create an environment that encourages and rewards research excellence, with the aim of improving the University's research profile. The following is a brief account of progress made in 2010.

NMMU Research Themes		
CO-ORDINATING FACULTY	THEME	DRIVER
Arts	Social cohesion	Prof Velile Notshulwana
Business and Economic Sciences	Regional economic development (including SMMEs and entrepreneurship)	Prof Elmarie Venter
	Ethics, governance and leadership	Prof Piet Naudé
Education	Curriculum development for all faculties across the University	Prof Nonnie Botha
Engineering, the Built Environment and Information Technology	Automotive and related manufacturing	Prof Henk De Jager
Health Sciences	Health and disease management responsive to regional needs	Prof Ilse Truter and Prof Mark Watson
Science	Natural resource management and energy	Prof Andrew Leitch

NRF Rated Researchers

NMMU recognises the rating of researchers as an important benchmark of research excellence in South Africa. The number of NRF rated researchers was 64 in 2010 compared to 57 in 2009 ensuring that NMMU retained its place among the top ten South African universities in terms of NRF rating.

The grading of researchers is based primarily on the quality of the research outputs in the recent past and is undertaken by national and international peer reviewers. An A rating is granted to researchers who are leading international scholars in their field, while B rated researchers should enjoy considerable international recognition.

Established researchers who have demonstrated the ability to conceptualise problems and apply research methods to investigating them, linked to coherence and ongoing engagement with the relevant academic field, are awarded a C rating.

The Y rating category is reserved for young researchers with a Doctorate who are recognised as having the potential to establish themselves as researchers. The L category is being phased out and was reserved for researchers who previously demonstrated potential, but have been unable, for practical reasons, to realise their full potential.

Number of Rated Researchers per Faculty							
FACULTY	A	B	C	P	Y	L	TOTAL
Arts			4		1	1	6
Business and Economic Sciences			2		2	2	6
Education			4			1	5
Engineering, the Built Environment and Information Technology		1	6				7
Health Sciences		1	2				3
Law			1		2		3
Science	1	4	23		2	2	32
Higher Education Access and Development Services			1				1
Sport Bureau			1				1
Total	1	6	44	-	7	6	64

2010 NMMU Rated Researchers		
NAME	RATING	UNITS
Cowling, Prof RM	A1	Science
Branch, Prof B	B2	Science
Christopher, Prof AJ	B2	Science
Baird, Prof D	B3	Science
Von Solms, Prof R	B3	EBEIT
Watson, Prof MB	B3	Health Sciences
Leitch, Prof AWR	B3	Science
Adams, Prof JB	C1	Science
France-Jackson, Prof H	C1	Science
Groenewald, Prof NJ	C1	Science
Hattingh, Prof DG	C1	EBEIT
Kerley, Prof GIH	C1	Science
Olivier, Prof B	C1	Arts
Stretch, Dr RA	C1	Sport Bureau
Wagener, Prof MC	C1	Science
Wooldridge, Prof TH	C1	Science
Booth, Prof GL	C2	Science
Botha, Prof JR	C2	Science
Engelbrecht, Prof JAA	C2	Science
Foxcroft, Prof CD	C2	HEADS
Gerber, Prof TIA	C2	Science
Janse van Vuuren, Prof HE	C2	Arts
Kotze, Prof EF	C2	Arts
Lombard, Dr AT	C2	Science
Pistorius, Dr PA	C2	Science
Radder, Prof L	C2	Business and Economic Sciences
Strydom, Dr NA	C2	Science
Truter, Prof I	C2	Health Sciences
Van de Venter, Dr M	C2	Science
Van Dyk, Prof EE	C2	Science
Zeelie, Prof B	C2	Science
Abou-El-Hossein, Dr K	C3	EBEIT
Booth, Prof PWK	C3	Science
Botha, Prof RA	C3	EBEIT
De Lange, Prof N	C3	Education
Ferg, Dr EE	C3	Science
Frost, Prof CL	C3	Science
McClelland, Prof CW	C3	Science
McGrath, Prof P	C3	EBEIT
Milne, Prof PJ	C3	Health Sciences
Naudé, Prof P	C3	Business and Economic Sciences
Neethling, Prof JH	C3	Science

2010 NMMU Rated Researchers		
NAME	RATING	UNITS
Olivier, Prof MAJ	C3	Education
Raditlhalo, Prof TS	C3	Arts
Shakantu, Prof WMW	C3	EBEIT
Singh, Prof P	C3	Education
Smallwood, Prof JJ	C3	EBEIT
Vrancken, Prof PHG	C3	Law
Webb, Prof P	C3	Education
Wesson, Prof JL	C3	Science
Whittington, Dr PA	C3	Science
Hibbert, Prof L	L	Arts
Struwig, Prof FW	L	Business and Economic Sciences
Smith, Prof EE	L	Business and Economic Sciences
Wood, Prof LA	L	Education
Kakembo, Prof V	L	Science
Somai, Dr BM	L	Science
Mzilikazi, Dr N	Y2	Science
Binza, Dr SM	Y2	Arts
Venter, Prof E	Y2	Business and Economic Sciences
Viviers, Dr S	Y2	Business and Economic Sciences
Bohler-Muller, Prof N	Y2	Law
Knoetze, Prof E	Y2	Law
Downing, Dr TG	Y2	Science

2010 NRF Rating

The following staff received NRF ratings in 2010:

Prof P Singh C3

Over the past three decades, Prof Singh has researched the equal importance that emotional intelligence (EI) and cognitive abilities (IQ) play within education. His research has evidenced the diverse ways in which the educational goals of leadership, curriculum development and organisational effectiveness can be achieved. His work on SWEAT (Strengths, Weaknesses, Expectations, Abilities and Tensions) as an alternative to the SWOT (Strengths, Weaknesses, Opportunities and Threats) approach in order to establish a collegial leadership culture in institutions such as schools has also brought international interest.

Research findings enabled him to develop the SWEAT Achievement Cycle. SWEAT analysis is based on a collegial model. Its key characteristics include the planning and evaluation processes, which are guided by shared decision-making, empowerment, emancipation and consequently shared leadership within the organisation.

Prof WMW Shakantu C3

Prof Shakantu's research activity is diverse. Presently he is working in the area of construction supply chain and logistics management. The domain here is how to increase construction output without a corresponding increase in resources utilised or how to achieve the same output with less resources i.e. sustainability of the construction process. In the Built Environment Research Centre (BERC), work involves resolution of pressing industry problems for the built environment stakeholders.

Dr PA Pistorius C2

Dr Pistorius' interests relate to processes and life-history parameters that impact on wildlife populations and their distributions. He is particularly interested in the mechanisms, intrinsic and extrinsic, that drives and governs marine top predators (seabirds, seals, cetaceans and sharks) at the population level. The role of environmental factors, including climate change, in governing population numbers, temporally and spatially, forms a focal part of his research. He is currently collaborating internationally on a range of projects with among others the Seychelles Islands Foundation (SIF), Falklands Conservation (FC) and University of Montpellier. Locally he is involved with behavioural and demographic research, often within a conservation-based context, on marine top predators along the South African coast, as well as at the Prince Edward Islands.

Prof TS Raditlhalo C3

Prof Raditlhalo is keenly interested in both the past and future intellectual processes of South Africa. His work on Ntate Mphahlele (with others) has made him aware of just how much of our South African past has been marginalised - a very painful realisation that archival work, in particular, is the necessary beginning of re-discovery, hence the restorative approach to his research. At the same time, by consciously crafting his research and outputs alongside scholars such as Njabulo Ndebele, he has formed the link between the thinkers in the 1950s and those in the next generation and works consciously to examine and dissect the anti-intellectual present. He is of the firm opinion that many South African scholars remain bound in what Ndebele calls "mind prisons", and his research aims to determine the present and the future with our minds and our hands.

Dr S Viviers Y2

Besides investigating the risk-adjusted returns of socially responsible investment (SRI), Dr Viviers' research in the field of SRI has also addressed questions such as: is ethical investing ethical; what are the main barriers and drivers of SRI in the South African context; and how should SRI be defined (particularly in relation to black economic empowerment)? She has made use of both positivistic and phenomenological research paradigms to uncover the answers to these questions. In the past two years, her attention has turned to environmental management within the South African context. Unless a clear business case has been made, managers are not likely to reduce the carbon footprint that their processes and products are creating. The business case for improved environmental management is particularly relevant for SMMEs.

Dr SM Binza Y2

Dr Binza conducted his PhD research project focusing on Public-Private Partnerships in South Africa. The model developed during this research can assist policy makers to plan more effectively and improve the implementation of Public-Private Partnership projects and programmes.

Re-evaluations: (previously rated and who have successfully been re-evaluated)**Prof I Truter C2 (previously C2)**

Prof Truter is the Researcher of the Year in the Health Sciences Faculty and is Head of the division of Pharmacy Practice in the Department of Pharmacy and Director of the Drug Utilisation Research Unit (DURU) at NMMU. Her research involves the study of the prescribing, use, effects and economic aspects of medicine in large numbers of people. Although her research focus is primarily on central nervous system medicine and/or conditions (for example, depression, pain management, Attention Deficit/Hyperactivity Disorder (ADHD), Alzheimer's disease and Parkinson's disease), she is also involved in studies on cancer, antimicrobials, and more recently, consumer studies to investigate how and why people are using specific medicines and/or treatments. Prof Truter has published more than 50 peer-reviewed articles in this field, is the author of two book chapters, 150 articles in professional journals, and has presented over 250 conference presentations.

Dr NA Strydom C2 (previously Y2)

Research by NRF C2 rated ichthyologist and plankton ecologist, Dr Strydom, focuses on shallow water ecosystems, mainly estuaries and surf zones. This work is ongoing and explores the recruitment dynamics of larval stage fishes to nursery areas and what drivers underpin the survival of early developmental stages of coastal fishes in these habitats. Research remains at the cutting-edge of the research field and numerous publications will arise from these works.

Prof M van de Venter C2 (previously L)

Prof van de Venter's work focuses on the areas of anticancer and antidiabetic activities of plant extracts and purified or synthesized compounds, with special focus on the biochemical mechanisms of action. She continues to collaborate with other researchers who need her expertise in cell-based assays. Her work with traditional healers will also continue and she is currently busy with the establishment of a medicinal garden on the NMMU Missionvale Campus. An information centre for African traditional medicine will form part of the garden.

NRF Research Niche Areas (RNAs)

In 2010, the following four RNAs were allocated a budget of R3 402 399 by the National Research Foundation (NRF) and NMMU top-up funding to support 16 staff members and their students:

- Innovative Batch Chemical Technology for Downstream Chemical Products and Processes: Prof Ben Zeelie (team leader).
- Business Information Risk and Security: Prof Rossouw von Solms (team leader).
- Manufacturing Technology: Prof Danie Hattingh (team leader)
- Biodiversity-based economy in the Eastern Cape: Prof Graham Kerley (team leader).

Technology Stations

NMMU has two Technology Innovation Agency-funded Technology Stations:

- Automotive Components Technology Station headed by Prof Danie Hattingh.
- Downstream Chemical Technology Station headed by Prof Ben Zeelie.

Research Output Units

The research output subsidy allocated by the Department of Higher Education and Training (DHET) for research publications and graduating Masters and Doctoral students represents a crucial benchmark of research excellence. The monetary value of the subsidy from this source increased from R59 million (based on 2008 outputs) to R64 million (based on 2009 outputs) mainly due to the increase in the Rand value per unit (confirmed outputs and figures for 2010 will only be available in 2012).

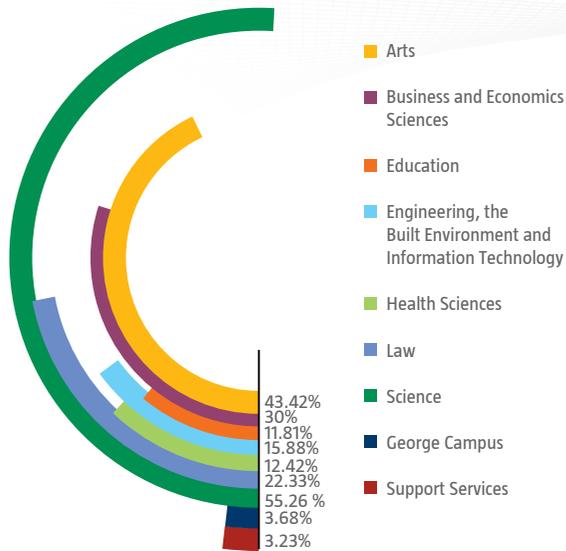
Year	Journal Articles	Books	Conferences	Research M&D Students	Total
2006	172.20	1.71	13.82	213.99	451.72
2007	165.04	.33	14.33	257.46	437.16
2008	156.44	5.99	21.21	320.88	504.52
2009	195.89	1.68	27.34	278.9	503.81
2010	199.92	*	*	400.966	*
* not yet available					

In 2009, there was a 22% increase to 224.91 units for research publications (books, conference proceedings and journal articles) compared to 183.64 units in 2008. A further increase was noted in 2010 from 195.89 to 199.92. Masters and Doctorate units also increased from 278.9 in 2009 to 400.966 in 2010.

Staff members who generated more than two DHET units from accredited journal articles

NAME	UNITS
Olivier, Prof B	7
Gerber, Prof TIA	5,026
Truter, Prof I	4,5
Terblanche, Prof HO	4
Cowling, Prof RM	3,633
Anandjiwala, Dr R	3,502
Abrahams, Mr D	3
Christopher, Prof AJ	3
Hurst, Dr AM	3
John, Dr PH	3
Naudé, Prof PJ	3
Petrus, Dr TS	3
West, Dr ME	3
Kerley, Prof GIH	2,958
von Solms, Prof R	2,84
Webb, Prof P	2,5
Linklater, Dr W	2,375
Perks, Prof S	2,333
Ferg, Dr EE	2,211
Botha, Prof MM	2
Bower, Dr R	2
Delport, Prof HJ	2
Dicken, Dr ML	2
Konik, Dr A	2
Loyson, Prof PR	2
Mayekiso, Prof TV	2
Ocran, Dr MK	2
Postel, Dr CG	2
Vrancken, Prof PHG	2

Research Output Units 2010



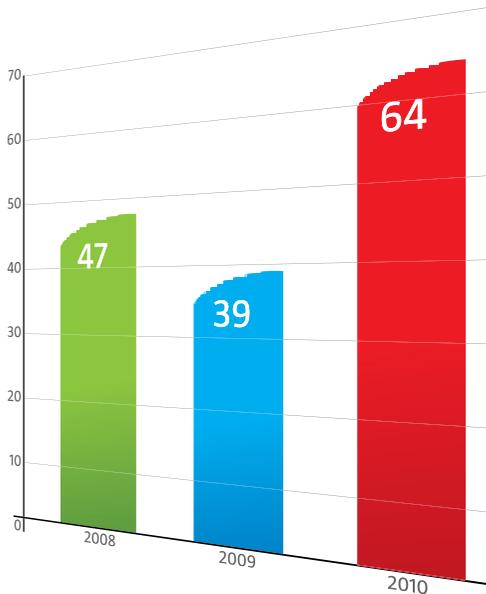
Internal Research Funding

The main funding categories are: research incentives, top-up of NRF grants, payment of page fees, scholarships and bursaries, Research Development Fund, Teaching Replacement Grant, the Research Themes Grants, and the Transformation and Equity Research Grant.

Research Incentives

Various incentives are in place to encourage staff members to engage in research activities that will enhance the research strategy of NMMU. Incentives include: bonuses for obtaining NRF rating, incentive funding for publications and postgraduate students qualifying for Department of Higher Education and Training research output subsidy, awards for the top faculty and institutional researchers and innovation, as well as recognition of top performers in the performing and creative arts.

Number of Doctoral Graduates 2008 - 2010



The following amounts were paid during 2010 for research incentives:

1. Faculty RTI Committees - R2 194 908.
2. Individual researchers - R6 104 479.
3. Promoter/ co-promoters and Supervisors/ co-supervisors (for M + D's) - R381 000.
4. Rated researchers - R160 000.

Top-up of NRF Grants

Two staff members from the Faculty of Engineering, the Built Environment and Information Technology, Prof Khaled Abou-El-Hossein and Prof Danie Hattingh, were allocated R4 224 765 by the NRF under its National Equipment Programme (NEP). This amount was topped up with R2 112 382 by NMMU.

The NMMU participated in NRF's Institutional Research Development Programme (IRDP) in which 16 staff members participated. As part of the contractual agreement between NMMU and NRF an amount of R896 799 was contributed as top-up funding.

The NMMU also participated in NRF's Thuthuka Programme providing top-up funding of R700 000 to 12 grant holders.

Distribution of Doctoral Graduates by Faculty	
FACULTY	N=
Arts	6
Business and Economic Sciences	12
EBEIT	10
Education	9
Health Sciences	5
Law	1
Sciences	21
Total	64

Page Fees

Fifty-one mainly new/emerging researchers were assisted with the payment of journal page fees, which amounted to R57 722.

Twenty-four Postdoctoral Fellowships were hosted by the NMMU during the period under review. Fellowships were funded by the NMMU Council, internal departments or units, and four fellowships

were funded by external funders including the NRF, MRC and the Claude Leon Foundation. The NMMU contribution in respect of fellowships totalled R1 1134 083.

Research Development Fund (RDF)

Thirty-two emerging researchers at NMMU received internal funding support to the value of R597 000. The RDF is awarded on the basis of a research proposal (which is peer-reviewed) and provides seed funding for staff that are either pursuing Doctoral studies or have recently attained a Doctoral qualification.

NMMU Masters and Doctoral Bursaries

During 2010, 252 Masters students and 111 Doctoral candidates received bursaries from the NMMU to the value of R7.863 million. Research Capacity Development also managed NRF scholarships (grant holder-linked and free-standing) to the value of R7.351 million. Other external postgraduate scholarships amounted to R1.7 million.

Research Capacity Development Workshops

The NMMU invested R915 000 to facilitate 27 formal Research Capacity Development workshops presented during 2010, attended by 254 staff. Topics presented included aspects of research project management, career development, research supervision, writing for publication, and research methodology.

Research Sabbaticals

Fifty-one sabbaticals were approved to provide staff members with time to focus their attention on research related activities.

External Research Funding

National Research Foundation (NRF)

The NRF remained the largest external funder of research at NMMU and awarded R49 643 498 in grant funding in 2010 of which R49 471 696 was expensed. Eighty-nine staff members were grant holders participating in 27 programmes and sub-programmes of NRF.

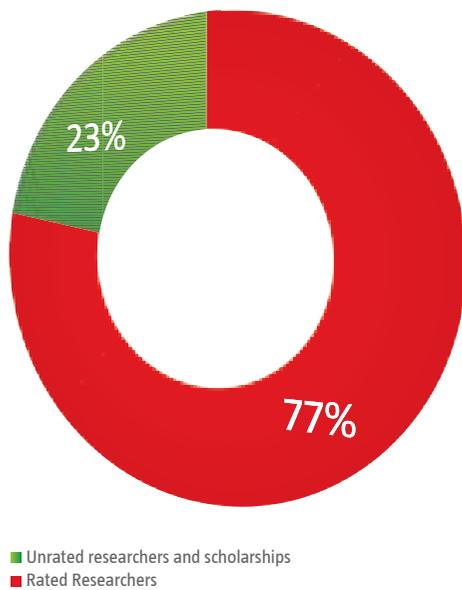
NRF Grants to NMMU in 2010 per category	
PROGRAMME	TOTAL
Ad Hoc Grants - LCD	85000
African Coelecanth Ecosystem Programme	1360.4
Collaborative Research with National Facilities	422828.3
Competitive Support for Unrated Researchers	249657.74
Conservation and Management of Ecosystems and Biodiversity	206880.91
Development Grant for KFD	60000
Distinct South African Research Opportunities	25859.98
Economic Growth and International Competitiveness	247174
Incentive Funding for Rated Researchers	1631332.77
Indigenous Knowledge Systems	239641.21
Institutional Research Development Programme	2808735.59
International Science and Technology Agreements	900004.03
Knowledge Interchange and Collaboration	40000
MCM Provincial Funding	219107
Nanotechnology Flagship Programme	1512095.99
National Equipment	26127706.95
National Nanotechnology Grant	1441000
NP - Improving Academic Qualifications	600000
NP - Support for Women and Young Researchers	300000
Rediba	193882.58
Researchers in Training	436984.89
SA Research Chairs - Open	1833425.28
Scholarships and Fellowships Programme	6629988.76
Sustainable Livelihoods: the Eradication of Poverty	147770.38
Technology and Human Resources for Industry Programme (THRIP)	2618747.33
Unlocking the Future	96314.09
Women in Research	568000
Total Sum of Total Awarded	49 643 498.18

Included in the NRF allocation is the Technology and Human Resources for Industry Programme (THRIP) in which eight staff members participated in nine projects. The total amount received from NRF was R5 824 217 and from industry partners R7 211 873. Within this programme 87 students were supported.

NRF rated researchers were allocated R38 353 369, which represents 77% of the total amount.

Total NRF Allocations

2010/11 Financial Year



Bilateral Funding Received in 2010

South Africa-Germany: Prof JR Botha, Prof Igor Gorlach and Prof Theo van Niekerk.

South Africa-Poland: Dr Tommy Bornman, Prof Carminita Frost and Prof Khaled Abou-El-Hossein.

South Africa-Kenya: Prof Saartjie Roux.

South Africa-Sweden: Prof Japie Engelbrecht, Prof JR Botha and Prof Paul Webb.

International Foundation for Science (Switzerland): Prof Carminita Frost.

National Research Foundation -Deutsche Forschungsgemeinschaft: Dr Nomakwezi Mzilikazi.

Other External Funding

Other statutory funding agencies contributed smaller amounts:

- Medical Research Council, R562 000.
- African Laser Centre - R267 520.
- National Laser Centre - R606 000, and
- The Water Research Commission - R1 608 185.

In addition to external grant funding, contract research projects were undertaken during 2010 to the value of R17 715 258.

Intellectual Property (IP) and the Commercialisation of Research

A new IP Policy has been approved that fits the new legislative requirements under the Intellectual Property Rights from Publicly Financed Research and Development Act, which was proclaimed in August 2010. Typically, commercialised IP will be in the form of a patent, but all forms of IP, such as copyright, are also commercialised where possible.

During 2010, 13 disclosures were received from staff and students, compared to 11 in 2009. Five provisional patent applications were filed (from two in 2009), although only one "international" (Patent Cooperation Treaty) patent application was filed.

NMMU continued to be involved in the spin-off companies created in previous years to commercialise the NMMU's IP. The **rose preservation technology**, commercialised through African Floralush (Pty) Ltd, received further funding from the IDC to increase production capacity. This company, based in Gauteng, employs approximately 40 previously unskilled workers. While cash flow remains a concern, exports have increased and the technology and the company continue to make a social and economic impact.



iLuba roses produced by African Floralush - a start up company using technology patented by the NMMU



Rubber Nano Products (Pty) Ltd project: Jacqueline Barnett and Robert Bosch

The **replacement of zinc oxide in rubber compounds**, commercialised through Rubber Nano Products (Pty) Ltd, has taken far longer than expected to reach commercial fruition. However, deals struck with major European and Asian players in late 2010 will yield income in 2011. The product is currently being made at a toll production facility near East London and is thus already making a social and economic impact in the Province.



Algae-to-energy project: PhD student, Carla Barnard with a photo bioreactor

Work on developing the **algae-to-energy project**, through Zalgen (Pty) Ltd, and the **novel welding project**, through Mantacor (Pty) Ltd, is continuing. Both projects have recently received significant funding from Eskom, and discussions are ongoing with the Technology Innovation Agency, which looks set to fund future research and development.

NMMU's Contribution to Provincial Innovation

NMMU is involved in a number of provincial initiatives to enhance innovation and economic benefit. NMMU, on behalf of 12 other local organisations, has driven the creation of a Regional Innovation Forum in the Nelson Mandela Bay and the Cacadu District Municipalities. The Forum, created under the auspices of the Department of Science and Technology, brings together stakeholders from academia, industry and government to provide a voice for innovation in the region and to drive various innovative projects. One project is the development of a Science Park at the NMMU. A business plan for the Park is currently being written, which will provide an indication of funding requirements and sustainability of the Science Park.

The NMMU has also championed the development of a Regional Technology Transfer Office serving all Eastern Cape universities, as none of the other universities has a technology transfer office as required by the IP Act. This is the first regional office approved by the Department of Science and Technology, who has pledged R2.5 million to support the Office, which will reside at NMMU.

Expanding Focus on the Scholarship of Teaching and Learning

NMMU is committed to providing a quality learning experience that fosters student success and holistic development. Among the ways to enhance teaching and learning at NMMU has been to form communities of practice and to engage in the Scholarship of Teaching and Learning (SoTL). SoTL involves systematic research into teaching and learning and student success factors. While a variety of outputs ensue from such research, SoTL researchers are increasingly encouraged to publish their work in peer-reviewed journals as this assists in building a body of knowledge internationally concerning research into teaching and learning.



Prof Cheryl Foxcroft, Dean: Teaching and Learning

In 2009, 8% of NMMU's subsidy-generating publications fell in the SoTL category. During 2010, it is encouraging to note that this percentage increased. Of the publications that qualified for subsidy in 2010, 11.5% had a SoTL focus. Breaking this into the various subsidy-earning categories, 7.8% of the published articles, 12.5% of the book chapters and 19.6% of the published conference proceedings that gained subsidy at NMMU in 2010 had a SoTL focus. When the titles of these publications were thematically analysed, ten themes emerged. **These were:**

1. **Literacies and language in teaching and learning** - for example: Ayliff, D.H. (2010). "Why can't Johnny write? He sounds okay!" Attending to form in English second language teaching. *Perspectives in Education* 28(2), p. 1 - 8; and Webb, P. (2010). Science Education and Literacy: Imperatives for the Developed and Developing World. *Science* 328(5977), p. 448 - 450.
2. **Approaches to higher education teaching and learning** - for example: Knoetze, E. (2010). Die onderrig van die inheemse reg: bevoeg, of beperk deur boeke? *Obiter* 31(3), p. 662 - 685;

- Loyson, P. (2010). Teaching Kinetics using Excel. *Journal of Chemical Education* 87(9), p. 998; Calitz, A. & Greyling, J. (2010). The evaluation of a collaborative/social ICT student work environment. *The South African Computer Lecturers' Association - SACLA 2010*: Pretoria, South Africa, 3 - 5 June 2010; and Van Niekerk, J.F. & Thomson, K. (2010). Evaluating the Cisco Networking Academy program's instructional model against Bloom's taxonomy for the purpose of information security education for organizational end-users. *IFIP World Computer Congress 2010*: Brisbane, Australia, 20 - 23 September 2010.
3. **e-Learning and supporting student learning** - for example: Butgereit, L. & Botha, R.A. C3TO: A scalable architecture for mobile tutoring over cellphones. *Third IFIP TC 6 International Conference, WCITD 2010 & IFIP TC 6 International Conference, NF 2010*. Held as part of WCC 2010: Brisbane, Australia, 20 - 23 September 2010; Kantore, A. & Van Greunen, D. (2010). An evaluation of the usability of an m-learning tool - a case study. *12th Annual Conference on World Wide Web Applications*: Durban, South Africa, 21 - 23 September 2010; and Chinyamurindi, W.T. & Louw, G.J. (2010). Gender differences in technology acceptance in selected South African Companies: Implications for electronic learning. *SA Journal of Human Resource Management* 8(1), p. 1 - 7.
 4. **Experiential and applied learning** - for example: Holdack-Janssen, H., Lorenz, S. & Van Niekerk, T.I. (2010). Multi-Disciplinary student projects in engineering education: A case study in the automotive industry. *International Conference on Competitive Manufacturing*: Stellenbosch, South Africa, 3 - 5 February 2010.
 5. **Graduate qualities and personal development of students** - for example: Styan, J. & Crafford, G.J. (2010). Practitioners' perceptions of soft skills possessed by quantity surveying graduates. *Quantity Surveying Conference 2010: The P8 Summit*: East London, South Africa, 15 October 2010.
 6. **Research supervision** - for example: Botha, M.M. (2010). Practices in postgraduate research supervision: From apprentice to scholar. *Acta Academica* 1, p. 57 - 74.
 7. **Higher education - comparability studies** - for example: Botha, M.M. (2010). Compatibility between internationalizing and Africanizing Higher Education in South Africa. *Journal of Studies in International Education* 14(2), p. 200 - 213.
 8. **Higher Education: Service delivery and risk reduction issues** - for example: Ricks, E.J., Strümpher, J. & Van Rooyen, D. (2010). A model for Higher Education Campus Health Services. *Health SA* 15(1), p. 1 - 7; Harris, C. & Paddey, M. (2010). International students' perceptions of service quality in tertiary institutions - an exploratory study. *International Research Symposium in service management 'Service Imperatives in the new economy'*: Mauritius, 24 - 27 August 2010; and Gwandure, C., Mayekiso, T. & Elkonin, D. (2010). The locus of control-based HIV and AIDS Risk Reduction Training among University Students. *Africa Insight* 40(2), p. 121 - 130.
 9. **Linking school and higher education performance** - for example: Govender, V.G. (2010). An investigation into the relationship between mathematical background and performance in first-year pre-calculus mathematics. *Proceedings of the Eighteenth Annual Meeting of the Southern African Association for Research in Mathematics, Science and Technology Education*: Durban, South Africa, 18 - 21 January 2010; and Koorsse, M., Calitz, A.P. & Cilliers, C.B. (2010). The impact of IT at schools on e-skills development. *eSkills Summit 2010*: Cape Town, South Africa, 26 - 28 July 2010.
 10. **School and FET Curricula and teaching** - for example: Treu, P., Olivier, M.A.J., Bean, P. & Van Der Walt, J.L. (2010). A group of educators' stance on the implementation of South Africa's further education and training curriculum. *Teaching and Teacher Education* 26(2), p. 343 - 350; Webb, P. & Mayaba, N. (2010). The effect of an integrated strategies approach to promoting scientific literacy on grade 6 and 7 learner's general literacy skills. *African Journal of Research in SMT Education* 14(3), p. 35 - 50; and Olivier, M.A.J., De Lange, N. & Wood, L.A. (2010). Using participatory video to explore teachers' lived experience. *Perspectives in Education* 28(4), p. 43 - 51.

Research Excellence

NMMU Researcher of the Year 2010



Prof Reinhardt (JR) Botha

Physics Professor Reinhardt (JR) Botha, who holds a prestigious Research Chair in Nanophotonics as part of the South African Research Chairs Initiative (SARChI) jointly funded by the National Research Foundation (NRF) and Department of Science and Technology (DST), is conducting innovative research in photonic applications - devices that absorb or emit light - for the infrared and ultraviolet wavelength ranges, which can be used in applications from atmospheric pollution monitoring to pharmaceutical process control.

Professor Botha is a Von Humboldt fellow, with extensive experience in the epitaxial growth of semiconducting layers and heterostructures, including quantum structures, and expertise in various electrical and optical techniques suitable for characterisation of nanostructures. He has over 70 papers published and accepted for publication in peer-reviewed international journals.

Recent results on the development of zinc oxide nanostructures, in particular, show promise for UV emission, which in turn can stimulate white light in a Light Emitting Diode (LED).

Professor Botha is involved in numerous challenging projects including:

1. The development of InAsSb and related nanostructures for applications in mid-infrared detectors. This work includes the development of InAs/GaInSb strained layer superlattices and InAsSb quantum dots by MOCVD. MOCVD is a technique suitable for commercial scale deposition of semiconductors and offers control of the deposition process on the atomic scale.
2. The development of ZnO and MgZnO by MOCVD for ultraviolet detectors. This project focuses on issues such as p-type doping in ZnO (one of the outstanding issues preventing this exciting material from yielding high quality photo diodes), and the prevention of phase separation in MgZnO, in order to produce high quality ZnO/MgZnO quantum structures.

3. Hydrothermally grown ZnO nanorods on silicon substrate for white light emitters. This work addresses the challenges of controlling the orientation and dispersion of nano seed crystals on silicon substrate, to act as templates for the formation of ZnO nanorods. It is also aimed at controlling the shape and size of the ZnO nanorods.

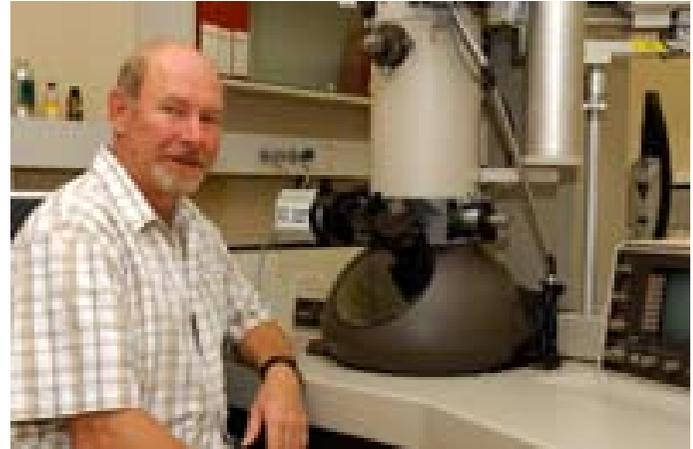
Apart from the interesting fundamental phenomena manifesting themselves on the nano and quantum scales, and the challenges associated with manipulating and manufacturing semiconductor structures on these scales, this work is aimed at serving a local niche industry involving the manufacture of infrared sensors. Infrared sensors have a wide range of applications such as atmospheric pollution monitoring and pharmaceutical process control. The latter two applications arise from the numerous absorption bands of hydro-carbons, water, carbon oxides and gaseous sulphides in the 3 - 5 μm range of the infrared spectrum. The group recently achieved very promising results in this area of research, demonstrating InAs detectors with response comparable to that of commercial diodes available from the leading manufacturer of photosensitive devices in the world, Hamamatsu (Japan). The NMMU group is currently exploring funding mechanisms to take this research scale work to the next level.

“I can say with confidence that we strive to be at the forefront of international development and offer high quality postgraduate training”.

Considerable effort also goes into the development of improved procedures for the manufacture of new materials and structures for light emitting and light detecting devices operating in the ultraviolet (UV) part of the spectrum. Recent results on the development of zinc oxide nanostructures, in particular, show promise for UV emission, which in turn can stimulate white light in a Light Emitting Diode (LED). The ability to produce high quality, high intensity white LEDs for solid state lighting is a world-wide endeavour, with a potential annual turnover of billions of US dollars.

Prof Botha is adamant that this kind of work necessitates international exposure and experience. “I can say with confidence that we strive to be at the forefront of international development and offer high quality postgraduate training. We have several strong collaborations with overseas and local groups, which provide ample opportunity for staff and students to travel abroad. This type of academic exchange is vitally important to raise our international competitiveness”.

High Resolution Transmission Electron Microscopy



Prof Jan Neethling

For Prof Jan Neethling, the acquisition of a High Resolution Transmission Electron Microscopy (HRTEM) has been a work in progress since 1984. It was then that a committee of prominent scientists met to discuss the possibility of obtaining a high resolution microscope. Prof Neethling took on the responsibility of reading through all the existing research and mounting a challenge for advanced electron microscopy. During the past 20 years he suffered numerous setbacks and frustrations, but has displayed an indefatigable tenacity.

“Nanotechnology is increasingly important, because it impacts a range of other scientific disciplines.”

2010 saw the culmination of all that work as work began on a state-of-the-art building to house a JEOL double aberration-corrected HRTEM. The building will also house sample preparation equipment and other cutting-edge microscopes. Some of the microscopes were acquired in 2010, with the remainder planned to arrive in 2011 once the building is complete. “This is not just big news for NMMU, but for South Africa as a whole. Until we acquired this technology South Africa was some 20 years behind the rest of the world in advanced electron microscopy. An important turning point came in 2005 with the Department of Science and Technology’s launch of a national Nanotechnology Strategy,” says Prof Neethling.

Nanotechnology is increasingly important, because it impacts a range of other scientific disciplines. The aim of nanotechnology is not only to reduce the size of things, but to take advantage of the fact that at the nanoscale (one billionth of a metre) the properties of traditional materials may change and new capabilities and applications may be discerned and utilised.

Walking between the worlds

The National Nanotechnology Strategy was developed around six focus areas - water, energy, health, chemical and bioprocessing, mining and minerals, and advanced materials and manufacturing - and prioritised the importance of the characterisation and development of nanomaterials used in water purification, chemical processing, the beneficiation of minerals and metals and the development of advanced materials and manufacturing.

Prof Neethling and his team are in the final stages of building the Centre for HRTEM and it is anticipated that the centre will officially open in 2011. With the bulk of the R120 million in funding from the Department of Science and Technology, the Department of Higher Education and Training, NMMU and Sasol, the aim of the HRTEM is to provide a broad community of South African scientists and students with the instrumentation to conduct nanoscale materials research.



Newly completed HRTEM building on the Summerstrand South Campus

Once established, the HRTEM will be the first double corrected microscope of its kind that has been sold commercially outside of Japan and will complete a suite of four electron microscopes, costing a total of R90 million, that have arrived from the Tokyo manufacturer JEOL and one microscope from a manufacturer in the Netherlands.

“Once established,” continues Prof Neethling, “the centre will be the best on the continent and among the best in the world. The key principle is that the centre will be able to train many postgraduate students over the coming decade, which will significantly uplift the skill base of materials science in the country. In addition, it is envisaged that the centre will become the first port of call for those involved in nanoscale research. While we will have the expertise on how to extract the most from nanomaterials using the HRTEM technology, it is our belief that we will be able to collaborate in a truly inter-disciplinary fashion with a vast array of sciences, both at the pure research and applied research levels”.



Prof Cleone Cull

Prof Cleone Cull was granted a research sabbatical in 2010. This period is usually understood as a time and space for reflection, critique and production. For most academics, this means a focus on one or two of these elements. For Prof Cull the year was an amalgamation of all three. What began as a year of study and reflection upon that study, grew organically into a year of creation. By the end of the year, 18 works had been created.



Queen of Heaven: *Five branched on fire*

The structure that underpins these pieces derives from Prof Cull's exploration of the feminine deity (or lack thereof) within Judeo-Christian belief systems. Prompted by the work of Margaret Barker who argues that representations of the "Queen of Heaven", was forcibly removed (and destroyed) from Holy of Holies in King Solomon's Temple during the time of Josiah's reform in 622 BCE, Prof Cull began to think through the implications of this removal and destruction of the form and image of the Divine Feminine. As an artist she "instantly visualised a space in which only the male principle held ground; next to him was a gap, which resonated with loss". Her series of drawings focuses on the 'gap' created by the loss of the Sacred Feminine and seek to answer the following questions: what journey would a scorned deity undertake to be reinstated in the Holy of Holies, in all her glory; and what visual narrative could embody a story that resonates in both ancient and contemporary worlds?

She has travelled and read widely, feeding her memory with both visual and written text across a wide range of theologies, cosmologies, systems of thought and cultures that are stored in journals that act as aide-memoires. During the exhibition of the sabbatical work, the journals were on display to illustrate the links between research and practice.

What she learned over the past year has altered not only her approach to the creative end point, but more importantly, has re-



Sipping at the Tree of Fire

affirmed the critical focus on the process of creativity. As Flannery O'Connor put it: "I write because I don't know what I think until I read what I say," Cull's output for the year was as much focused on the object itself as the process that was involved in getting there.

"This not only changed the direction of the work that I created but has had significant implications for my teaching upon my return to the University. The omnipresence of the teleological, of the finished article tends to obscure the very hesitation, the revisions, the discardings and the remnants that lead to the final product. Students need to embrace this process of major failures and minor triumphs in order to create anything that is truly new. The time to focus and reflect has opened up new ideas about the teaching of the process of creativity, this after a lifetime in education".

"The motivation of all research, irrespective of discipline, is curiosity".

Prof Cull is appreciative of NMMU for the space and encouragement that made this project possible. "NMMU has always been supportive of fine arts and has shown a commitment and understanding that research is a broad and diverse church. I am all too aware of the difficulties that organisations like the National Research Foundation (NRF) have in cataloguing the artefact". To date, the NRF understands research along the lines of journal and book publications, it notes how often peers reference these articles and assigns a value accordingly. It has never been able to quantify the artefact, because it is extremely difficult to assign a value. Prof Cull believes this is slowly changing. "Over recent years the terms of the debate are shifting. The work of art, the picture, the advertising campaign even, has every bit as much power to subvert the way that we experience the world as a journal article and this debate is increasingly entering into the sphere of what constitutes research. The motivation of all research, irrespective of discipline, is curiosity".

Institute for Chemical Technology: InnoVenton

There are research endeavours where the goal of the research is clearly understood by all involved. The challenge is to join the dots in order to reach a specific outcome. There are other kinds of research that grow organically from an idea, an intellectual instinct, and grow and mutate as the research process unfolds. The work of InnoVenton belongs to this latter form.

2010 was a watershed year for InnoVenton (NMMU Institute for Chemical Technology, encompassing the Downstream Chemicals Technology Station). It started two major projects that will enable the Institute to make a significant and lasting impact.

A new building for the Fuel Chemicals Platform was started in the third quarter of 2010 and will be completed in May 2011. This platform substantially increases the analytical capability and small production pilot plant facilities, particularly to support research projects on fuels and biofuels, and fuel producers and fuel user industries.

The Algae-to-Energy research project was started in 2010 to investigate the growth, harvesting and conversion of algae biomass to 'bio-crude' oil, and then to liquid fuels and other green applications. Funding applications to the Technology Innovation Agency, Eskom and Omnia look promising for 2011, which will take the project to the next level.



Prof Ben Zeelie

Prof Ben Zeelie, who heads up the programme, is optimistic about where this line of enquiry is headed. "The way in which this project has evolved has always been about building from the bottom up. It is, at once, very simple and very complicated. That is its beauty. We can take this process into extremely remote areas, with little or no infrastructure, and can harvest clean water from the salt or brackish water in which the algae grow, use the biomass to generate biogas for heating/cooking, and the remainder as bio-fertiliser for vegetable gardens".

"Most of the materials that we use," continues Prof Zeelie, "are recycled and require only basic resources and know how. That means that people in water scarce areas can make use of this technology to sustain themselves and their environment. World-class researchers have experimented with algae for a number of decades and with a range of output purposes. The work we are doing is transforming and mutating as we go along, which is precisely what makes it fascinating".

The Micro-algae, Biomass-to-Energy project is aimed at the development of a viable algae-biomass to energy industry based on the direct liquefaction of micro-algae biomass and synergising the use of algae-biomass and coal. The planned technology will address many aspects of green energy systems, including the sequestration of industrial CO₂, the investigation of the remediation

of coal fines dumps and the recovery of algae from polluted inland water bodies.

The NMMU has formulated a multi-pronged business concept involving universities, private investors, CO₂-generating industries, and the wider community. The business concept envisages the production of algal biomass in closed-system photo-bioreactors in a distributed manner with the involvement of CO₂-generating industries. The latter will benefit from carbon credits, or reduced carbon taxes, through the registration of carbon-sequestration projects. Direct job creation and community involvement will result from the operation of photo-bioreactor systems.

In order to realise its objectives, the NMMU has established a pilot PBR facility that can produce 2-10 t/biomass (dw) per year, on the premises of InnoVenton. When cost and technical effectiveness have been proven, scale-up to mid-sized facilities with production rates of 150 - 750 t/a will commence. The NMMU, through InnoVenton, will play a prominent role in the technical development of the PBR system, direct liquefaction process, as well as associated business opportunities such as coal fines recovery and fresh water recovery. Chemical engineering support will be provided by the University of Cape Town's Chemical Engineering Department, who is also involved in the development of the direct biomass liquefaction process through the Centre of Excellence in Catalysis (c*change).

The project involves several Postdoctoral, PhD and Masters students. The initial infrastructural costs were met by InnoVenton, which included the preparation of the site and building of the 400m² greenhouse, and the establishment of offices and a small lab on the site. TIA has assisted with funding part of the start-up running costs of the pilot unit over the start-up phase from November 2009 to December 2010.

"2010 was a watershed year for InnoVenton. It started two major projects that will enable the Institute to make a significant and lasting impact".

"At the start of this project it would be impossible to predict the permutations and possibilities that have come to the fore," says Prof Zeelie. "The team is cautiously optimistic that the initial results could lead to derivative extractions - the transformation of algae processes to variegated forms of parallel energy - that were never considered at the beginning of the project. Research into the more complex aspects, like the production of specific fuel types and fertilizer, is in the early stage, but is nevertheless yielding extremely encouraging results".

Innovation through Engineering - eNtsa



Prof Danie Hattingh

The week before 9/11, Prof Danie Hattingh was contacted by Dr Sam Sampath from the US Army, Navy and Airforce Research Agency. Prof Hattingh was in the UK at the time and the two made tentative arrangements to meet before his return to South Africa at the US Embassy in London. Then came 9/11 and Prof Hattingh assumed that other priorities would overtake the proposed meeting. However, Dr Sampath made contact again and was more determined than ever to engage. In 2003, the US Research Agency funded the first international workshop in friction stir welding. Held in Port Elizabeth, the workshop contained the seeds of the R11 million contract presently being conducted at the Department, specifically around the WeldCore™ technology developed by the group.

Although the NRF initially only contributed R14 000 to the project at the start-up, the general sense was that the work was too academic and there was little envisaged application for business processes. However, by 2005, Prof Hattingh and his colleagues were invited to write a paper for an internationally acclaimed journal, *Welding in the World*, to publish the research results on the development of the "Force Foot Print" online measuring technique, which was well received by their peers.

Then came a call from Eskom's Chief Welding Engineer, Philip Doubell. For Doubell the problem faced by Eskom was an aging high pressure steam infrastructure, which needed to be kept in service safely until it could be upgraded or replaced. Together Hattingh, Doubell and a team at the NMMU worked on a range of solutions and, in partnership, came up with a process that allowed in situ material sampling and reparation of high pressure steam lines.

"The savings gained by being able to repair on site and, through our technology, being able to assess the condition of the steam lines in a way that allows for accurate prediction of remnant life cannot be overestimated. The cost savings for companies like

Eskom are enormous. The ability to extend the life of very expensive components and to increase replacement intervals holds huge benefits," says Prof Hattingh.

Over the past ten years, under the leadership of Prof Hattingh, the eNtsa technical team has grown to 16 members working together to solve a range of engineering problems for big and small companies alike. "I am immensely privileged to be part of this team. We have, in effect, created a brain trust with some of the best engineering minds in the business and whose function it is to solve actual industry problems. That also means that this is not purely applied research, but challenges faced have a reciprocal impact on the theoretical research we pursue".

"For me this is the purpose of innovation. It is not for its own sake, but rather it is concretely linked to what industry needs. That is finally what engineering should be about - it is a science for improving people's lives," says Prof Hattingh.

This research team has been internationally acclaimed for its work.

A testament to the impact that WeldCore™ has had on the industry resulted in it being awarded the National Innovation Competition's first prize in August. There is also keen interest being shown by the petro-chemical industry in Malaysia and the power generation industry in the United States.

This research team has been internationally acclaimed for its work through the publication of articles in leading journals, by industry which approaches them and by those who operate within the field and appreciate the significance of their endeavours in Friction Processing for the benefit of society.

International reviewer engineer Professor Lucas Susmel, of the University of Ferrara in Italy, states that development of new welding technologies and processes are "absolutely outstanding". This is thanks to "meticulous and systematic work fully based on sound scientific bases." Prof Susmel believes this research can "successfully compete with the most prestigious private and public European institutions working on the development of innovative welding technologies". Similarly, Professor Neil James, co-editor of the *International Journal of Fatigue*, refers to the team's "world-leading" developments, which he believes will have "even greater national and international impact in the future".

"No other research group in South Africa would be able to claim the same level of impact in such a challenging world-class activity as Friction Stir Welding," writes the leading mechanical engineer.

Institute for ICT Advancement (IICTA)

valuable contributions made over long periods of time. There was a pleasing increase in the number of journal publications (six) and conference papers (34).



Prof Rossouw von Solms

The IICTA comprises of five research groups, namely: Information Security Management and Governance, Health Informatics, End-to-End Service Design, Usability and User Experience, and Enterprise Knowledge Engineering.

The focus of IICTA is to provide state-of-the-art education and training, conduct relevant and responsive research, and to provide assistance through consultation, conferences and short courses in the field of ICT to commerce, industry and the community.

Three PhD students of the Institute graduated in 2010, with a further five candidates to be examined for graduation in early 2011. A number of Institute members were elected to national and international management bodies, which serves as recognition for their continuous

Two of the projects undertaken by IICTA are highlighted below:

Empowering pensioners

The community project, under the guidance of Prof Rossouw von Solms, teaches pensioners to effectively use the Internet for their personal benefit. Facial recognition technology was successfully introduced during 2010 and the users of the system can now log into various Internet-based services, such as Gmail, Skype and Facebook without having to remember and enter a single user ID or password. This project received positive exposure in the local press during 2010.

A number of Institute members were elected to national and international management bodies, which serves as recognition for their continuous valuable contributions.

Surveying cyber habits

Prof Von Solms led a very successful survey that was conducted of nearly 1600 school children varying from grades 6 to 12. A questionnaire surveyed the cyber habits of school children with the objective of educating these Internet users about the safe and secure usage of Internet-related services. This project also attracted coverage in the local press. Formal research publications will also follow.



From left to right - Back: Eranee Swanepoel; Mariska de Lange; Prosecutor Maninjwa; Dr Kerry-Lynn Thomson; Ewald Stieger. Front: Zonke Ngaye, Prof Von Solms and Miemie Mogale.

Reports from the Chairs

NMMU has the following Research Chairs:

- Chair in HIV/Aids Education funded with R3 million by the Faculty of Education. The incumbent is Prof Naydene de Lange.
- GMSA Chair of Mechatronics in the Faculty of Engineering, the Built Environment and Information Technology (EBEIT). The incumbent is Prof Igor Gorlach.
- VWSA-DAAD International Chair in Automotive Engineering in EBEIT is headed by Prof Theo van Niekerk.
- Chair in Nanophotonics allocated to Prof Reinhardt Botha of the Physics Department established under the SA Research Chairs (SARChI) initiative.

The HIV and AIDS Education Research Chair

The HIV and AIDS Education Research Chair is a new initiative of the NMMU's Faculty of Education. The Research Chair aims to promote research and engagement within educational settings in general and within poor communities in particular. The role of the Chair is to provide academic leadership, conduct research, publish, supervise postgraduate students, ensure academic engagement, and facilitate learning processes within the field of HIV and AIDS.

Prof Naydene de Lange took up the position as Chair of HIV and AIDS Education Research at the end of 2009. In 2003, when working at the University of KwaZulu-Natal (UKZN), Prof de Lange was introduced to arts-based participatory methodologies, which opened up a whole new way of doing research, particularly in addressing HIV and AIDS in rural communities in KwaZulu-Natal. It is this approach that continues to shape her work.

The following core projects were in progress during 2010:

- **Every Voice Counts: Rural Teacher Development in the age of AIDS (2007 - 2011). NRF funding. Managed by the NMMU Research Office.**

This is a project that draws together various initiatives around teacher development in rural areas in the age of AIDS. Currently, two NMMU Doctoral candidates and one Masters candidate at UKZN are receiving grant-linked bursaries.

- **Digitizing data: Giving life to data to 'save' lives in the age of AIDS (2008 - 2011).**

The aim of this project is to manage and store vast amounts of visual data that has been produced in various projects using visual participatory methodologies. It also aims to make the data accessible to the community and researchers in South Africa and Canada. One Doctoral candidate from NMMU is currently receiving a grant-linked bursary.

- **Through Their Eyes: Rural Rwandan Girls' and Women's Vision for Engendering Poverty Reduction Strategies (2009 - 2012).**

This research project aims to identify the lessons, challenges and opportunities for enhancing gender equality. It aims to reveal new ways of thinking about current poverty strategies, specifically through including girls and women in the development process. The research findings and data gained from this particular study can provide theoretical insights for other contexts or situations, which are comparable elsewhere in Africa.

- **Youth as knowledge producers digital archive.**

This project focuses on the use of visual and other arts-based methodologies, such as participatory video and community photography, in working with youth, in order to address issues of sexuality and empowerment in the age of AIDS.

- **Teddy Diaries: A textual display of family life.**

The South African part of the study takes place in Noll, near Uniondale in the Langkloof. A farm school provides the context for the exploration of children's views of family life. Using drawing as a visual participatory methodology it enables us to make critical recommendations for children in rural education contexts.

Prof de Lange has five Doctoral students working under her guidance. R Mahadev is exploring sexual violence among Indian youth in the age of AIDS; T Mnisi is exploring HIV-related stigma with learners in two rural Kwazulu-Natal schools; S Pillay is examining the construction of sexuality of female adolescents of Indian descent in the face of HIV and AIDS; C Kader is exploring how female adolescents in "sugar daddy" relationships construct their sexuality in the context of HIV and AIDS; and F Khanare's research is looking into the lived experiences of orphaned and vulnerable children in the age of HIV and AIDS in rural KwaZulu-Natal.

GMSA Chair of Mechatronics in the Faculty of Engineering, the Built Environment and Information Technology (EBEIT)

Since 2008, the Chair, Prof Igor Gorlach, and his team have been closely working with local industry in the field of mechatronics. In particular the collaboration with General Motors has borne extremely positive results and the partnership has achieved a close correlation between the needs of industry and the Mechatronics curriculum.

2010 saw the continuation of an ongoing research collaboration with Aachen University in Germany, working on a project in robotics and metrology systems. Two NMMU Mechatronics Masters students have travelled to Aachen to conduct research on the project. As an extension of this continuing relationship, together with the close collaboration with General Motors South Africa (GMSA), the Chair successfully proposed a joint project between the three institutions, which will pave the way for significant research opportunities. The joint project is centered around the improvement in accuracy of industrial robots through the use of various innovative metrology solutions, such as vision and laser systems. The research holds potential to benefit GMSA production within the context of the South African automotive industry, while remaining on the forefront of research in the field. This strategic direction of research further provides significant potential for prospective Masters and PhD students.

A number of students completed their final year projects solving industry-related design tasks at GMSA, Continental and Welfit Oddy plants. Daniel Duvenage completed his final year project at the Continental plant. The requirement was to develop a special purpose machine to automatically measure tyre beads after the forming process. He succeeded in this design and the developed machine met all of the strict industry requirements, including stringent process parameters, reliability and high accuracy, and earned him a distinction for the project. The machine was manufactured and commissioned at the Continental plant. In terms of training, Prof Gorlach has further supported training courses for undergraduate and postgraduate students; these include courses in CFD and Adams simulation software.

As a non-NRF funded Chair, Prof Gorlach is positive about the possibility of replicating this model in other areas within the University. "The corporate world is not an anathema to the academy. They are all too willing partners. What is simply required is for higher education to justify the common ground that we share and to solve interesting problems. This is not a matter of conflicting ideologies, but common sense. General Motors, Continental and others are only too keen to absorb our postgraduate students. And it's mutually beneficial: graduates need work experience and business needs theoretical acumen".

He concludes by arguing that "there should be a seamless flow of expertise and experience between academia and business and it should simultaneously flow from the university to business and back again. All graduates happily employed and all mechatronic problems solved - that is my dream".

The VWSA-DAAD Chair

Among the VWSA-DAAD Chair, Prof Theo van Niekerk's, many projects during 2010, the partnership with Germany's Prof Becker to create mechatronic solutions for the automotive industry was perhaps the most rewarding. Dubbed as the Formula Student project the objective was to create a formula student racing vehicle with the following:

- Complete CAD design of a single seat formula type race car according the SAE rules, as well as German competition specific rules. Calculations and FEA analysis on all critical components.
- Manufacturing and assembly of complete vehicle - cutting, notching, welding of frame. Machining of part components.
- Individual suspensions assembly, powertrain component assembly, full integration of complete vehicle.
- Electronic component installations, wire harness manufacturing.
- Electrical and mechanical component integration and testing.
- Race car setup, suspension and engine optimisation, vehicle testing.

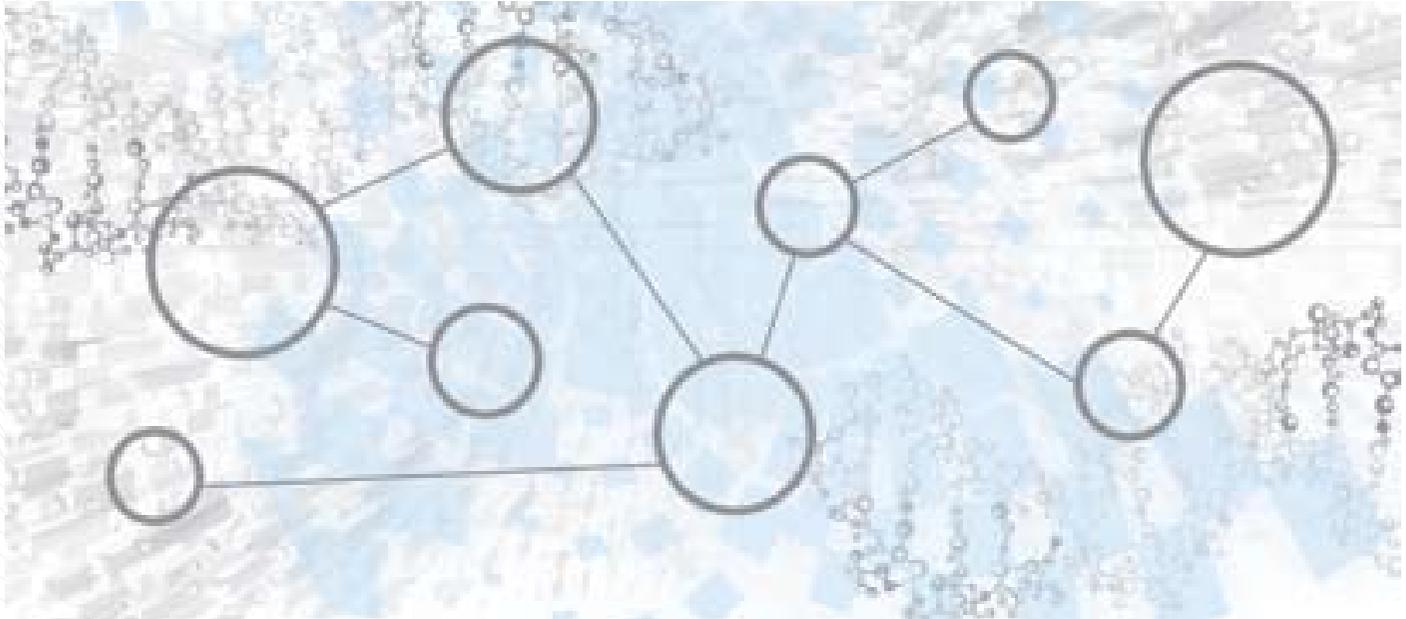
The main objective was to provide students with a real life exercise in design and manufacture and the business elements of automotive engineering. This taught them the value of teamwork, working under pressure and adhering to tight deadlines. It demanded total commitment, many frustrations and challenges along the way with the net result being the development of highly talented young engineers capable of thriving in the pressures of the business world.

In conjunction with this project, the team has also been working on solar systems to drive auxiliary automotive subsystems. A test setup consisting of a solar panel, charge controller and advanced measurement systems were integrated into a Polo vehicle and an autonomous vehicle to measure the characteristic performance of solar cells within automotive applications. Solar technology could be applied within the future project to provide energy to auxiliary equipment.

Prof Van Niekerk has also worked on the development of a vehicle bus-communication simulator to develop and test the performance of a centralised FPGA control system. This technology may be used in future formula student racing vehicles for engine and distributed control purposes, as well as work done on the development of a GPS controlled AGV. The technology could be used in future formula student projects.

Companies involved with Formula Student through technical support and sponsorship get face-to-face access to these highly skilled young engineers, who are viewed both as potential recruits and as potential future customers. Formula Student provides opportunities in brand awareness and sales and there are real business benefits to be gained. This further aids the supply of high quality engineers into the automotive industry as the project provides the students with a real life exercise in design and manufacture and the business elements of automotive engineering.

Research Entities



Research entities are intended to position NMMU at the forefront of national and international research in relation to the institutional research themes. Research entities contribute towards the establishment of a vibrant research and innovation culture by creating a research environment that fosters and enhances multi-/inter-/cross-/transdisciplinary research.

During 2010, there were 30 registered research entities. At the highest level are institutes (three), followed by centres (nine) and units (eighteen). Two entities report directly to the Deputy Vice-Chancellor: Research and Engagement. The entities fulfilled their mandates successfully during 2010 by producing the following high level outputs:

- Peer reviewed journal articles - 93.
- Books and book chapters - 24.
- Conference papers delivered - 136.
- Supervision of Masters and Doctoral students - 63.
- Patents - 5.

During 2010, there were 30 registered research entities.

In addition to the outputs mentioned above, entities were involved in collaborative research projects nationally and internationally.

Name	Leader	Faculty
INSTITUTES		
Friction Processing Research Institute	Prof Annelize Els-Botes	EBEIT
Institute for Information and Communication Technology Advancement	Prof Rossouw von Solms	EBEIT
InnoVenton	Prof Ben Zeelie	Science
CENTRES		
Built Environment Research Centre	Prof Winston Shakantu	EBEIT
Centre for Mechatronics and Manufacturing	Prof Khaled Abou-El-Hossein	EBEIT
Centre for African Conservation Ecology	Prof Graham Kerley	Science
Centre for Energy Research	Prof Ernest van Dyk	Science
Centre of Expertise in Forecasting	Prof Igor Litvine	Science
Centre for High Resolution Transmission Electronic Microscopy	Prof Jan Neethling	Science
Telkom Centre of Excellence and its sub-entities	Prof Janet Wesson	Science
Centre for Educational Research, Technology and Innovation and its sub-entities	Prof Paul Webb	Education
UNITS		
Cyclic Peptide Research Unit	Prof Pieter Milne	Health Sciences
Drug Utilisation Research Unit	Prof Ilse Truter	Health Sciences
Family Business Unit	Dr Margaret Cullen	Business and Economic Sciences
Unit for Applied Management Sciences	Prof Elroy Smith	Business and Economic Sciences
Labour Relations and Human Resources Unit	Prof Dave Berry	Business and Economic Sciences
Labour and Social Security Law Unit	Prof Adriaan van der Walt	Law
Intercultural Education Unit	Prof Nonnie Botha	Education
Raymond Mhlaba Research Unit for Public Administration and Leadership	Prof Sebenzile Masango	Arts
Research and Outreach Unit for Technology Education	Prof Rossouw von Solms	EBEIT
Sustainability Research Unit	Prof Christo Fabricius	George
Integrated Environmental and Coastal Management Unit	Dr Derek du Preez	Science
ENTITIES REPORTING TO THE DEPUTY VICE-CHANCELLOR: RESEARCH AND ENGAGEMENT		
HIV and AIDS Unit	Dr Jill von der Marwitz	
Centre for the Advancement of Non-Racialism and Democracy	Mr Allan Zinn	

INSTITUTES

Institute for Information and Communication Technology Advancement and its sub-entities (IICTA)

Leader: Prof R von Solms

IICTA has been operating in 2010 according to its new structure. This new structure comprises of five research groups, namely: Information Security Management and Governance, Health Informatics, End-to-End Service Design, Usability and User Experience, and Enterprise Knowledge Engineering.

A number of highlights and achievements were reported for 2010.

- Three PhD students graduated and a further five candidates handed in PhD theses to be examined for graduation early 2011.
- A number of Institute members were elected on national and international management bodies. This serves as recognition for the continuous valuable contributions made over long periods of time.
- The increased number of research outputs in the form of journal publications and conference papers.

During 2010, the faculty appointed an Honorary Professor, Prof Mikko Korpela and a Research Associate, Dr Nicola Bidwell.

The outputs of IICTA for 2010 can be summarised as follows:

• PhD students	3
• Masters students	4
• Journal articles	6
• International conference papers	19
• National conference papers	15

Due to the vast number of postgraduate students, the capacity of research supervisors and promoters is very limited and hardly any more students can be accepted for Masters and Doctoral qualifications. The appointment of three Adjunct Professors in 2009, and the Honorary Professor and Research Associate in 2010 will certainly prove to make a difference in this aspect.

The financial situation of IICTA is sound. The majority of the research funding stems from the NRF and were used according to NRF and NMMU financial policies.

Friction Processing Research Institute (FPRI)

Leader: Dr A Els-Botes

In 2010, the Friction Processing Research Institute (FPRI) had a year of proficient professional developments and the unfortunate loss of a valuable team member with the untimely death of Dr Calvin Blignault in August. His related research and academic responsibilities were re-distributed within the research group and his academic peers.

Significant applied research within the field of Friction Processing, more specifically Friction Stir Welding, has been conducted during 2010 and is still ongoing. Research expertise developed over the last couple of years within FPRI led to a substantial contract research project on Friction Stir Welding as an alternative joining technique for a large tanker manufacturer based in South Africa. Developments over the past year included marketing progression to enhance both internal and academic awareness of the Institute. International experiments have had a high technological impact due to the collaboration between researchers at Plymouth, Bristol and NMMU, and the interface with two operators of a nuclear power plant. Our international visitors, Professor James and Susmel visited in late 2010 and during their stay interacted with postgraduate research students, staff and mechanical engineering professionals. An increase in industry interaction has taken place due to the research efforts of the group. Our neighbouring unit, eNtsha (previously known as the Automotive Components Technology Station) has received national and international recognition for their projects related to Friction Stir Welding, which has led to the development of a spin-off company.

InnoVenton/DCTS - InnoVenton: NMMU Institute for Chemical Technology and Downstream Chemicals Technology Station (DCTS)

Leader: Prof B Zeelie

InnoVenton has responded well during 2010 to specific strategic interventions and plans. 2010 was a significant year in which focus shifted to include more teaching and learning activity into InnoVenton's offerings and a large change in research and development focus too much fewer, larger projects. This has already shown benefit in the greater focus and leverage of existing resources and will lead to the building of capacity and realisation of greater efficiency as a research institute.

Financially, InnoVenton has managed to maintain a sound position during a difficult climate through exercising tight control. The entity is now well positioned to move forward to the next level as a research institute on the back of the Algae-to-Energy and Fuel Chemical Centre projects.

CENTRES

Telkom Centre of Excellence (CoE)

Leader: Prof J Wesson

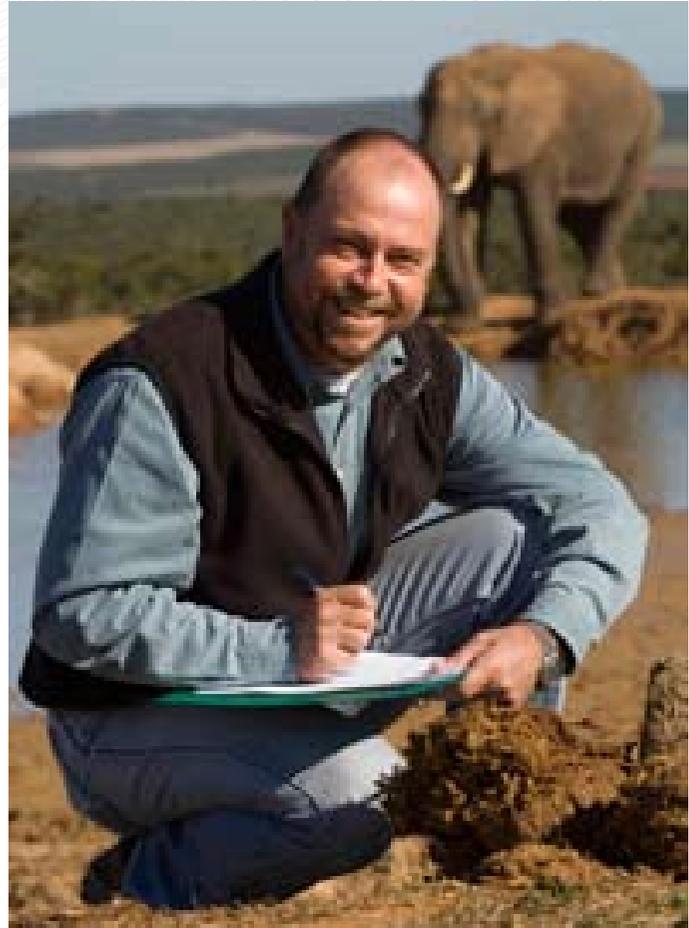
The CoE received generous funding in 2010. The DMA Unit received a total of R505 731.25 from Telkom (R219 298.25), Dimension Data (R50 000) and THRIP (R100 000 + R103 332 + R33 101). The OFC Unit received a total of R938 377.19 from Telkom, Ingoma Holdings, Dartcom, Hezeki Contracting and THRIP. The Photovoltaics Unit received a total of R193 860.00 from Telkom, TFMC and THRIP.

Several students had papers accepted at international conferences and in publications; and successful candidates were awarded Honours, Masters and PhD degrees at the graduation ceremony held in April 2010.

Centre for African Conservation Ecology (ACE)

Leader: Prof G Kerley

The Centre for African Conservation Ecology again performed well in 2010, with significant achievements in terms of research output, including 14 refereed scientific publications, and nine conference presentations, with five Honours, five MSc and 14 PhD students busy with their degrees, while four MSc students graduated during 2010. Staff and students of ACE made a substantial contribution to science management in South Africa and further afield, and high levels of community service were achieved, particularly through the Grysbok Environmental Education Trail. Overall funding remains project focussed, with a broad variety of funders supporting the Centre, whereas a cyclic decline in institutional support income was experienced in 2010, but the Centre has adequate reserves to cover this. Human resources remain strong and were boosted in 2010 through the recruitment of a Postdoctoral fellow and a researcher. Research Associates also serve to boost this aspect. The Centre is financially healthy, and well on its way to fulfilling its vision as articulated for the period 2007 - 2011.



Prof Graham Kerley

Centre for Energy Research (CER)

Leader: Dr E van Dyk

The Centre for Energy Research performed well in 2010, with research outputs including two refereed publications, eight conference presentations, ten MSc/MTech and two PhD students busy with their degrees, while one PhD student graduated during 2010. Staff and students of the CER make a valuable contribution to energy research and the energy field in general in South Africa. The CER also engages with several local and national companies, doing contract research. Most funding received by the CER is project based, with a wide range of funders, from government to industry, supporting various activities. The CER is growing and establishing itself as a viable university research entity, with a high national profile.

Centre for Educational Research, Technology and Innovation (CERTI)

Leader: Prof P Webb

Members in the Centre for Educational Research, Technology and Innovation (CERTI) were published in five international and four national conference proceedings, presented three papers at international conferences and eight at national conferences. They produced seven articles in accredited journals, two papers in other peer reviewed journals, five book and chapters in books, and supervised one Masters and six PhD candidates to completion. They won eight grants worth R1 626 5400 and ran four community engagement projects. Bursaries were solicited for 48 Science and Mathematics Education students registered at the NMMU. An Action Research conference and a HIV/AIDS Education Research symposium were run. Recommendations from mid-year strategic planning sessions were that the Centre should be an umbrella body that provides professional support and services to all academics in the Faculty and not have designated academic members in the future.

Centre for Manufacturing and Mechatronics (CMM)

Leader: Prof K Abou-El-Hossein

The Centre has been involved in activities such as linking NMMU to industry, especially in the high precision industry. One of the major achievements of the Centre for 2010 was the successful acquisition of funding under the National Equipment Programme sported by NRF to acquire a state-of-the-art machining centre that can be used to fabricate ultra-high precision components. In addition, the Centre has managed to establish good links with other research institutions in the area of high precision manufacturing. The Centre also has managed to attract two PhD students and two MEng students, and offer a number of research projects to the final year students in the Department of Mechatronics.

Centre for the Advancement of Non-Racialism and Democracy (CANRAD)

Leader: Mr A Zinn

Since the launch of CANRAD in March 2010, the Centre has included the broader community in lectures, research, seminars and special events both on and off campus. A major achievement was the deepening of the NMMU Value: Respect for Diversity through CANRAD hosting Diversity Month in August 2010 with over 50 programmes and events across five NMMU campuses. NMMU

Vice-Chancellor, Professor Derrick Swartz said that the launch of CANRAD marks a historic moment in the development of NMMU as it has created the possibilities for making a progressive and defining contribution to not only the contemporary understanding of the non-racial project in post-apartheid South Africa, but also practically engaging with civil society, especially schools and neighbourhoods, in building multicultural consciousness and skills. We believe that we had major achievements both with regards to engagement as well as research outputs in 2010, bearing in mind that we were only functional for one year.

UNITS

Cyclic Peptide Research Unit (CRPU)

Leader: Prof PJ Milne

The financial position of the CRPU is sound and the Unit has a loyal donor in Clinisut that supports research into fundamental Pharmaceutical Chemistry.

Drug Utilisation Research Unit (DURU)

Leader: Prof I Truter

The Drug Utilisation Research Unit (DURU) at NMMU promotes, educates and informs all interested parties about the rational and cost-effective use of healthcare resources, with specific emphasis on the management of medicines. Research outputs of DURU during 2010 included the production of thirteen (13) international peer-reviewed publications, as well as the graduation of one PhD student (May 2010) and one Masters student (April 2011). Four articles published in the *South African Pharmaceutical Journal*, and 23 presentations at mostly international conferences. The Director was re-rated as a C2 researcher, and elected as a representative for Africa on the DUR-SIG of the International Society for Pharmacoepidemiology. In addition to all the foregoing, the Director was the NMMU Health Sciences Faculty Researcher of the Year 2010.

HIV/AIDS Unit

Leader: Dr J von der Marwitz

The NMMU HIV and AIDS Unit's most significant achievement in 2010 was the EU's financial support provided to the Campus Health Services to enable Art accreditation. NMMU is the first higher education institution to provide this health service on campus.

Labour and Social Security Law Unit (LSSLU)

Leader: Prof JA van der Walt

The LSSLU continued to present and expand high quality training and research output in the form of articles, seminars and conferences on labour law. During 2010, it specialised in Education Labour Law. It also set the scene for expansion of research and training in other SADC (Southern African Development) countries.

Labour Relations and Human Resources Unit (LRHRU)

Leader: Prof D Berry

The Labour Relations and Human Resources Unit, as an established brand, is the research and engagement of the School of Industrial Psychology and Human Resources. Emphasis in previous years and during 2010 has been on building research capacity amongst staff. This together with the goals to increase the intake of Masters and Doctoral students has led to increased participation in international conferences and the satisfactory delivery of research outputs. However, severe constraints are placed on the expansion of the research outputs by staff and students due to the difficulty of recruiting experienced academics particularly Industrial Psychologists. Conference attendance, community and institutional engagement, formal and non-formal teaching programmes outside the institution, association with professional bodies and collaborative relationships with national and international academics were continued to ensure that the profile of the Unit, School and Institution was enhanced.

Unit for Economic Development and Tourism (UEDT)

Leader: Mr H Bartis

Two journal articles in a South African Journal (SAJ) were published. Four (4) international conferences were attended. Nine (9) research reports were written. A further achievement is reflected in the production of postgraduate students - one Masters (by coursework/treatise), and one Doctoral degree.

The Tourism Research Unit (TRU) increased its outputs during 2010 in accordance with its objectives. In late 2010, the TRU changed its name and realigned itself to form a school-based research unit called the Unit for Economic Development and Tourism (UEDT).

Integrated Environmental and Coastal Management (IECM)

Leader: Dr D du Preez

In 2010, the IECM had a successful year in that we met the objectives that were set at the end of 2009. Members of the IECM completed a land mark national beach classification and mapping exercise submitted to the South African National Biodiversity Institute. This assessment will be incorporated into the National Spatial Biodiversity Assessment of 2011. Also noteworthy were the visits by Prof Clarisse Odebrecht (Federal University of Rio Grande in Brazil to NMMU) and Prof Eileen Campbell (plenary speaker at the *IV Congresso Brasileiro de Oceanografia*). The IECM contributed financially and through participation, to the successful launch of the South East African Climate Consortium (SEACC), which was hosted by NMMU. Nine (9) journal articles were published, all through the ISI and IBBS. Three (3) conferences were attended - one of these internationally. Seven (7) Masters degrees (all by research) were produced. Two Doctoral degrees were conferred. A further attainment was the production of one (1) research report.



Botany students surveying the seaweed abundance and diversity on one of Port Elizabeth's rocky shores. The seaweed being pointed out is *Gelidium pristoides*, which is commercially important

Unit for Applied Management Sciences (UAMS)

Leader: Prof EE Smith

The Unit for Applied Management Sciences (UAMS) represents the research pillar of the School of Management Sciences. The reason for the existence of the UAMS is to act as the consulting and research arm for the various departments comprising the School of Management Sciences (Business Management, Logistics, Marketing Management, as well as Management and Entrepreneurship). All staff members of the School of Management Sciences are *ipso facto* also members of the UAMS. The Unit strives to develop socially and technologically competent professionals from diverse cultural and geographical backgrounds through sustaining, generating and imparting advanced knowledge by means of research, consulting, teaching and networking. The governance structure (committee of the Unit of Applied Management Sciences consists of seven members). Members of the Unit had the following research outputs: 34 international and national conference papers; 14 journal articles, nine book and book chapters, 19 Masters and Doctoral degrees completed; 41 BCom/BTech treatises completed and ten other publications in 2010. Members received various research related awards and grants. The closing balance of the Unit is R 5916.68

Unit for the Study of Construction Processes (USCP)

Leader: Prof JJ Smallwood

The Unit for the Study of Construction Processes (USCP) attached to the Department of Construction Management and the Department of Building and Quantity Surveying generated four Department of Higher Education (DHET) recognised journal papers and twenty-three DHET recognised conference papers in 2010. In addition, the second edition of a book was published. Postgraduates include three MSc (Build Environment); one MSc (Construction Management); and two PhD (Construction Management) students. The USCP cost centre reflects a positive balance.

The Unit for Professional Ethics (UPE)

Leader: Prof P Naudé

The Unit for Professional Ethics has increased its research outputs and maintained its significant teaching commitments in applied ethics in various academic programmes in the faculties of Arts and Business and Economic Sciences.

Sustainable Research Unit (SRU) - George

Leader: Prof C Fabricius

During 2010, the SRU focused on two key objectives: creating the impetus for a broader student Green Campus movement and raising additional enabling funds. Both objectives were achieved with the establishment of a student organisation and the successful application for NRF community engagement research funds for three postgraduate students and two postdoctoral students. Significant progress was made with establishing national and international research networks with good prospects for additional funding. The SRU was highly successful with community engagement, with five talks on the local community radio station (Eden FM), hosting several community workshops on sustainability and publishing at least 15 press releases on sustainability issues - all of which found their way to the SRU website: www.nmmu.ac.za/sru.

SRU members published five peer-reviewed academic papers and one book chapter during 2010, and co-organised one international and two national conferences, one keynote address was presented at a national conference, and the SRU is alive and well.

Research and Outreach Unit for Technology and Education (RoUTE)

Leader: Prof HJ de Jager

The mission of the Research and Outreach Unit for Technology Education (RoUTE) is to actively engage and promote scholarship in teaching and learning in order to advance technology education within the internal and external community both nationally and internationally.

During 2010, the Head of the Unit, Dr Ray Harris resigned. Mr Anthony Marks was appointed as interim Head from 1 July until 31 October 2010. Professor Henk de Jager was appointed as Head effective from 1 November 2010. Some exciting projects during 2010 included the HEDS-TL Pilot Project to address the language and reading and writing skills of students. Another project was the Mentorship Programme in the School of Engineering where retired engineers were used as specialist mentors to mentor senior students and first years. The preliminary results obtained from this project are very promising. The Unit will continue to align its goals with Visions 2020 during the year 2011.

Research Entities Registered in 2010

During 2010 three Research Units - Lean Process Development, Family Business, and Visual Methodologies for Social Change - were registered. In the same year, the Centres for High Resolution Transmission Electron Microscopy, Built Environment Research, and Expertise in Forecasting were also registered. A brief outline of these follows below:

Units

Family Business Unit (FBU)

Head: Dr RM Cullen (Faculty of Business and Economic Sciences)



Dr RM Cullen

The Family Business Unit aims to be at the forefront, both nationally and internationally, in producing high quality research outputs that are published in the top academic journals of the world. It further intends to create a platform to share knowledge and best practices with family businesses.

Unit for Lean Process Development (ULPD)

Head: Prof JJ Pieterse (Faculty of Engineering, the Built Environment and Information Technology)



Prof JJ Pieterse

The Unit for Lean Process Development is actively engaged in research and scholarly and community service activities to advance education and skills improvement to enhance the competitive advantage of the South African business and academic community through the implementation of the lean process philosophy.

Visual Methodologies for Social Change Unit (VMSCU)

Head: Prof N de Lange (Faculty of Education)



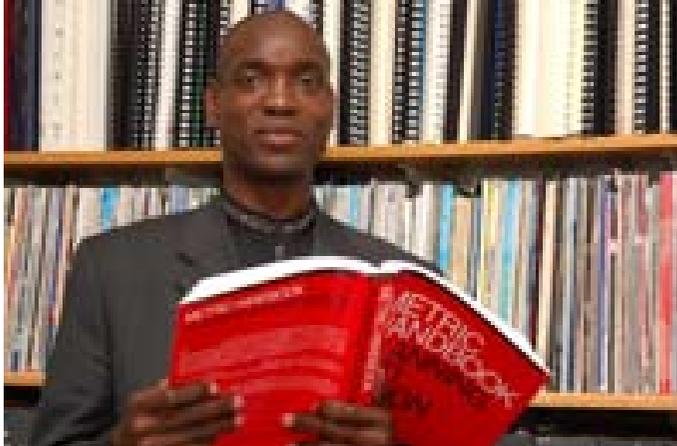
Prof N de Lange

The Visual Methodologies for Social Change Unit operates under the umbrella structure of the Centre for Educational Research, Technology and Innovation (CERTI), in the Faculty of Education. It strives to advance the study of visual and participatory methodologies (photovoice, participatory video, digital archives, performance in community-based work) in education settings.

Centres

Built Environment Research Centre (BERC)

Director: Prof WMW Shakantu (Faculty of Engineering, the Built Environment and Information Technology)



Prof WMW Shakantu

The construction industry plays an indispensable role, directly and indirectly, in South Africa's economic growth, and the industry makes a huge contribution to the quality of life of South Africans. However, the South African construction industry, like its counterparts around the world, is notorious for underperforming, which manifests itself in the poor quality of finished products, products that cost more than they should due to rework as a result of poor quality, and construction organisations not achieving their project timelines.

The construction industry plays an indispensable role in South Africa's economic growth.

The Built Environment Research Centre was established at the NMMU to produce systemic solutions to built environment problems and to address the continued absence of theoretical and applied research work on the nature and dynamics of problematic areas within the built environment. The Centre draws together multidisciplinary, cross-faculty expertise and provides high level human resources to the South African built environment through postgraduate research training.

Centre of Expertise in Forecasting (CoEF)

Director: Prof IN Litvine (Faculty of Science)



Prof IN Litvine

The Centre of Expertise in Forecasting was established with the recognition of a critical need among many sectors of society, including commerce, industry and government, for accurate and reliable information regarding the future. The Centre provides research services to external parties and stakeholders, as well as providing a platform for postgraduate student training. The Centre uses modelling and discipline-specific expertise to study risks and trends associated with, for example: energy, finance, economics, auditing, marketing, sporting outcomes, pharmaceutical trends, climate, population growth, and housing requirements. The research undertaken is cross-cutting, adding value to research in other departments and faculties. Examples include projects in energy modelling and forecasting, financial modelling, pharmaceutical forecasting and sport forecasting, educational trend forecasting, and urban population and social requirement forecasting.

The Centre provides research services to external parties and stakeholders, as well as providing a platform for postgraduate student training.

The Centre strives to serve the needs of the community through sustainable development of human resources and excellent academic programmes, research and service delivery. The work done through the Centre contributes towards the enhancement of many sectors of the community and empowers students, staff and external partners through practical and needs-driven research. The Centre uses the context of forecasting to teach advanced statistical methods at postgraduate level, to enable clients to make decisions informed by the best possible reasoned advice, to generate meaningful research that is applicable in the South African and international contexts and initiate innovative projects.

Centre for High Resolution Transmission Electron Microscopy (CHRTEM)

Director: Prof JH Neethling (Faculty of Science)



Prof JH Neethling

The Centre for High Resolution Transmission Electron Microscopy will make significant contributions to nanoscience research and human capital development through materials characterisation and development at the nanoscale. A wide range of materials can be investigated and characterised using Transmission Electron Microscopy (TEM), such as semiconductors, metal alloys, metals, ceramics, minerals, composite materials, carbon based materials, and smart materials. This is important for both academic research in these fields and, more broadly, in nanotechnology, as well for industries requiring materials to be characterised, such as the nuclear and renewable energy, electronics and communication and the automotive and components sectors.

The Centre for High Resolution Transmission Electron Microscopy will make significant contributions to nanoscience research and human capital development through materials characterisation and development at the nanoscale.

The Centre was established with support from the Department of Science and Technology, the Department of Higher Education and Sasol after the national nanoscience community supported the establishment of the Centre at the NMMU due to its acknowledgement as a leader in the field of electron microscopy. The only double aberration corrected atomic resolution TEM on the African continent is housed in the Centre along with three other state-of-the-art electron microscopes and sophisticated specimen preparation equipment. The Centre for HRTEM is also a member

of the DST-initiated National Nanoscience Postgraduate Teaching Platform that will offer an inter-university, multi-site MSc degree in Nanoscience.

The Centre will advance the existing nanoscience research and training programmes of the NMMU by contributing significantly to the building of an essential critical mass of knowledge and experience in HRTEM and nanoscience.



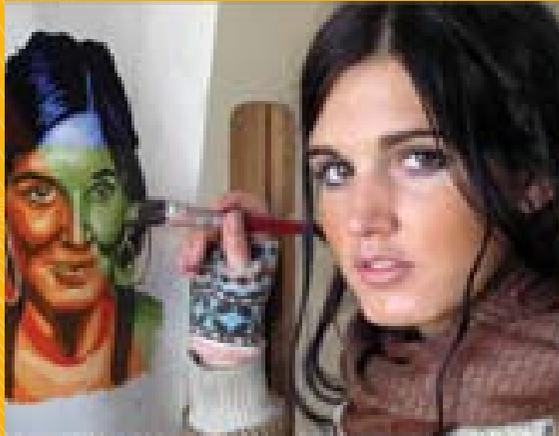
Moving JEOL 700IF SEM into the new laboratory, Centre for HRTEM



New FEI Helios FIBSEM installed in the Centre for HRTEM

Faculty of Arts

Creating tomorrow



School of Architecture

DEPARTMENTS

Department of Architectural Technology and Interior Design
Department of Architecture

School of Governmental and Social Sciences

DEPARTMENTS

Department of Political and Governmental Studies
Department of Sociology and Anthropology (incorporating History)

School of Language, Media and Culture

DEPARTMENTS

Department of Applied Language Studies
Department of Journalism, Media and Philosophy
Department of Language and Literature
Department of Public Relations and Communication Studies

School of Music, Art and Design

DEPARTMENTS

Department of Art and Design: Introductory Studies
Department of Applied Design
Department of Studio Art
Department of Music

Dean's Overview



**Prof Velile Notshulwana,
Executive Dean: Faculty
of Arts**

Research is our most valuable tool of acquiring knowledge - past, present and future. Research enables us to push back areas of ignorance, find new ways of doing things, and doing them better. For any profession to advance and gain status it must be committed to research.

With this recognition of the importance of research in our work, the Faculty of Arts proposes the Five-year Research Development Plan (RDP-5). This Plan is intended to promote research and postgraduate development. Identifying and supporting particular research focus areas is central to this overarching Plan. To this end, established and emerging researchers within the Faculty of Arts are collaboratively working to build postgraduate expertise, supervision capacity and to direct carefully identified research focus areas within the School of Architecture; School of Governmental and Social Sciences; School of Language, Media and Culture; and School of Music, Art and Design.

For any profession to advance and gain status it must be committed to research.

The main purpose of the RDP-5 is to create teams of researchers within the Faculty of Arts' academic departments and schools that will work on clearly defined research and postgraduate education areas in contribution to consolidating expertise in these areas. **The Plan seeks to:**

- Increase the production of postgraduate numbers and institutionalise a research culture in the Faculty of Arts.
- Identify focus areas of research, grow scholarly outputs, and increase the number of Faculty members with Doctorates.
- Develop diverse research areas with representation across disciplines in the Faculty of Arts, and
- Identify and address historical challenges related to equity and access opportunities and outcomes.

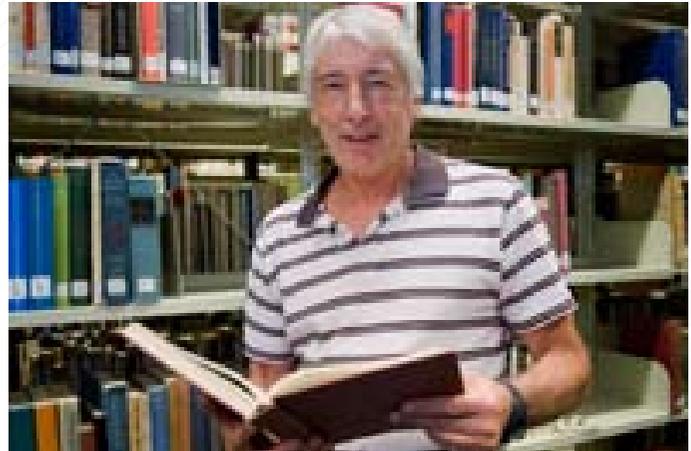
In 2010, the Faculty of Arts saw numerous members contribute to the body of scholarly knowledge through their research, conference presentations, and publications of book chapters, journal articles and participation in policy decision forums. As such, some of our members were recognised for their achievements. Professor Bert Olivier was awarded with the Faculty of Arts Researcher of the Year Award and Dr Rudi Bower was awarded the Emerging Researcher of the Year Award in the Faculty of Arts.

In my leadership capacity, as Dean of the Faculty of Arts, I am happy to report that the achievements of 2010 have set the foundation for continuous improvement; especially on our efforts of improving throughputs and harnessing the quality of the graduates we produce.

Prof Velile Notshulwana

Executive Dean: Faculty of Arts

Faculty Researcher of the Year



Prof Bert Olivier

Professor of Philosophy Bert Olivier, who was the 2008 and 2009 Researcher of the Year, strives to ask the uncomfortable questions that challenge the status quo, but ultimately aim at improving life for all. Concerned with world issues like global warming and the ongoing destruction of ecosystems, Prof Olivier has recently shifted his focus to ecological philosophy. His other research interests include, among others, the philosophy of culture, art and architecture, cinema, music and literature, as well as the philosophy of science.

Prof Olivier's take on research is strongly influenced by the impact that past thinkers can still have on current problems. "Philosophical research, unlike technological research, is almost precisely what the word says: "re-search" that is, looking at or re-reading, the philosophers (and all other writers and artists, for that matter) of the past in the light of present historical and social events, and inversely, looking at the present through the eyes of the thinkers of the past (and the present). It is sometimes surprising to see what one comes up with".

The impact that technology is having on modern life has also instigated an important shift in Prof Olivier's thinking. "My focus," he argues, "has shifted slightly from my general orientation - the philosophy of culture and the arts, as well as social theory and psychoanalytic theory - as barometers of the human condition, to the philosophy of technology in relation to ecological concerns. My research is based on the premise that humanity has an unquenchable desire for power in multifarious modes, and that - as psychoanalytic theory, as well as philosophy of technology and ecology confirm - even if it happens at the cost of the natural environment, on which all life depends, people will not cease pursuing this power".

“Judging by responses from overseas and local colleagues, at least some of my research is regarded as being valuable - I have received several invitations for contributions to journals, books and to be a keynote speaker at conferences, the latest being justified by the statement that my work seems to point in fresh, new directions for higher education”.

Prof Olivier’s take on research is strongly influenced by the impact that past thinkers can still have on current problems.

In interesting ways, this ‘philosophy of the future’ returns to the fundamental questions about what we know and how we know what we know. Prof Olivier continues to be interested in the “questions and phenomena that strike me as being of importance for the future of humanity. Responses to my work from colleagues and the public have confirmed that this is the most valuable direction to concentrate one’s efforts”.

Faculty Emerging Researcher of the Year



Dr Rudi Bower

The research interests of music lecturer, Dr Rudi Bower, range from historical musicology and philosophy to jazz and musical instrument construction. Dr Bower is also a well-known concert guitarist, who performs exclusively on South African-made guitars.

There is a common preconception that the history and development of the classical guitar has been set in stone (or wood) for some considerable period. Dr Bower is at pains to question that assumption.

“My general area of research is musical instrument development and construction with specific reference to the classical guitar in South Africa,” says Dr Bower.

“This is done,” he continues, “within both the historic-critical paradigm, as well as the current break with set traditions that is emerging on a global scale. Core to this research is the identification and archiving of specific construction techniques developed by individual builders, as well as innovative new materials such as indigenous woods and their ultimate role on the sound qualities of the instrument”.

Dr Bower is also a well-known concert guitarist, who performs exclusively on South African-made guitars.

An offshoot of this research has meant that Dr Bower is increasingly interested in those who not only craft and play instruments, but in those who listen and the effect that listening to music has on psycho-social development. “Currently, a branch of my research is developing with a focus on human development through exposure to the arts from an early age,” says Dr Bower. “This is done with reference to case studies conducted and will hopefully have an impact on current views of how the arts can be more meaningfully incorporated into early human development”.

Faculty Highlights and Achievements

Elisabeth Eybers Award

The Elisabeth Eybers Award by the South African Academy for Science and Arts was awarded to Prof Helize Janse van Vuuren for a project on “Africa in the imagination - in Afrikaans, Flemish and Dutch literature”.

The award is normally given to an established researcher in the field of Afrikaans and Dutch literature or language, to further intercultural links with Dutch researchers and culture. In 2010, two recipients shared the large monetary bursary (intended for a research visit to the Netherlands or Belgium), namely Prof Janse van Vuuren (NMMU) and Emeritus-Professor Chris van der Merwe of the University of Cape Town.

The international Afrikaans Literature Association Conference

This conference was held from 27 - 29 September 2010. The two themes of the conference were: *Marginality* (with specific focus on the San, the Khoi and their descendants and representations in literature) and *Transnationalism* (migration, exile, diaspora, identity) in *Afrikaans literature*. The conference was attended by academics from Poland, Belgium and Holland, as well as nationally. Young, developing researchers and postgraduate students were sponsored, as well as the travel cost of Polish colleagues (an impressive sponsorship was obtained from the Dagbreek Trust, as well as smaller ones from the Hiemstra Trust, Nasboek Press and Waltons). A special issue with conference papers is being prepared for publication in the journal for the study of Afrikaans literature, *Stilet*, by guest editors Helize Janse van Vuuren and Marius Crous (lecturer in Afrikaans and Dutch literature at NMMU).



Prof Helize Janse van Vuuren

FACULTY OF ARTS RESEARCH UNIT		
NAME	ACRONYM	LEADER
Raymond Mhlaba Research Unit for Public Administration and Leadership	RMRUPAL	Prof S Masango

Faculty of Business and Economic Sciences

Managing tomorrow



School of Accounting

DEPARTMENTS

Department of Applied Accounting
Department of Auditing and Taxation
Department of Financial Accounting
Department of Management Accounting

School of Industrial Psychology and Human Resource Management

DEPARTMENTS

Department of Human Resources Management
Department of Industrial and Organisational Psychology

School of Management Sciences

DEPARTMENTS

Department of Business Management
Department of Management and Entrepreneurship
Department of Logistics Management
Department of Marketing Management

School of Economics, Development and Tourism

DEPARTMENTS

Department of Economics
Department of Development Studies
Department of Tourism

Business School

Dean's Overview



Prof Niekie Dorfling,
Executive Dean: Faculty
of Business and Economic
Sciences

In 2008, the Faculty developed and approved a strategic plan to support the development of research within the Faculty. The aim of the plan was to provide the Faculty with a conceptual framework that will facilitate the longer term growth of research within the Faculty both in terms of output and impact. This strategic plan is built on three interdependent pillars, namely focus, staff capacity and postgraduate students. During 2010, we concentrated on strengthening these pillars and we experienced the early-phase fruits of the strategy.

While still in its infancy, the Faculty views the research chairs initiative as an important strategy to boost research capacity, as well as research and discipline leadership.

Firstly, the Faculty decided to concentrate its resources on a limited number of research themes. Two such themes were agreed upon for the Faculty, namely Local Economic Development, and Governance and African Leadership. The implementation of these two themes were supported by a range of initiatives including the establishment of a 'theme-team' with an assigned team leader; aligning the allocation of research resources with the themes and promoting the themes among both staff and postgraduate students.

Secondly, special initiatives were launched to build capacity among staff to do research. A major focus was on providing individual researchers with time to engage with research. The Faculty views the workload management system and increasing the permanent staff complement as important strategies to build research capacity.

Various workshops were held to assist new and emerging researchers to get published and to sharpen their skills around areas such as research methodology and access to funding. During 2010, the establishment of research chairs was also introduced as a specific strategy to build research capacity. While still in its infancy, the Faculty views the research chairs initiative as an important strategy to boost research capacity, as well as research and discipline leadership. Furthermore, a comprehensive survey was conducted among staff to gain a better understanding of research support needs. As a result, we are implementing strategies to address these, including freeing researchers from unnecessary administrative demands and tasks not directly related to their research activities.

Thirdly, the Faculty continued its focus on growing its postgraduate enrolments as a strategy to promote and grow research outputs. Supporting initiatives include the active promotion of postgraduate programmes, building capacity for research supervision and the initiating and introduction of additional postgraduate programmes.

The initiatives described above are clearly paying off. An increasing proportion of new research initiatives within the Faculty, for both staff and students, are aligned with our two research themes. We have also seen a marked increase in research output. The total research units generated by the Faculty grew by as much as 83% over the last two years. This growth is evident across the full range of research outputs within the domain of the Faculty. Our research units from articles published in accredited journals are at an all-time high while we have also seen a sharp increase in conference participation by staff. The growth in our postgraduate student enrolments and graduations was also impressive. The period 2008 to 2010 saw Masters registrations increasing by 36% while Doctoral registrations grew by 60%. The same trend was also reflected in our graduation numbers: Our Masters and Doctoral graduates grew by 45% and 100% respectively over the last two years, with the 2010 cohort of Doctoral graduates being the largest single cohort of Doctorates ever to graduate in the history of the Faculty.

I am extremely proud of the research achievements of the Faculty during the recent past and excited about the opportunities and capacity for continued and accelerated growth. This unfolding growth trajectory is only possible because of the commitment, hard work and excellence of my colleagues.

Prof Niekie Dorfling

Executive Dean: Faculty of Business and Economic Sciences

Faculty Researcher of the Year



Prof Elmarie Venter

Business management Professor Elmarie Venter is firmly focused on the success of family businesses. In 2003, she completed her Doctorate on family business succession - where a family business is handed over to the next generation - and has gone on to become one of the country's leading experts in this under-researched area. Prof Venter acknowledges that this research area is as complex as it is rewarding. "I mainly do research in the areas of family business management and small and medium-sized enterprises. I am also doing a project on Facebook and its influence on brand image and brand identity".

Prof Venter and her colleagues are in the process of designing two large research projects on family businesses.

Over the past year, her interest has been specifically on copreneurships (a couple or family acting together as joint entrepreneurs). "I am interested," says Prof Venter, "in the factors that influence the success of copreneurships, factors that influence the success of sibling partnerships and factors that influence the job satisfaction and commitment of non-family employees in family businesses".

"We have replicated our research on copreneurships with colleagues in the Netherlands. We recently presented a paper on this research at the 11th International Family Enterprise Research Academy (IFERA) Conference in Sicily, Italy, where we won the award for the best paper. All our research on copreneurships, sibling partnerships and non-family employees is used as content for our workshops that we present for the NMMU Family Business Unit. Several of my Masters and Doctoral students also do their research on these areas".

Prof Venter and her colleagues are in the process of designing two large research projects on family businesses. "Firstly, one

that will focus on appropriate dependent variables to use for our research. In other words, what exactly does “success” mean in a family business. Secondly, I want to investigate the role of women in family businesses”.

Faculty Emerging Researcher of the Year

Mr Houdini Fourie, a senior lecturer in the Department of Auditing and Taxation, is conducting research on the behavioural skills and abilities of internal auditors, which is one of the fastest-growing professions globally. He aims to find a framework to teach students aspiring to be internal auditors the vital soft skills they will need to succeed in the workplace.

An ongoing concern for both the University and the corporate world is establishing a smooth transition from graduation to the world of work. Mr Fourie’s research is intent on making this transition as seamless as possible. For this to occur means “the development of soft skills (behavioural skills) of internal auditors as part of formal tertiary education. Internal auditors should have more skills than the mere technical cognitive skills that we teach them at university. Employers require more work ready internal auditors entering the system and as a university we should consider reviewing the curriculum of our internal audit educational programmes in order to fulfil the needs of the employers of our students”.



Mr Houdini Fourie

Mr Fourie is currently busy with a DCom Internal Auditing through the University of Pretoria, which he plans to complete by November 2012. “The title for my DCom research is: “An educational framework incorporating work integrated learning for internal audit students at tertiary institutions.”

He is also continuing with a collaborative research project on the “standing of and demand for internal auditing in the South African Public Sector”.

Mr Fourie’s work is already having an impact on the curriculum content of universities teaching internal auditing in South Africa. “The title for my Masters degree was: “Communication and internal auditing: a South African perspective”. The suggested internal audit curriculum of the Institute of Internal Auditors (globally) and universities in South Africa now include a substantial focus on communication skills”.

The introduction of Work-Integrated Learning (WIL) into the formal internal audit educational programme curriculum is an important part of ensuring that graduates are ‘work ready’.

“In respect to the collaborative research with Nelson Mandela Metropolitan University, Tshwane University of Technology, University of Johannesburg, University of South Africa, Monash (South Africa) and University of Pretoria (referred to as the iKUTU Research Team) an agreement was signed by the six universities and National Treasury. In addition, National Treasury has indicated that more projects are expected and that they would strongly consider the iKUTU Research Team to undertake future “contract research” for them. The iKUTU team indicated its availability and willingness in this regard. The iKUTU Research Team is also planning to expand the research on the standing of and demand for internal auditing to the rest of the world”.

The introduction of Work-Integrated Learning (WIL) into the formal internal audit educational programme curriculum is an important part of ensuring that graduates are ‘work ready’. Mr Fourie continues, “I am keen to investigate the most effective and efficient means of implementing a WIL integrated approach at universities in South Africa”. Presently, though, Mr Fourie is continuing his work on the iKUTU/National Treasury agreement and estimates that it will be complete by the end of 2013. “Following on this third phase, the research will be expanded to be conducted globally in order to do comparisons between the standing of and demand for internal auditing in South Africa and the rest of the world”.

Faculty Highlights and Achievements

Cross fertilisation of research between faculties

The Entrepreneurship Honours students (from the Department of Business Management) are required to do a Business Plan as a project each year. The goal behind these projects is to undertake real life projects in order for students to gain some practical experience, as well as ensuring that the business plans produced are of value to someone and not just an academic exercise.

In 2010, students enrolled for Business Management teamed up with NMMU's Institute of Chemical Technology (InnoVenton) and completed business plans to establish the possibility of commercialising an algae-to-energy process developed by InnoVenton.

Dr Shelley Farrington, lecturer in the Department of Business Management, and Otto Lessing, General Manager of Zalgen (the company created by InnoVenton for the commercialisation of the technology), acted as the advisers for the students on the plans, which were worked on from the end of July to early October.

The Department of Innovation Support and Technology Transfer sponsored prizes for the Best Business Plan.



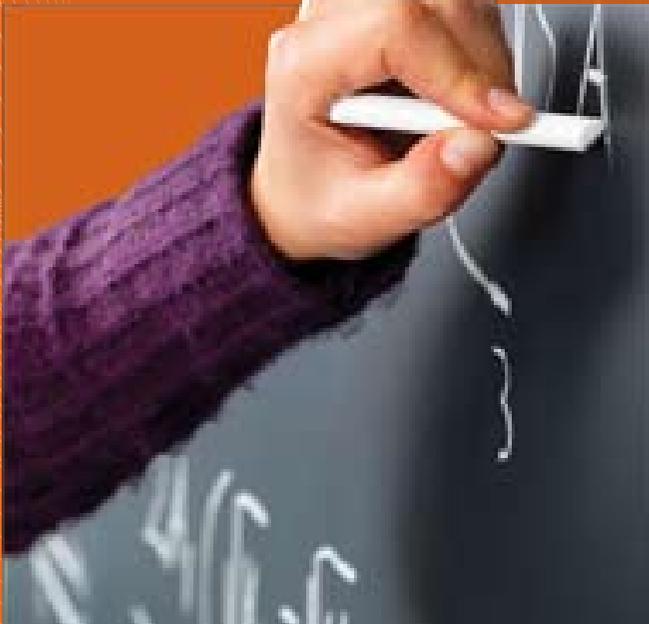
From left to right: Dr Shelley Farrington, Jacome Strydom, Shelley Saunders, Ilze Visser, Jaci Barnett (Innovation Support and Technology Transfer) and Otto Lessing (Zalgen)

FACULTY OF BUSINESS AND ECONOMIC SCIENCES RESEARCH UNITS

NAME	ACRONYM	LEADER
Family Business Unit	FBU	Dr M Cullen
Labour Relations and Human Resources Unit	LRHR	Prof D Berry
Unit for Applied Management Sciences	UAMS	Prof E Smith
Unit for Economic Development and Tourism	UFEDT	Prof H Lloyd
Unit for Professional Ethics	UPE	Prof P Naudé

Faculty of Education

Guiding tomorrow



School of Initial Teacher Education

School for Continuing Professional Development

School for Education Research and Engagement

Dean's Overview



**Prof Denise Zinn,
Executive Dean: Faculty
of Education**

"Why is research important, and how do we do relevant research that makes a difference, and builds good researchers?" These are the fundamental questions that informed the Faculty's research strategy in 2010. With 59 being the average age of the most published researchers in the Faculty, it became necessary to urgently review our strategy, and focus on developing the emerging researchers in the Faculty, but with an eye on research that makes a real impact on our world.

These Hubs (centres of activity) are generating several new possible research areas, and new layers of researchers, that are centrally connected to the work we do in the Faculty and in schools.

Several initiatives to build a new crop of researchers and writers got off the ground. We started an interesting experiment with a new structure called Hubs, initiated by staff with special disciplinary or research interests, to establish themselves around themes or projects related to their discipline. The Hubs can include people inside the Faculty, across faculties, and also from communities of practice outside the University, to focus on engagement, research and teaching and learning. By the end of 2010, four Hubs had 'registered' in: Science Education, Maths Education, Grade 8 Literacy and School Improvement. These Hubs (centres of activity) are generating several new possible research areas, and new layers of researchers, that are centrally connected to the work we do in the Faculty and in schools.

Other initiatives to nurture new researchers included a series of workshops and a writer's retreat with Solani Ngobeni, publishing editor for *Africa Insight*, as well as other internal and external writing retreats for newly published Doctoral graduates and their supervisors. Added to these initiatives, opportunities were provided for researchers to attend both international and local conferences, and saw our staff visiting several countries across the world: Dr Christo Pienaar with Fulbright Scholar Dr Eileen Raymond delivered a paper at a *Conference for Exceptional Children Convention* in Tennessee, USA; new Drs Andre du Plessis and Mary-Grace Villeneuve attended a *Science and Technology Conference* in Slovenia; four staff members, Drs Blignaut, Pillay, Toni

and Prof Zinn, presented at the *WCCES* in Istanbul; Prof Naydene de Lange presented at an *HIV and AIDS in Education Conference* in Vienna; Dr Logan Athiemoolam at the *International Drama in Education Conference* in Brazil; and Dr Lyn Webb presented at an *International Conference for Psychology and Maths*, also in Brazil.

Our established researchers in the Faculty were also productive, and have continued to hold the Faculty flag high, with some truly significant outputs.

The Faculty also hosted several conferences at NMMU in 2010. In August 2010, Prof Lesley Wood and her team hosted the first international *Action Research Conference* in South Africa, with delegates from universities all over South Africa, as well as international participants. In September 2010, Prof Naydene de Lange hosted a *National Symposium on HIV and AIDS in Education Research*, out of which a new Community of Practice, funded by HEAIDS, was established and this will keep a steady focus on HIV and AIDS in Education research alive. Dr Tulsi Morar, Head of our Off Campus Unit (OCU) serves as the coordinator of the SAARMSTE Research School, and organised a successful school at Haga Haga for 40 Doctoral and Postdoctoral students doing research in Maths Education. To end the year, as part of the preparation for the Faculty's new Centre for the Community School to be established in 2011, the Faculty, in collaboration with CANRAD, ABC Connects and NAPDI hosted the first *Manyano Network Conference*, bringing together community schools, school leaders, community members, and researchers to celebrate and reflect on the manner in which the university, schools and communities can work together to improve schools and strengthen communities.

Several international researchers and scholars were hosted by the Faculty in 2010, and they brought fresh perspectives that could be incorporated into our research approaches: Profs Peter and Marianne Hewson, funded by the NRF International Grant for eminent scientists, spent two weeks running workshops with staff, one focussing on group supervision, which informs a new approach in the Faculty with both a Masters and new Doctoral cohort. Fulbright Scholar Eileen Raymond focussed on incorporating the Universal Design for Learning into our teaching and learning, research and engagement activities, and this has yielded papers for conferences and journal articles.

Our established researchers in the Faculty were also productive, and have continued to hold the Faculty flag high, with some truly significant outputs. Some examples are the eight Doctoral graduates in 2010, four of whom were members of staff (all four supervised by Prof Paul Webb). A significant 234 Honours students graduated, and these students will form a pool from which new Masters students can be recruited. In addition to several articles, two new books authored by Faculty members were published in

2010: Prof Alette Delpport's *Emotions, Social Transformation and Education*, and Prof Prakash Singh's *Innovative Strategies to develop better schools* based on research he has undertaken over several years.

Finally, international collaborations continue to be sought and consolidated; a new research-based collaboration was set up between the Faculty and the University of Tanzania in Dar-es-Salaam (Profs Naydene de Lange and Lesley Wood), with a focus on HIV and AIDS Education, and the Swedish-SA Links continue with a focus on Scientific Literacy, and development literacy competencies in learners through different subject matter (Prof Paul Webb, Dr Raj Kurup and Ms Nokhanyo Mayaba).

The Faculty's research strategy for 2010 is likely to see improvements in outputs in future years, as we continue to build on existing strengths, but also focus on emerging research and researchers in innovative ways that seek to engage in research that is relevant, rigorous and contributes to social change.

Prof Denise Zinn

Executive Dean: Faculty of Education

Faculty Researcher of the Year



Prof Lesley Wood

HIV and AIDS in education is Prof Wood's main focus - how to help teachers and learners respond to the challenges of the pandemic. For Prof Lesley Wood, this entails the promoting and use of action research, using participatory methodologies for contributing to the theory generating capacity of action research in general and to the role of action research in transforming education in particular.

Prof Wood is upbeat about the direction her research is taking.

“Much of the past year has been spent on promoting gender equality as HIV prevention, working with teachers and learners in township schools to raise awareness around this issue and to mobilise learners to take action to transform gender relations in their school and community. There has also been a strong focus on the integration of HIV and AIDS into the curriculum at tertiary level, using self-reflective values-based methods of enquiry as a base for this”.

A leading international expert in action research has aptly described her work as having “significant implications for”:

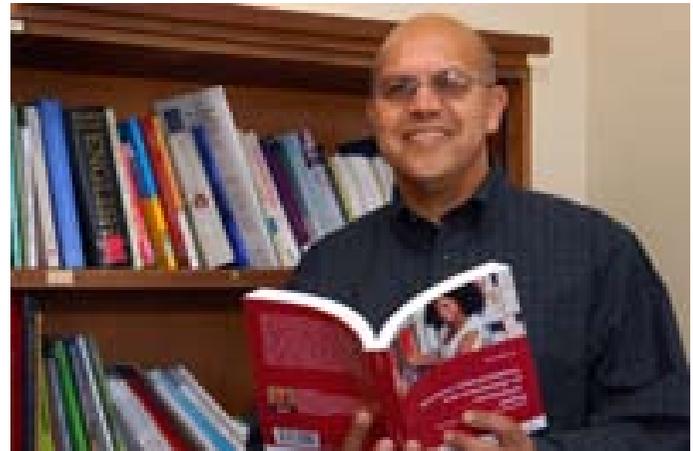
1. “How to combat HIV and AIDS through addressing cultural, social and structural issues.
2. Developing new forms of teacher professional education, which focus on offering justification for the development of personal theories of practice, by identifying appropriate criteria and forms of standards of judgement, and
3. Showing how higher education faculty can also make judgements about their work as they support the professional education of practitioners. The significance of these links is that standards of practice and standards of judgement can be linked for enhancing professional education of the teaching profession, while taking action to improve the quality of life experience for all. It is also demonstrating the development of a new approach to pedagogical research”.

Prof Wood is upbeat about the direction her research is taking. “I believe the HIV and AIDS research we are doing as a faculty is cutting-edge, and we are promoting educational research for social change, so that knowledge does not just remain in the hands of a few, but is created and disseminated by those in the field to contribute towards transformation of our societies for social good. There is a great need to continue to work in a participatory and transformative way to combat the social, gender and cultural drivers of the HIV pandemic”.

Faculty Emerging Researcher of the Year

Dr Sylvan Blignaut’s research interests revolve around curriculum policy, curriculum implementation, educational change, classroom-based research and teacher epistemologies.

He has recently returned from a Fulbright Scholarship and feels that the experience has had a significant impact on his research. “I still focus largely on educational change but my focus has shifted to social justice issues in curriculum. During my visit as a Fulbright Scholar to the University of Washington, Seattle, in the USA during 2010 - 2011, I have focused on social justice issues in the construction of teacher education curricula”.



Dr Sylvan Blignaut

Dr Blignaut is of the opinion that his research focus has the potential to fundamentally change the way we think and conceptualise not only teacher education curricula, but curriculum transformation in general at higher education institutions in South Africa. “I would like to embark on comparative studies in this area (social justice) with other African and South African universities to further enhance the scholarship in this crucial area at this critical juncture in our history. To realise this objective, I have recently applied for financial support through the National Research Foundation”.

Faculty Research Themes

HIV and Aids in Education (Driver: Prof Naydene de Lange)



Prof Naydene de Lange

Research that addresses issues in HIV and AIDS Education in primary, secondary and tertiary educational settings in general, and engages communities in research by drawing on participatory research methodologies.

Humanising pedagogy (Driver: Prof Denise Zinn)



Prof Denise Zinn

The theme of a humanising pedagogy focuses on what it is that makes us human and how teaching and learning can extend and support that “humanness”. Current research on humanising pedagogies has, up to this point, been almost exclusively theoretical and written in ways that makes it largely inaccessible to the very human beings for whom it professes to advocate. It has also focused on the contextual aspects of teaching, learning, and schooling without getting beneath the more visible blanket of context to explore complex dynamics of what goes on inside and between people. In addition, and importantly, current research leaves largely unexplored ways of teaching and learning that engage the intellectual and imaginative capacities of children and adults, directing them towards an awareness of their place among, and responsibility towards all human beings and the planet.

Schools and community partnerships (Driver: Dr Alistair Witten)

Research on this topic focuses on ways in which schools address some of the social challenges to schooling and the use of social capital to build school and community partnerships to support learners. Research will also be used to develop theoretical and practice-based models of school improvement that are relevant and responsive to the contextual realities of schools.

Education for change and social justice (Driver: Prof Alette Delpont)

Research that aims to address the role of education in contributing to a transformed and socially just South African society, including a focus on barriers to learning, special education needs and inclusive education.

Teacher professional development (Driver: Dr Noluthando Toni)

The Integrated Strategic Planning Framework for Teacher Education and Development in South Africa (2011 - 2025) advocates for the development and improvement of both the quality of teachers and teaching. This strategic planning framework identifies several phases of career advancement of teachers, which include continuing professional development and learning. The above-mentioned theme (teacher professional development) encompasses integrated and cross-sectional research on the nature of, and improvement of, pre- and in-service teacher education.

Science, Mathematics and Technology Education (SMTE) (Driver: Prof Paul Webb)

This research theme focuses on research in the following areas:

- Language and Science, Mathematics and Technology Education.
- Science Mathematics and Technology Literacy.
- Indigenous Knowledge Systems and Science, Mathematics and Technology Education.
- Environmental Education and Education for Sustainable Development.
- Technology and Integrated Computer Technologies in Education, and
- Curriculum and Teacher Development in Science, Mathematics and Technology.

FACULTY OF EDUCATION RESEARCH ENTITIES		
NAME	ACRONYM	LEADER
CENTRES		
Centre for Educational Research, Technology and Innovation and its sub-entities	CERTI	Prof P Webb
UNITS		
Intercultural Education Unit	ICEDU	Prof MM Botha
Unit for Visual Methodologies for Social Change	UVMSC	Prof N de Lange

Faculty of Engineering, the Built Environment and Information Technology

Technology for tomorrow



School of Engineering

DEPARTMENTS

Department of Civil Engineering
Department of Electrical Engineering
Department of Industrial Engineering
Department of Mechanical Engineering
Department of Mechatronics

School of the Built Environment

DEPARTMENTS

Department of Construction Management
Department of Building and Quantity Surveying

School of Information and Communication Technology

DEPARTMENTS

Department of Applied Informatics
Department of Information Technology

Dean's Overview



**Prof Henk de Jager,
Executive Dean: Faculty
of Engineering, the
Built Environment and
Information Technology**

The Faculty's striving towards research excellence gained remarkable impetus during 2010, with staff and students involved in applied, developmental and industry-related research and technology transfer. We have increased our research capacity and strengthened links and partnerships with industry, research councils and national and international universities. These strong partnerships contributed to our research successes, and I would like to thank our partners for their support and ongoing commitment towards NMMU. A number of our international partners visited NMMU during 2010, including the German Minister of the Interior, Sport and Integration, Minister Uwe Schunemann.

The Faculty's ongoing focus to establish world-recognised niche areas required further restructuring of our research entities, which resulted in the approval of the Built Environment Research Centre as a registered NMMU entity.

2010 was a year in which the Faculty excelled in research activities. One example is the WeldCore™ Team who won the NSTF Innovation Team Award based on 2010 outputs. The technology developed by the team can accurately monitor degradation of power plant infrastructure to reduce plant down-time and save substantially on costs.

Extensive progress has been made in our research entities as indicated by the number of publications and postgraduate students. The Faculty's ongoing focus to establish world-recognised niche areas required further restructuring of our research entities, which resulted in the approval of the Built Environment Research Centre as a registered NMMU entity. The Faculty also became involved in a number of community-oriented research projects, which included the "Dr Math" project in collaboration with the CSIR, which provides learners with maths tutoring through MXIT on their cell phones. Another interesting project is the Mobile Business Applications research project focussed on Spaza shop owners, rural clinics and healthcare systems.

We have increased our pool of established researchers including Prof Scott Fee from Minnesota State University (USA) who was appointed as Visiting Professor, and Prof MJ Korpela from the University of Eastern Finland who has been appointed as an Honorary Professor.

I would like to acknowledge all the staff in the Faculty for their dedication and hard work in achieving these research successes and taking the Faculty forward. Our postgraduate students have performed exceptionally well at national and international levels. Their commitment towards their research activities and studies is evident in our Faculty. Finally, the Faculty extends our appreciation to top management for their support and leadership.

2010 was an exceptional year for our Faculty - but we realise that 2011 will bring new exciting challenges in ensuring that we establish the Faculty as one of the leading faculties of its kind. Our University's icon, Mr Nelson Mandela once said: "Education is the most powerful weapon which you can use to change the world". Our Faculty will continue to provide quality postgraduates, technological innovation, analyse complex problems, explore new territory and produce new knowledge to ensure that we meet the needs of the region, province and country.

Prof Henk de Jager

Executive Dean: Faculty of Engineering, the Built Environment and Information Technology

Faculty Researcher of the Year



Prof Darelle van Greunen

In popular perception, engineering is often regarded as a "hard science", focussing on the deliverable product. Prof Darelle van Greunen's research introduces a human element.

"My interest is on the user experience and the impact of using technology in disadvantaged communities. My research focuses on how a person feels about using a product, technology, system

or service. User experience highlights different aspects of human-computer interaction, but it also includes a person's perceptions of the practical aspects such as utility, ease of use and efficiency of the system. User experience is subjective in nature, because it is about an individual's feelings and thoughts about the system. User experience is dynamic, because it changes over time as the circumstances change".

Prof van Greunen works from Gandhi's principle - be the change that you want to see in the world - to contribute to the ever-changing demands of society.

Over the past year she has been exploring systems to support very small enterprises and specifically the use of mobile devices for this purpose: investigating how mobile devices can be used to contribute to health management and improvement.

"It is my intention," says Prof van Greunen, "to create a research and social context that is not only relevant to the mission and objectives of both the NMMU, but to the broader South African community. The implications of this research is to use ICTs to play a catalytic role in the attainment of some specific Millennium Development Goals, namely, to eradicate extreme poverty and hunger; achieve universal primary education; promote gender equality and empower women; reduce child mortality; improve maternal health; combat HIV and AIDS, tuberculosis; diabetes and other diseases, and develop a global partnership for development".

Prof van Greunen works from Gandhi's principle - be the change that you want to see in the world - to contribute to the ever-changing demands of society. "This takes my focus to crucial areas such as healthcare and education and poverty eradication. I will be investigating the use of technology to enhance these areas in a manner that is also valuable to the everyday man in the street".

Faculty Emerging Researcher of the Year

Access to information and the protection of one's information are currently central themes in our techno-centric world. Dr Kerry-Lynn Thomson's research intersects with these aspects. "My research is primarily concerned with the human aspect of information security. Achieving security within information systems can no longer be seen simply as a technical issue, but increasingly involves the active participation of people in order to securely design, deploy, configure and maintain systems. My research includes all the aspects of information security that relate to the attitudes and behaviour of people, and how human characteristics or

technologies may be positively influenced and modified to improve the level of protection provided”.

Dr Thomson admits there is no definitive solution to secure human behaviour - no two people are the same and may react to the same situation in different ways. With technological advances, the focus is inevitably on the technology rather than the people who use it. Her work attempts to redress this by focussing firmly on the user interface. “My focus for 2010 has been on approaches for educating employees to increase their information security awareness. In addition, my research is branching out to include the human behavioural aspects of Terrestrial Trunked Radio (TETRA)”. The TETRA Academy in the NMMU School of ICT is the only one of its kind internationally where TETRA training is offered in conjunction with a higher education institution.



Dr Kerry-Lynn Thomson

Dr Thomson admits there is no definitive solution to secure human behaviour - no two people are the same and may react to the same situation in different ways.

“As such, I foresee much of my future research incorporating aspects of this radio technology, as well as continuing with research in the field of information security”.

Faculty Research Themes

Working across disciplines

The immense connectivity potential that has been opened via the internet has also impacted directly on the way that business and academia approach collaborative enterprises. The ability to work with colleagues in different faculties and different business sectors is encouraged within NMMU and is seen as integral to the University’s Vision 2020. **What follows are some of the collaborations underway within the Faculty:**

- The Industrial Engineering Department and the Business School collaborate in areas like guest lecturing, facilitating strategic planning sessions for senior management and promoting Doctoral studies.
- Cross disciplinary work is well entrenched in the School of Engineering and is manifested in:
 - The sharing of common laboratory spaces and equipment for under- and postgraduate studies in the following academic programmes: ND, BTech, MTech, DTech Electrical and Mechanical Engineering as well as the BEng, MEng and PhD Mechatronics.
 - Joint research, development and commercialisation work in Mechatronics, Materials Processing, Manufacturing and Renewable Energy is done by multidisciplinary staff and students.
 - Student projects such as Baja Bug, Formula Student, Solar Racing Car and Siemens Cyber Junkyard are completed by multidisciplinary teams.
- eNtsa: Co-operation between the Centre for High Resolution Transmission Electron Microscopy (HRTEM) and eNtsa have started with respect to interpretation of material science aspects (EBSD) of Ti6Al4V Friction Stir Welds and Friction Hydro Pillar Processing of alloy steels as used in the power generation industry. An MSc student from the Department of Mathematics is currently working on a heat flow model with Friction Processing Research Institute (FPRI) and eNtsa related to FSW of Titanium.
- Within the Mechatronics Department, a Masters research project entitled: “Enhancing the Accuracy of a Low Cost Reconfigurable Machine Tool”. The project involved Mechatronics and Computer Science. The project was jointly supervised by Prof Gorchach and Mr Du Plessis from Computing Sciences. As a result, a paper was compiled and submitted to an international journal, *Manufacturing Science and Engineering*. Currently, Mr A Norman, a Masters student, is also busy with a cross disciplinary project, entitled: “Calibration of Industrial Robots using Artificial Intelligence”. Local car manufacturers will benefit from the expertise in robotics and manufacturing systems that will be developed through this research in advanced robotics.

Research benefitting the community and beyond

The majority of the research conducted within the Industrial Engineering Department assists the regional automotive industry to become leaner and therefore more sustainable. The research conducted by Piet Roodt (Establishing Lean Systems in South African Higher Education Institution Support Services) will also have an impact on the efficiency of tertiary institutions.

In the School of Engineering, multidisciplinary outreach to communities and schools is undertaken to foster interest in post-school studies and specifically in the fields of Mathematics, Science and Engineering. The research done in light metal forming, as well as friction processing is cutting-edge and assists in ensuring the competitive edge of local manufacturing communities, as well as pushing the envelope of science and technology in a global environment. Research in renewable energies works towards ensuring a greener future for all while providing much needed access to education and communication for remote regions and communities through the establishment of off-grid solar, wind and hybrid energy systems.

The School of ICT, in cooperation with the CSIR has developed the scalable C3TO architecture as part of a Masters research project to host the "Dr Math" tutoring platform. The "Dr Math" platform facilitates mathematics tutoring via MXIT to school learners by volunteers. Since the development of the scalable architecture, the number of registered users increased from around 6000 to more than 25000. The architecture thus enabled the volunteer network to reach many more students in need of mathematics tutoring.

The "Dr Math" platform facilitates mathematics tutoring via MXIT to school learners by volunteers.

A group of senior citizens of the Laubscher Park East Retirement Village in Walmer benefited from an NMMU research and community outreach project on how to use Internet-related services in a secure and user-friendly manner. Prof Rossouw von Solms and Devon Dawson of NMMU's Institute for Information and Communication Technology Advancement (IICTA) placed a desktop computer, linked to the Internet via an ADSL line at the retirement village. User accounts were created for residents and they were taught how to use e-mail (Gmail), Skype and Google. Etienne de Lange evaluated the results of Devon's research and continued with the project after Devon graduated. He assessed the needs of the citizens and developed FacePortal, a system that made use of facial recognition technology to identify and authenticate the individual users. The system was designed as residents experienced problems in handling and remembering all the user IDs and passwords. A single sign-on approach, using facial recognition, was developed to cater for all services requiring user authentication and allowed users to log in

only once in order to access these various services. Two additional services - Wikipedia and Facebook were also introduced. "Modern information technologies, including the Internet, offer a number of wonderful benefits and opportunities to senior citizens to improve their quality of life. The project aimed to offer these Internet-based services in a user-friendly manner," says De Lange.

eNtsa was involved with a supplier development programme funded by TIA, which focuses on the Eastern Cape component suppliers to assist with innovation, product, process development and job retention/creation. The WeldCore™ process, with two patent applications, has been widely lauded as an innovative solution for providing a method for more accurate life extension predictions for aging power plant equipment.

Automotive and Related Manufacturing Engineering

NMMU recorded significant growth and development in the institutional theme focussing on Automotive and Related Manufacturing Engineering. This cross-faculty theme includes inter-disciplinary research in the faculties of Science, Business and Economic Sciences and the Faculty of Engineering, the Built Environment and Information Technology. NMMU was, in 2010, actively involved in supporting the automotive sector and its supply chain industry through research, specifically those linked to the automotive manufacturers in the region. These interventions, include amongst others, training, technical projects, and research, technology support, which are mainly provided by eNtsa (Automotive Components Technology Station), the VWSA-DAAD International Chair in Automotive Engineering, the GMSA Chair in Mechatronics, the Unit for Lean Process Development, the academic departments within the School of Engineering and the NMMU Business School in the Faculty of Business and Economic Sciences.

Some of the research highlights in 2010 include significant progress in the area of materials joining including the Friction Stir Welding process, as well as the Taper Stud Welding process.

Research projects completed in 2010 linked to this theme, and more specifically the automotive sector, include:

- The development of sound measurement systems.
- Automation of assembly line and design of prototypes.
- Design of various fixtures and comparative studies.
- Design and development of models for discharge systems.
- Recycling of automobiles.
- Intelligent automotive thermal comfort control.

- In-line measuring technique with tool error detection in an automotive production line.
- Robot cell fixtures; the development of a lean culture measurement tool, and
- The introduction of a lean product development process tailored for the South African automotive industry.

Some of the research highlights in 2010 include significant progress in the area of materials joining including the Friction Stir Welding process, as well as the Taper Stud Welding process. Our research platforms and expertise in this field rate among the best in the world. The value added by the Faculty of Science in terms of material sciences increased the research capacity in this area. Research into laser metal forming, encompassing metal cladding and forming, is growing in intensity and showing promising results. Materials processing research is supported by active research projects in residual stress analysis, as well as fatigue prediction and measurement.

The NMMU's Faculty of Business and Economic Sciences have continued their active research involvement in the automotive sector during 2010. Research projects completed include: factors that negatively affect the implementation of lean manufacturing in the Eastern Cape automotive industry; the South African automotive industry and government incentive interventions; the impact of increased electricity tariffs on the automotive industry in South Africa; the implementation of e-business in the South African automotive sector; the benefits of using selected lean principles at an exhaust manufacturing firm; flexible manufacturing systems in the automotive component industry; factors influencing improvements of productivity at Ford's Struandale engine plant; and impact of company vision and values on the success of an automotive company in Nelson Mandela Bay.

Furthermore, the VWSA-DAAD Chair in Automotive Engineering spearheaded many research initiatives in the fields of automotive engineering and related manufacturing processes. In addition, the GMSA Chair in Mechatronics added significant momentum to research and development in the field of Mechatronics with the main focus on the automotive industry.

Research Highlights

NMMU wins the National Innovation Competition



Left to right: Dr Mamphele Ramphele (Chairperson of the Board of the Technology Innovation Agency), Mr Dirk Odendaal (eNtsa - Senior Project Manager), Mr Darren Samuel (eNtsa - DTech: Intern), Daniel Bulbring (eNtsa - DTech: Intern) and Dr Phil Mjwara (Director-General, Department of Science and Technology)

At a gala event held in August 2010 at the Moses Mabhida Stadium in Durban, NMMU's WeldCore™ team beat 57 other finalists to win the National Innovation Competition run by the Technology Innovation Agency. This followed a first round of the Competition held in 2009 at each institution, with the top three teams from each institution going through to the final round.

The technology was developed under the guidance of Prof Danie Hattingh and other members of the Automotive Components Technology Station in the Department of Mechanical Engineering. Eskom recently pledged R11 million support to finalise the technology, which can make a significant difference to the life and safety of aging infrastructure.

Research Entities

The Friction Processing Research Institute (FPRI)

In 2010, the Friction Processing Research Institute had a year of mixed fortunes. It was a year of proficient professional developments together with the unfortunate loss of a valuable team member with the untimely death of Dr Calvin Blignaut in August. His related research and academic responsibilities were re-distributed within the research group and his academic peers.

Significant applied research within the field of Friction Processing and, more specifically, Friction Stir Welding was conducted during 2010. Research expertise developed within FPRI led to a substantial contract research project on Friction Stir Welding as an alternative joining technique for a large tanker manufacturer based in South Africa.

International experiments have had a high technological impact due to the collaboration between researchers at Plymouth, Bristol and NMMU, and the interface with two operators of a nuclear power plant. An international scientist, Professor James Susmel visited in late 2010 and during his stay interacted with post-graduate research students, staff and mechanical engineering professionals. An increase in industry interaction has taken place due to the research efforts of the group.

Centre for Mechatronics and Manufacturing (CMM)

The Centre for Mechatronics and Manufacturing serves the needs of the community by contributing to sustainable development through research and service delivery. It endeavours to provide the region's SMEs with access to expertise in mechatronics, promotes inter-disciplinary research across the School (especially

with electrical and mechanical engineering departments) and facilitates undergraduate students' exposure and involvement in real life problems related to mechatronics and manufacturing.

The Centre has been involved in activities aimed at linking NMMU to industry especially in the area of high precision industry. One of the major achievements of the Centre for 2010 was the successful acquisition of a grant for R3.7 million under the National Equipment Programme of the NRF to acquire a state-of-the-art machining centre that can be used to fabricate ultra-high precision components.

In addition, the Centre has managed to establish good links with other research institutions in the area of high precision manufacturing. The Centre has attracted two PhD students and two MEng students and a number of research projects by final year students in the Department of Mechatronics are being supervised.

FACULTY OF ENGINEERING, THE BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY RESEARCH ENTITIES		
NAME	ACRONYM	LEADER
INSTITUTES		
Friction Processing Research Institute	FPRI	Prof A Els-Botes
Institute for Information and Communication Technology Advancement	IICTA	Prof R von Solms
CENTRES		
Built Environment Research Centre	BERC	Prof W Shakantu
Centre for Mechatronics and Manufacturing	CMM	Prof K Abou-El-Hossein
UNITS		
Research and Outreach Unit for Technology Education	RoUTE	Prof H de Jager
Unit for Lean Process Development	ULPD	Prof JJ Pieterse

International Visiting Professors

International visitors for 2010 in the Faculty included Prof Neil James and Prof Luca Susmel. Both Professors visited from the 22 - 26 November. During their visit, Prof James conducted research collaboration projects and Prof Susmel hosted an SAIMEchE lecture on the 24th of November 2010.

Faculty of Health Sciences

Caring for tomorrow



Department of Biomedical Technology

Department of Environmental Health and Social Development
Professions

Department of Human Movement Science

Department of Nursing Science

Department of Pharmacy

Department of Psychology

Department of Radiography

Dean's Overview



Prof Raj Naidoo,
Executive Dean: Faculty
of Health Sciences

All research undertakings within Health Sciences have some impact on the communities and regions in which they are located - this takes place at all levels. From the publications and conference information in the Report it is evident that there is a global audience. Much of the work within the Faculty bears a high degree of relevance to the community and regional needs.

Transformation of the University and empowerment

Research projects were mostly of a nature which portrayed transformation in the broader sense. Nursing Science, Human Movement Science and Psychology in particular, had foci applicable to women's health and the indigenous population.

All research undertakings within Health Sciences have some impact on the communities and regions in which they are located.

Health and a new generation of academics

The commitment to fostering a new generation of academics is implicit in all research undertakings involving postgraduate students and younger staff engaged with Masters and PhD studies who were seen as future academic leaders in their respective disciplines. Hand in hand with this, is the continual drive to improve staff qualifications. All departments had academic staff pursuant of higher degrees, especially Doctorates. Nursing Science, Pharmacy, Social Development Professions, Biomedical Technology and Psychology were notable in this regard.

Prof Raj Naidoo
Executive Dean: Faculty of Health Sciences

Faculty Researcher of the Year



Prof Ilse Truter

Prof Truter possesses dual expertise in business management and pharmacy and her research combines these two dimensions. As she puts it, “as part of pharmacoepidemiology, I investigate the prescribing and usage patterns of medicine, and also focus on aspects related to the cost of medicine. The research methodology employed varies from pure quantitative studies (analysing large prescription databases consisting of millions of medicine records) to more qualitative aspects (involving questionnaires, interviews and/or focus groups)”.

Prof Truter’s current research focuses on the central nervous system including, for example, the treatment of conditions such as depression, anxiety, Alzheimer’s disease, Parkinson’s disease, Attention Deficit/Hyperactivity Disorder (ADHD), and the management of pain. However, she is also involved in projects and the supervision of postgraduate studies on cancer treatment, antimicrobials, and communication and counselling aspects in pharmacy.

Prof Truter’s current research focuses on the central nervous system including, for example, the treatment of conditions such as depression, anxiety, Alzheimer’s disease, Parkinson’s disease, Attention Deficit/Hyperactivity Disorder (ADHD), and the management of pain.

There is ongoing unhappiness at all levels of the South African population concerning the cost of medicine. Her research aims, in the long-term, to address this issue. “Ultimately, I hope my research will ensure that medicines are used more appropriately (rationally) and cost-effectively. These are, however, long-term goals. I am

involved in several international projects, which I hope will assist in making our University the leader in this field of research in South Africa”.

By her own admission, Prof Truter has a multitude of lines of enquiry that she wishes to pursue. “There are so many aspects that I still want to investigate! I would like to continue my research on the central nervous system focussing more on dosages and the cost of treatment, but also to investigate the prescribing of, especially, antibiotics in our country and compare it with international trends. In addition, I want to get involved in more consumer/patient-orientated studies. In other words, not only looking at the overall (pharmacoepidemiological) patterns, but also the motivations and perceptions of individuals towards medicine and how they are used”.

Faculty Emerging Researcher of the Year



Prof Louise Stroud

Head of Psychology, Associate Professor Louise Stroud is conducting research, both locally and internationally, on the extended revised Griffiths Mental Developmental Scales, a specialised psychological test that assesses various areas of children’s development. Prof Stroud - a member of the international committee of the London-based Association for Research in Infant and Child Development, which controls and regulates the use of the Griffiths Scales - is leading an international research team tasked with updating the scales to ensure they are contemporary and culturally relevant to the various countries in which they are used.

Most of her work focuses on the development of infants and children. With the pressures faced by our youth in South African, early childhood development assumes an increased importance and ways of reliably measuring that is a primary concern. “The main focus of my research (both locally and internationally) is on the Griffiths Mental Developmental Scales (GMDS). The Griffiths Scales is a specialised psychological test, which assesses various areas of

children's development. It specialises in measuring developmental trends indicative of mental growth in children from babies to age eight years.

"I am a member of the International Committee, the Association for Research in Infant and Child Development (ARICD), based in London, United Kingdom, which controls and regulates the use of the Griffiths Scales. I am leading a research team, which will see the Griffiths Scales updated and re-standardised to ensure they are contemporary and culturally relevant to the various countries in which they are used around the world".

Prof Stroud points out that the child of today experiences a very different world to those born a decade ago.

In terms of scope and depth this is, by her own admission, a daunting project. "At the commencement of the project (in July 2010), a qualitative, exploratory, descriptive research approach was adopted in the analysis and implementation of Phase One of the Griffiths Mental Development Scales re-standardisation project. One of the aims of Phase One was to establish current thinking on child development and its assessment. This information has served to establish the emerging themes in thinking regarding the avenues of learning, child development, assessment and child development theories. Phase One is nearing completion and forms the underpinning basis to Phase Two, which will commence in January 2012".

Prof Stroud points out that the child of today experiences a very different world to those born a decade ago. The changing technology, for one thing, has far-reaching implications for her work. "The re-standardisation of the Griffiths Mental Development Scales will allow for the creation of a seamless and continuous psychological test of general development for infants and young children. This research project will see the Scales updated to ensure they are in line with current rapid changing times (e.g. the advent of technology, which has impacted on children's development), and that they remain robust and culturally relevant (the GMDS is used in many various countries around the world). This is an international research project with many local, national and international role-players.

Faculty Highlights and Achievements

Nursing

Prof van Rooyen, Prof Strumpher, Dr Ricks and Mr Morton are involved in the University of Gothenburg-NMMU project, entitled: "Barriers to healthcare and the right to health for persons with mental illness in South Africa: How can access and the right to health be improved?" As part of the project, Prof Lena Andersson of the University of Gothenburg has been visiting since 2010. She has presented lectures to staff and students during her visits.

Department staff are members of FUNDISA (Forum for University Nursing Deans In South Africa). Members of the Exco Committee of FUNDISA are coordinators of four distinct portfolios of which "Research" is one. Prof Dalena van Rooyen (Nursing Science) was elected the coordinator of the Research Portfolio for Nursing research in South Africa. She has also been inducted to an American Honour Society for her contributions to Nursing Science.

Psychology

Prof Mark Watson specialises in lecturing postgraduate courses in career psychology, school psychology and adolescent psychology. His research focuses on career development and career assessment of primary, secondary and tertiary students from all South African population groups. He has been offered an appointment as an Honorary Professor in the School of Education at the University of Queensland, Australia, for the period January 2011 to December 2013. During 2010, Prof Watson was on sabbatical in his field of research in Career Psychology.

Dr Mary McMahon from the School of Education at the University of Queensland, Brisbane, Australia, and Professor Jenny Bimrose from the Institute of Employment Research of the University of Warwick, England, visited the Department of Psychology in 2010. Both international academics are research associates within the Psychology faculty and delivered a keynote address (with Professor Watson) at the Faculty's *Postgraduate Student Conference* in October. In addition, all three delivered papers at the *International Association of Educational and Vocational Guidance Conference* that was held in Cape Town in October.

Other

Prof Ilse Truter (Pharmacy) has been appointed to an international society for Pharmacoepidemiology; Prof Rosa Du Randt (Human Movement Science) has been appointed to an international advisory panel on coaching education; several senior academic staff have also been appointed to Editorial Boards of reputable international research journals in Pharmacy, Nursing and Psychology.

FACULTY OF HEALTH SCIENCES RESEARCH UNITS

NAME	ACRONYM	LEADER
Cyclic Peptide Research Unit	CPRU	Prof P Milne
Drug Utilisation Research Unit	DURU	Prof I Truter

International Visiting Professors

International visitors for 2010 in the Faculty included:

Prof Meredith Harris, Fulbright Scholar from Northwestern University, Boston, USA.

Prof Pierre Lafranchi, Centre for International Sport Studies, Neuchatel University, Switzerland.

Department of Environmental Health and Social Development Professions

Prof Maren Bak and three colleagues from Gothenburg University, Sweden.

Ms Leonie Hammerla from the Evangelische Fachhochschule, Darmstadt, Germany.

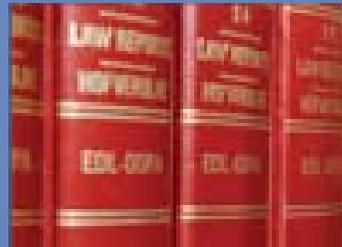
Prof Jogen Pillay and 25 students from the University of Ohio, USA.

Department of Pharmacy

Date of visit	Name of visitors and contact staff member in department	Nature of involvement/visit	Outcome of visit
August, 8 - September, 3 2010	Final year PharmD students from University of West Virginia (UWV), USA (Mrs J McCartney)	Join ZCL401 hospital programme with final year BPharm students	Introduce and develop an international rotation site for UWV PharmD students - submit portfolio of clinical evidence on return to USA
Feb/March 2010	Mr George Dranitsaris Consultant Pharmacist from Ontario, Canada. (Prof I Truter)	Registered PhD student with NMMU Guest lecture for Faculty of Health Sciences	Research collaboration
Last week of July and first week of August 2010	Final year MPharm students from Nottingham University, UK (Mrs S Burton)	Experiential visit - ZCL401 hospital programme with final year BPharm students	Experiential only - no specific outcomes

Faculty of Law

Defining tomorrow



Department of Criminal and Procedural Law

Department of Mercantile Law

Department of Private Law

Department of Public Law

Dean's Overview



**Prof Vivienne Lawack-Davids, Executive Dean:
Faculty of Law**

In tune with the research objectives of Vision 2020, the Faculty of Law has for the past three years concentrated on creating an environment that is conducive to research and innovation and, in so doing, grows the research base to ensure future sustainability.

As reported in previous Annual Research Reports, we connected established researchers with emerging researchers through a mentorship programme. The Mentorship Programme started off informally towards the end of 2008 and was formalised in 2010. We are indebted to Dr Blanche Pretorius, Director of Research Capacity Development, for her efforts in assisting us to formalise the Mentorship Programme. The heightened research activity of academics in our Faculty in 2009 resulted in an increase in our research outputs from 15 units in 2009 to 22,833 units in 2010!

One of the mentees, Mr David Abrahams, who specialises in International Humanitarian Law, published three articles in accredited law journals, one of which was published in an international journal.

Some of the research conducted by legal scholars in the Faculty has had a significant impact, leading to policy and legislation.

Together with the increased research output, an enthusiastic spirit of research collaboration was fostered. The Faculty is hoping to continually grow its research base through its academics, research associates and honorary and visiting professors. For example, Visiting Professor, Prof Pieter Badenhorst of the University of Deakin, Australia, and our Honorary Professor, Prof Eltjo Schrage, Professor Emeritus of the University of Amsterdam, also made meaningful contributions. In addition, academic staff co-published with alumni, the Dean having published with Lynette Swart (LLM) and Mr Abrahams with Adv Ashley Moorhouse.

Under the leadership of Prof André Mukheibir, the Department of Private Law once again showcased their research and organisational abilities in hosting the second *Private Law and Social Justice Conference*. This Conference is growing in stature and private law academics from all over South Africa attended the Conference.

Some of the research conducted by legal scholars in the Faculty has had a significant impact, leading to policy and legislation.

Other research initiatives included a research seminar on Labour Law and Social Justice hosted by the Labour and Social Security Law Unit, while the Department of Criminal and Procedural Law hosted a research seminar on Anti-corruption. The keynote address was delivered by Adv Willem Heath, former Judge of the High Court of South Africa.

Some of the research conducted by legal scholars in the Faculty has had a significant impact, leading to policy and legislation. For example, Prof Avinash Govindjee collaborated with the Institute for Social Law and Policy (ISLP) and a colleague from the University of Johannesburg (Mr M Nyenti) on a project for the Compensation Fund pertaining to the "Introduction of Early Return to Work Arrangements in South Africa". A policy is being formulated in this regard, which should result in promulgated legislation by 2014.

Other collaboration included a poster presentation by Ms Lindi Coetzee (NMMU) and Mr Adlai Davids (HSRC). The poster was entitled: "Routine HIV Testing (RHT) and its Implications for the Socio-economic Right of Access to Healthcare in South Africa", presented at the 2010 *World Aids Conference*, held in Austria.

The Faculty of Law values and recognises the contributions made by all its legal scholars, hence the second "Law Oscars", held in December 2010. I would like to use this opportunity to thank all our scholars for their commitment and effort in furthering the research mission of the Faculty and the University.

Prof Vivienne Lawack-Davids

Executive Dean: Faculty of Law

Faculty Researcher of the Year



Prof Adriaan van der Walt

Prof Adriaan van der Walt is Head of both the Department of Mercantile Law and the Labour and Social Security Law Unit. His research interests include the effect of the Constitution on employment contracts, and equality and non-discrimination in the workplace. Through the Labour and Social Security Law Unit, Prof van der Walt has assisted in drafting labour legislation in Mauritius and has also focused on labour law in South Africa's education sector, including the vexing question of an educator's right to strike.

Through the Labour and Social Security Law Unit, Prof van der Walt has assisted in drafting labour legislation in Mauritius.

Prof van der Walt is all too aware that the question of equality in the workplace is a contentious issue. "My interest is in aspects of Employment and Labour Law, particularly equality in employment. Over the past year I have been researching the duty of fair dealing in employment contracts and substantive equality in employment," says Prof van der Walt.

"My research is interested in obtaining a clearer understanding of the concept of substantive equality, and the limitations of affirmative action. It is of practical relevance to all employers and employees in South Africa and beyond. In fact, I am currently embarking on comparative research between affirmative action measures in South Africa and India".

Faculty Emerging Researcher of the Year

Advocate Razaana Denson, a lecturer in the Department of Private Law, is conducting research on the status of Muslim marriages in South Africa. These unions are currently not recognised as valid in terms of South African law, despite provision being made for such recognition by the country's Constitution. In the absence of a legal framework for the regulation of Muslim marriages and divorce, the married lives of Muslims remain unpredictable and outside of their control.

"I'm researching the general principles relating to the Law of Marriage as expounded in Islamic Law. **This necessitates a study of the following:**

- The betrothal.
- The requirements for the conclusion of a marriage.
- The personal and proprietary consequences of marriage.
- The dissolution of marriage, and
- The consequences of the dissolution of a marriage.

My research is also investigating the general principles relating to the law of parent and child as expounded in Islamic Law. This requires a study of Muslim Personal Law pertaining to issues of custody, guardianship and access of minor children. An investigation will be undertaken as to the implementation of these general principles of Marriage Law, as well as the Law relating to Parent and Child in Algeria, Nigeria, Britain, Australia and South Africa (Commonwealth countries)".

Advocate Razaana Denson, a lecturer in the Department of Private Law, is conducting research on the status of Muslim marriages in South Africa.

The release of the Draft Muslim Marriages Bill has generated vigorous debate among sectors and groups of the Muslim community. Advocate Denson's work is an attempt to provide various solutions as to how Muslim Personal Law can be implemented in South Africa without compromising either the rights contained in the Bill of Rights or Islamic Law.

“It is important to acknowledge that despite the apparent conflict between the rights contained in the Bill of Rights and Islamic Law, the enactment of any legislation in South Africa, which seeks to regulate Muslim Personal Law will only be successful in its implementation if such laws take place within the confines of the rulings and teachings of Islamic Law. What effect, for example, will the Constitution have on the implementation of Islamic Law if it is granted legal recognition in South Africa?”

In addition, Advocate Denson is also undertaking comparative research into the law relating to the principle of the best interest of the child in terms of South African Law and the position in terms of Islamic Law.

FACULTY OF LAW RESEARCH UNIT		
NAME	ACRONYM	LEADER
Labour and Social Security Law Unit	LSSLU	Prof A van der Walt

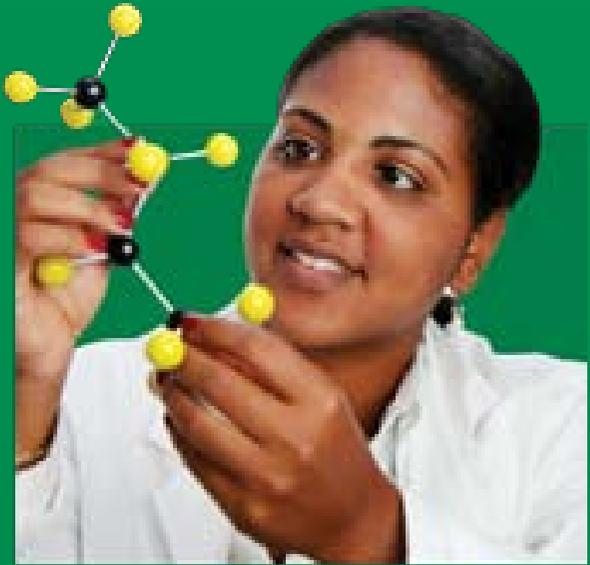
International Visiting Professor

International visitors for 2010 in the Faculty included:

Dr James Rodgers, a Fulbright Specialist. Dr Rodgers assisted the Faculty with the Separate is NOT Equal programme in conjunction with CANRAD, which was an engagement initiative.

Faculty of Science

Discovering tomorrow



School of Biomolecular and Chemical Sciences

DEPARTMENTS

Department of Biochemistry and Microbiology
Department of Chemistry
Department of Textile Science

School of Computer Science, Mathematics, Physics and Statistics

DEPARTMENTS

Department of Computing Sciences
Department of Mathematics and Applied Mathematics
Department of Physics
Department of Statistics

School of Environmental Sciences

DEPARTMENTS

Department of Agriculture and Game Management
Department of Botany
Department of Geosciences
Department of Zoology

Dean's Overview



**Prof Andrew Leitch,
Executive Dean: Faculty
of Science**

2010 was another exciting year for the Faculty of Science, with many research and innovation endeavours being undertaken, all in support of the Vision 2020 Strategic Plan of the University. As expected, at the heart of all these projects is the training of postgraduate students. Following our records of the previous year, we again set a record by having 21 postgraduate students completing their Doctorates during 2010. This is in line with the Faculty's commitment to improving the throughput rates of the research students. In addition, four of our own academic staff completed Doctoral degrees; more than 60% of our academic staff now have completed Doctorates. This is vitally important for the Faculty, especially with the loss, each year, of a few senior academics who reach the age of retirement. Fortunately, many of them choose to maintain their research linkages with the Faculty and are appointed as Research Associates.

Over the past year, we also continued to grow the number of students registered for Masters and Doctoral degrees in the Faculty to 251 students.

Over the past year, we also continued to grow the number of students registered for Masters and Doctoral degrees in the Faculty to 251 students - the majority of them registered for full-time studies. To fund all these student projects is not easy; however, the Faculty succeeded in attracting almost R40 million in funding from external sources, of which R37 million was specifically for research and related projects. The funding received is significant (given the present economic uncertainty in the country), and reflects the confidence with which external funders and stakeholders continue to view the research and innovation activities of the Faculty. We continued to receive applications from new students for Masters and Doctoral studies from across the country and further afield. However, the number that can be accepted each year is limited by the funding available to run the projects and of course, the availability of experienced persons who can act as promoters and supervisors. In this regard, we intend, in the future, to make more use of the growing number of Research Associates appointed in the Faculty. Furthermore, training has been given to ensure that more researchers in the Faculty are skilled in writing research proposals and are able to source external research grants.

A sod-turning ceremony was held on 24 May 2010 to initiate the construction of the two-level building to house the Centre for High Resolution Transmission Electron Microscopy (HRTEM), under the direction of Prof JH Neethling from the Department of Physics. The magnificently designed state-of-the-art building has since been completed and will be officially opened on 5 October 2011. This facility will enable the Faculty to become the leader in Africa - and one of the leading institutions in the world - in the area of atomic physics and nanoscience through the ability to conduct electron microscopy studies at atomic resolution. Part of the funding for the building came from the Efficiency Funding Grant of the Department of Higher Education and Training. The Efficiency Funding also provided for the replacement of about R17 million worth of teaching and research equipment in all our laboratory-based departments during the latter part of 2010. This equipment places the Faculty as one of the best equipped in the country for basic research studies in the natural sciences.

According to a recent report by the NRF, an analysis of the impact of research papers published over the past five years revealed that our researchers in the School of Environmental Sciences are leading the country.

On the subject of nanoscience, we were delighted that Prof Reinhardt (JR) Botha, holder of the SARChI Chair in Nanophotonics, was recognised as the NMMU Researcher of the Year for 2010. The innovative research that he and his team of students are carrying out on semiconducting nanostructures for photodetectors and sensors in the mid - to far infrared wavelength ranges, is groundbreaking and strategically important for the country. We were also thrilled that Prof Werner Olivier (Department of Mathematics and Applied Mathematics) was granted a Maths Education Chair to develop his innovative ideas to address the Maths education problems at schools. This is the culmination of ten years of studies conducted by Prof Olivier and colleagues in the Govan Mbeki Maths Development Programme, which runs various interventions including the offering of the Maths curriculum to Grades 11 and 12 learners each Saturday on our Missionvale Campus.

According to a recent report by the NRF, an analysis of the impact of research papers published over the past five years revealed that our researchers in the School of Environmental Sciences are leading the country. Their cutting-edge work in terms of conservation and environmental research is acknowledged internationally and continues to focus on issues of relevance to the region, as well as further afield, in line with the vision of the NMMU. Our researchers are acknowledged leaders in sandy beach expertise as well as long-term monitoring of coastal ecosystems. It was thus appropriate

that our Botanists hosted the *25th Congress of the Physiological Society of Southern Africa* during 2010.

InnoVenton (Institute for Chemical Technology) continued to develop expertise in biofuels. Their project to produce bio-energy from micro-algae has attracted national interest. A R10 million extension to their existing Gomery Avenue building was undertaken as part of plans to develop a national fuel chemicals platform, using funding from industry, including Sasol. Their microstructured reactor, the only such reactor in South Africa, was delivered and commissioned in preparation for various innovative student projects.

Our Centre for Energy Research continues to attract much attention as it emphasises the need to focus on renewable energy for sustainable solutions to the country's energy problems. As with the other research entities in the Faculty, the training of students at various postgraduate levels is emphasised. Some of this training took place in collaboration with partner institutions such as Makerere University (Uganda) and Oldenburg University (Germany). The Faculty especially enjoyed strengthening research ties with these two institutions, with various student and staff exchanges taking place during 2010. Our Faculty also hosted a workshop with Oldenburg University in September 2010, to initiate a four-year "North-South" partnership funded by DAAD.

It is with a great sense of pride and appreciation that I acknowledge the hard work and commitment of our researchers in the Faculty, who continue to draw international attention to the NMMU through the quality of their research outputs and their interactions with many international research groups.

Prof Andrew Leitch

Executive Dean: Faculty of Science

Faculty Emerging Researcher of the Year



Dr Tim Downing

Dr Tim Downing, a Senior Lecturer in the Department of Biochemistry and Microbiology, is conducting key research on cyanobacteria (or blue-green algae), a natural component of freshwater ecosystems. As pollution increases, due to agriculture, industry and partially treated and untreated waste, cyanobacteria becomes dominant in the water and produces a wide range of bioactive compounds, many of which are toxic. The knowledge obtained in Dr Downing's research is fundamental to the management of these organisms and evaluation of the associated risks to animals and humans via drinking water, recreational use, and the consumption of foods from the aquatic ecosystem or from crops irrigated with such water.

In particular, Dr Downing is investigating the health risks of ecotoxicology and biosynthesis and physiological role of Beta-methyl amino-L-alanine (BMAA) in cyanobacteria.

"BMAA is the only natural toxin associated with amyotrophic lateral sclerosis, a rapidly progressing, fatal motor neuron disease. Our understanding of the dynamics of production of the toxin will, in addition to answering a 40-year-old question on the origin of the toxin and expanding our fundamental biochemical knowledge, allow for a structured approach to environmental epidemiology and the development of exposure risk and tolerable level guidelines".

To date, this research has attracted significant funding and has resulted in the development of an international network of collaborators. The research has also resulted in many papers in international scientific journals and many conference presentations.

Dr Downing is convinced that "this research will naturally lead to a re-evaluation of potential human exposure risk and epidemiological research cases on our new understanding of toxin prevalence and incidence dynamics".

Research Highlights

The conservation and management of South Africa's estuaries

Three completed PhD studies in the Department of Botany have each made a significant contribution to the conservation and management of South Africa's estuaries. Taryn Riddin's thesis investigated the dynamics of plants in a small temporarily open/closed estuary, the East Kleinemonde. This is the dominant type of estuary in South Africa, which is the meeting place of land and sea, but often closes off to the sea when a sand berm forms across the mouth. The survival of these estuaries is threatened by climate change and also by a reduction in freshwater inflow due to abstraction for human use. Taryn's research has provided an understanding of the responses of the plants to the dynamic changes in these estuaries.

Anusha Rajkaran's thesis: "A status assessment of mangrove forests in South Africa and the utilisation of mangroves at Mngazana Estuary" identified pressures and impacts resulting in the decline of mangroves. The research also produced a unique dataset on the growth and population dynamics of the mangroves at Mngazana Estuary. Mangroves are rare and endangered as they are the only trees that grow in tidal saline habitats. Management recommendations for the continued survival of mangroves were made and submitted to the Department of Environmental Affairs.

Chantel Bezuidenhout's research contributed to the environmental water requirement studies of the Department of Water Affairs for the Orange, Olifants, Great Brak, Kromme and Seekoei estuaries. In addition, data on the Orange River Estuary salt marsh was used in the rehabilitation of the area by the Working for Wetlands National Programme.

Promoter of the studies, Prof Janine Adams, provided a challenge to the three students to be the first of her female students to graduate with a PhD. They certainly rose to the challenge to all graduate in 2011. Taryn will continue with Postdoctoral research in 2011, Anusha is a contract lecturer at NMMU and Chantel works for a leading environmental consulting agency in Port Elizabeth.



Anusha Rajkaran, Prof Janine Adams, Chantel Bezuidenhout, Taryn Riddin

Women in Science



Dr Kwezi Mzilikazi in the category "Emerging Woman Scientist"



Marietjie Landman in her category, "PhD Fellowship"

Two academics in the Department of Zoology have been selected as finalists in the Women in Science Awards. The Awards are part of the Department of Science and Technology's efforts to increase the number of women scientists and researchers in the country, and to profile successful scientists and researchers as role models for younger women and girls.

Research Entities

The Centre for African Conservation Ecology



Wetlands of the Tsitsikamma plateau are protected by law from afforestation. Foresters argue that preserving wetlands greatly increases the fire hazard to pine plantations. Conservationists argue that wetlands harbour much biodiversity and sustain important ecological processes. Can these different perspectives be resolved? Our research quantified showed that the wetlands harboured significant biodiversity and that they could sustain relatively short-rotation and cool-season burns that would minimise fire risk. However, forestry companies needed to place greater emphasis on fire preparedness, especially on days of high fire danger.

The Centre for African Conservation Ecology is committed to building its national and international recognition in the fields of ecological and conservation research, and postgraduate training and to expand this role in Africa. The Centre's purpose is to develop scientific knowledge of the ecology and conservation of African ecosystems, especially in the Eastern Cape and adjacent regions of high biodiversity, which will enable society to make wise environmental management decisions. In achieving this, the Centre will build human capacity through postgraduate training.

The Centre for African Conservation Ecology again performed well in 2010, with significant achievements in terms of research output, including 15 refereed scientific publications, and nine conference presentations, with five Honours, five MSc and 14 PhD students busy with their degrees, while four MSc students graduated during 2010. Staff and students of the Centre made a substantial contribution to science management in South Africa and further afield, and high levels of community service were achieved, particularly through the Grysbok Environmental Education Trail.

Overall funding remains project focussed, with a broad variety of funders supporting the Centre. A cyclic decline in institutional support income was experienced in 2010, but the Centre has adequate reserves to cover this. Human resources remain strong and were boosted in 2010 through the recruitment of a Postdoctoral fellow and a Researcher.

Research Associates also serve to boost this aspect. The Centre is financially healthy, and well on its way to fulfilling its vision as articulated for the period 2007 - 2011.

Telkom Centre of Excellence

The NMMU/Telkom Centre of Excellence (CoE) is a research-based centre that strives to serve the needs of the Information and Communication Technology (ICT) industry by developing highly qualified Masters and Doctoral graduates through applied research in collaboration with its industry partners. The Centre is comprised of three units: Distributed Multimedia Applications (DMA), the Optical Fibre Characterisation Unit (OFC) and the Photovoltaics Unit.

Led by Prof Janet Wesson, the Centre received funding of approximately R1.6 million in 2010 from Dimension Data, Telkom, Ingoma Holdings, Dartcom and Hezeki Contracting, TFMC and THRIP.

Several students had papers accepted at international conferences and in publications; and successful candidates were awarded Honours, Masters and PhD degrees at the graduation ceremony held in April 2010.

Distributed Multimedia Applications

By the end of 2010, six dissertations, models and six conference papers on a comparison of legacy system modernisation approaches for a service-oriented architecture (SOA), a comparative framework for mobile SOA using compression and an intelligent multimodal interface for in-car communication systems had been completed or delivered. Technology transfer, in the form of the research knowledge embodied in the prototypes produced, took place through research reports, journal articles, conference presentations and interaction between the CoE and its industry partners. In addition, Telkom Masters bursars and other postgraduate students carried knowledge with them when they entered employment with Telkom and Dimension Data.

Research, in conjunction with the Industry Partners, has been conducted in the areas of Information Visualisation, Data Mining, Mobile Technologies and Usability Testing.

Optical Fibre Characterisation Unit

The Optical Fibre Characterisation Unit has a strong research component and published research results in international literature. Seven manuscripts were submitted to international journals during 2010 for publication. Six published conference proceedings appeared during 2010 (one from a prestigious international conference). The Optical Fibre Characterisation Unit continued to train PhD graduates: one PhD student graduated in 2010. The Unit also continued to utilise links with overseas

institutions, notably with the University of Padua (Italy), the Danish Technical University (Copenhagen), Sup'Com in Tunisia and Moi University in Kenya.

A PhD project aimed towards building the first PMD compensation system in the country has been in progress (this resulted in a patent application in 2009). The group has also been involved with the first Polarisation Optical Time Domain Reflectometry (P-OTDR) measurements made in South Africa.

This Unit has been involved with promoting awareness of optical fibre technologies in schools, and had several school visits during 2010.

Photovoltaics Unit

The leader of the Photovoltaics Unit, Prof Ernest van Dyk, regularly examined theses for local and overseas universities and reviewed papers for solar energy journals. He gave invited lectures at international and local conferences and served on the technical committee for the *International Association of Science and Technology Development Conference on Advanced Technology in the Environment Field*.

During 2010, the Photovoltaics Unit was involved with solar energy demonstration projects in Tyefu and New Brighton in Port Elizabeth. The group also advised the University of Fort Hare on Photovoltaics research related matters.

The Centre for Energy Research (CER)

The Centre for Energy Research is a research-based entity that strives to serve the energy research needs of Africa by means of training students and conducting applied energy research.

The goals of the CER are to:

- Grow the entity in terms of involvement from researchers in Science, Engineering and Economics faculties.
- Conduct applied research.
- Produce graduates and
- Publish research results.

In order to grow the research base of the entity it is essential, because of the multidisciplinary nature of energy research, to involve as many researchers from different faculties in the activities of the CER. This is ongoing and members of the CER, with assistance of the Deans of Science and Engineering, the Built Environment and IT, continually encourage academics to become involved. In terms of conducting research, both contract and project based, producing graduates and publishing results, this work is continuous and ongoing.

The CER performed well in 2010, with research outputs including two refereed publications, eight conference presentations, ten MSc/MTech and two PhD students busy with their degrees, while one PhD student graduated during 2010. Staff and students of the CER make a valuable contribution to energy research and the energy field in general in South Africa. The CER also does contract research for several local and national companies. Most funding received by the CER is project based, with a wide range of funders, from government to industry, supporting various activities. The CER is growing and establishing itself as a viable university research entity, with a high national profile.

Specific projects include:

- An ongoing project with Telkom dealing with renewable energy technology applications in the Telkom network.
- Development of a prototype concentrator photovoltaics for Eskom, and
- Various projects with the Nelson Mandela Bay Metro, including embedded generation and solar water heater assessment and monitoring.

International Visiting Professors

Date of visit	Name of visitor	Outcome of visit
2 - 3 February 2010	Prof Richard Ernst, Professor of Physical Chemistry, ETH, Zurich (Switzerland)	Nobel Laureate, gave a guest lecture on 2 Feb 2010 entitled: "Academic responsibility and our future".
10 - 11 March 2010	Sir David King, Oxford University	Gave an invited lecture and participated at the launch of SEACC.
October 2010	Prof Dmitriy Cherniy, Kiev Shevchenko National University	Was invited as a speaker at the annual workshop on Forecasting in Energy and Finance. He presented two lectures at the workshop.

George Campus

Growing tomorrow



School of Business and Social Sciences

DEPARTMENTS

Department of Financial Information Systems
Department of Information Technology
Department of Marketing
Department of Sport Management
Department of Tourism

School of Natural Resource Management

DEPARTMENTS

Department of Agricultural Management
Department of Forestry
Department of Game Ranch Management
Department of Nature Conservation
Department of Wood Technology

Campus Principal's Overview



**Prof Christo Fabricius,
Campus Principal:
George Campus**

Our researchers were very active during 2010. One of the Campus' challenges is to increase the number of potential supervisors, to enable our postgraduate student group to grow and our research outputs to increase. No fewer than 30% of full-time staff are busy completing Masters and Doctoral qualifications and three of them have taken sabbaticals to complete theses or papers.

The Campus now has a bustling postgraduate laboratory where students from different disciplines work and interact. Research capacity development has had a huge impact on the Campus with many staff and students attending training workshops, both on and off campus.

Our resident statistician is leaving her mark on the many papers and theses submitted for review, and two new Associate Professors and the promotion of two colleagues to the same rank are also making a difference. This resulted in a sharp increase in the number of peer-reviewed papers produced by George Campus staff.

During 2010, the Campus hosted a number of important conferences, such as the *International Erosion Control Association Conference*, a *Fire Symposium* and training courses, which contributed to a rising research culture on Campus. Collaborative research projects with NMMU's Science Faculty, SANParks, Rhodes University, CSIR, the University of Kwazulu-Natal and Stellenbosch University are contributing to the growing research capacity on campus.

The Sustainability Research Unit, in its second year of existence, has also grown significantly. One of the Unit's key achievements was to mobilise students to participate in Green Campus events and research projects, and to host "thought leadership discussions" around fundamental issues such as vulnerability, water security, land reform and soil conservation.

The future is bright for research at NMMU's George Campus, with many new alliances, funding proposals and collaborative projects in the pipeline.

Prof Christo Fabricius
Campus Principal: George Campus

George Campus Researcher of the Year



Dr Beatrice Conradie

Dr Beatrice Conradie was an agricultural and natural resource economist and Lecturer in the School of Business and Social Sciences. A micro-economist with a strong interest in poverty alleviation and local economic development, she has done research on the wild flower and wine industries, farm labour markets and the role of women in agriculture.

Dr Conradie was the lead author for two articles in ISI journals (“District level total factor productivity in agriculture: Western Cape Province, South Africa”) *Agriculture Economics* and (“What is the appropriate level of aggregation for productivity indices? Comparing district, regional and national measures”) *Agrekon*. She was also the lead author of two research reports.

Dr Conradie states that her research focus is the “frontier between commercial agriculture and environmental regulation. If we cannot get this relationship right, we can forget about a sustainable future”.

George Campus Emerging Researcher of the Year

Dr Jaap Steenkamp, a Senior Lecturer in Natural Resource Management and Programme Manager for George Campus’s Forestry Programme, is conducting research on the extent of HIV/AIDS among workers in the forestry industry, in order to make predictions about how the disease is likely to affect this industry in future years.

Dr Steenkamp’s work manages to cut across human and natural resources and examines forestry-related utilisation of human resources, developing management guidelines (for forestry SME’s) where extraordinary factors influence productivity and the viability of forestry contracting businesses.

“I’m particularly concerned about identifying contributing constraints to labour shortages in forestry contracting businesses in South Africa. In the forestry industry we need to find out why, in certain forestry activities, there is a shortage of human resources while, in general, there are high levels of unemployment. The results from such research are also guiding the mechanisation effort and requirements in the forestry industry”.

With the government’s focus on job creation, his research plugs directly into the problems of job creation, retention, skills levels and HIV. “My research is specifically applicable to South Africa as we have the highest incidence of HIV and AIDS in the world, averaging over 40% infection rate in the forestry contracting sub-sector. The research results are used to develop management models to understand and mitigate the shortages of human resources for certain forestry activities (specific forestry jobs like pitting, planting, bark peeling, etc.). It also assists in strategising to apply the correct labour to capital ratio in contracting businesses. This means that contracting businesses can remain viable through adjusting constantly to the changing business environment”.



Dr Jaap Steenkamp

He is hopeful that his research will migrate from a social focus to a technology focus enabling the mitigation of the constraints and challenges of the forestry contracting sub-sector.

GEORGE CAMPUS RESEARCH UNIT		
NAME	ACRONYM	LEADER
Sustainability Research Unit	SRU	Prof Christo Fabricius

Entities reporting directly to the Deputy Vice-Chancellor: Research and Engagement



Left: Dr Jill von der Marwitz, Director of the HIV/AIDS Research Unit.



Right: Centre for the Advancement of Non-Racialism and Democracy (CANRAD) team.

HIV/AIDS Research Unit

In 2010, the most significant achievement was the European Union financial support provided to Campus Health Services to enable Anti-Retroviral Treatment accreditation. The Unit also produced an article entitled: "A necessary dialogue: A South African case study exploring the role of the national HRD in HIV/AIDS non-government organisations human resource development international 2010".

Centre for the Advancement of Non-Racialism and Democracy (CANRAD)

CANRAD was launched in March 2010 as a crucial part of the broader transformation objectives of the University. The Centre aspires to be a leader in the advancement of non-racialism and democracy within the University and broader society. In order to achieve this the Centre promotes the advancement and praxis of non-racialism and democracy through research, advocacy, education and training, locally, nationally and internationally. The Centre straddles a difficult - but unique - divide between theory and praxis and between research and advocacy. This means, in effect, that participation from the wider community is as important as the solitary nature of research.

Since its launch, the Centre has included the broader community in lectures, seminars and special events both on and off campus. These include the 'Difficult Dialogue' series, which have addressed the challenges that face higher education in South Africa, NMMU's relationship with Israel and the implications for racialism and non-racialism in post-apartheid South Africa. In addition to numerous road shows that have been undertaken to popularise the intent of the Centre, two book chapters, two journal articles have been accepted and a website has been constructed to highlight the ongoing activities of the Centre.

A major achievement was the deepening of the NMMU value of "Respect for Diversity" through CANRAD hosting Diversity Month in August 2010 with over 50 programmes and events across five NMMU campuses.

Doctorates

The Minister of Higher Education and Training has signed a performance agreement with the President of the Republic of South Africa to deliver, by 2014, on one of the 12 outcomes adopted by government, in order to achieve “a skilled and capable workforce to support an inclusive growth path.” In response, the Department of Higher Education and Training (DHET) has developed a set of indicators for the realisation of these outputs. Output five relates to increasing “Doctoral graduates to 1 350 per annum by 2014 [from 1 142 in 2008]”. NMMU’s focus on increasing Doctoral output is directly linked to this DHET imperative.

Presented here are brief précisés that will offer insight into the variety of questions being asked by our emerging researchers.

Sam Usadolo

(Applied Language Studies)



Sam Usadolo

Justice through language: A critical analysis of foreign African interpreters in South African courtrooms.

This study reflects an intense engagement with the ethics of the profession of court interpreting. It combines a thorough grounding in translational theory with a linguistic Human Rights perspective in approaching the universal problem of linguistic barriers in the administration of justice on various continents. While his analysis is aimed at a restricted target population, the findings of his research suggest a thorough relook at the nature of multilingual justice in South Africa as a whole. As such, the thesis will be of special interest to policy makers, both in this country and further afield, who have to deal with the post-colonial heritage of language inequalities in courts of law. It is a timely reminder of the urgency with which the demands of linguistic diversity need to be addressed where human beings are at their most vulnerable.

This study also has a contribution to make in terms of suggesting strategies to ensure that quality court interpreting becomes a reality as a matter of principle.

Zola Peter

(IsiXhosa)



Zola Peter

Literary depiction of female characters by male writers in selected IsiXhosa drama works.

This study demonstrates the literary depiction of female characters by male writers. The chosen drama texts depict female characters as not having a destiny of their own. This shows that male writers write about themes of male interest that often place female characters in uncomplimentary roles. The male heritage in African literature and criticism is evident in male writings as they fail to portray female characters in their totality and in their true complexity - this is evident by their use of stereotypes when portraying female characters. Females' relations to men in the selected dramas define them as someone's daughter, wife or mother. In this study, African female writers are encouraged to start portraying female characters as having a destiny of their own and to explore themes that embrace the solution of a world without men. This work demonstrates the notion that female writers should use literary works as a non-violent, but effective instrument to voice their plight. Female writers could offer a self-image, patterns of self-analysis and general insights into the female's situation, which are ignored by the male writers in their portrayal of female characters.

This thesis has made a contribution to the work of literature that deals with female portrayal. It concludes by arguing that female writers should write and depict female characters as strong and independent to counter-balance the prevailing depiction within the existing literature.

Mcebisi Ncwadi

(Economics)



Mcebisi Ncwadi

The economic impact of the local business service centres on small, medium and micro-enterprises in the Eastern Cape.

In an effort to support the development of small, medium and micro-enterprises (SMMEs) in South Africa the government established local business service centres (LBSCs). The LBSCs are accredited organisations, which deliver non-financial business support to SMMEs. Large sums of public funds have been spent on the LBSCs in order to provide support to the SMMEs. Despite the LBSC support provision, some small businesses continued to fail in the Eastern Cape. Failure of the small business sector led to a widespread belief that the LBSCs had little or no impact on small businesses.

This study makes use of a cost benefit analysis to evaluate the economic impact of the LBSCs in the Eastern Cape during the period 2001 - 2005. The results of a cost benefit analysis prove that the public investment in SMMEs through the LBSCs was worthwhile and economically viable. The LBSCs improved social welfare through job creation and increased the relative incomes of the small businesses during the period under review. Further analysis using econometric modelling on a sample frame of 452 small businesses in the Eastern Cape proves that in order to boost the small business sector, support provision should go beyond the LBSCs. Variables such as education, macro-economic environment and gender play an important role in the success of the small business sector. An integrated small business development strategy in the Eastern Cape is recommended.

Pamela Austin

(Education)



Pamela Austin

A values-based approach to promoting excellence in Mathematics education.

Pamela Austin's study emerged as a result of her concern about low self-efficacy amongst Mathematics education students and an apparent decline in values in contemporary society. Her case study, which examined the effect of a values-based approach to promoting self-efficacy in pre-service Mathematics educators, was grounded in her 'ontology of excellence', which incorporates the values of respect, fairness, accountability, honesty and compassion. A constructivist and inquiry-based teaching and learning approach formed the framework of the study, which was underpinned by notions of 'new scholarship' - the view that teaching is about engagement in participatory learning and the development of communities of creative students. Her study made use of both quantitative and qualitative data gathering methods and her findings suggest that a values-based approach to teaching can be an effective approach to enable Mathematics teachers and Mathematics teacher educators to pursue excellence and influence their learners' and students' Mathematics self-efficacy.

As teacher education worldwide has been proclaimed to be in crisis epitomised by a lack of vitality in teacher preparation, her research study has a contribution to make in terms of informing teacher educators, teachers and policy makers about perspectives and interventions, which may contribute to the development of teachers' Mathematics self-efficacy, and possible strategies they can use to contribute to the integrity and vitality of the teaching profession.

Esther Akinlabi

(Friction Stir Welding)



Mr Louis von Wielligh and Esther Akinlabi

Characterisation of dissimilar friction stir welds between 5754 Aluminium and c11000 Copper.

This thesis has contributed to the field of Friction Stir Welding.

In particular, it has contributed to:

- Establishing a process window for the Friction Stir Welding of 5754 Aluminium Alloy and c11000 Copper.
- Identifying inter-metallic compounds present within the sample, which are detrimental to the weld quality, and
- Establishing process parameters resulting in limited or no inter-metallic formation within the welds.

Friction Stir Welding (FSW) is a solid state welding process invented and patented by The Welding Institute (TWI) in 1991 for joining ferrous and non-ferrous materials. The FSW of Aluminium and its alloys have been commercialised and recent interest has focused on joining dissimilar materials. However, in order to commercialise this process, research studies are required to characterise and establish process windows. This research has revealed that the interfacial areas are characterised by mixture layers of Aluminium and Copper, while 33% of the tensile samples are within the acceptable range.

Through this research it can be concluded that the overall analysis of the weld quality is dependent on the shoulder diameter of the tool and in Akinlabi's study the 18 mm diameter shoulder was the most appropriate of the three tool diameters considered. A process window of medium spindle speed of 950 rpm and low-to-medium feed rate between 50 and 150 mm/min was established for the FSW of Aluminium and Copper. Welds produced at 1200 rpm and 300 mm/min with low heat input did not have inter-metallics formed at the joint interface.

Portia Jordan

(Nursing)



Portia Jordan

Evidence-informed clinical guidelines for nursing-care practices related to the safety of the mechanically ventilated patient.

Approximately 75% of patients admitted to critical care units globally require intubation and mechanical ventilation. However, it has been documented that although mechanical ventilation is a life-saving treatment modality, it is associated with more than 30% of in-hospital mortalities. Due to the high mortality rate, nursing-care rendered to intubated patients in critical care units should be done in such a way as to reduce the risk of adverse events in order to optimise patient safety. One way to ensure patient safety in intubated mechanically ventilated patients is to base nursing-care practices on the best available evidence. An evidence-informed approach to clinical practice aims to integrate research evidence, clinical expertise and the interpretation of patients' needs and perspectives in making decisions about best care modalities.

In using a quantitative approach, it was found that nursing-care practices, as related to mechanically ventilated patients being treated by professional nurses, were not being done according to best recommended practices. Systematic reviews on two of the four identified nursing-care practices were undertaken to identify the best recommended practices.

The research study has made a unique contribution to the body of knowledge, research and nursing practice as two evidence-informed clinical guidelines and clinical algorithms were developed. The clinical guidelines were based on the best available evidence for two nursing-care practices related to the safety of the intubated mechanically ventilated adult patient and can be used to enhance nursing-care rendered by professional nurses in the critical care units in the Nelson Mandela Bay Municipality.

Gareth Kilian

(Pharmacy)



Gareth Kilian

Development and testing of liposome encapsulated cyclic dipeptides.

The study explores the use of the two diketopiperazines cyclo(His-Gly) and cyclo(His-Ala) for the treatment of cancer, utilising liposomes as the method of drug delivery. The aim of the study was to develop liposomes, which would allow for the effective encapsulation of diketopiperazines and to determine whether encapsulation enhanced the tumour suppressive action and specificity of the diketopiperazines selected for further evaluation in this study.

The data presented in the study are novel and reflect critical thinking and planning to develop a system that could lead to potential new forms of treatment for a variety of disease states. The data builds on the body of knowledge that has been created over the years in the CPRU (Cyclic Peptide Research Unit) in which the study was undertaken and enhances the knowledge base of the biological activity of cyclic dipeptides.

Anusha Rajkaran

(Botany)



Anusha Rajkaran

A status assessment of mangrove forests in South Africa and the utilisation of mangroves at Mngazana estuary.

The study investigated the present state of mangrove forests in South Africa. These are considered rare as mangroves are the only trees that grow in tidal saline habitats. Estuaries were surveyed in KwaZulu-Natal to provide a status assessment of the mangroves in this province as the largest areas of mangrove in South Africa are found here. Mangroves were completely lost from eleven estuaries between 1982 and 1999 and a further two estuaries by 2006. This was attributed to various impacts such as wood harvesting, altered water flow patterns coupled with salinity changes, prolonged closed-mouth conditions and subsequent changes to the intertidal habitat.

Mangrove growth rates were measured over a five-year period at Mngazana Estuary in the Eastern Cape. No other dataset of this kind exists in South Africa, providing a unique opportunity to assess the dynamics of a mangrove forest. The major threat to the mangroves at this site is removal as a result of harvesting. The research identified the differences between harvested and non-harvested sites. A matrix model was developed and used to assess the effect of different harvesting intensity scenarios on the mangrove population.

Management recommendations for the continued survival of mangrove forests in South Africa were made and submitted to the Department of Environmental Affairs. Research results have been published in three scientific papers with a fourth under review.

Taryn Riddin

(Botany)



Taryn Riddin

Dynamics of macrophytes in the East Kleinemonde, a small temporarily open/closed South African estuary.

Temporarily open/closed estuaries, such as the East Kleinemonde, are the dominant type of estuary in South Africa. They are the meeting place of land and sea, but are often closed off to the sea owing to the formation of a sand berm across the mouth. A reduction in freshwater inflow due to abstraction for human use or as a result of climate change threatens the survival of these estuaries. The research has made an original contribution to the field of knowledge on macrophyte responses as it showed that macrophyte habitats have a high natural variability in cover over time, they respond quickly after a disturbance event and there are large sediment seed reserves that remain viable from two to more than five years. This ensures habitat persistence even when conditions are unfavourable, such as prolonged periods of mouth closure.

The study showed that the East Kleinemonde Estuary fluctuates between various macrophyte states, depending on thresholds of water level and salinity.

The frequency of macrophyte states under historical conditions, as well as under future freshwater inflow scenarios, was predicted. Spatial analysis was used to determine available macrophyte habitat area under varying water level conditions. The results from this study can be integrated into the approach used to assess the environmental water requirements of South Africa's estuaries as required by the National Water Act of 1998. The results are applicable to similar estuaries in South Africa and therefore the study has made a significant contribution to the conservation and management of these fragile ecosystems. The research has also contributed to the topic internationally as three chapters of the thesis have already been published in leading international journals.

Doctorates

■ Faculty of Arts

DOCTOR LITTERARUM

BOTHA, Maria Elizabeth

(Afrikaans and Dutch)

Die outobiografiese kode in Antjie Krog se poëtiese oeuvre

Promoter: Prof H E Janse van Vuuren

PETER, Zola Welcome

(IsiXhosa)

Literary depiction of female characters by male writers in selected IsiXhosa drama works

Promoter: Dr L L Kwatsha

Co-promoter: Prof M M Somniso

DOCTOR PHILOSOPHIAE

ADAMS, Leinadu

(Public Administration)

An investigation of the attitudes of South African Police Service

Management with respect to the viability of computer assisted training in the Eastern Cape Province

Promoter: Prof H J Nel

Co-promoter: Mr D Venter

MUBOKO, Never

(Conflict, Transformation and Management)

Conflict and Sustainable Development: The case of the Great Limpopo Transfrontier Park, Southern Africa

Promoter: Dr G Bradshaw

NYAMBUGA, Charles Ongadi

(Media Studies)

The role of the press in political conflict in Kenya: A case study of the performance of The Nation and The East African Standard newspapers

Promoter: Prof P W Cunningham

Co-promoters: Ms J Steyn-Kotze and Ms B M Wright

USADOLO, Sam Erevbenagie

(Applied Language Studies)

Justice through language: A critical analysis of foreign African interpreters in South African courtrooms

Promoter: Prof E F Kotzé

■ Faculty of Business and Economic Sciences

DOCTOR COMMERCII

DYUBHELE, Noluntu Stella

(Economics)

The survival strategies of unemployed rural women: A case study of the Wooldridge area of the Ngqushwa Municipality

Promoter: Dr P Le Roux

DOCTOR OF BUSINESS ADMINISTRATION

CALITZ, Andre Paul

A model for the alignment of ICT education with business ICT skills requirements

Promoter: Prof J Greyling

Co-promoter: Dr M D M Cullen

KOIGI, Alice Nyambura

Improving organisational effectiveness of public enterprises in Kenya

Promoter: Prof C A Arnolds

LOURENS, Ann Sharon

The development of a technology-strategy framework to improve the competitiveness of small- to medium- sized furniture manufacturers in South Africa

Promoter: Prof J A Jonker

WAKAH, George Odhiambo

Micro perspectives on poverty alleviation in Kenya: A comparative analysis of the Central and Nyanza provinces

Promoter: Dr P Le Roux

DOCTOR PHILOSOPHIAE

HATEGEKIMANA, Celestin

(Development Studies)

Women's empowerment in post-1994 Rwanda: A case study of the Mayaga region

Promoter: Dr J Cherry

DOCTOR TECHNOLOGIAE

NGALO, Osmond Tolo

(Human Resources Management)

Trust building strategies to enhance collective bargaining processes in organisations

Promoter: Prof D M Berry

Co-promoter: Dr P Poisat

DOCTOR TECHNOLOGIAE

VAN EYK, Marle

(Marketing)

Analysis processes as antecedents for decision-making related to growth strategies of South African game ranchers

Promoter: Prof L Radder

Co-promoter: Dr J M Burger

PHILOSOPHIAE DOCTOR COMMERCII

HENSENS, Wouter

(Business Management)

Hotel rating through guest feedback

Promoter: Prof F W Struwig

Co-promoter: Dr O Dayan

NCWADI, Mcebisi Ronney

(Economics)

The economic impact of the local Business Service Centres on small, medium and micro-enterprises in the Eastern Cape

Promoter: Dr P Le Roux

PIRO, Karen

(Industrial Psychology)

Investigating the impact of a psychometric assessment technique in the South African automotive industry

Promoter: Prof R J Snelgar

ROOTMAN, Chantal

(Business Management)

An international comparative study on the relationship marketing and customer retention of retail banks: Lessons for South Africa

Promoter: Prof M Tait

Faculty of Education

DOCTOR EDUCATIONIS

DALI, Christopher Malizo

Adequacy of the advanced certificate in education to develop the work-integrated learning competencies of principals: A case study

Promoter: Prof P Singh

DIDLOFT, Virginia Charmaine

Enhancing self-esteem as a teacher of English using Action Research

Promoter: Prof W L Holderness

GEDULD, Deidre Chanté

Promoting social inclusion in school: Reflecting on ourselves

Promoter: Prof W L Holderness

GRIESEL, Issabella

The teaching of financial management principles to school leaders in disadvantaged schools

Promoter: Dr J McFarlane

PHILOSOPHIAE DOCTOR EDUCATIONIS

AUSTIN, Pamela Winifred

A values-based approach to promoting excellence in Mathematics education

Promoter: Prof P Webb

BOTHA, Marius Johan

Guidelines for learners support in senior Secondary schools in the Nelson Mandela Metropole

Promoter: Dr C F Pienaar

MEIRING, Leslie Frank

The impact of toys as educative curriculum material on pre-service Primary school Natural Sciences teachers' understandings of energy

Promoter: Prof P Webb

NTAOTE, Grace Makeletso

Exploring ways of assisting Lesotho educators to offer care and support to children orphaned and rendered vulnerable by HIV and AIDS

Promoter: Prof L Wood

Co-promoter: Prof W L Holderness

SEPENG, Johannes Percy

Grade nine second-language learners in township schools: Issues of language and mathematics when solving word problems

Promoter: Prof P Webb

Faculty of Engineering, the Built Environment & Information Technology

DOCTOR TECHNOLOGIAE

MULLER, Otto

(Electrical Engineering)

UMTS/HSDPA cell-edge optimisation using intelligent antenna control system on macro site

Promoter: Prof T I van Niekerk

DOCTOR TECHNOLOGIAE**AKINLABI, Esther Titilayo**

(Mechanical Engineering)

Characterisation of dissimilar friction stir welds between 5754 aluminium alloy and c11000 copper

Promoter: Prof A Els-Botes

Co-promoter: Prof P J McGrath

PHILOSOPHIAE DOCTOR**COLEMAN, Alfred**

(Information Technology)

Developing an E-health framework through electronic healthcare readiness assessment

Promoter: Prof M E Herselman

Co-promoter: Prof D Pottas

OPHOFF, Jacobus Albertus

(Information Technology)

A model for privacy-aware presence management in mobile communications

Promoter: Prof R A Botha

RASTOGI, Rahul

(Information Technology)

Information security service management: A service management approach to information security management

Promoter: Prof R von Solms

RUXWANA, Lennox Nkqubela

(Information Technology)

The adoption of quality assurance in E-health acquisition for rural hospitals in the Eastern Cape Province

Promoter: Prof M E Herselman

Co-promoter: Prof D Pottas

VAN NIEKERK, Johannes Frederick

(Information Technology)

Fostering information security culture through integrating theory and technology

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(Construction Management)

Influences on construction project delivery time

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OKOLIE, Kevin Chuks

(Construction Management)

Performance evaluation of buildings in educational institutions: A case study of universities in South-East Nigeria

Promoter: Prof W Shakantu

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(Engineering)

Intelligent automotive thermal comfort control

Promoter: Prof T I van Niekerk

Co-promoters: Prof H Holdack-Janssen and Prof G Gruhler

Faculty of Health Sciences**DOCTOR OF PHILOSOPHY****JORDAN, Portia Janine**

(Nursing)

Evidence-informed clinical guidelines for nursing-care practices related to the safety of the mechanically ventilated patient

Promoter: Prof R M van Rooyen

O'BRIEN, Coleen Ann

(Nursing)

Nursing strategies to facilitate self management in persons living with Diabetes Mellitus Type 2

Promoter: Prof R M van Rooyen

Co-promoter: Dr E J Ricks

DOCTOR PHILOSOPHIAE**WESSELS, Sally May**

(Psychology)

The children's auditory performance scale (CHAPS): An exploration of its usefulness in identifying central auditory processing disorder in a South African clinical setting

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Co-promoter: Prof L Stroud

PHILOSOPHIAE DOCTOR**BLIGNAULT, Suzette Martha**

(Pharmacy)

Audit of community pharmacy activities

Promoter: Dr M van Huyssteen

Co-promoter: Mr D Venter

KILIAN, Gareth

(Pharmacy)

Development and testing of Liposome Encapsulated Cyclic Dipeptides

Promoter: Prof P Milne

Faculty of Law**DOCTOR LEGUM****TAIWO, Elijah Adewale**

(Public Law)

The implementation of the constitutional right to education in South Africa and Nigeria

Promoter: Prof A Govindjee

Co-promoters: Prof P H G Vrancken and Prof D J Olowu

Faculty of Science**DOCTOR PHILOSOPHIAE****MENGWE, Sargent Moses**

(Geography)

Towards social impact assessment of copper-nickel mining in Botswana

Promoter: Dr A H De Wit

PHILOSOPHIAE DOCTOR**BEZUIDENHOUT, Chantel**

(Botany)

Macrophytes as indicators of physico-chemical factors in South African estuaries

Promoter: Prof J B Adams

Co-promoter: Dr T G Bornman

CHANGUNDEGA, Jesman Moreblessing

(Physics)

Nonlinearity-related polarization crosstalk in WDM systems

Promoter: Prof A W R Leitch

ELLIOTT, Gayle Pamela

(Biochemistry)

Implementation of novel flow cytometric methods to assess the in vitro anti-diabetic mechanism of a sutherlandia frutescens extract

Promoter: Prof M van de Venter

Co-promoter: Prof S Roux

ESTERHUIZEN-LONDT, Maranda

(Microbiology)

B-N-Methylamino-L-Alanine in South African fresh water cyanobacteria: Incidence, prevalence, ecotoxicological considerations and human exposure risk

Promoter: Dr T G Downing

IREETA, Winston Tumps

(Physics)

Aerial optical fibres in telecommunication systems: SOP and PMD monitoring, and tolerance of modulation formats

Promoter: Prof A W R Leitch

LOW AH KEE, Nalise

(Biochemistry)

The functional role of cancer procoagulant at a molecular level: Its role in cancer and coagulation

Promoter: Prof C L Frost

Co-promoters: Prof R Naude and Prof G Blatch

MHANGARA, Paidamwoyo

(Environmental Geography)

Land use/cover change modelling and land degradation assessment in the Keiskamma catchment using remote sensing and GIS

Promoter: Prof V Kakembo

MUGAGGA, Frank

(Environmental Geography)

Land use change, landslide occurrence and livelihood strategies on Mount Elgon slopes, Eastern Uganda

Promoter: Prof V Kakembo

Co-promoter: Prof M Buyinza

MUNJI, Mathew Kimaiyo

(Physics)

Characterization of concentrator solar cell devices and materials using light-beam induced current measurements

Promoters: Prof E E van Dyk and Dr F J Vorster

NKONGOLO, Nsalambi Vakanda

(Environmental Geography)

Quantification of greenhouse gas fluxes from soil in agricultural fields

Promoter: Prof V Kakembo

Co-promoter: Dr P Masika

OLIVIER, Ezra Jacobus

(Physics)

The role of palladium in the migration of silver in silicon carbide

Promoter: Prof J H Neethling

PADAYACHEE, Pragashni

(Mathematics)

A case study: Exploring a DVD driven approach for teaching and learning mathematics, at Secondary school level, with a framework of blended learning

Promoter: Dr H H Boshoff

Co-promoters: Dr H Johannes and Prof A F Harding

RAJKARAN, Anusha

(Botany)

A status assessment of mangrove forests in South Africa and the utilisation of mangroves at Mngazana estuary

Promoter: Prof J B Adams

RIDDIN, Taryn

(Botany)

Dynamics of macrophytes in the East Kleinemonde, a small temporarily open/closed South African estuary

Promoter: Prof J B Adams

SETLALEKGOMO, Mpho Rinah

(Zoology)

*The metabolic rate of the Eastern Cape Angulate tortoise (*Chersina angulata*) with reference to ectothermy*

Promoter: Dr P R D Winter

Co-promoter: Dr S Els

SULEMAN, Essa

(Microbiology)

*Mutational analysis of the PacC binding sites within the *aflR* promoter in *A. flavus**

Promoter: Dr B M Somai

VAN ROOYEN, Isabella Johanna

(Physics)

Effects of phosphorous doping and very high temperatures on the nanostructure of silicon carbide and triso coated particles

Promoter: Prof J H Neethling

Co-promoter: Prof J A A Engelbrecht

WAIT, Michelle

(Zoology)

*Resource utilisation and reproduction of the hermit crab *Clibanarius virescens* (Crustacea: Decapoda: Anomura) in South Africa*

Promoter: Dr D S Schoeman

Co-promoter: Prof D Baird

WESTRAADT, Johan Ewald

(Physics)

Thermal degradation of diamond compacts: A TEM investigation

Promoter: Prof J H Neethling

Co-promoters: Dr C Montross and Prof I Sigalas

WILHELM-RECHMANN, Angelika

(Botany)

Using social marketing to bridge the gap between systematic conservation planning and implementation at the local government level

Promoter: Prof R Cowling

Research Masters

Faculty of Arts

MAGISTER ARTIUM

GOUWS, Stephanie - CUM LAUDE

(Anthropology)

A study on the cultural adjustment of the domestic partners of German expatriates in the Nelson Mandela Bay Automotive Industry

Supervisor: Prof H C Pauw

KRITZINGER, Barbara Lucy - CUM LAUDE

(Anthropology)

An exploration of myth in the adaptation processes of Zimbabwean migrants residing in Port Elizabeth

Supervisor: Dr T S Petrus

LOCHHEAD, Hayley - CUM LAUDE

(Philosophy)

Ethics and complexity: Exploring the significance and application of complexity thinking in ethical theory, with special reference to the graphic novel Watchmen

Supervisor: Dr A Hurst

MKUZO, Zamuxolo Tim Oshea

(Public Administration)

An assessment of the quality of housing delivery in the Nelson Mandela Bay Municipality: The beneficiaries' perspective (2008 - 2010)

Supervisor: Prof R S Masango

MOSTERT, Linda Ann - CUM LAUDE

(English)

Feminist appropriations of Hans Christian Andersen's The Little Mermaid and the ways in which stereotypes of women are subverted or sustained in selected works

Supervisor: Dr N J Smith

Co-supervisor: Dr M E West

MVANYASHE, Andiswa

(IsiXhosa)

Uphononongo lokuchubeka kwezimo zabalinganiswa kwiincwadi ezichongiweyo zedrama zesixhosa

Supervisor: Dr L L Kwatsha

MVUYANA, Bongekile Yvonne Charlotte

(Public Administration)

A study of the relationship between rural-urban migration and housing delivery: A case study of cleremont township in the Province of Kwazulu-Natal

Supervisor: Prof R S Masango

RÖTH, Johan Friedrich

(Afrikaans and Dutch)

Horrelpoot (2006) van Eben Venter as apokaliptiese roman: 'n Intertekstuele studie

Supervisor: Dr M L Crous

Co-supervisor: Prof H E Janse van Vuuren

STRYDOM, Gideon Louwrens

(Afrikaans and Dutch)

'n Vergelykende studie van Ingrid Winterbach se die Boek van Toeval en Toeverlaat (2006) en Etienne Van Heerden se Asbesmiddag (2007)

Supervisor: Prof H E Janse van Vuuren

WHITE, Emma Lindsey

(Sociology)

Investigating the effects of form-focused activities on the acquisition of articles and pronouns in English amongst Grade 11 Xhosa learners

Supervisor: Dr D Ayliff

Co-supervisor: Prof P W Cunningham

MAGISTER TECHNOLOGIAE

SOHA, Sandi

(Public Relations Management)

An exploration of the role of a strategic internal communication system in the merging Walter Sisulu University

Supervisor: Dr H S Fourie

Faculty of Business and Economic Sciences

MAGISTER ARTIUM: DEVELOPMENT STUDIES

HORN, Maryke Eda

Key safety, security and legal measurers required for the successful management of a guest house

Supervisor: Prof H R Lloyd

OZUMBA, Chineme Obiageli Ifenkily

The role of legislations and human resource policies on gender and development in South Africa: A description of trends of female employment and promotion

Supervisor: Dr M Brooks

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MAGISTER ARTIUM**MANNATHOKO, Bame Joshua**

(Economics)

Survival analyses of SMME's in Botswana

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(Business Management)

Servant leadership principles as part of the corporate philosophies of companies

Supervisor: Prof F W Struwig

GORLACH, Vsevolod Igorevich

(Economics)

An economic analysis of the impact of economic freedom on economic growth in the SADC

Supervisor: Dr P le Roux

HOSKING, Phillipa Amy

(Business Management)

A conjoint choice experiment analysing water service delivery in three Eastern Cape municipalities

Supervisor: Prof M Tait

Co-supervisors: Dr G D Sharp and Prof J K Bosch

MENZIES, Greig Hamilton

(Economics)

An economic evaluation of a wind power electricity generating farm in South Africa

Supervisor: Prof S G Hosking

Co-supervisor: Mr M C Sale

NYABOGA, Dennis Nyarunda

(Economics)

Valuing preferences for freshwater inflows into the Gonubie, St. Lucia and Uilkraalsmond estuaries

Supervisor: Prof S G Hosking

Co-supervisor: Prof M Du Preez

SCHOLTZ, Laurie May

(Business Management)

Impact of social entrepreneurs' education and business skills training on the non-profit organisations

Supervisor: Prof E Venter

SCHWEGLER, Stefan - CUM LAUDE

(Business Management)

Derivatives in emerging markets: A South African focus

Supervisor: Dr S Viviers

SONG, Junli

(Business Management)

Perceptions of Chinese Students on the Quality of Academic Programs and Services Offered at the Nelson Mandela Metropolitan University

Supervisor: Prof M Tait

VAN GREUNEN, Conrad

(Business Management)

Business Ethics in the Life Insurance Sector in South Africa

Supervisor: Dr S Viviers

Co-supervisor: Prof E Venter

MAGISTER TECHNOLOGIAE**POTGIETER, Deidre Jessica Sophia - CUM LAUDE**

(Human Resources Management)

Mentoring as a Strategy to Develop Leadership Potential of Female Employees

Supervisor: Dr P Poisat

MULDER, Attilia Cesira - CUM LAUDE

(Marketing)

Motivations of international trophy hunters choosing to hunt in South Africa

Supervisor: Prof L Radder

Faculty of Education**MAGISTER EDUCATIONIS****BROWNE, Elaine***The implementation of the Arts and Culture Learning Area in previously disadvantaged primary schools in the NMB Area:**Teacher experiences*

Supervisor: Prof A Delpont

DANIELS, Nicolette Deidré - CUM LAUDE*The promotion of scientific literacy within a museum context*

Supervisor: Prof P Webb

MAY, Melissa - CUM LAUDE*Exploring the use of interactive teaching and learning strategies in HIV and AIDS Education*

Supervisor: Prof L Wood

VON WILDEMANN, Amy-Rose*"The way I implement discipline in my classroom reflects who I am"-**Teacher philosophies in an Eastern Cape township high school*

Supervisor: Prof A Delpont

Co-supervisor: Prof N de Lange

WEBBER, Heidi - CUM LAUDE

The impact of the family dynamics of having a child and sibling with Down Syndrome

Supervisor: Dr A J Greyling

WIENAND, Merna Adeliade

Empowering teachers to render learner support to learners who experience reading barriers

Supervisor: Dr C F Pienaar

■ Faculty of Engineering, the Built Environment and Information Technology

MAGISTER SCIENTIAE**HURBISSOON, Roneesh Mehta**

(Construction Economics)

Constructability effects of green buildings

Supervisor: Prof N S Buys

MAGISTER TECHNOLOGIAE**BEZUIDENHOUT, Petrus Conrad**

(Civil Engineering)

The traffic flow characteristics on the R75 between Despatch and Port Elizabeth - An integrated approach

Supervisor: Mr A Nagel

Co-supervisor: Ms K D Hogan

MAGISTER TECHNOLOGIAE**LAMOUR, Bernhardt Gustave**

(Electrical Engineering)

An analysis of the reliability of the 22kv distribution network of the Nelson Mandela Bay Municipality

Supervisor: Dr R T Harris

Co-supervisor: Mr A G Roberts

ODENDAAL, Morne

(Electrical Engineering)

Wireless Rotational Process Monitoring System

Supervisor: Prof T I van Niekerk

Co-supervisor: Dr G Kruger

OPHOFF, Madri - CUM LAUDE

(Electrical Engineering)

Distributing intelligence in the wireless control of a mobile robot using a personal digital assistant

Supervisor: Prof T I van Niekerk

BADENHORST, Kenneth Merwin

(Mechanical Engineering)

The simulation of vehicle engine cooling in a climatic chamber

Supervisor: Prof P J McGratch

Co-supervisor: Prof A Els-Botes

ERASMUS, Daniel Jacobus - CUM LAUDE

(Mechanical Engineering)

The fatigue life cycle prediction of a light aircraft undercarriage

Supervisor: Prof D G Hattingh

Co-supervisor: Mr A Young

MASHININI, Peter Madindwa

(Mechanical Engineering)

Process window for Friction Stir Welding of 3mm Titanium (Ti 6al 4v)

Supervisor: Prof D G Hattingh

Co-supervisor: Dr H Lombard

PRETORIUS, Shaun

(Mechanical Engineering)

Development of flexible automotive measurement adaptors for the Pq25 VWSA platform

Supervisor: Mr K H Du Preez

Co-supervisors: Prof T I van Niekerk and Mr T Lichtenberg

BUTGEREIT, Laura Lee - CUM LAUDE

(Information Technology)

C³TO: An architecture for chat based tutoring

Supervisor: Prof R A Botha

JURGENS, Geert Dirk

(Information Technology)

From desktop to mobile: A framework for function and content transformation

Supervisor: Prof R A Botha

KANTORE, Adelin - CUM LAUDE

(Information Technology)

User interface evaluation metrics for a typical M-Learning Application

Supervisor: Prof D van Greunen

MONK, Thomas Philippus

(Information Technology)

Educating users about information security awareness by means of game play

Supervisor: Mr J F van Niekerk

Co-supervisor: Prof R von Solms

NANGUE, Calvin Raoul - CUM LAUDE

(Information Technology)

Guidelines for the successful integration of ICT in schools in Cameroon

Supervisor: Prof D van Greunen

Co-supervisor: Ms K A Church

MASTER OF ENGINEERING IN MECHATRONICS

BUCHMANN, Marco - CUM LAUDE

Advanced monitoring system for bolted connections in vehicle construction

Supervisor: Prof T I van Niekerk

Co-supervisor: Prof Dr Ing Paul Wollschlager

HAMED, Maïen Mohamed Osman,

Vision-guided tracking of complex three-dimensional seams for robotic gas metal arc welding

Supervisor: Prof T I van Niekerk

Co-supervisor: Prof D G Hattingh

LIGHT, Timothy Vernon - CUM LAUDE

Dynamic modelling of the reconfigurable machine tool

Supervisor: Prof I A Gorchach

Co-supervisor: Dr G J Wiens

SIMPSON, Mark,

Enhancing the accuracy of a low cost reconfigurable machine tool

Supervisor: Prof I A Gorchach

Co-supervisor: Mr M C Du Plessis

VIOL, Florian,

An in-line measuring technique with tool error detection in an automotive production line

Supervisor: Prof T I van Niekerk

Co-supervisor: Prof H F G Holdack-Janssen

■ Faculty of Health Sciences

MAGISTER ARTIUM

WALKER, Rostin Ashley

(Human Movement Science)

Incidence and mechanism of injuries occurring over one season among premier and president league hockey teams of the Nelson Mandela Metropolitan University

Supervisor: Prof R Du Randt

Co-supervisor: Mr D Venter

WITTHUHN, Amori Cathy

(Human Movement Science)

Effects of hydrotherapy group exercises on selected health-related fitness variables in older women with Type II Diabetes Mellitus

Supervisor: Dr M L Baard

MAGISTER CURATIONIS

DUNSDON, Jeananne

Professional nurses' experiences of a team nursing care framework in critical care units in a private healthcare group

Supervisor: Prof R M van Rooyen

Co-supervisor: Ms P J Jordan

MAGISTER PHARMACIAE

LUNAT, Imran

Traditional, complimentary and alternative medicine use in HIV positive patients

Supervisor: Ms S Burton

Co-supervisor: Mrs B Gold

MULINGE, Florence Muthoni

Identifying, recording and monitoring adverse effects associated with antiretroviral treatment

Supervisor: Ms S Burton

Co-supervisor: Mrs B Gold

OETTLE, Judith Ann Elizabeth

Pharmacotherapeutic treatment of attention Deficit/Hyperactivity Disorder in children

Supervisor: Ms J McCartney

Co-supervisor: Prof I Truter

SINGH, Vikesh

Implementation of the dual therapy prevention of mother-to-child transmission protocol

Supervisor: Ms S-A Boschmans

VAN NIEKERK, Anida Cornel - CUM LAUDE

Implementation of intravenous to oral antibiotic switch guidelines in the general medical wards of a tertiary level hospital

Supervisor: Ms S-A Boschmans

MAGISTER SCIENTIAE

FANG, Yuan Yuan

(General Health Sciences)

In vitro drug-herb interaction potential of African medicinal plant products used by type II Diabetics

Supervisor: Prof S Roux

Co-supervisors: Mr G Kilian and Dr T Koekemoer

TSHANGA, Siphokazi Sisanda

(General Health Sciences)

Antibacterial activity of Liposome Encapsulated Cyclo (Tyr-Pro)

Supervisor: Mr G Kilian

Co-supervisor: Prof P Milne

MAGISTER TECHNOLOGIAE

AGHERDIEN, Ahfeyah

(Biomedical Technology)

Validation of an automated method for Thrombotic Microangiopathy in HIV positive patients in the Nelson Mandela Metropolitan Bay

Supervisor: Prof N Smith

Co-supervisor: Dr D Oelofse

Faculty of Law

MAGISTER LEGUM

MBALEKWA, Simbarashe

(Mercantile Law)

The legal and regulatory aspects of international remittances within the SADC Region

Supervisor: Prof V A Lawack-Davids

SWART, Lynette

(Mercantile Law)

The legal framework pertaining to selected segments of the financial market

Supervisor: Prof V A Lawack-Davids

WAGENAAR, Tanya - CUM LAUDE

(Private Law)

A comparative analysis of the development of performers' rights in the United Kingdom and South Africa

Supervisor: Prof F E Marx

Faculty of Science

MAGISTER COMMERCII

OLIVER, Chantelle

(Statistics)

A choice experiment valuation of the river inflows into the Bushmans Estuary

Supervisor: Dr G D Sharp

Co-supervisor: Prof S Hosking

SWANEPOEL, Paul - CUM LAUDE

(Statistics)

A forecasting model for Photovoltaic Module Energy Production

Supervisor: Prof I N Litvine

Co-supervisor: Prof E E van Dyk

MAGISTER SCIENTIAE

BARNARD, Carla

(Chemistry)

Investigating the effect of various film-forming polymers on the evaporation rate of a volatile component in a cosmetic formulation

Supervisor: Dr N M Vorster

Co-supervisor: Mr C Bosma

BOONZAAIER, Melissa Kay

(Zoology)

The effect of thermal nest environment on hatchling sex ratios and success of Loggerhead Turtles (Caretta Careta) and the possible implications for turtles nesting in Kwazulu-Natal, South Africa

Supervisor: Dr R Nel

Co-supervisor: Dr A Leslie

DAVISON, Candace

(Biochemistry)

A biochemical study of the antidiabetic and anticoagulant effect of Tulbaghia Violacea

Supervisor: Prof C L Frost

Co-supervisor: Mrs R A Levendal

DE KOCK, Roy

(Botany)

Bushclump rehabilitation of Grassridge Bontveld after strip mining

Supervisor: Prof E E Campbell

DU PLESSIS, Daniellé

(Microbiology)

Characterisation of the VeA Promoter Of A. Flavus

Supervisor: Dr B M Somai

FRANCIS, Farzaana

(Chemistry)

The photodecomposition of different polymorphic forms of 1,4-Dihydropyridine Calcium Channel Blockers

Supervisor: Dr D Grooff

Co-supervisor: Dr E E Ferg

HALLAM, Stacey Leigh

(Zoology)

Heterothermy and seasonal patterns of metabolic rate in the Southern African Hedgehog

(Atelerix Frontalis)

Supervisor: Dr N Mzilikazi

HAUPT, Philip Wouter - CUM LAUDE

(Botany)

The use of fish species in a marine conservation plan for Kwazulu-Natal

Supervisor: Dr A Lombard

HOVE, Darlington

(Applied Mathematics)

Finite element analysis of a composite sandwich beam subjected to a four point bend

Supervisor: Prof J W Gonsalves

Co-supervisor: Prof R D Anandjiwala

HUGO, Christine Denise - CUM LAUDE

(Botany)

The influence of fire and plantation management on wetlands on the Tsitsikamma Plateau

Supervisor: Dr L H Watson

Co-supervisor: Prof R M Cowling

JANSE VAN VUUREN, Arno - CUM LAUDE

(Physics)

Radiation damage in Gallium Arsenide and Silicon Carbide

Supervisor: Prof J H Neethling

JOUBERT, Cornelia Sophia

(Zoology)

Environmental monitoring of Finfish Cage Farm in Algoa Bay (South Africa): A pilot study

Supervisor: Dr R Nel

KOTSEDI, Daisy

(Botany)

The response of Microalgal Biomass and community composition to environmental factors in the Sundays Estuary

Supervisor: Prof J B Adams

Co-supervisor: Dr G C Snow

NDOU, Aifheli Amos

(Mathematical Statistics)

Assessing the statistical methodologies of business research in the South African context

Supervisor: Dr G D Sharp

Co-supervisor: Prof M Tait

NIYONZIMA, Francois Niyongabo

(Biochemistry)

Bioaccumulation and ecotoxicology of B-Methylamino-L-Alanine (BMAA) in model crop plants

Supervisor: Dr T G Downing

OLIVIER, Wernich Corne

(Geology)

A Geochemical and structural study of the Witteberg Group, Cape Supergroup, with specific focus on the Perdepoort member as a potential silica source

Supervisor: Prof P W K Booth

Co-supervisor: Mr C R Anderson

SCHNABLEGGER, Gerald Ernst

(Biochemistry)

The anticancer activity of Cyathula Prostrata on two malignant cell lines

Supervisor: Prof M van de Venter

SNYDERS, Charmelle Delray

(Chemistry)

An investigation into the effect of carbon type additives on the negative electrode during the partial state of charge capacity cycling of lead acid batteries

Supervisor: Dr E Ferg

VAN DER VYVER, Marius Lodewyk - CUM LAUDE

(Botany)

Restoring the biodiversity of canopy species within degraded spekboom thicket

Supervisor: Prof R M Cowling

Co-supervisor: Prof E E Campbell

VISSER, Claire

(Microbiology)

Evaluation of model systems for the study of protein association/ incorporation of B-Methylamino-L-Alanine (BMAA)

Supervisor: Dr T G Downing

Co-supervisor: Prof M van de Venter

VROMANS, Deborah Claire

(Botany)

Macrophyte phenology in a temporarily open/closed estuary compared with a permanently open estuary

Supervisor: Prof J B Adams

Co-supervisor: Ms T Riddin

WASSERMAN, Ryan John - CUM LAUDE

(Zoology)

The importance of estuarine head waters for fishes in selected Eastern Cape systems, with particular emphasis on the influence of freshwater inflow, migration barriers and non-native predators on the juvenile and small fish component

Supervisor: Dr N A Strydom

Co-supervisor: Dr O Weyl

WILKEN, Dewald Dirk

(Geology)

A palaeolimnological study of the Knysna Wilderness Area and its application to sea level change

Supervisor: C R Anderson

Co-supervisor: Prof P W K Booth

WILLIAMS, Nathaniel John

(Physics)

On the design and monitoring of photovoltaic systems for rural homes

Supervisor: Prof E E van Dyk

Co-supervisor: Dr F J Vorster

MAGISTER TECHNOLOGIAE**GOJELA, Ntombekaya**

(Chemistry)

Hydrogen economy: Mea manufacturing for Pem Electrolysers

Supervisor: Dr S Gouws

Co-supervisor: Dr E Ferg

PONGOMA, Basanda

(Chemistry)

The Investigation of alternative processes for the Oxidation of Phenol

Supervisor: Dr E E Ferg

Co-supervisor: Dr S Gouws

MAGISTER TECHNOLOGIAE**COETZER, Wentzel Christoffel - CUM LAUDE**

(Game Ranch Management)

Attitudes towards hunting amongst the economically active public in Port Elizabeth

Supervisor: Prof P Du P van Niekerk

Patent Applications Filed



HATTINGH, D.G. & WEDDERBURN, I.N. 2010. Undercut tooling arrangement. SA Patent application (2010/08014)

HATTINGH, D.G., WEDDERBURN, I.N. & DOUBELL, P. 2010. Friction welding apparatus. SA Patent application (2010/08014)

HATTINGH, D.G., WEDDERBURN, I.N. & DOUBELL, P. 2010. Friction welding apparatus. European Patent application (09793721.3)

HATTINGH, D.G., WEDDERBURN, I.N. & DOUBELL, P. 2010. Friction welding apparatus. US Patent application (12/995,014)

MKENTANE, K. & VORSTER, N. Hair treatment composition. Provisional Patent application (2010/04284)

MÜLLER, P.H., MÜLLER, R.B. & SAVAGE, L. 2010. Grading structural planks, boards and the like. Provisional Patent application (2010/04236)

SMITH, F. 2010. A method for mitigating single event upsets in sequential electronic circuits. Provisional Patent application (2010/0219)

WAGENER, M.C., BOTHA, J.R. & WAGENER, V. Method and Apparatus for Determining Dopant Density in Semiconductor Materials. PCT application (PCT/IB2010/051404)

WRIGHT, Y.S. & WRIGHT, D.J. Beverage container. SA Patent application. (2010/08541)

ZEELIE, B., DUGMORE, G.M. & BARNARD, J.P. Process and System for the production of micro-algae, bio-oil and secondary products. Provisional Patent application (2010/05629)

ZEELIE, B. & DUGMORE, G.M. Coal fines beneficiation using micro-algae and related processes. Provisional Patent application (2010/05979)



Exhibitions and Performances

Exhibitions:

- Re.Sponse Exhibition Nelson Mandela Metropolitan Art Museum. Curated exhibition in which artists connected to the NMMU and created artworks in response to works from the NMMAM Collection - September 2010.
- Bev de Lange: Masters Exhibition, NMMU - November 2010.
- The Collective: Graduate Exhibitions, NMMU - November 2010.

Performances:

- **NMMU Choir:** Invited to present 12 concerts at Fabricca del Canto International Choral Festival in Legnano and in Milan - June 2010.
- **John Edwards Jazz Trio:** Suite for Violin and Jazz Piano by Claude Bolling, in collaboration with Juan Munoz (violin) and Mariel Illusorio (piano). St Andrews Drill Hall, Grahamstown - 23 October 2010.
- **John Edwards Jazz Qunitet:** Groovin' High. Performance of jazz standards and original compositions. Hosted by the Grahamstown Music Society. St Andrews Drill Hall, Grahamstown (DVD recording available) - 25 September 2010.
- **John Edwards Jazz Trio:** Hosted by the Port Elizabeth Music Society, South Campus Auditorium, NMMU, Port Elizabeth (audio recording available) - 17 February 2010.
- **John Edwards Jazz Trio:** Fifa World Cup Concerts: Two new compositions entitled *Strumpet* and *Marabi Suite* were commissioned by Nelson Mandela Bay Big Band Director and Conductor, Gareth Williams. Sponsored by NMB Arts and Culture and performed at the Opening and Closing Fifa World Cup concerts by Nelson Mandela Bay Big Band (DVD footage available) - 11 June 2010 and 11 July 2010.
- **Charles Briars Scholarship Concert** - 27 May 2010.
- **Prestige Concert** - 25 October 2010.

Publications

Faculty of Arts

DHET Accredited Journal Articles

AYLIFF, D.H. 2010. "Why can't Johnny write? He sounds okay!" Attending to form in English second language teaching. *Perspectives in Education* 28(2), pp 1 - 8.

BINZA, S.M. & SEEMELA, V.P.P. 2010. The role of Government as a catalyst for reform during periods of economic downturn. *Africa Insight* 40(2), pp 189 - 200.

BOGOPA, D.I. 2010. Health and Ancestors: The Case of South Africa and Beyond. *Indo-Pacific Journal of Phenomenology* 10(1), pp 1 - 8.

DRAAI, E.E. 2010. Collaborative Government for improved Public Service delivery in South Africa. *Africa Insight* 40(2), pp 131 - 140.

FREE, L. & OLIVIER, T. 2010. Twixt the workshop and the classroom: Transgressing or progressing. *Acta Academica* 42(4), pp 231 - 255.

GODDARD, S. 2010. Not Just a Detective Novel: Trauma, Memory and Narrative Form in *Miss Smilla's feeling for snow*. *Journal of Literary Studies* 26(4), pp 1 - 19.

HIBBERT, L. 2010. Local and global perspectives on overcoming literacy challenges in South Africa. *International Journal of the Sociology of Language* 206, pp 207 - 226.

ISAACS-MARTIN, W. 2010. Strengthening national identity through national symbols and historical narrative: Do national leaders have a role to play? *Africa Insight* 40(3), pp 80 - 91.

JOHN, P.H. 2010. André Groenewald, populêre letterkunde en die Afrikaanse literatuurgeskiedenis. *Litnet Akademies* 7(3), pp 35 - 46.

JOHN, P.H. 2010. D.P.M. Botes, Marcel Duchamp, die Europese avant-garde en 'n literêre definisie van plagiaat. *Tydskrif vir letterkunde* 47(2), pp 48 - 58.

JOHN, P.H. 2010. Die 'Terapeutiese perspektief' en die 'Agtstekleurgekkel' van *30 nagte in Amsterdam* (2009) deur Etienne van Heerden (2009). *Stilet* 21(2), pp 188 - 204.

JORDAAN, D.J. 2010. Reflective visual literacy: Far more than meets the eye. *Communitas* 15(1), pp 21 - 38.

KONIK, A. & KONIK, I. 2010. Challenging the social sciences through visual arts: Reconsidering Foucault in the light of Field's *Little Children* (2006). *South African Journal of Art History* 25(2), pp 43 - 57.

KONIK, A. 2010. Time-images in Khyentse Norbu's *Travellers and Magicians* (2003): The possibility of critical Buddhist cinema. *South African Journal of Art History* 25(2), pp 125 - 144.

KOTZE, E. 2010. Author identification from opposing perspectives in forensic linguistics. *Southern African Linguistics and Applied Language Studies* 28(2), pp 185 - 197.

KOTZE, E. & HIBBERT, L. 2010. Are multilingual education policies pipe dreams? Identifying prerequisites for implementation. *Alternation* 17(1), pp 4 - 26.

OLIVIER, B. 2010. 'Terror(ism)' in the context of cosmopolitanism. *Alternation* 17(2), pp 333 - 360.

OLIVIER, B. 2010. AVATAR: Ecopolitics, technology, science, art and myth. *South African Journal of Art History* 25(3), pp 1 - 16.

OLIVIER, B. 2010. Cinema and communication: 'Cinelogic' and 'Cinaesthesia'. *Communitas* 15, pp 39 - 55.

OLIVIER, B. 2010. Foucault and individual autonomy. *South African Journal of Psychology* 40(3), pp 292 - 307.

OLIVIER, B. 2010. Images and mediation. *South African Journal of Art History* 25(1), pp 34 - 46.

OLIVIER, B. 2010. The 'quasi-universality' of the humanities. *PHRONIMON - Journal of the South African Society for Greek Philosophy and the Humanities* 11(1), pp 15 - 24.

OLIVIER, B. 2010. Eros en lewe in die 21ste eeu. *LitNet Akademies* 7(2), pp 241 - 256.

PETRUS, T.S. 2010. Cultural profiling: The (ab)use of cultural beliefs in criminal profiling in witchcraft-related cases in the Eastern Cape. *Acta Criminologica* 2, pp 59 - 71.

PETRUS, T.S. 2010. Empowering the powerless: Using anthropological knowledge to address the challenge of witchcraft-related crime in post-apartheid South Africa. *Africa Insight* 40(3), pp 50 - 60.

PETRUS, T.S. 2010. Witchcraft-related crime as ritualised violence in the Eastern Cape. *Acta Criminologica* 23(2), pp 82 - 93.

POSTEL, C.G. 2010. Găuwa dwaal vennag: Anna M. Louw se *Kroniek van Perdepoort* ondergrawe deur trieksters en transdans. *LitNet Akademies* (7)1, pp 42 - 60.

POSTEL, C.G. 2010. Media, Mediums and Metaphors. The Modern South African Sangoma in Various Texts. *Current Writing* 22(1), pp 107 - 122.

SCHMIDT, J.M. & WEST, M.E. 2010. Whiteness studies in South African literature: A Bibliography. *English in Africa* 37(1), pp 103 - 114.

SNODGRASS, L. 2010. A Gendered perspective of post-conflict reconstruction African women in Peace-building. *Africa insight* 40(2), pp 109 - 120.

STEYN-KOTZE, J. 2010. In Search of Africa's democratic theory: Exploring liberty, equality and democratic construction in the Cold War. *Journal of Contemporary History* 35(1), pp 1 - 18.

STEYN-KOTZE, J. & TAYLOR, D. 2010. Ke nako: Service delivery as a key challenge for the Zuma Administration. *Africa Insight* 40(3), pp 198 - 212.

TERBLANCHE, O. 2010. Die Congregational Kerk in Uitenhage en die Groepsgebiedewet. *Historia* 55(2), pp 226 - 242.

TERBLANCHE, O. 2010. Die verskille tussen Nederland en Vlaandere ten opsigte van Suid-Afrika tydens die apartheidsjare: 'n Ontleding. *Tydskrif vir Geesteswetenskappe* 50(4), pp 447 - 466.

TERBLANCHE, O. 2010. Vlaandere en Suid-Afrika: Die donker skaduwee van apartheid. *Journal for Contemporary History* 35(1), pp 81 - 98.

TERBLANCHE, O. 2010. Vlaandere en Suid-Afrika: Normalisering van politieke en kulturele betrekkinge sedert 1990. *New Contree* (59), pp 111 - 137.

THOMAS, H.M.B. 2010. S'inscrire dans la transformation du pays: NMMU passe du FLE au FOS. *French Studies in Southern Africa* (40), pp 153 - 170.

TREU, P., OLIVIER, M.A.J., BEAN, P. & VAN DER WALT, J.I. 2010. A group of educators' stance on the implementation of South Africa's further education and training curriculum. *Teaching and Teacher Education* 26, pp 343 - 350.

TSATSIRE, I., TAYLOR, J.D. & RAGA, K. 2010. Local service delivery enhancement - attitudes: A case study of the Nelson Mandela Bay Municipality. *TD The Journal for Transdisciplinary Research in Southern Africa* 6(1), pp 271 - 285.

VOSS, T. 2010. '... speak that I may see thee': Bushmen, Bleek, Language and Race in South Africa. *Kronos* 36, pp 312 - 318.

VRANCKEN, M. 2010. La Noire De...d'Ousmane Sembène: de l'écrit à l'écran. *French studies in Southern Africa* (40), pp 167 - 187.

WEST, M.E. 2010. Portraits in Miniature: White English-Speaking South African women in selected short stories by Nadine Gordimer. *English in Africa* 37(1), pp 77 - 91.

WEST, M.E. 2010. Responding to whiteness in contemporary South African Life and Literature: An interview with Njabulo S. Ndebele. *English in Africa* 37(1), pp 115 - 124.

WEST, M.E. & SCHMIDT, J.M. 2010. Whiteness studies in South Africa: A South African perspective. *English in Africa* 37(1), pp 9 - 13.

Peer-reviewed Book Chapters

WOZNIAK, J. 2010. Le Malentendu Colonial - From missionary history to afropolitanism. Contexts of a documentary film discourse in: WOZNIAK, J. & VAN RYNEVELD, H. (Eds). *Einzelgang und Rückkehr im Wandel der Zeit. Unknown passages - New beginnings*. SUN MeDIA: Stellenbosch, South Africa.

KOTZÉ, A. 2010. Destandaardisasie en herstandaardisasie: Gelyklopende prosesse in die nuwe Suid-Afrika? in: VAN DER WAL, M. & FRANCKEN, E. (Eds). *Standaard-talen in beweging*: Nodus Publishers, Münster, Germany.

GIBBS, P. 2010. Race and ideology in Port Elizabeth: A view from the Northern Areas, 1979 - 1990 in: THERON, B. (Ed). *The Road to Democracy in South Africa Volume 4 [1980 - 1990] Part 1*: Unisa Press, Pretoria, South Africa.

Faculty of Business and Economic Sciences

DHET Accredited Journal Articles

ARNOLDS, C., BOSHOF, C., MAZIBUKO, N.E. & KLEMEZ, B. 2010. The motivational impact of job security, recognition, monetary incentives and training on the job performance of blue-collar employees. *South African Journal of Labour Relations* 34(1), pp 86 - 102.

CONNOR, T. 2010. Umgidi at the Mabambas': Gender, practice and performance among farm workers in the Sundays River Valley. *Journal of Southern African Studies* 36(1), pp 95 - 111.

DAYAN, O., ARNOLDS, C. & STRUWIG, M. 2010. Empirical testing of Kotler's high-performance factors to increase sales growth. *Acta Commercii* 10(2010), pp 205 - 226.

DICKEN, M.L. 2010. The ichthyofauna in the Port of Ngqura, South Africa. *African Journal of Marine Science* 32(3), pp 491 - 499.

- DICKEN, M.L.** 2010. Socio-economic aspects of boat-based ecotourism during the sardine run within the Pondoland Marine Protected Area, South Africa. *African Journal of Marine Science* 32(2), pp 405 - 411.
- DU PREEZ, M. & LEE, D.E.** 2010. The contribution of trout fly fishing to the economy of Rhodes, North Eastern Cape, South Africa. *Development Southern Africa* 27(2), pp 241 - 253.
- DU PREEZ, M. & LEE, D.E.** 2010. Estimating the value of a positive change in trout fly-fishing quality in the Rhodes trout fishery, Eastern Cape, South Africa. *South African Journal of Economics and Management Sciences* 13(2), pp 158 - 176.
- DU PREEZ, M., TESSENDORF, S. & HOSKING, S.G.** 2010. Application of the contingent valuation method to estimate the willingness-to-pay for restoring indigenous vegetation in Underberg, Kwazulu-Natal, South Africa. *South African Journal of Economics and Management Sciences* 13(2), pp 135 - 157.
- DU PREEZ, M. & HOSKING, S.G.** 2010. Estimating the recreational value of freshwater inflows into the Klein and Kwelera estuaries: An application of the zonal travel cost method. *Water SA* 36(5), pp 553 - 561.
- FARRINGTON, S.M., VENTER, E. & BOSHOF, C.** 2010. The influence of family and non-family stakeholders on family business success. *The Southern African Journal of Entrepreneurship and Small Business Management* 3(2010), pp 32 - 60.
- FOURIE, W.** 2010. To be human is to be free: A Protestant contribution to the discourse on human dignity. *Scriptura* 104, pp 250 - 262.
- HURST, A.** 2010. Complexity and the Idea of Human Development. *South African Journal of Philosophy* 29(3), pp 310 - 329.
- HURST, A.** 2010. Self-transformation through (Dis)illusion in Tom Robbins's *Skinny Legs and All*. *Journal of Literary Studies* 26(4), pp 98 - 117.
- JOOSTE, L.** 2010. Accounting ethics - an empirical investigation of managing short-term earnings. *South African Journal of Economics and Management Sciences* 13(1), pp 98 - 111.
- KRÜGER, J. & ROOTMAN, C.** 2010. How do small business managers influence employee satisfaction and commitment? *Acta Commercii* 10, pp 59 - 72.
- LLOYD, H.R. & VAN RAYNER, M.S.F.** 2010. Cost saving and service quality. A case study in the state health sector. *Administratio Publica* 18(2), pp 74 - 104.
- LLOYD, H.R. & MEY, M.** 2010. An ethics model to develop an ethical organisation. *SA Journal of Human Resource Management* 8(1), pp 1 - 12.
- CHINYAMURINDI, W.T. & LOUW, G.J.** 2010. Gender differences in technology acceptance in selected South African Companies: Implications for electronic learning. *SA Journal of Human Resource Management* 8(1), pp 1 - 7.
- LOUW, G.J. & VIVIERS, A.** 2010. An evaluation of a psychosocial stress and coping model in the police work context. *SA Journal of Industrial Psychology* 36(1), pp 1 - 11.
- KLEMZ, B.R., BOSHOF, C. & MAZIBUKO, N.E.** 2010. Business development in emerging markets: The impact on the spending behaviour of elderly caregivers of family members with HIV/AIDS in South Africa. *South African Journal of Economics and Management Sciences* 13(4), pp 463 - 474.
- NAUDÉ, P.J.** 2010. Human dignity in Africa: Sketching the historical context. *Scriptura* 104, pp 221 - 230.
- BEZUIDENHOUT, R.M. & NAUDÉ, P.J.** 2010. Public Theology as cultivation of a common public life. *NGTT: Ned Geref Teologiese Tydskrif* 1/2 (24), pp 24 - 35.
- NAUDÉ, P.J.** 2010. Op 'n mespunt. Die ontvangs van Johannes Calvyn in die denke van Willie Jonker. *NGTT: Ned Geref Teologiese Tydskrif* 51(3/4), pp 82 - 91.
- OCRAN, M.K.** 2010. South Africa and United States stock prices and the Rand/Dollar exchange rate. *South African Journal of Economics and Management Sciences* 13(3), pp 362 - 375.
- OCRAN, M.K.** 2010. Exchange rate pass-through to domestic prices: The case of South Africa. *Prague Economic Papers* 19(4), pp 291 - 306.
- PERKS, S., MUTETI, J.K., PIETERSEN, J. & BOSCH, J.K.** 2010. Strategic implications of the drivers of E-business implementation in developing countries. *Journal of Contemporary Management* 7, pp 519 - 548.
- PERKS, S.** 2010. Exploring the management abilities of spaza shop owners in the Nelson Mandela Metropolitan Municipality. *South African Journal of Economics and Management Sciences* 13(4), pp 447 - 463.
- ROOTMAN, C. & KRÜGER, J.** 2010. Adapting SMME business functions during economic turmoil. *Acta Commercii* 10, pp 107 - 119.
- SMITH, E.E. & PERKS, S.** 2010. A perceptual study of the impact of green practice implementation on the business functions. *Southern African Business Review* 14(3), pp 1 - 29.

RADDER, L., PIETERSEN, J., WANG, H. & HAN, X. 2010. Antecedents of South African high school pupils' acceptance of universities' SMS advertising. *International Business and Economics Research Journal* 9(4), pp 29 - 39.

SMITH, E.E. & PERKS, S. 2010. Evaluating SMEs corporate social performance: A stakeholder perspective. *Journal of Contemporary Management* 7, pp 71 - 93.

VIVIERS, S. & BOUDLER, J-M. 2010. Verslaggewing oor volhoubaarheid in die Mynbou-sektor: Die identifisering van kritieke aangeleenthede. *Tydskrif vir Geesteswetenskappe* 50(1), pp 66 - 86.

Peer-reviewed Book

NAUDÉ, P. 2010. *Neither calendar nor clock: Perspectives on the Belhar confession*. Eerdmans: Grand Rapids. United States of America.

Peer-reviewed Conference Proceedings

BYARUGABA, J.M., TAIT, M. & BOSCH, J.K. Service quality perceptions in the Uganda mobile telephone branch of industry. *22nd Annual Conference of the Southern Africa Institute for Management Scientists*: Mpekwani, South Africa, 12 - 15 September 2010.

DAYAN, O. & ARNOLDS, C. The role of e-business tactics in launching new products: Comparative study of three industries. *12th Annual Conference on World Wide Web Applications*: Durban, South Africa, 21 - 23 September 2010.

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Research Support

Research Governance

The Research and Engagement portfolio is headed by Prof Thoko Mayekiso, Deputy Vice-Chancellor: Research and Engagement. The Deputy Vice-Chancellor is assisted by three directors who head the following departments: Dr Pieter van Breda, Research Management; Dr Blanche Pretorius, Research Capacity Development and Ms Jaci Barnett, Innovation Support and Technology Transfer.

Department of Research Management (RM)

RM focuses mainly on the needs of established researchers.

It manages:

- All NRF grants, excluding Thuthuka and student bursaries.
- The Technology and Human Resources for Industry Programme (THRIP).
- The development of an in-house research information system (RIMS) and the roll-out of the national DST/NRF supported InfoEd RIMS.
- The submission of applications for NRF rating.
- The registration and activity reporting of research institutes, centres and units.
- The submission of publication research output subsidy claims to the Department of Higher Education and Training (DHET).
- The development and implementation of various categories of research incentives.
- Applications for research leave and research sabbaticals via the NMMU Research Committee, which is chaired by the Director of RM.
- All external research grants aimed at established researchers.
- Internal support such as the Transformation and Equity Research Grants (TERG) and the Research Theme Grants (RTG).
- The Unit for Statistical Consultation (USC), which renders a free statistical consultation service to staff, as well as postgraduate students.
- The identification and nomination of staff for external research awards.
- The DST/NRF Research Chairs.
- The Researcher of the Year Awards.
- Internal and external research surveys.
- Research partnerships.
- Monitoring various research activities on behalf of the Deputy Vice-Chancellor: Research and Engagement and the NMMU Research, Technology and Innovation (RTI) Committee.
- Advises the Capital Resource Allocation Committee (CRAC) on the allocation of research equipment, and
- Individual research accounts in close cooperation with NMMU's Finance Department.

Department of Research Capacity Development (RCD)

RCD focuses mainly on the needs of emerging researchers and postgraduate students. **Its core functions are:**

- Managing institutional and external funding support for postgraduate students.
- Facilitating initiatives to expand the levels of accredited research outputs by emerging researchers.
- Improving the academic staff qualification profile.
- Assuming responsibility for institutional research capacity development programmes/interventions.
- Providing mentorship to developing research staff and postgraduate students.
- Harnessing the research contribution of research associates, and
- Managing the NMMU Research Ethics Committees (Animal and Human).

Department of Innovation Support and Technology Transfer (IS&TT)

IS&TT undertakes the following activities:

- Technology transfer activities, which encompass the protection, management and commercialisation of NMMU's Intellectual Property (IP) such as:
 - Development of patenting/protection strategy.
 - Development of commercialisation strategy.
 - New company creation and protection of NMMU's interests.
 - License agreements.
- Innovation Support for external research-related activities such as facilitating collaborations and contracts, proposal writing, access to funding, including:
 - Presence on Advisory Boards of research entities with commercial activities.
 - Contract development and negotiation.
 - Management of Innovation Award scheme.
 - Implementation of Technology Transfer and Proposal Tracking modules in InfoEd.
- Other innovation activities at local, provincial and national level such as:
 - Running the National Innovation Competition at NMMU.
 - Guiding the Regional Technology Transfer Office anchored at NMMU.
 - Driving the creation of a regional innovation forum.
 - Development of the business case for the creation of a Research Park at NMMU.

Research at NMMU is governed by a committee of Senate and the Research, Technology and Innovation (RTI) Committee where all faculties and relevant support services are represented.

This Committee has oversight over a number of operational subcommittees: Research Committee, Innovation Committee, Publications Committee, Research Ethics Committee (Human) and Research Ethics Committee (Animal). Each faculty has its own Research, Technology and Innovation Committee.

Finance Department

The Department of Finance has a section (comprising three staff members) whose primary function it is to focus on research-related financial matters.

The Unit for Statistical Consultation

The Unit for Statistical Consultation (USC) renders a free statistical consultation service to staff as well as Masters and Doctoral students engaged in academic research.

Research Funding Database

NMMU subscribes to Research Africa, a funding database that is available to all staff and postgraduate students. Research Africa allows researchers to search for funding opportunities in specific areas of interest and to set up e-mail alerts when calls for proposals are made.

Directory of Experts

The NMMU online Directory of Experts, a combined project between the departments of Marketing and Corporate Relations and Research Management was updated in 2010 and can be viewed on the NMMU website: <http://www.nmmu.ac.za> under "community". Hard copy versions targeting the media and funding agencies were published.

Research Websites

The departments of Research Management (RM), Research Capacity Development (RCD) and Innovation Support and Technology Transfer (IS&TT) have designed their own websites aimed at providing online access to information and services offered. These can be accessed at: <http://www.nmmu.ac.za>.

Research Management Information Systems

The InfoEd National Research Information Management System (RIMS) allows the Research Office to capture a wide range of research data that can easily be extracted and allows for trends to be identified and strategies to be developed to further enhance research capacity and quality. For example, it allows individual research profiles to be extracted, along with CVs of researchers and specific faculty or department outputs. Other capabilities include tracking and developing proposals, assisting with research ethics approval and identifying research funding opportunities via Sponsored Programmes Information Network (Spin). During 2010 the following InfoEd modules were used or are in the process of being rolled out: Research Output Module (ROM), Technology Transfer (TT), and Ethics (Human).

An in-house information system has also been developed. This system, referred to as Research Master File, compiles various valuable pieces of data into an informative view of research activity by the researcher, in terms of research output that can be subsidised and main streams of funding. This archive of pertinent research data can provide valuable assistance to stakeholders of various levels to evaluate performance of individuals and faculties.

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