

NMMU Research and Innovation Report 2011



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

Respect for diversity

Taking responsibility

Respect for the natural environment

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Message from the Vice-Chancellor



**Prof Derrick Swartz,
Vice-Chancellor**

It gives me great pleasure to introduce the *2011 Annual Research Report* of Nelson Mandela Metropolitan University (NMMU). The results of 2011, together with trends recorded since 2009, clearly shows NMMU's overall research and development (R&D) profile evolving along a positive and hopefully sustained growth path. We are hugely encouraged by these strides.

By illustration, the number of NMMU National Research Foundation (NRF) rated researchers has grown from 57 and 64 in 2009 and 2010, to 66 in 2011, including two A1 rated researchers recorded for this year. Although natural science is still the major contributor of rated researchers and aggregate research unit output, this is encouraging growth in the contribution of other faculties, and it is hoped that this trend will continue into the future. Research output units have also shown quite encouraging upwards growth in recent years, growing from 224.01 units in 2009 to 255.51 in 2010, although Masters and Doctoral units have decreased in 2011, largely due to the atypical spike in doctoral graduations in 2010.

The results of 2011, together with trends recorded since 2009, clearly shows NMMU's overall research and development (R&D) profile evolving along a positive and hopefully sustained growth path. We are hugely encouraged by these strides.

The NMMU research output subsidy, a crucial benchmark for research performance, has grown from R59 million in 2010, R64 million in 2011 to R78 million in 2012. We have every reason to believe that this positive growth curve will be sustained in the next few years. Apart from the subsidy, NMMU has also benefitted from generous funding support from the NRF, recording funding support of R104.7 million for the 2011/12 period. Internally, this has enabled the University to raise the levels of research funding support across the system, whilst particularly targeting support for Research Development and Teaching Replacement Grant funding for emerging and next generation researchers. In addition, the University has also invested in nineteen (19) Postdoctoral Fellowships in 2011. These interventions, among others, are crucial for the renewal of NMMU's research capabilities into the next generation.

In terms of internationalisation of research, the University continues to foster a range of focused international partnerships with a core number of multi-dimensional university partners on all continents. The NMMU Internationalisation Committee is constantly reviewing the range, depth and quality of our partnerships, paying particular attention to new research opportunities in Brazil, India and China, apart from the wider African continent. The University has also benefitted from its membership of the successful Erasmus Mundus consortium, involving five (5) South African Universities in partnership with a number of European Universities (Leuven, Freie Universität Berlin, Pierre et Marie Curie, Karolinska Institutet, Masaryk, Granada and Amsterdam), enabling exchange opportunities for staff and students around exciting research projects.

At a strategic level, and in line with NMMU's Vision 2020, our goal is to make a pioneering, critical and constructive contribution - through the production and dissemination of knowledge - to tackling the deep problems of growing social inequality and economic exclusion in South Africa and the wider continent.

NMMU has created a variety of institutional systems and instruments to enable the University to more vigorously build its research profile. This includes, among others, building the strategic capabilities of a number of Research Institutes, Centres and Units across the University. In 2011, NMMU has increased these capabilities by the launch of the Centre for High Resolution Transmission Electron Microscopy (HRTEM) focusing on material science, and the ESKOM funded Centre for Expertise in Forecasting. We are increasingly strengthening our links with industry, businesses and communities in the Eastern and Southern Cape. In addition, we have a number of leading Research Chairs, funded from both public and private sources to concentrate research and development in specific fields such as automotive engineering, nanophotonics, and, social sciences, HIV/AIDS and mathematics education respectively.

At a strategic level, and in line with NMMU's Vision 2020, our goal is to make a pioneering, critical and constructive contribution - through the production and dissemination of knowledge - to tackling the deep problems of growing social inequality and economic exclusion in South Africa and the wider continent. We are committed to using the University's considerable knowledge assets to actively and creatively promote a vibrant economic, social and political democracy in which all sections of society, particularly

the poor, can find a meaningful place in society. We strongly believe that knowledge and skills are key social assets to enabling effective advancement and deepening of the quality and scope of democratic life in the world.

With the excellent support of the University Council, and under the very capable leadership of our Deputy Vice-Chancellor: Research and Engagement, Professor Thoko Mayekiso, I believe that NMMU has grounded its research system on a sustainable pathway for meeting the many challenges of the future. We will continue to raise the levels of investment, ensure new capabilities are unlocked for future generations, foster a vibrant research and intellectual culture, not only in publications and patents, but also providing multiple platforms for our researchers and academics to play a critical and constructive role in advancing the quality of public and intellectual life. It is hoped that our partners in Government, particularly the Department of Higher Education and Training, NRF, DST and other departments will continue to raise overall investment in pursuit of research excellence. It is also hoped that industry will progressively increase its contribution to research at NMMU into the future.

Prof Derrick Swartz
Vice-Chancellor

Message from the Deputy Vice-Chancellor: Research and Engagement



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

There is a vibrant and visible research *zeitgeist* sweeping through the Nelson Mandela Metropolitan University (NMMU).

Research and applied outputs are on the rise across the whole spectrum as evidenced by the increase in the number of students who completed Research Masters and Doctoral degrees; promising indications of the balance between quantity and the quality of publications in accredited journals, and modest increase in research funding.

2011 has seen an increase of publications in ISI and IBSS indices from 116 in 2010 to 189 in 2011.

It is very encouraging to note the steady increase in the number of NRF rated researchers but also pleasing is the increase in the number of female rated researchers.

The researchers' profiles and stories included in this *Research and Innovation Report* bring to the fore some common threads worth highlighting.

2011 has seen an increase of publications in ISI and IBSS indices from 116 in 2010 to 189 in 2011.

The researchers have identified research grants, generous research leave, "replacement" staff for researchers, research infrastructure, supportive colleagues and a generally collegial atmosphere as the main enablers for research and innovation at NMMU. Almost without exception, researchers are driven by the passion for what they are researching and even more importantly, by the quest to make a difference.

Research undertaken shows a clear drive by the researchers to engage in relevant and responsive research such as harnessing the sun and wind, which leverages these as alternative forms of energy, thereby contributing to the challenges of energy saving and sustainability. The often marginalised and rural poor become part of the communities that NMMU is involved with, as an engaged university.

Mentoring and coaching of emerging researchers take place on a large scale and the institution has introduced a number of initiatives to develop and enhance research capacity. Early career researchers are emboldened to get into areas of research that are groundbreaking such as Cyber Citizenship.

The NMMU recognises the importance of being an active member of the international knowledge society. As such, it developed a comprehensive network of international higher education institutions. Research collaboration forms an integral part of the institutional collaboration. In 2011, new projects were introduced and research themes were created between researchers from the NMMU and the international partner institutions. 2011 also saw a clear push by the NMMU to develop new international research partnerships with non-traditional areas of collaboration. A visit to universities in Brazil was the beginning of an expansion of our global research footprint in countries with the same development agenda as South Africa.

Another important development in 2011 was the start of the process that resulted in the NMMU being awarded four DST/NRF Research Chairs as part of the South African Research Chairs Initiative (SARChI).

Our efforts to promote excellence have resulted in the identification of thirteen institutional research themes, namely: Science, Mathematics and Technology Education for Society (SMTE); Sustainable Local Economic Development; Cyber Citizenship; Manufacturing Technology and Engineering; Nanoscale Characterisation and Development of Strategic Materials; Strategic Energy Technologies; Sustainable Human Settlements; Coastal Marine and Shallow Water Ecosystems; Humanising Pedagogies; Democratisation, Conflict and Poverty; Biodiversity Conservation and Restoration; Health and Wellbeing; and Earth Stewardship Science.

One of the important developments in 2011 was the launch of the Centre for High Resolution Transmission Electron Microscopy whose main thrust is the characterisation of strategic materials using advanced transmission electron microscopy and related techniques.

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The Chair in Earth Stewardship Science was established in 2011 and the incumbent is Prof Maarten de Wit, an NRF A rated scientist. His transdisciplinary approach is starting to contribute towards advancing the discourse of critical scholarship.

It is pleasing to note that increasing numbers of academic and professional support staff are members of national and international structures where they are providing research leadership as well as expert advice.

We strive to provide a conducive policy environment that supports and rewards research and innovation excellence. A number of research-related policies were approved in 2011 such as the Research Sabbatical Leave Policy and the Policy on the Management of Research, Technology and Innovation (RTI) Activities at the NMMU.

Significant strides were made in the area of intellectual property utilisation and protection. Eight provisional patent applications were filed in the area of space electronics, animal health (anti-parasitic agents for birds), forest engineering and software applications.

The NMMU is well positioned to make a meaningful contribution to the research agenda of our country.

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I would like to take this opportunity to express my appreciation for the strategic leadership of our Vice-Chancellor, Professor Derrick Swartz, and the sterling efforts of the Executive Deans, Chairpersons of Faculty Research, Technology and Innovation Committees and the Research Office.

Prof Thoko Mayekiso

Deputy Vice-Chancellor: Research and Engagement

NMMU and Socially Engaged Research



**Prof Enver Motala,
Adjunct Professor**

The NMMU's Vision 2020 document specifically asserts the importance of making the University 'a "responsive and engaged institution that contributes to a sustainable future through relevant and critical scholarship". It hopes to pursue this through wide ranging partnerships and collaborations whose purpose it is to generate knowledge that will be useful to both its external and internal communities. The University's Vision is aimed, inter alia, at stimulating the development of a democratic culture and responding to the demands of the "public good" through the pursuit of socially engaged research. Such research will moreover clarify the University's conception of its "community" and "publics", while simultaneously strengthening its orientation to the corpus of its scholarly activities more generally.

In more conventional approaches to the purposes of universities, the idea that its *scholarship through research* is the key to the conceptualisation of higher learning. This idea has great merit and needs to be cultivated. Such scholarship is critical to the life and work of academics. The production of scholarly writing that is peer-reviewed and published in accredited journals has immense value for reasons which are obvious. Such scholarly activities attract students into faculties that have renown; it encourages leading scholars in the field to seek employment at the university; improve its standing internationally, inviting greater collaborations with it and improves its long-term prospects. It brings prestige to the university and most importantly attracts increased funding to achieve the planned goals of the institution.

In more conventional approaches to the purposes of universities, the idea that its scholarship through research is the key to the conceptualisation of higher learning.

This critical constitutive element of the life of universities can be fostered together with activities directed at the stimulation of a democratic culture through socially engaged scholarship. This requires a wider conception of the idea of scholarship and an imagination, which conceptualises such scholarship as associated with public reasoning and engagement. Boyer's view that, that scholarship should encompass not only the scholarship of research (discovery) but also the pursuit of *scholarship of integration, application, and teaching* should be amplified to include the *scholarship of public engagement*. This implies both the *ex post* "application" of

knowledge, and an understanding of how knowledge is generated, to what purposes, in whose interest and also questions about whose knowledge is privileged and whose excluded. These engagements can moreover take place with the very constituencies in which the university is situated, defined broadly - i.e. beyond the confines of the "ivory tower". Wider conceptions of scholarship are necessary in social settings where scientific knowledge is necessary to address the seemingly intractable issues facing democratic societies. This implies engagements using "public reasoning" and other mechanisms to advance social awareness and academic scholarship together with a wider intellectual and social orientation, which requires academics to reach beyond the responsibilities of conventional academic work associated with the production of peer-reviewed articles, teaching and postgraduate supervision.

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reservoirs of understanding and local
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Academics can amplify their roles by participating in scholarship through social engagement, making their intellectual outputs more widely available to the university's "publics", engaging with its many challenges intellectually and practically; to build on the relationship between the university and its community and to relate academic knowledge to its application by producing new conceptualisations, theories and their associated laws. It can support the production of scientific knowledge, which is anchored in a deep and enduring approach to the "public good" even while it simultaneously interrogates commonly held views and examines the integrity, diversities and strengths of social and indigenous ways of knowing by engaging with the wider range of the sources of knowledge and its epistemologies. This approach would enrich the university's capacity to engage with the direct experiences of society since in these experiences too are deep reservoirs of understanding and local ways of knowing and acting, which can often be relied upon to solve some of the seemingly intractable dilemmas facing society. By doing this, the university can avoid the pitfalls of forms of knowledge that ignore the possibilities of learning from social experience, relying solely on academic knowledge as the *only* and "objective" basis of scientific understanding.

Science without a wider social purpose i.e. in the reductive way that the idea of the third mission of universities is sometimes conceived - does not orient itself sufficiently to the broader aims of scientific enquiry and the production of knowledge as envisaged by many of the greatest thinkers through the ages who have pronounced unequivocally on the social (and spiritual purposes) of knowledge; of knowledge as essentially about the resolution of social and human issues (even if these relate to the physical and cosmological environmental inhabited by humans) as inextricable from the purpose of addressing the lives of humans as conscious beings. Their writings repudiate any suggestion that scientific knowledge is separable from knowledge about the human condition, the aspirations, hopes, loves, tribulations, histories and philosophies of humanity and its cultural, linguistic, creative and expressive ideas encompassed in the pantheon of scientific disciplines on which academic knowledge is grounded.

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 develop, implement and manage research information management systems.

During 2011, various research strategies aligned to NMMU's Vision 2020 were rolled out. These included a process to redefine the institutional research themes and to strengthen and expand research chairs and entities as theme drivers. Significant progress was made in this regard by revising existing and developing new policies to create an enabling research framework.

Other positive trends were the increase in Council funding allocated for research and the significant growth in external research grants.

The further development of an internal research information system (RIMS) to compliment the InfoEd RIMS currently being rolled out by the NRF/DST, has enabled NMMU management to take more informed decisions related to research.

Other positive trends were the increase in Council funding allocated for research and the significant growth in external research grants.

Established researchers managed to further enhance their national and international standing. This was done inter alia through research collaborations, successful NRF rating applications, including re-evaluations, and a 41% increase in the number of Department of Higher Education and Training (DHET) subsidy units for journal articles.

Department of Research Capacity Development



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

The three core functions of the Department of Research Capacity Development are: to provide financial assistance to postgraduate candidates and postdoctoral fellows, ensuring ongoing development of emerging researchers, and to provide oversight for the institutional research ethics committees.

NMMU continues to make significant progress in its drive to create an enabling environment to support and encourage its emerging researchers. For students this has meant a focus on increasing access to funding for postgraduate studies and also opportunities for enhancing research and publication skills. The concerted efforts towards a culture of research publication have contributed to a significant increase in the number of publications by postgraduate students and postdoctoral fellows.

A positive trend is evident in the percentage of staff holding doctoral qualifications, which now stands at just under 40%.

Staff have been encouraged to further their qualifications and to improve their research profiles and productivity. A positive trend is evident in the percentage of staff holding doctoral qualifications, which now stands at just under 40%. This remains a central goal to improve the staff qualification profile in order to respond meaningfully to the targets set in the University's 2020 Vision Statement.

In 2011, the University saw the initiation of the NMMU's Early Career Development Programme and the Next Generation Initiative as two focused interventions to support the career development of early career academics and to grow our own timber in specific scarce skills disciplines.

The Department of Research Capacity Development recognises that higher education institutions are increasingly challenged to recruit and retain adequate numbers of academics and researchers to constitute the next generation of academics. Hence the NMMU's strategy takes a two-pronged approach focusing on staff currently in the academy and augments this approach with a focus on postgraduate students on a trajectory towards a career in academia.

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 is responsible for the protection and management of intellectual property owned by the NMMU through the core activities of attracting and assessing invention disclosures as well as patenting and other forms of intellectual property protection. Where appropriate, intellectual property is assigned or licensed to a wholly-owned company of the NMMU that undertakes commercialisation activities such as licensing and spin-out company formation. The Department also facilitates and negotiates external, research-related grants and contracts, with specific emphasis on intellectual property ownership issues.

There were a number of innovation success stories in 2011: the NMMU attracted significant funding for large, late-stage development projects, which revolve around some of its patents; some of the older projects that have been commercialised through start-up companies are selling products and are on their way to commercial success; and the NMMU is incubating design students who are starting their own businesses.

NMMU is the anchor institution for the Eastern Cape Regional Technology Transfer Office; driving technology transfer at all Eastern Cape higher education institutions.

Together with these internal successes, the NMMU also played a role locally, regionally and nationally: the Regional Innovation Forum was successfully launched with twelve local organisations, which recognise that innovation is a key driver for local economic development; the NMMU initiated, and is the anchor institution for, the Eastern Cape Regional Technology Transfer Office, driving technology transfer at all Eastern Cape higher education institutions; and NMMU staff play a major role in the Southern African Research and Innovation Management Association, the national association for research and innovation management leadership.

The NMMU continues to support innovation activities both in terms of the provision of expertise and financially. This has seen an increase in disclosures every year as well as a 60% increase in the number of provisional patent applications filed from 2010. These provisional patent applications become part of the suite of over 30 projects managed by the Department to ensure the NMMU continues to make a contribution to the innovation space for the benefit of South African society.

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 13 themes were formally approved in 2011.

Institutional Research Themes	
THEME	DRIVER
Biodiversity Conservation and Restoration	Prof Graham Kerley
Coastal Marine and Shallow Water Ecosystems	Dr Derek du Preez
Cyber Citizenship	Prof Rossouw von Solms
Democratisation, Conflict and Poverty	Prof Velile Notshulwana
Earth Stewardship Science	Prof Maarten de Wit
Health and Wellbeing	Prof Rosa du Randt
Humanising Pedagogies	Prof Denise Zinn
Manufacturing Technology and Engineering	Prof Danie Hattingh
Nanoscale Characterisation and Development of Strategic Materials	Prof Jan Neethling
Science, Mathematics and Technology Education for Society	Prof Paul Webb
Strategic Energy Technologies	Prof Ernest van Dyk
Sustainable Human Settlements	Prof Kobus van Wyk
Sustainable Local Economic Development	Prof Hendrik Lloyd

NRF Rated Researchers

Total Number of Rated Researchers at NMMU (2009 - 2011)

2009	57
2010	64
2011	66

Number of Rated Researchers per Rating Category (2009 - 2011)

RATING CATEGORY	2009	2010	2011
A1	1	1	2
A2	0	0	0
B1	0	0	0
B2	1	2	2
B3	4	4	5
C1	9	9	11
C2	12	15	18
C3	17	20	19
Y1	0	0	0
Y2	6	7	4
L	7	6	5
Total	57	64	66

Number of Rated Researchers per Faculty/Division

FACULTY	A	B	C	P	Y	L	TOTAL
Arts			4				4
Business and Economic Sciences			2		1	2	5
Education			3			1	4
Engineering, the Built Environment and Information Technology		2	9		1		12
Health Sciences		1	2				3
Law			1		1		2
Science	2	4	25		1	2	34
Higher Education Access and Development Services			1				1
Sport Bureau			1				1
Total	2	7	48	0	4	5	66

Rated Researchers

NAME	RATING	FACULTY	DISCIPLINE
Cowling, Prof RM	A1	Science	Botany
De Wit, Prof M	A1	Science	Geology
Branch, Dr B	B2	Science	Zoology
Christopher, Prof AJ	B2	Science	Geography
Baird, Prof D	B3	Science	Zoology
Kotze, Prof P	B3	EBEIT	Information Technology
Roux, Dr D	B3	Science	Ecology
Von Solms, Prof R	B3	EBEIT	Information Technology
Watson, Prof MB	B3	Health Sciences	Psychology
Adams, Prof JB	C1	Science	Botany
France-Jackson, Prof H	C1	Science	Mathematics
Groenewald, Prof NJ	C1	Science	Mathematics
Hattingh, Prof DG	C1	EBEIT	Mechanical Engineering
Kerley, Prof GIH	C1	Science	Zoology
Olivier, Prof B	C1	Arts	Philosophy
Stretch, Dr RA	C1	Sport Bureau	Sport Science
Wagener, Prof MC	C1	Science	Physics
Wooldridge, Prof TH	C1	Science	Zoology
Gerber, Prof TIA	C1	Science	Chemistry
Downing, Dr TG	C1	Science	Biochemistry
Leitch, Prof AWR	C2	Science	Physics
Booth, Prof GL	C2	Science	Mathematics
Botha, Prof JR	C2	Science	Physics
Engelbrecht, Prof JAA	C2	Science	Physics
Foxcroft, Prof CD	C2	HEADS	Psychology
Fabricius, Prof C	C2	Science	Natural Resource Management
Hurst, Dr A	C2	Arts	Philosophy
Janse van Vuuren, Prof HE	C2	Arts	Afrikaans Literature
Kotze, Prof EF	C2	Arts	Afrikaans Literature
Lombard, Dr AT	C2	Science	Botany
Pistorius, Dr PA	C2	Science	Zoology
Radder, Prof L	C2	Business and Economic Sciences	Marketing Management
Strydom, Dr NA	C2	Science	Zoology

NAME	RATING	FACULTY	DISCIPLINE
Truter, Prof I	C2	Health Sciences	Pharmacy
Van de Venter, Dr M	C2	Science	Biochemistry
Van Dyk, Prof EE	C2	Science	Physics
Van Greunen, Prof D	C2	EBEIT	Information Technology
Zeelie, Prof B	C2	Science	Chemistry
Abou-El-Hossein, Dr K	C3	EBEIT	Mechatronics
Botha, Prof RA	C3	EBEIT	Information Technology
De Lange, Prof N	C3	Education	HIV/AIDS Education
Ferg, Dr EE	C3	Science	Chemistry
Frost, Prof CL	C3	Science	Biochemistry
Herselman, Prof M	C3	EBEIT	Information Technology
McClelland, Prof CW	C3	Science	Chemistry
McGrath, Prof P	C3	EBEIT	Mechanical Engineering
Milne, Prof PJ	C3	Health Sciences	Pharmacy
Naudé, Prof P	C3	Business and Economic Sciences	Theology
Neethling, Prof JH	C3	Science	Physics
Shakantu, Prof W	C3	EBEIT	Construction Management
Singh, Prof P	C3	Education	Curriculum and Educational Leadership
Smallwood, Prof JJ	C3	EBEIT	Construction Management
Van der Merwe, Prof A	C3	EBEIT	Information Technology
Vrancken, Prof PHG	C3	Law	Public Law
Webb, Prof P	C3	Education	Mathematics Education
Wesson, Prof JL	C3	Science	Computer Science
Whittington, Dr PA	C3	Science	Zoology
Struwig, Prof FW	L	Business and Economic Sciences	Business Economics
Smith, Prof EE	L	Business and Economic Sciences	Business Management
Wood, Prof LA	L	Education	Educational Psychology

NAME	RATING	FACULTY	DISCIPLINE
Kakembo, Prof V	L	Science	Geosciences
Somai, Dr BM	L	Science	Microbiology
Mzilikazi, Dr N	Y2	Science	Zoology
Venter, Prof E	Y2	Business and Economic Sciences	Business Management
Knoetze, Prof E	Y2	Law	Private Law
Thomson, Dr K-L	Y2	EBEIT	Information Technology

2011 NRF Rating

The following staff were newly rated in 2011:

Dr Kerry-Lynn Thomson: Y2



Dr Kerry-Lynn Thomson is a newly rated researcher with a Y2 NRF rating. Over the past few years, Dr Thomson has presented numerous papers at both national and international conferences. The most recent of which was a paper entitled: *Combating Information Security Apathy by Encouraging Prosocial Organisational Behaviour* at the Human Aspects of Information Security and Assurance (HAISA) Symposium in London in 2011 and the paper was subsequently published in a special edition of *Information Management and Computer Security* in 2012. Dr Thomson's current research includes information security, with an emphasis on culture and education. The primary research is looking at the use of well-established learning tools (for e.g. the Cisco Networking Academy programme) for potential use in information security education, as well as understanding organisational behaviour in an attempt to cultivate an information security corporate culture. Future research goals will continue to include information security research and, in addition, a large part of the research in future will incorporate Terrestrial Trunked Radio (TETRA) research.

Prof Christo Fabricius: C2



Prof Christo Fabricius is a newly rated researcher in the C2 category focusing on natural resource management research. His recent research reflects a progression from a rights-based approach to a sustainable, resilience and adaptive co-management approach to natural resource management. His participation in the Millennium Ecosystem Assessment and subsequent membership of the Resilience Alliance precipitated the shift, and his students followed suit. This shift also marked a move away from local case studies towards greater international participation.

Prof Fabricius' research bridges the divide between the community level, where the impact of resource conservation or degradation are experienced, and the policy level, where policies and other decisions are made, which affect local livelihoods. His research furthermore integrates and transcends the boundaries between social and ecological sciences, providing a unique perspective on sustainability founded on resilience theory, adaptive co-management and complex systems approaches. This perspective is conceptually challenging and unconventional. To achieve this, teamwork is essential and he has built trust with a large network of local, national and international specialists.

Prof Darelle van Greunen: C2



Prof Darelle van Greunen is the Group Leader of the User Experience Research Group in the Institute for ICT Advancement. Her research is regarded as trendsetting in the international user experience and human computer interaction community as it focuses on the opportunities and challenges provided by the use of technology in the developing world and more specifically on new and innovative technologies to assist with poverty alleviation and the improvement of health care in under-served areas.

Prof van Greunen was recently elected to the ICT4Health Capacity Building Working Group operating under the auspices of the Deputy Minister of Health with a view of improving the current lack of capacity in the health care sector. She is also involved with a number of national health care initiatives (M-health, e-Health and Telemedicine) in collaboration with the Medical Research Council and the CSIR. The projects are executed under the auspices of the Minister of Health and aim to assist with the roll out of the National Health Insurance Programme of South Africa.

She is the project leader of the newly established NMMU-Emmanuel Haven Living Lab, which focuses on using ICT for the betterment of the lives of citizens in the Motherwell area. This initiative is undertaken in collaboration with several partners including the Transnet Foundation.

Re-evaluations:

Prof AJ Christopher: B2

Prof Anthony (AJ) Christopher is working in the related fields of political and historical geography. His focus area has been upon the organisation and workings of the population census in Commonwealth countries, especially South Africa. There has been a shift towards complexity - in terms of data gathering during census. Whereas previously the census questionnaire would have questions on a few items of census data, information sought of late is often a multi-page per individual requiring a hundred or more pieces of information.

Prof Christopher has done ongoing research in the meticulous analysis of census data and land records located in a wide range of cities and countries. His research has been firmly rooted in place and space, and has varied in scale from the global, to the individual cities. He has produced several papers devoted to the analyses of data from the population censuses of South Africa.

Prof Christopher's published works have contributed to the understanding of political geography, particularly the significance of the census as a source of information - especially the ordering of information in a form intelligible to the state bureaucracy. In future, he will continue the comparative analysis of the Commonwealth census with regard to questions of identity (nationality, race, ethnic group, language and religion).

Prof Ernest van Dyk: C2

Prof Ernest van Dyk's research is focused on photovoltaic (PV) cell, module and systems characterisation and development. In addition to standard PV characterisation his work has included the use of specialised characterisation tools such as light beam induced current measurements (LBIC), electroluminescence (EL) and infrared thermography. Various LBIC systems have been developed that enable the detection and identification of performance limiting defects in regular and concentrator solar cells, and PV modules. These systems use focused laser light or focused sunlight as a beam probe. An important aspect of PV characterisation is the extraction of device parameters. Advanced parameter extraction algorithms employing particle swarm optimisation or differential evolution are employed and have also been used to analyse point-by-point current-voltage (I-V) characteristics obtained from LBIC measurements. Research on PV systems includes small solar home systems appropriate for use in rural communities and larger grid-connected systems. The latter includes kW-scale systems for embedded generation and large power plant scale systems.

The development of concentrator PV (CPV) technology is a large part of his research. CPV technology has the potential to substantially reduce the cost of electricity generated from PV and the aim of this research is to develop a suitable high concentrator PV (HCPV) and low concentrator PV (LCPV) modules for manufacture in South Africa.

Prof Andrew Leitch: C2

Dean of the Faculty of Science, Professor Andrew Leitch has had an NRF rating for more than 20 years. His recent C2 rating from the NRF is evidence of his ability to maintain a strong research activity in spite of the administrative pressures linked to being Dean of the Faculty. "To lead a Faculty that has such an international research profile, it is important for me as Dean to maintain my research standing - and with it the NRF rating," says Prof Leitch.

Over the past few years, his research has focused on optical fibre technologies for the next generation telecommunications network in Africa. He leads the Optical Fibre Research Unit, which he established in the Department of Physics in 2001.

Since 2004, when the first postgraduate students graduated, ten MSc and six PhD graduates have received their degrees following research projects carried out in the Unit, and a number of papers in relevant international scientific journals are published each year. The Unit continues to receive funding from relevant industrial stakeholders, as well as from the NRF, THRIP and the National Laser Centre in South Africa.

Prof Leitch has also been able to develop strong research ties with other African countries including Kenya, Tunisia and Uganda. These are funded by the African Laser Centre, of which Prof Leitch was a founding member. In Europe, the collaborative linkages have been with the Danish Technical University and the University of Padova (Italy). These linkages have resulted in numerous student exchanges, all of which have been of great value to the students.

Prof Danie Hattingh: C1

Prof Danie Hattingh is a C1 rated researcher, NRF grant holder and niche area leader within Engineering Manufacturing. He has been extensively involved in research capacity and infrastructure development and a founding member of the Friction Processing Research Institute (FPRI) and is currently the Director of both FPRI and eNtso, a research and technology transfer centre at the NMMU. He introduced the Friction Stir Welding (FSW) technology to South Africa and started an active research programme during 2001 with the aim of creating an internationally-recognised facility that would contribute knowledge and expertise to develop the FSW technology for the manufacturing industry.

Prof Hattingh is now internationally-recognised and his research group recently developed a platform and process, trademarked as WeldCore™, a novel online, in-situ core removal and repair procedure. The unique process has two international patents associated with it and won the National Innovation Fund Competition.

Prof Hattingh's research interests are in the key areas of characterising the energy input, process interpretation by a novel NMMU developed "force footprint" model; linking process parameters with residual stresses mapping. The development of new leading edge techniques using the principal of friction hydro pillar processing as repair and joining technique is currently a high priority for Prof Hattingh's research group. Evidence of the research impact can be seen in his participation and leadership in competitive peer-reviewed European Union beam time applications over the past few years at the world-renowned ILL and ESRF facilities in France, who have provided over 38 days of synchrotron and 17 days neutron radiation beam time with a real facility cost of around £675 256 (R7.8 million). Prof Hattingh also serves on the Editorial Advisory Board of the *International Journal of Fatigue* published by ELSEVIER.

Prof Tim Downing: C1

Prof Tim Downing conducts research on fresh surface-water quality with specific reference to cyanobacterial toxins, their environmental fate, ecotoxicology, toxicology and human and animal exposure risks. In addition to evaluating the causes of cyanobacterially related mortalities in the Kruger National Park, evaluating the national cyanobacterial toxin risk and studying the physiological role of well-known cyanobacterial toxins within the producing organisms, his recent research activity has focused on the cyanobacterial metabolite β -N-methylamino-L-alanine (BMAA), a neurotoxin linked to the development of the neurodegenerative disease, amyotrophic lateral sclerosis (ALS).

In recent years, he has developed a robust and sensitive analytical method for this toxin and applied it to the evaluation of human exposure risk for this toxin from water sources and via trophic accumulation in ecosystems. In addition to showing unequivocally that BMAA is a cyanobacterial metabolite and determining the prevalence, incidence and distribution of BMAA producing cyanobacteria in South Africa, he has shown that human exposure is most likely via aerosol and ingestion of bioaccumulated toxin rather than via consumption of potable water. Work on ecotoxicology has resulted in a better understanding of both the environmental fate and potential ecological effects of this toxin. Much of the current research effort is on the biosynthesis, environmental regulation, and metabolic role of BMAA in cyanobacteria, human exposure evaluation, and the neurotoxic effects within model systems.

Prof Thomas Gerber: C1

Prof Thomas Gerber has extensive experience in the synthesis of many classes of organic compounds and their interaction with Re and Tc in the oxidation states +1 and +V. These compounds include benzimidazoles, oxazoles, and thiazoles that have the potential application in the diagnosis of Alzheimer's disease. Other ligands used were antipyrines, quinazolines, benzamides, imidazoles, pyrimidines and uracils among others.

Prof Gerber in this research has demonstrated that the reaction of $[\text{ReO}_2(\text{py})_4]\text{Cl}$ with the tridentate N3-donor Schiff base N-(2-aminobenzylidene)-1,2-diamine (H2L3) led to the formation of the rare oxo-free '3+3' rhenium (V) compound $[\text{Re}(\text{L}_3)_2](\text{ReO}_4)$. His current research focus is on oxo-free rhenium (V) compounds with metal-nitrogen multiple bonds, for example metal-hydrazido and metal-imido complexes. This research has shown that the reaction of 1, 2-diaminobenzene (H2dab) with trans- $[\text{ReOCl}_3(\text{PPh}_3)_2]$ in ethanol produces trans- $[\text{Re}(\text{dab})\text{Cl}_3(\text{PPh}_3)_2]$, in which dab is coordinated as a monodentate imide.

Additionally, Prof Gerber and his team of researchers have attempted the synthesis of the potentially tridentate Schiff base ligand H2OPhsal, which lead to the isolation of the zwitterion derivative H3ono. The reaction of H2ono with trans- $[\text{ReOBr}_3(\text{PPh}_3)_2]$ surprisingly led to the isolation of the rhenium (III) complex $[\text{ReBr}(\text{PPh}_3)_2(\text{ono})]$ (1), which ono acts as a dianionic tridentate ligand.

The area of pursuit for the last eight years (2004 to date) has been an interest in the coordination chemistry of rhenium, which was mainly centred on its +V oxidation state, since it is easily accessible from the reduction of perrhenate (which is beneficial for its radio-pharmaceutical application), and is stabilised by a large variety of donor atoms. The study of ligands containing the amino group, especially aniline is an active research field in the coordination chemistry of rhenium, and Prof Gerber and his group have become the most active in this research niche internationally.

Prof Geoff Booth: C2

At the beginning, Prof Geoff Booth had a number of diverse interests, which included lattices of radicals, as well as Generalised ADS. With the passage of time though, his focus shifted to near-rings and sandwich near-rings of continuous functions. He collaborated with Prof Peter Hall to study primeness, which hitherto their research had not been studied. He looked more in-depth at both near-rings of continuous self-maps and sandwich near-rings of continuous functions. This kind of work has become his exclusive interest at present. He has attained some interesting results on strongly primeness, and has published results derived from such research. He has delivered papers at a number of international conferences, covering places such as Australia, Spain, Taiwan and Greece.

The study of near-rings of continuous functions has proved interesting to him, because it provides a large number of examples of near-rings with a differing structure, and the second thing it does is provide a link between algebra and topology. This understanding will contribute to resolving some questions in near-ring theory. Prof Booth has also contributed significantly to the theory of lattices of radicals of associative rings with Halina France-Jackson.

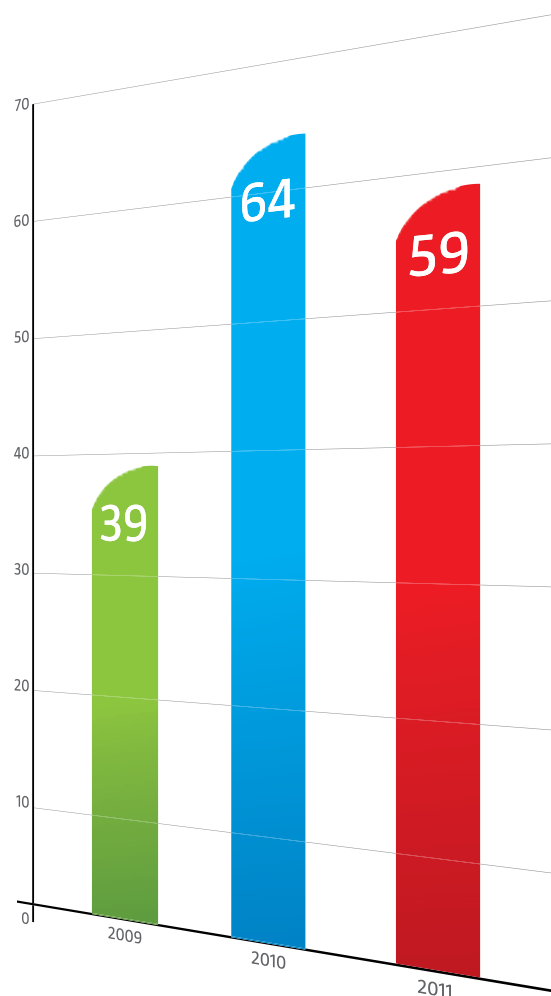
Research Output Units

The research output subsidy units 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 and is based on successful Doctoral and Masters graduates and subsidies generated through academic publications. The monetary value of the subsidy from this source increased over the past three years as follows: R59 million (2010 based on 2008 outputs), R64 million (2011 based on 2009 outputs) and R78 million (2012 based on 2010 outputs).

In 2010, there was a 13.6% increase to 255.51 units for research publications (books, conference proceedings and journal articles) compared to 224.01 units in 2009. This is remarkable given the fact that there was already a 22% increase from 2008 to 2009.

Masters and Doctorate units decreased by 3.26% from 400.966 units in 2010 to 387.899 units in 2011. This was mainly due to a drop in the number of Doctoral candidates graduating from 64 in 2011 (class of 2010) to 59 graduating in 2012 (class of 2011).

Number of Doctoral Graduates 2009 - 2011



Distribution of Doctoral Graduates by Faculty 2010 - 2011

FACULTY	2010	2011
Arts	6	8
Business and Economic Sciences	12	12
EBEIT	10	6
Education	9	6
Health Sciences	5	3
Law	1	-
Science	21	17
Total	64	59

Masters Research Output Units per Faculty 2011

FACULTY	2011
Arts	28
Business and Economic Sciences	69
EBEIT	23
Education	6
Health Sciences	32
Law	8
Science	45
Total	210.899

DHET Research Output Subsidy Units, 2007 - 2011

Year	Journal Articles	Books	Conferences	Publications Total	Research M&D Students	Publications and Students Total
2007	165.04	.33	14.33	179.70	257.46	437.16
2008	156.44	5.99	21.21	183.64	320.88	504.52
2009	195.89	1.68	27.34	224.91	278.9	503.81
2010	200.92	8.98	45.61	255.51	400.966	656.48
2011	283.26	*	*	*	387.899	*
* not yet available						

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

No	SURNAME	UNITS
1	Gerber, Prof TIA	29.144
2	Hosten, Dr E	10.873
3	Schalekamp, Mr H	6.498
4	Downing, Prof TG	5.79
5	Crous, Dr ML	5.5
6	Figueiredo, Dr EP	5.36
7	Smallwood, Prof JJ	5.33
8	McClelland, Prof CW	5.215
9	Olivier, Prof G	5
10	Cowling, Prof RM	4.22
11	Janse van Vuuren, Prof HE	4
12	Van de Venter, Prof M	3.95
13	Adams, Prof JB	3.545
14	Botha, Prof JR	3.54
15	Wood, Prof LA	3.335
16	Christopher, Prof AJ	3
17	Marx, Prof FE	3
18	Naudé, Prof PJ	3
19	Singh, Prof P	3
20	Voss, Prof AE	3
21	De Wit, Prof MJ	2.93
22	Mzilikazi, Dr N	2.85

No	SURNAME	UNITS
23	Strydom, Dr NA	2.84
24	Badenhorst, Prof PJ	2.5
25	Marchand, Mr H	2.5
26	Harran, Dr M	2.334
27	Raga, Prof K	2.21
28	Truter, Prof I	2.18
29	Govindjee, Prof A	2.16
30	Klos, Dr ML	2
31	Lawack-Davids, Prof VA	2
32	Mekoa, Prof IS	2
33	Radder, Prof L	2
34	Schrage, Prof EJH	2
35	Von Bonde, Dr JC	2
36	Webb, Dr NL	2

Research Funding

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 (RDF), Teaching Replacement Grant (TRG), Research Themes Grants (RTG), and the Transformation and Equity Research Grant (TERG).

The internal NMMU research budget (excluding student bursaries, scholarships and Khulisa/Phulisa projects) has grown as follows:

2010	R11 553 530	(-7.74%)
2011	R16 984 855	(+47.01%)
2012	R19 275 161	(+13.48%)

The increase since 2011 is mainly due to the creation of new support categories and increased research productivity by staff members.

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, innovation awards and recognition of top performers in the performing and creative arts.

The following amounts were paid during 2011 (based on 2009 outputs) for research incentives:

1. Faculty RTI Committees: R2 194 908.00
2. Individual researchers: R6 104 479.00
3. Promoter/Co-promoters and Supervisors/Co-supervisors (for M + D's): R381 000.00
4. Rated researchers bonus: R300 000.00

Top-up of National Research Foundation Grants

Two staff members from the Faculty of Engineering, the Built Environment and Information Technology (EBEIT), Prof K Abou-El-Hossein and Prof D Hattingh, were allocated R4 224 765 by the NRF under its National Equipment Programme (NEP). This amount was topped up in 2011 with R2 112 382 by NMMU. The NRF allocated a further R5 297 019 to Prof JAA Engelbrecht from the Faculty of Science under its Nano National Equipment Programme (NNEP).

The NMMU participated in NRF's Institutional Research Development Programme (IRDP). As part of the contractual agreement between NMMU and NRF an amount of R622 752 was contributed as top-up funding.

The NMMU also participated in NRF's Thuthuka Programme providing top-up funding of R661 729 to eight grant holders.

The NRF's incentive funding for rated researchers also requires contractual top-up for those staff members rated in the "L" and "Y" categories. This amounted to R160 000 compared to R222 000 in 2010.

Page Fees

Thirty-eight mainly new/emerging researchers were assisted with the payment of journal page fees, which amounted to R60 974, compared to R57 722 the previous year (51 staff members).

Transformation and Equity Research Grants

Twenty-six black and female researchers were granted support to the value of R237 707 to present papers at national and international conferences.

Research Themes Grant

The Research Themes Grant is aimed at fostering inter-disciplinary research and developing research expertise within the NMMU institutional research themes. An amount of R633 500 (15% less than the previous year) was allocated to 29 staff members.

NMMU Masters and Doctoral Bursaries

During 2011, 357 Masters students and 149 Doctoral candidates received bursaries from NMMU valued at R9 919 million. NRF scholarships (grant holder-linked and free-standing) to the value of R6 498 500 were also managed by the Research Office. Other external postgraduate scholarships amounted to R537 970.

Research Development Grant and Teaching Replacement Grant

The University provides two main streams of funding to its emerging researchers namely, the Teaching Replacement Grant and Research Development Funding. The budget for these funding streams during 2011 totalled R938 865.

External Research Funding National Research Foundation

The National Research Foundation (NRF) remains by far the largest external funder of research at NMMU and awarded R104 708 521.40 in 29 programmes during the 2011/12 Financial Year compared to R49 643 498 in the previous year. The main reason for this dramatic increase was the funding of equipment for the new HRTEM Centre at NMMU.

Included in the NRF allocation is the Technology and Human Resources for Industry Programme (THRIP) in which eight staff members participated in eight projects. The total amount received from NRF was R6 795 407 and from industry partners R10 424 175. It is encouraging to note that the industry contribution increased with just over R3 million in one year.

NRF Grants to NMMU in 2011 per Funding Category	
PROGRAMME	TOTAL
Collaborative Research with National Facilities	R850 000.00
Community Engagement Programme	R506 200.00
Competitive Programme for Rated Researchers	R1 107 139.24
Development Grant for KFD	R25 000.00
Distinct South African Research Opportunities	R38 140.02
Economic Growth and International Competitiveness	R408 419.71
Incentive Funding for Rated Researchers	R3 405 580.97
Indigenous Knowledge Systems	R120 000.00
Institutional Research Development Programme	R3 273 933.49
International Science and Technology Agreements	R17 046 655.87
Knowledge Interchange and Collaboration	R259 300.00
MCM Provincial Funding	R226 394.32
Nanotechnology Flagship Programme	R105 974.51
National Equipment	R33 224 000.00
National Nanotechnology Grant	R11 997 509.60
Rediba	R49 164.74
Renewable and Sustainable Energy Scholarships	R260 000.00
Research Infrastructure Support Programme	R108 500.00
Researchers in Training	R33 190.81
SA Research Chairs	R10 172 661.72
SANHARP	R507 800.00
Scarce Skills Development Fund	R360 000.00
Scholarships and Fellowships Programme	R9 787 200.00
Society, Ecosystems and Change (SEACHange)	R1 391 745.14
South African Square Kilometer Array Project	R342 929.96
Sustainable Livelihoods: The Eradication of Poverty	R116 249.31

PROGRAMME	TOTAL
Technology and Human Resources for Industry Programme (THRIP)	R6 795 407.00
Thuthuka	R1 592 404.00
Unlocking the Future	R160 695.99
Women in Research	R436 325.00
Total	R104 708 521.40

Bilateral Funding

South Africa - Germany:

Prof JR Botha
 Prof Andre Calitz
 Prof Maarten de Wit
 Prof Theo van Niekerk

South Africa - Poland:

Dr Tommy Bornman
 Prof Carminita Frost

South Africa - Kenya:

Prof Saartjie Roux

South Africa - Sweden:

Prof JR Botha
 Prof Japie Engelbrecht
 Prof Paul Webb

South Africa - Russia:

Prof Jan Neethling

International Foundation for Science (Switzerland):

Prof Carminita Frost

National Research Foundation - Deutsche Forschungsgemeinschaft:

Dr Nomakwezi Mzilikazi

Other External Funding

African Laser Centre: R239 000.00

Coega Development Corporation: R100 000.00

Council for Scientific and Industrial Research: R201 233.00

Eskom: R11 517 000.00

National Laser Centre: R852 456.00

Rooibos Council: R80 000.00

SANParks: R405 000.00

Technology Innovation Agency: R4 665 320.00

Water Research Commission: R955 000.00

NRF Research Niche Areas

The Institutional Research Development Programme (IRDP) of NRF seeks to assist higher education institutions in the development and enhancement of their research culture, environment, ethos and practice to become world-class African universities in order to deliver the skills required by the national system of innovation.

The main objectives of the IRDP are to increase the quality of PhDs and other research outputs. Linked to this it seeks to promote staff development, increase the number of rated researchers and facilitate institutional partnerships.

The NMMU had to identify and focus within the context of the IRDP its research activities into a limited number of Research Niche Areas (RNAs) where there were existing strengths and the potential for further development. The four RNAs eventually approved for NMMU by external peer reviewers were all pitched at the highest level, that of "developed RNAs".

Innovative Batch Chemical Technology for Downstream Chemical Products and Processes

Team Leader: Prof Ben Zeelie



Mr Lubabalo Mafu at one of InnoVenton's Small Production Platform rigs.

The research focus of this five-year programme was primarily on the development of alternative production methodologies for downstream chemicals and chemical products through the development of alternative technologies to traditional-batch and semi-batch production technologies. The development and evaluation of opportunities to grow and develop the South African downstream chemicals manufacturing sector was a particular focus of the programme.

Effective chemical process development is an amalgam of synthetic methods, physiochemical properties, purification technologies, and chemical engineering (reactor and separation technologies) - orchestrated in a manner that will produce the desired chemical product safely, in high-quality, reproducible, and cost efficient. This type of integrated and applied research is not normally carried out at universities, which made the programme rather unique in the world.

The following researchers formed part of the programme over the five-year period: Dr Shawn Gouws (Organic Electrochemical Synthesis); Dr Gary Dugmore (Small Production Platforms); Prof Ben Zeelie (Batch Chemical Process Development) and Dr Nigel Harmse (Natural and Renewal Raw Materials). The following students graduated with Masters and Doctoral degrees from the programme: I Asquith (Doctorate); S Buddoo (Doctorate); GR Gordon (Doctorate); MP Thomas (Doctorate); MC Schaefer (Doctorate); C Lombe (Masters); SE Qusheka (Masters); B Mpuhlu (Masters); L Brooks (Masters); N Rust (Doctorate); JR Indurkar (Doctorate); ND Satikge (Masters); PR Makgwane (Doctorate); LR Mafu (Masters); and B Mpuhlu (Doctorate). The programme also resulted in eight peer-reviewed publications, 14 conference presentations and five patents.

Some highlights of the work carried out over the five-year period include the development of a continuous process for the production of p-menthane-3,8-diol, a valuable chemical that can be used in a variety of applications such as insect repellents, bactericides, and others. A small production platform was designed, constructed and optimised in our Kilo-Lab facility. The results of this work were then used for the specification and design of a commercial-scale production reactor capable of producing 120 ton product per year. A second example was the design, construction and use of a small production platform for the synthesis of a new candidate fuel additive from local South African raw materials. This synthesis, which usually involves reacting highly flammable materials under high pressure and temperature, was carried out in a continuous-flow reactor over a solid catalyst safely and approximately 100 kg of the product was delivered for testing purposes.

Business Information Risk and Security

Team Leader: Prof Rossouw von Solms



Prof Rossouw von Solms celebrates with three of his students: Ewald Stieger, Melanie Viljoen and Lynn Fitcher, who got research papers accepted or published in DHET accredited journals during 2011.

This NRF Research Niche Area (RNA) focuses primarily on the managerial aspects of information security and integration. Aspects like information security governance, education and awareness, culture, risk and other human related topics are particularly focused on.

The roots of this RNA go back to the late 1990s when the first NRF niche areas were instituted. During the subsequent fifteen-odd years this RNA has excelled by publishing 47 papers in peer-reviewed journals and close to 100 peer-reviewed conference papers. During 2011, five journal papers were published and another five accepted for publication during 2012. Also during 2011, close on 20 conference papers were presented at national and international peer-reviewed conferences. From a human resource development point of view, this niche area also excelled. Two PhD candidates graduated in April 2011.

Manufacturing Technology

Team Leader: Prof Danie Hattingh

Over the past decade the Manufacturing Technology research group conducted research that served the needs of the manufacturing community through sustainable development and research excellence. The research was first housed within the Manufacturing Technology Research Centre (MTRC) that was later restructured to the Institute for Advance Manufacturing and Engineering Research (IAMER), which is now known as the Friction Processing Research Institute. The research contributed toward the development of the manufacturing community, staff and students.

Principal objectives were to generate engineering knowledge through industry-based research projects, contributing to enhance product quality and productivity of manufacturing processes. Additionally, the research contributed to the development of new manufacturing techniques to support process optimisation and control. This included modeling and simulation of new and existing manufacturing processes to develop intelligent monitoring and control strategies for improved system performance. The niche area was involved in more than 21 articles, 20 artefacts and the successful training of 17 postgraduate students. Over 50 technical reports and one patent were also produced.



Postgraduate students with Prof James, co-editor of the *International Journal of Fatigue*, during a workshop presented on writing skills for engineering publications.

Biodiversity based economy in the Eastern Cape

Team Leader: Prof Graham Kerley

The RNA entitled: "Building a biodiversity based economy in the Eastern Cape" focuses on understanding natural resources and their use in the Eastern Cape.

During 2011, this project had two focal areas: using remote sensing and ground-truthing to assess natural ecosystems, and exploring the linkages between biodiversity and ecotourism. Accordingly, land use/cover change modeling and land degradation assessments were carried out in the Keiskama and Great Fish River catchments and estimations. Above ground carbon stocks were made by PhD student, Mr Nyamugama, using remote sensing and Geographical Information Systems (GIS). Soil CO₂ flux measurements from land cover types ranging from intact, transformed and degraded subtropical thicket vegetation have been conducted by PhD student, Ms Zengeni, using a soil respiration system. From the ecotourism aspect, PhD student, Ms Maciejewski, was able to show that ecotourism may provide support to conservation - and yet may also be in conflict with conservation.

Her work, including the first regional study on the use of private protected areas and the lack of justification of high densities of elephants for ecotourism, has important policy implications.



PhD student, Ms Zengeni, and Prof Vincent Kakembo measuring CO₂ flux from intact thicket vegetation at Amakhala Game Reserve.

Technology Stations

NMMU has two Technology Stations funded by the Technology Innovation Agency: eNtsa, headed by Prof Danie Hattingh; and the Downstream Chemicals Technology Station, headed by Dr Gary Dugmore. The aim of the Technology Station Programme is to assist SMME's to improve their competitiveness and innovation in a selected technical area. The two NMMU Technology Stations assist many SMME's in the Port Elizabeth area.

eNtsa - Technology Station

Team Leader: Prof Danie Hattingh

eNtsa is a Technology Station of the Technology Innovation Agency (TIA). The NMMU-based eNtsa unit is recognised as a prominent research, design and technology support unit for the advanced manufacturing sector in South Africa. The initial focus of eNtsa was the automotive sector with a very strong emphasis on supplier development of component manufacturers. As the expertise of the group grew, the project scope broadened and became more reflective of the wider engineering and manufacturing sector. The expansion in scope created new opportunities enabling the transfer of innovative technologies and applications, proudly developed within the NMMU.

eNtsa's funding is predominantly obtained from two categories of sources. The first stream is from the TIA Grant. Currently, eNtsa has a three-year grant from TIA, which is primarily provided for operational expenses and the establishment of infrastructure to perform technology transfer services. The second stream of income is from paying clients, this could be private business, public funds (SPII), incentive schemes, NGOs or international donors.

Currently, eNtsa consists of 24 members, which include researchers, engineers, academics and office professionals, with contract research projects in excess of R20 million. The operational culture of eNtsa is best summarised by the groups' slogan "innovation through engineering" and eNtsa's Vision: "engineering innovative solutions for a sustainable future". The terms "innovation" and "engineering" are broadly used in today's society. Within eNtsa's context, innovation refers to the creation of better or more effective products, processes, technologies, or ideas that are accepted by markets. On the other hand, engineering refers to the discipline of acquiring and applying scientific and practical knowledge in order to design and build structures, machines, devices, systems, materials and processes that safely realises the improvements to the lives of people.

Apart from academic publications, postgraduate student development, patents and artefacts the most rewarding and tangible output relates to the technology developed and transferred to industry. This encourages an environment in which industry can be presented with unique engineering solutions. Two examples that had the most impact is the development of a nine metre long Friction Stir Welding (FSW) platform for GRW Engineering (GRW) and the collaboration with Eskom using Friction Taper Stud Welding to repair engineering structures.

Firstly, the GRW project allows the company to explore the use of FSW as an alternative manufacturing technique for building road tankers. This technology will provide GRW a global competitive advantage and is envisaged to result in the reduction in production time and cost. Additionally, the added benefit of using FSW will ensure a superior joint quality as opposed to current conventional techniques.

Secondly, the Eskom project relates to the development of the WeldCore™ process. NMMU researchers in collaboration with Eskom have developed and patented this exciting new technique, now trademarked as WeldCore™. WeldCore™ is the result of almost a decade's research based on developing an innovative alternative solution to do in-situ material sampling and reparation of high pressure steam lines for the worldwide power generation sector. This technology is known for its value proposition as a process developed with the aim of assisting with decision-making around remnant life prediction of current engineering structures. Furthermore, the process relates to reducing the risk of unexpected catastrophic failure and reduction of plant downtime, which contributes to substantial cost savings.

A meeting held on 13 May 2011 between eNtsa and an engineering team from Eskom, finalised the details for implementation of an R11 million research contract. This contract, one of the largest research contracts awarded to the NMMU, is in support of late stage research and development for the finalisation and commercialisation of the coring and friction process repair technique, trademarked by the NMMU as WeldCore™.

National Science and Technology Forums-BHP Billiton Award - 26 May 2011



Ms Naledi Pandor, Minister of Science and Technology with Prof Danie Hattingh (Director of eNtsa) and Mr Phillip Doubell (Welding Engineer of Eskom's Resources and Strategy Division) who received the award "Research leading to an innovation", on behalf of the group.

The eNtsa team won the 2011 National Science and Technology Forum (NSTF) Award for "Research leading to an innovation by a team" for the WeldCore™ technology. This award winning process was developed by the eNtsa group and Eskom's Innovation and Sustainability Division. This category award is for individuals/teams that have made outstanding contributions to science, engineering and technology through research that has led to an innovation in South Africa.

The NSTF-BHP Billiton awards are intended to identify and celebrate individuals and organisations for exceptional contribution in SETI. These awards were presented by the Minister of Science and Technology, Ms Naledi Pandor, and the Department of Science and Technology at a gala event held at the Emperors Palace on the 26th of May.

On Saturday, 3 September 2011, a team of engineers from eNtsa successfully implemented the first commercial application related to the patented WeldCore™ technology, jointly developed by NMMU and Eskom. This was done at the Rotek facilities in Johannesburg on a component with a R1.2 billion replacement value.

The application included the removal of a core sample and repair of the removal site by a Friction Taper Hydro Pillar Processing platform developed specifically for this application at eNtsa.



Removal of a core sample and repair of the removal site by a Friction Taper Hydro Pillar Processing platform developed specifically for this application at eNtsa. The cylindrical core sample removed from the turbine rotor disk allowed Eskom's engineers to accurately determine subsurface creep damage.

The cylindrical core sample removed from the turbine rotor disk allowed Eskom's engineers to accurately determine subsurface creep damage. This information provided adequate scientific evidence to create confidence in extending the service life of the current structure. This consequently now will lead to the postponement of capital expenditure and result in a major cost saving for Eskom. This momentous event is the result of hard work and research, co-developed by eNtsa and Eskom, over the past eight years.

Longest Friction Stir Weld Demo - 6 October 2011



eNtsa's group of engineers on the welding platform designed and commissioned for a leading road tanker manufacturer, GRW.

eNtsa successfully completed the longest Friction Stir Weld in Africa. This event took place on 6 October 2011 at 15:00 at the Motive Tooling Warehouse.

The weld completed measured more than eight metres long using five millimetre aluminium plates on a newly developed platform by the NMMU for GRW, a local road tanker manufacturer in Worcester.

The success of the longest welding attempt event will be the stepping stone to transfer the technology for South Africa and the first commercial roll out of Friction Stir Welding for Africa.

Downstream Chemicals Technology Station

Team Leader: Dr Gary Dugmore

The Department of Science and Technology (DST) initiated the Technology Stations Programme (TSP) to create support for SME's in targeted business sectors. Situated within InnoVenton: NMMU Institute for Chemical Technology, the Downstream Chemicals Technology Station (DCTS) forms part of the TSP, and operates in the chemical and allied industries. The DCTS's main focus is on three main activities, namely the provision of (i) technology support services, (ii) analytical and testing support services, and (iii) training support services.

The focus of the technology support services is to specifically interact with industries, including Small, Medium and Micro Enterprises (SMME's) in the secondary and tertiary chemical manufacturing industry with the view to developing and improving products and production process technologies, stimulate technology transfer and increase skills levels.

The scope of technology support services is to: (i) provide a comprehensive support function to industries in the secondary and tertiary chemical manufacturing sector, from R&D, toll production, specific technology support, training and quality improvement; (ii) assist the targeted industries and SME's in the assimilation of technologies that could increase their global competitiveness; (iii) provide a link with technology sources and technology information; (iv) provide a centre for technology demonstration (specifically alternative production technologies) and technology transfer for the downstream chemical manufacturing sector; (v) provide access to InnoVenton's services to the downstream chemical manufacturing sector; and (vi) assist in the establishment of relationships between InnoVenton and SME's and industry based on mutual trust and interdependence.

Examples of technology support projects during 2011 include: the development of a small production platform for methylisocyanate (MIC), a valuable but toxic intermediate in the synthesis of plant protection chemicals (the objective is to develop a production platform that will provide just enough MIC to be consumed entirely in a next step, thereby eliminating any handling, transport and storage); the evaluation and scale-up of an enzymatic process for

the extraction of Inulin (dietary supplement and pro-biotic) from chicory; and the electrochemical production of antioxidants for the food and flavour industry.

The analytical and testing services are a vital component of the Technology Station's activities. Not only does it provide access for small companies to very expensive facilities (which most probably cannot afford) but also to expert knowledge that is not available in-house. Although not specifically measured, the provision of these services make a substantial contribution to economic development in the region.

During 2011, a substantial investment into the Station's capabilities has been made possible by stakeholders, in particular the TIA and Sasol, to acquire specialised equipment for the creation of a fuel chemicals production, analysis and testing platform. This investment has improved and expanded the scope of support that can be provided to the industry sector, as well as the training of high level manpower through postgraduate student training. During 2011, analytical and testing services were provided to 262 industry clients, mainly from the Eastern Cape region.

The training support services provided through the Technology Station activities include the provision of short learning programmes (e.g. specialised training in chemometrics), and providing internship opportunities to recently qualified students (from across the country) in order to gain experience in a working environment. During 2011, a total of seven interns were accommodated within the Station's activities.



Small production platform for methylisocyanate (MIC) synthesis.

Intellectual Property and the Commercialisation of Research (Innovation)

The NMMU continues to drive innovation and technology transfer by creating awareness of Intellectual Property issues and through the protection, management and commercialisation of the NMMU's Intellectual Property. In 2011, the NMMU awarded the Innovation and Technology Transfer Award for the first time, recognising individuals and teams that go beyond research and transfer research outcomes for societal benefit. The NMMU also makes a significant contribution to regional innovation.

The following is a brief account of the progress made in 2011. Innovation projects at various stages of development and from various disciplines are also highlighted.

Intellectual Property Awareness

Seminars on Intellectual Property are arranged by the Department of Innovation Support and Technology Transfer to provide staff and students with information regarding protection of various forms of Intellectual Property. These seminars are given by patent attorneys who are also available for consultation by staff and students. There are no patent attorneys in Port Elizabeth, so patent attorneys come from Cape Town to provide this service.

Intellectual Property Protection

During 2011, 14 disclosures were received from staff and students (from 12 in 2010) and eight provisional patent applications were filed (from five in 2010). Two "international" (Patent Cooperation Treaty) patent applications were filed. Novelty search reports received during the Patent Cooperation Treaty phase of the patenting process were positive, with two patent specifications receiving "clean" search reports i.e. all the patent claims were deemed completely novel and completely inventive by the examiner.

Five design applications were filed for designs on knitwear, and one trademark application was granted for WeldCore™.

Intellectual Property Management

Twenty projects in the pre-commercialisation stage were managed in 2011, with 75% of these focused around one or more pieces of registrable Intellectual Property owned by the NMMU. Two projects have attracted significant late stage research and development funding to proceed to commercialisation. Forty percent (40%) of the projects are pending further research, with the balance being discussed with potential market partners.

Intellectual Property Commercialisation

Three projects have been fully commercialised and the NMMU continues to be significantly involved in these projects. Two of the projects, preservation of roses and zinc oxide replacement, have included the creation of spin-off companies and the NMMU plays a role in these companies on the Board as well as assisting with advice on patent strategies. The companies involved in these projects are African Floralush and Rubber Nano Products, respectively. The third project involves the licensing of two pieces of software developed by the Student Counselling Centre of the NMMU. The software has been licensed to other institutions in South Africa.

Innovation and Technology Transfer Awards

The NMMU's Innovation and Technology Transfer Awards recognise those individuals and teams that go beyond research and transfer research outcomes for societal benefit. This is usually through the creation of new and improved products, services and processes and may be through commercialisation (i.e. for commercial gain, not necessarily by the University) or through social projects. Society benefits from innovation and technology transfer through economic development, access to better products and services, or through new and innovative social projects.

The inaugural award was won by Prof Danie Hattingh and his team at eNtsa for their work on commercial applications for novel friction welding technologies. Prof Hattingh and his team have successfully developed friction processing as an alternative joining and repair process for different materials and applications.

Contribution to Regional Innovation

The NMMU, along with 12 other local organisations, launched the Regional Innovation Forum in March 2011. 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. The Regional Innovation Forum has held a number of events to discuss topics of interest, and hosts a website showcasing innovation events and information.

The NMMU is also finalising a business plan for a Science Park / Incubator at the NMMU. This will provide an indication of funding requirements and sustainability of a Science Park.

The NMMU is the anchor institution for the Regional Technology Transfer Office, which serves all Eastern Cape universities. This is the first regional office approved by the Department of Science and Technology and funded by the National Intellectual Property Management Office. The office opened in August 2011.

Highlights of Innovation Projects:

Preservation of roses



Factory employees preparing Iluba roses for distribution.

African Floralush (Pty) Ltd, in which the NMMU holds shares, produces long life fresh roses using technology patented by the NMMU to extend the vase life of fresh roses. The roses, called Iluba, are preserved using a chemical preservation process developed by InnoVenton, the NMMU's Institute for Chemical Technology, based on initial research done by Tinie Maske of Kirkwood. An entrepreneur, JJ Viljoen, successfully grew the company, which attracted venture capital funding from the Industrial Development Corporation in 2009.

African Floralush is based in Muldersdrift, Gauteng, and has created job opportunities for more than 60 previously unemployed people. This location was selected as it offers easy access to rose farm producers and the international transport network. The company currently supplies roses to Europe as well as Canada and Japan. There are also a number of local distributors for the roses.

Replacement of zinc oxide



ZR6 Pallet.

A novel rubber chemical that can provide cost savings of up to 40% and can increase productivity by 40% was developed by Robert Bosch and his supervisors during his doctoral studies. The chemical also provides an environmentally-friendly alternative to zinc oxide, which is currently used in rubber products. The product is being sold by Rubber Nano Products (Pty) Ltd, in which the NMMU owns shares, although the volumes are still small. All the market trials have been positive, with a number of industrial rubber manufacturers switching to the product.

The largest market for this product is in passenger vehicle tyres, and tests have been positive at a major international tyre company. The product is currently made at a toll production facility near East London and formulation work is done in the NMMU laboratories.

Algae-to-Energy



Algae in hanging bags.

The Algae-to-Bio-energy project being run by InnoVenton, the NMMU's Institute for Chemical Technology, is focused on developing algae-based technologies for environmentally sustainable energy use and energy recycling. There are three main focus areas: production of algae using photobioreactors, using algae to bind waste and fine coal to produce higher value coal agglomerates, and producing biocrude oil from algae liquefaction. The project has received funding from the Department of Science and Technology's biofuels initiative, which is managed by the Technology Innovation Agency.

The project has attracted significant attention, given the current international focus on climate change and production of renewable energy, and was invited to exhibit at the COP17 Conference in Durban. Stakeholders and funders include the Department of Science and Technology, Eskom, and the Technology Innovation Agency. The University of Cape Town is collaborating on the project.



Algae greenhouse.

Friction processing applications



Prof Danie Hattingh and the welding machine.

Prof Danie Hattingh and his team at eNtsa have, in collaboration with Eskom, developed and patented a process that can assist with decision-making around life prediction of current engineering structures, including power stations. The process reduces the risk of unexpected catastrophic failure and reduces plant downtime, which contributes to substantial cost savings as well as increased safety.

The novelty of the process, trade marked as WeldCore™, is that a metallurgical sample can be taken without having to puncture the inner wall of the steam pipe and a structurally sound weld can be made to fill the blind hole created. In 2011, a team of engineers from eNtsa successfully removed a core sample from an Eskom turbine and repaired the removal site using the WeldCore™ process. This will lead to the postponement of capital expenditure and result in a major cost saving for Eskom.

The process will be commercialised via a spin-off company, Mantacor, which will provide services to local and international companies requiring material testing.

MaXhosa by Laduma™

Laduma Ngxokolo's Xhosa-inspired contemporary knitwear range was presented at Cape Town's Design Indaba as well as London Fashion Week in 2011. Named the "Best Emerging Designer" by *Marie Claire* magazine in 2011, the BTech Textile Design alumnus has developed his knitwear range under the MaXhosa by Laduma™ brand, which was started in May 2011 through a partnership between his company and the NMMU. Laduma was inspired to create a high-quality, eco-friendly Xhosa-inspired knitwear range for amakrwala (Xhosa male initiates), who currently dress in international brands soon after their initiation ceremony.



A selection of knitwear from the MaXhosa by Laduma™ brand.

The NMMU has assisted Laduma in registering five of his designs in South Africa and Europe, as well as providing him with incubation space at the Second Avenue Campus. The NMMU also provides him with mentorship and guidance, particularly as there are significant challenges in manufacturing high-quality knitwear locally.

Braid remover



Ms Khwezikazi Mkentane in the laboratory.

In the course of her MTech studies an NMMU Chemistry student, Khwezikazi Mkentane, identified that the crucial part of removing hair braids is detangling the matted hair. She decided to create a braid removal formulation that would solve this problem and facilitate the process of removing braids from human hair.

The formulation is the subject of a South African patent, and product evaluation trials on a number of volunteers were successful. The product will be licensed to a company in the cosmetic and hair product industry.

Expanding Focus on the Scholarship of Teaching and Learning



Prof Cheryl Foxcroft, Dean: Teaching and Learning

NMMU is committed to provide a responsive learning environment that fosters student success and holistic development. Among the ways to enhance teaching and learning at NMMU has been 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.

In 2009 and 2010, 8% and 11.5% of NMMU's subsidy-generating publications fell in the SoTL category. Of the publications that qualified for subsidy in 2011, 8% had a SoTL focus. While this might be interpreted as being that the number of SoTL-related publications decreased, the number of SoTL-related subsidy-generating publications in fact increased from 42 in 2010 to 44 in 2011. Breaking this into the various subsidy-earning categories, 5% of the published articles, 21% of the book chapters and 12% of the published conference proceedings that gained subsidy at NMMU in 2011 had a SoTL focus.

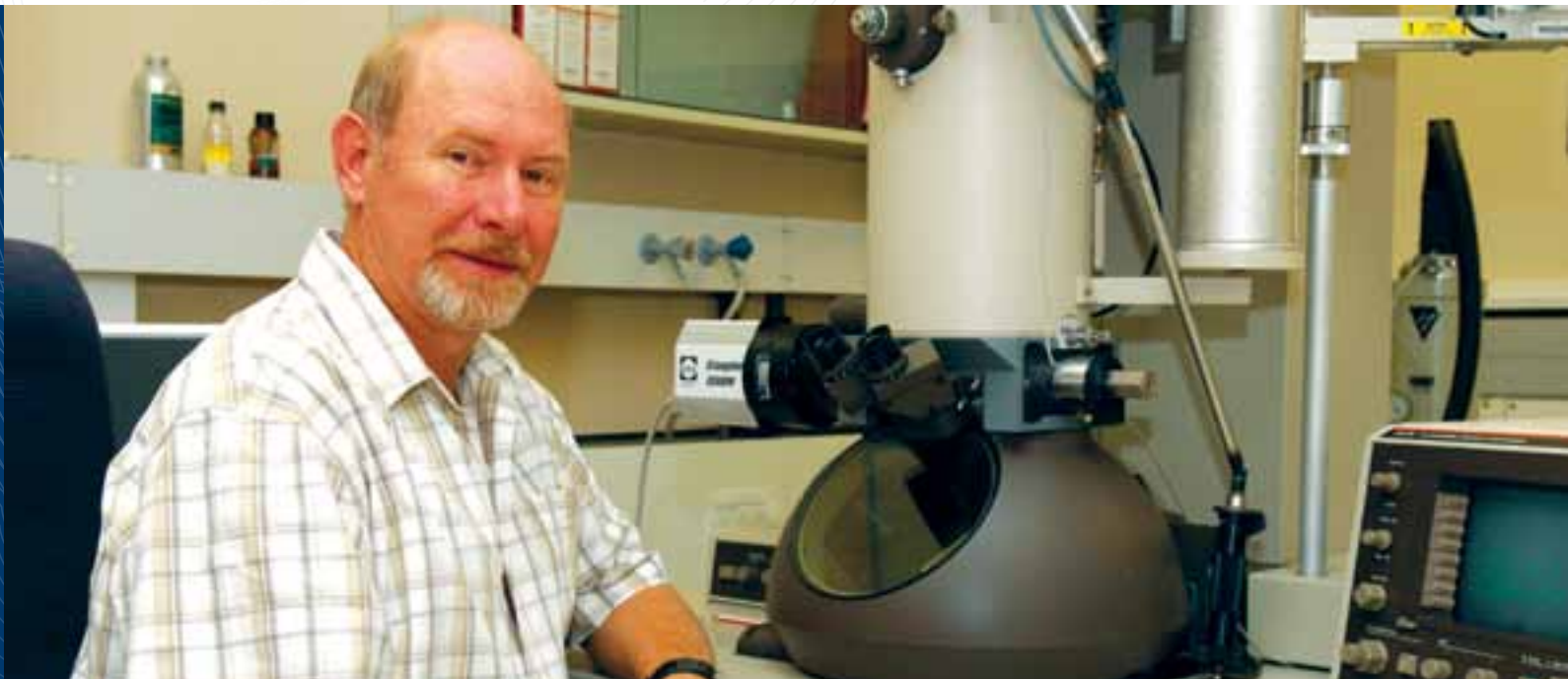
When the titles of these publications were thematically analysed, nine themes emerged. These were:

1. **Discipline-specific teaching and learning at a higher education level:** For example: Knoetze, E. Die onderrig van die inheemse reg: Bevoeg of beperk deur boeke? *Obiter*, 31(3); Wood, L.A. Lessons from a postgraduate certificate in education experience. *Acta Academica*, 43(4); Hibbert, L.L. Language development in Higher Education: Suggested paradigms and their applications in South Africa. *South African Linguistics and Applied Language Studies*, 29(1).

2. **Higher education curriculum studies:** For example: Feyt, L.E., Calitz, A.P. & Greyling, J.H. An investigation into the need for incorporating software testing and quality assurance into a higher education curriculum. *Proceedings of the 2011 Annual Conference of the South African Computer Lecturer's Association*.
3. **HIV/AIDS education:** For example: Baxter, J., Wood, L.A. & Austin, P.W. Reconsidering and repositioning HIV/AIDS within teacher education. *International Journal of Children's Rights*, 29(4).
4. **Academic literacies development in higher education:** For example: Kloss, M.L. Genre pedagogy in the mediation of situated literacies acquisition: The experiences of apprentices in a higher education community of practice. *Journal for Language Teaching (SALT)*, 45(1); Israel, H.F. Engineering soft skills? My responsibility. A case study at the Nelson Mandela Metropolitan University. *Proceedings of the First Biennial Conference of the South African Society for Engineering Education (SASEE)*; Knott, A., Lombard, H. & McGrath, P. Towards collaborative practices of academic citizenship in mechanical engineering education at a comprehensive university: A critique of discourses. *Proceedings of the First Biennial Conference of the South African Society for Engineering Education (SASEE)*.
5. **Student development and support:** For example: de Jager, M.J. & Ntlokwana, N. The prevalence and characteristics of higher education peer helping programmes: Managerial perspectives. *South African Journal of Higher Education*, 25(4); Van Lingen, J.M., de la Harpe, D.L. & Wannenburg, I. A cross-sectional exploration of the relationship between undergraduate nursing student wellness and academic outcomes in a South African higher education institution. *South African Journal of Psychology*, 47(3).
6. **Role of feedback:** For example: Lamb-du Plessis, S.M. & Simpson, Z. Students expectations of feedback on draft writing. *Per Linguam: A Journal of Language Learning*, 27(1); Harran, M. What higher education students do with teacher feedback: Feedback implications. *South African Linguistics and Applied Language Studies*, 29(4).
7. **Advancing teacher education:** For example: Delport, A.C. & Mufute, J. Training the non-specialist music teacher: Insights from a Zimbabwean case study. *Journal of Music Arts in Africa*, 7(1); du Plessis, A. & Webb, P. An extended "learning by design" framework based on learner perceptions. *American Journal of Research in Mathematics, Science and Technology Education*, 15(2).
8. **Enhancing education in schools:** For example: Singh, P. Xenophobia experienced by teachers in secondary schools: An exploratory study on curriculum reform in the Nelson Mandela Metropole. *Africa Education Review (Educare)*, 8(2).
9. **Pedagogical innovations:** For example: Padayachee, P., Boshoff, H.H., Olivier, W.A. & Harding, A. Technology to enhance the teaching and learning of mathematics. *Pythagoras*, 43(4); Nel, J. & Barnard, L. *Proceedings of the 2011 Annual Conference of the South African Computer Lecturer's Association*.

In addition to the subsidy-generating research outputs, it should also be noted that 10 Masters' dissertations and three Doctoral theses had a SotL-related focus. Examples are a Masters study by Wienand, M.A. entitled: *Empowering teachers to render learner support to learners who experience reading barriers*; a Masters study by Beck, R.A. entitled: *Retention and dropout rates for a sample of national higher certificate students in the School of Accounting*; and a Doctoral study by Ntaote, G.M. entitled: *Exploring ways of assisting Lesotho educators to offer care and support to children orphaned and rendered vulnerable by HIV and AIDS*.

Research Excellence



Prof Jan Neethling

Centre for High Resolution Transmission Electron Microscopy

The Centre for High Resolution Transmission Electron Microscopy (HRTEM) at NMMU, which was launched on 11 October 2011, has already attracted collaborators from all over the world. The Centre houses a suite of the most advanced electron microscopes on the African continent. All the research instruments, worth about R96 million, have been successfully installed in the Centre and are providing excellent results. One of the biggest challenges facing the world today is the provision of enough clean energy for fast growing economies and it is therefore not surprising that the Centre is also involved in energy technology research. A common challenge in the design of future fusion reactors, new nuclear fission reactors and high efficiency solar cells is the development of new materials that can withstand the extreme conditions that exist inside the reactors and in the case of solar cells, improve their efficiencies.

All the research instruments, worth about R96 million, have been successfully installed in the Centre and are providing excellent results.

The Centre is working with a team of Russian scientists on advanced materials for fusion and fission reactors; research on graphene is conducted in collaboration with scientists from Oxford University; research on diamonds for electronic devices involves scientists from the University of the Witwatersrand; electron microscopy research on semiconductor devices, which include quantum dots and emitters of ultraviolet light, is performed for collaborators of the NMMU Physics Department and electron microscopy investigations on luminescent crystals called nanophosphors are performed for physicists from the University of the Free State. Close research collaboration with Sasol focuses on nanoparticle catalysts used in Sasol's coal-to-liquids technology. Various joint projects on the beneficiation of platinum, vanadium, zirconium and other metals involve researchers from iThemba Labs, the University of Cape Town, Stellenbosch University and the Nuclear Energy Corporation of South Africa.

A significant achievement was the discovery of a migration mechanism of the fission product silver in the coated fuel particles used in high temperature nuclear reactors. This finding is an extremely important result since it can explain how radioactive Ag may be released by intact coated particles at elevated temperatures. Top international scientists have been working on this problem since the 1980s and to date no satisfactory explanation for the silver release problem has been found.

It is envisaged that nanotechnology in South Africa will benefit significantly from the cutting-edge research that the Centre is doing.

These cutting-edge results, documented in a paper entitled: *Palladium Assisted Silver Transport in Polycrystalline Silicon Carbide* by Jan Neethling, Jacques O'Connell and Jaco Olivier, were published in the journal *Nuclear Engineering and Design*. This publication was also identified by the Target Selection team of *Advances in Engineering* as being of "special interest to the Engineering community" and it was featured online in *Advances in Engineering*, which has considerable world-wide exposure. The Centre for HRTEM also collaborates with scientists involved in the development of future high temperature nuclear reactors in the USA. Recognition for the research carried out in the Centre is also evident by the invitation to the director of the Centre to present a talk at the international Microscopy Conference held in Kiel, Germany in 2011. The international journal *Imaging & Microscopy* also published a summary of the talk presented in Kiel.

Prof Jan Neethling, Director of the Centre for HRTEM, said the Centre is well-positioned to make contributions in the field of nanoscale materials characterisation and development for the South African nuclear build programme and the steel used in older coal-fired power stations. It is envisaged that nanotechnology in South Africa will benefit significantly from the cutting-edge research that the Centre is doing for the universities and research institutions in South Africa.

NMMU Researcher of the Year

Botany Professor Richard Cowling has published extensively – in the scientific and popular literature – on the ecology and conservation of the Fynbos, Succulent Karoo and Subtropical Thicket Biomes. He is widely acclaimed for his contribution to the theory and application of conservation science.

The NRF has rated him a world leader in conservation science, and he has been awarded a Pew Fellowship (USA), a Distinguished Service Award by the Society for Conservation Biology (USA), Cape Action for People and the Environment Gold Award for Innovating Conservation, a Flora Conservation Award by the Botanical Society



Prof Richard Cowling

of South Africa, and is an Elected Foreign Associate of the National Academy of Sciences USA.

He is further widely acclaimed for his work on threatened ecosystems and his determination to work closely with stakeholders to ensure that research actually leads to the implementation of solutions.

Furthermore, he was listed on www.ISIHighlyCited.com, a website for the world's most cited authors over the 25-year period, 1981 to 2005. Prof Cowling knows full well the valuable services nature provides – from supplying water, fuel and fibre to mitigating climate change – and is doing all he can to ensure nature's safeguarding. Focusing predominantly on the Eastern Cape, he has identified areas that need to come under conservation management.

He also maps the locality of "ecosystem services" – nature's services to man – and identifies strategies to safeguard them. "These are services we take for granted – like mountain catchments that ensure clean and adequate supplies of water, indigenous insects that pollinate our fruit crops, or veld that provides grazing, giving us meat and fibre."

Where necessary, he and his team provide the research for developing strategies to restore these ecosystem services, like removing thirsty alien plants from mountain catchment areas. He is also part of a team of scientists spearheading a unique project, in which spekboom – a hardy succulent shrub with an extraordinary ability to store carbon – is being planted in degraded veld in several nature reserves, and 300 trial plots across the Eastern Cape. "We are restoring an ecosystem service, namely, the ability of natural systems to sequester carbon, thereby reducing the impacts of climate change ... This may be one of the biggest restoration trials in the Southern Hemisphere," says Prof Cowling.

Music Education



Prof Aletta Delport

Prof Aletta Delport has research interests in music education, arts education, identity and social and educational transformation challenges. Her passion is researching social and educational transformation, but most specifically: “inner transformation”. Her attention has been captured by the value of music and the arts, and how these contribute to social transformation. Additionally, she also explores multicultural arts and music education, against the backdrop of the historical domination of Eurocentric traditions.

At the core of her research is addressing the question: “How can we stimulate inner transformation?” Here she uses her own transformation journey as an Afrikaner who grew up in the heydays of apartheid as a point of reference. She published for example a paper entitled: *Looking into the future with the past in mind* and this approach fuels her research efforts. Unlike René Descartes, who formulated *cogito ergo sum* (I think therefore I am), Prof Delport also interrogates how Afrikaans songs informed Afrikaner identity during the apartheid years, arguing, *canto ergo sum*: I sing therefore I am.

She therefore uses music education and the arts to foster and facilitate aspects of being human. For example, one of her PhD students explored the potential of music (hip hop), to help adolescents to resolve their identity crisis. One of the papers she read in 2011 reflected on pedagogy and how her own identity was shaped by fundamental pedagogics. She spends a lot of time researching and reflecting about the confluence of emotions, social transformation and education, and recently published a book, entitled: *Emotions, Social Transformation and Education*.

“As I continue to do what I am doing in terms of research, I too will change, I will grow,” she concludes.

She has been enabled to do her work because of the conducive research and working climate that the Dean of the Faculty of

Education has fostered. She operates from the “paradigm of disruption”, and positions herself in the “critical paradigm”. She relishes the space given to question phenomena. She is a firm believer in participatory research, but also acutely mindful not to objectify the participants. Her conviction is that once we cultivate humanity and humanness in people, transformation will ensue. Prof Delport is enamoured with “generating data”, as opposed to “gathering data”; inner driven as opposed to externally imposed transformation, which tends to be long-lasting.

Going forward, Prof Delport will continue researching emotions, social transformation and education.

At the core of her research is addressing the question: “How can we stimulate inner transformation?”

“As I continue to do what I am doing in terms of research, I too will change, I will grow,” she concludes.

Science and Maths Literacy



Prof Paul Webb

Science and mathematics literacy are Prof Paul Webb’s research areas. The fulcrum of his research is the use of science in society, teaching learners early in their educational journey the skill of argumentation, and promoting science literacy at school level.

Teaching science and mathematics becomes a challenge to the learners to whom English is not a first language. Challenges of a second language rear its head. Learners already face a “three language problem”: the language of instruction, the home language, and the challenge of bilingualism.

A further area under his probe is answering the question whether there is education for sustainable development.

An intriguing finding has been the discovery that once science and mathematics literacy have been improved, the ability for problem solving also improves among the learners - thereby demonstrating a nexus between general literacy and abstract intelligence. Unrelated skills, like being able to read map scales coalesce with other factors, to build the overall intelligence of students.

He collaborates with Gothenburg University and Uppsala University in Sweden, exploring what scientists understand with the concept "matter".

A further area under his probe is answering the question whether there is education for sustainable development.

"Fluid intelligence" and "cumulative intelligence" are areas that further attract his research attention.

Prof Webb states that: "Education is what is left after you have forgotten everything you learned."

Estuarine Ecology



Prof Janine Adams

Prof Janine Adams focuses on aquatic botany, conservation management and estuaries. She also worked closely with the Department of Water Affairs in the development and implementation of the National Water Act. The link between environment, biodiversity and climate change questions are areas that attract her attention.

"Linking up with what is topical", is what she advises for researchers to be on the pulse of their discipline - and getting ideas on what future research to follow. She also finds it prudent to be responsive to national and international challenges in the areas of her speciality.

She contributed to the writing of the St Lucia Estuary book, and continues to provide expert advice to the National Biodiversity

Assessment Project, and development of the Biodiversity Act. Her research addresses the important area of implementation. Water quality management for estuaries is also under her purview.

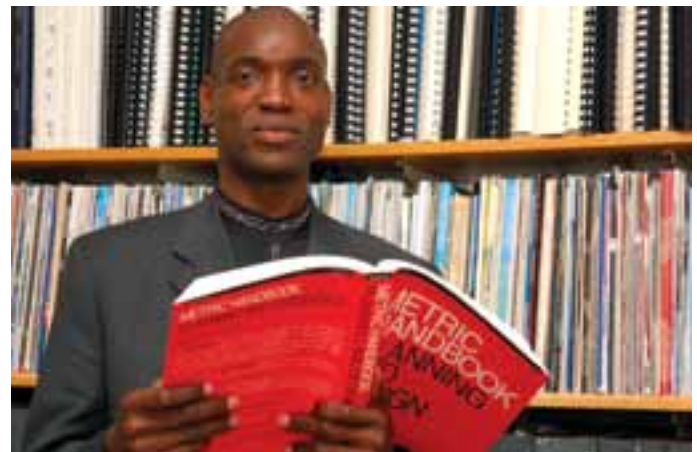
In the year under review, three PhD students completed their studies under her supervision.

She works closely with the CSIR, other universities, KwaZulu-Natal Wildlife, Cape Nature Reserve and internationally collaborates with some colleagues in the field, at universities in Belgium and France.

In the year under review, three PhD students completed their studies under her supervision. She is currently supervising 18 Masters and Doctoral students. To date, she has successfully supervised 22 Masters and 11 Doctoral students. Indeed a remarkable completion and success rate by her students.

The one challenge she relishes, yet is wary of, is teaching students who are underprepared.

Construction Management: An Eclectic Approach



Prof Winston Shakantu

Prof Winston Shakantu takes a closer look at small and medium enterprises in the area of construction. He also looks at the components of risk management in construction.

Prof Shakantu's passion is action research to resolve problems.

In the year under review, he produced a PhD in Construction Logistics. Additionally, another PhD, and two Masters students also graduated under his supervision.

He attained his NRF rating, and full professorship. He is thankful to the Dean of the Faculty “for giving him wings to fly”. He has collaborated with researchers from Minnesota State University in the USA and the University of Technology in New Zealand. He will be undertaking further collaborative work with universities in San Diego and Berkeley. For future research, he wants to expand his work on construction logistics, improve research outputs, and see growth in postdoctoral research student numbers. His passion is action research to resolve problems. One of the vexing challenges is to help SMME’s manage cash flow - not mixing personal money, with business money.

Prof Shakantu values working with managers from Eskom and the Coega Development Corporation.

Individual and Organisational Performance



Prof Cecil Arnolds

Prof Cecil Arnolds’ main research thrust is leadership and improving the performance of people and organisations. Looking ahead, he would like to undertake more research on improving leadership in Africa. He is currently supervising two Doctoral students.

His Doctoral student, Dr Alice Nyambura Koigi, was nominated to the government committee on review of state corporations in Kenya, as a result of her DBA study on Kenyan public enterprises. Prof Arnolds mostly collaborates with fellow staff members and students.

As Research Director of the NMMU Business School, his immediate and future goal is to increase the research output of the Business School through the effective management of MBA treatises, DBA theses and staff research.

Among national and international collaborators he notes Prof Christo Boshoff (Stellenbosch University), Regina Stofile (Walter Sisulu University) and Dr Oren Dayan (University of the Witwatersrand). He has also written conference papers and journal articles with Prof Bruce Klemz (St Cloud State University, USA).

As Research Director of the NMMU Business School, his immediate and future goal is to increase the research output of the Business School through the effective management of MBA treatises, DBA theses and staff research.

These are important research outputs in order to achieve the following, among others: making a contribution to the business development and management education in our region, country and the world at large through cutting-edge and relevant research; building the research image and stature of the Business School; achieving international accreditation for the Business School and its academic programmes.

He serves on the peer-review boards of the following journals: *SA Labour Relations Journal*; *Management Dynamics*; *Journal of African Business* and *Journal of Leadership and Development*. He is a regular reviewer of papers for the SAIMS and IBC conferences as well as peer-reviewer for the NRF.

Research Chairs

Research chairs provide a pivotal leadership link to the research teams across the broad spectrum of research endeavours; whether it is breakthrough research in HIV and AIDS within the higher education sector, or advances in automotive engineering, and international exposure-leadership and direction giving, the chairs prove crucial.

Collaboration, engagement, remaining focused, encouragement and fostering the conducive research climate are cues set by the chairs.

Additionally, the tangled skein that is mathematics education in South Africa - hitherto seemingly refractory to modulation - has received considerable attention and promising results. It is beginning to emerge, showing a turning of the tide for the better in mathematics education and benchmarked against international best practice, and “next practice”.

HIV and AIDS Education Research Chair

The HIV and AIDS Education Research Chair, an initiative of the Faculty of Education, 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. An advisory committee supports the Chair in providing strategic advice on the research programme. The second year has been exciting, enabling consolidation of work undertaken in the first year, while opening up opportunities for several new initiatives in the field of HIV and AIDS Education.

Addressing HIV and AIDS in South Africa could be seen as having had an about-turn with the Government's new invigorated approach to addressing the epidemic. Such an about-turn is augmented and accelerated through the core business of universities, i.e. teaching, research and engagement. Research in particular has a key role to play in contributing to knowledge production, but also to social change, by locating social science research more often in a participatory paradigm, which has a social change agenda. Engaging, for example, in visual participatory research, with the participants themselves determining the focus of the research, shaping the research process, making their voices heard, envisaging relevant solutions to their problems and taking up their own agency, could contribute to social change. Social science research then not only produces knowledge, but also contributes to agency and making a difference, especially in the lives of the people in the communities we as universities serve. In doing so, we "democratise" research and contribute to transformation in South Africa in the age of AIDS. This conceptual framework frames the research of the Chair and is inline with what the new *Charter for Humanities and Social Sciences* (DHET, 2011) proposes. Working within this framework, 2011 saw projects being rolled out and one edited book, eight chapters and one article being produced, with another book, four chapters and four articles accepted for publication in 2012.

Central to the work of the Chair is the HIV and AIDS Education Community of Practice, supported by the HEAIDS Programme under the auspices of Higher Education South Africa. A workshop, *Research Method and Pedagogy Using Participatory Visual Methodologies*, held over two days at the NMMU North Campus Conference Centre, brought together more than 50 academics from different higher education institutions all over South Africa, teaching and researching in the field of HIV and AIDS Education. The workshop focused on visual participatory methodologies and a publication, *Using a different lens for HIV and AIDS Education*, emanated from the workshop, aiming to extend this scholarship of research and teaching in the field of HIV and AIDS education and research in South Africa.

Various research and engagement projects funded by the NRF and SSHRC were continued with and a new proposal submitted to the NRF (successful). Eleven conference papers were read with several publications emanating from them. Two conferences: *What difference does this make? The arts, youth and HIV and AIDS* (Durban) and the *HIV and AIDS Education Conference: Envisioning Africa without HIV and AIDS: The role of Education* (Zanzibar); and one workshop: *HIV and AIDS Education Community of Practice Symposium, Research Method and Pedagogy: Using Participatory Visual Methodologies* were co-hosted.

Five postgraduate students are underway with their Doctoral studies. One postdoctoral fellow, Dr Mathabo Khau, extends the work of the Chair through engagement in projects and her numerous publications.



Prof Mitchell, from McGill University (Montreal, CA), leading a panel discussion on Visual Participatory Methodologies at the 2011 HIV and AIDS Education Community of Practice Symposium, held at NMMU.

VWSA-DAAD International Chair in Automotive Engineering



Prof Theo van Niekerk

The Chair in Automotive Engineering is a cooperation arrangement between NMMU's School of Engineering, NMMU's Office for International Education, supported by the German Academic Exchange Service (DAAD) and a leading automotive manufacturer, VWSA.

The main aim of the Chair is to facilitate increased innovation and international competitiveness of the integrated motor manufacturing

industry in the Eastern Cape through appropriate human resource development that will ensure an adequate number of high-level trained human capital in science, engineering and technology (SET). The Chair aims to provide champions in SET with leading-edge expertise to establish and advance an effective connection between higher education and the automotive manufacturing industry.

The Chair assists in the establishment of new research and development trends, identifies opportunities and initiatives within the field of materials and manufacturing technology, facilitate knowledge transfer into teaching and learning concepts and integrate it into undergraduate and postgraduate engineering programmes and further international opportunities and cooperation between the NMMU, German universities and automotive industry.

Research project highlights:

Low-cost Automation for VWSA Press Shop

Exchange student from Germany, Mr Denny Hermann, was responsible for designing and developing a “Low-cost” Automation System for the Press Shop at VWSA. The team consisted of NMMU and VWSA staff as well as Mr Hermann.

Recycling of automobiles



The dismantling team.

The Chair, in collaboration with Ostfalia University in Germany, VWSA and the Automotive Industry Development Centre (AIDC) initiated a project on the recycling of automobiles. Five German students and two South African VWSA trainees worked together on dismantling a VW Polo to determine the recyclability and reusability of the vehicle. This was done to determine whether the locally produced Polo complies with European Union standards. It was found that the vehicle is 95% reusable.

NMMU Racing



NMMU Racing team ready to compete.

NMMU Racing successfully competed at the Hockenheim, Germany, event in 2011. NMMU became the very first African team to successfully compete in this competition and finished 66th out of the 78 participating teams. The project has led to several joint research projects between the NMMU and Ostfalia University in Germany.

VWSA-NMMU Solar Car



NMMU Solar Car.

A Solar Vehicle Project was initiated by the Chair, which will increase the research capability into renewable energy at the NMMU. The project will entail the design and development of a solar powered vehicle that will expose students across a range of study fields to conduct research into the renewable energy market and build on the base of accumulated learning. The team will look to compete in the South African Solar Challenge in September 2012.

The success of the VWSA-DAAD Chair was evident when both VWSA and the German Academic Exchange Service (DAAD) once again committed to the collaboration for a further three years, with VWSA increasing the annual funding amount to R748 000. The extended collaboration will conclude on 31 March 2015.

DST/NRF Chair in Nanophotonics



Prof JR Botha

Professor JR Botha, a Professor of Physics at the NMMU, has been the holder of a national research chair in Nanophotonics since 2008. He 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 90 papers published or accepted for publication in peer-reviewed international journals.

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. Chemical bath deposition of 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 very 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, ranging from missile tracking to 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.

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 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 an LED. The ability to produce high-quality, high intensity white LED's for solid state lighting is a worldwide endeavour, with a potential annual turnover of billions of US dollar.

"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," says Prof Botha.

FirstRand Foundation Chair in Mathematics Education

The FirstRand Foundation Chair in Mathematics Education commenced in January of 2011 and was conceptualised and set up alongside three other chair positions nationally to help address the mathematics education crisis in the country. The primary aim of the Chair at NMMU is to extend and research the impact of a successful Techno-Blended Mathematics Teaching and Learning (TBTL) model that was developed by the Govan Mbeki Mathematics Development Unit. A secondary aim of the Chair is to demonstrate leadership in mathematics education in the Eastern Cape region by initiating and implementing sustainable development opportunities at the FET level for Mathematics educators and learners.



Prof Werner Olivier, Head of the Govan Mbeki Maths Development Unit, Chair in Mathematics Education.

Some of the significant developments since the inception of the Chair include:

- The successful implementation of a skills development and TBTL classroom programme in 10 pre-selected research secondary schools in the Nelson Mandela Metro;
- The expansion of a successful maths and science incubator school programme for learners to an additional three rural districts of the Karoo. More than 300 Grade 11 and Grade 12 learners with potential have benefitted from this structured development programme;
- The establishment of a satellite GeoGebra institute linked to the GeoGebra Institute in Cambridge, UK. GeoGebra is a recent and exciting open-source dynamic mathematics software programme designed to support the teaching and learning of mathematics at all levels. An international community of Mathematics teachers and researchers linked to more than 90 such GeoGebra institutes worldwide share a common vision of empowering mathematics educators with technology skills to teach mathematics for deeper understanding;
- The successful consolidation of the DVD resource basis of the TBTL model into an ultra-modern and flexible network executable flash video resource for use through IT networks, PC's and mobile Touch Pad devices. This development richly added to the flexible use and mobility of the TBTL model for teaching mathematics;
- Collaboration with the South African Agency for Science and Technology Advancement (SAASTA) to implement maths and science skills development training within the framework of the TBTL model. More than 200 in-service educators from seven provinces were successfully trained in 2011; and
- A PhD degree was awarded to a member of the Mathematics and Applied Mathematics Department, Dr Pragashni Padayachee, in 2011. Her study was based on the use of the TBTL model in the NMMU mathematics incubator school programme for learners.

GMSA Chair of Mechatronics



Prof Igor Gorlach

The GMSA Chair of Mechatronics has been involved with local industry and international partners since its establishment in 2009. The initiative aims to facilitate cooperation between industry and academia through research and innovation, with the overall objective to enhance human capital development in the automotive sector.

Within this framework, medium-term objectives include the provision of research capacity and the identification of applications for new technologies in the field of Mechatronics for automated manufacturing systems. To this end, the Chair, Prof Igor Gorlach, has established research collaborations with leading international universities and research institutions in several countries. These include ongoing collaborations with the University of Florida (USA), Aachen University (Germany) and the Institute for Industrial Technologies and Automation - ITIA (Italy), with a focus on robotics and machine tools. In addition, the Chair is working towards establishing further collaboration with the University of Luxembourg (Luxembourg) in the field of advanced manufacturing technologies in general assembly. This work is closely aligned with Adam Opel AG, a General Motors company, and is a promising research venture. Student research projects are also being conducted through the Advanced Manufacturing Technology Strategy (AMTS), a national collaboration initiated by the Department of Science and Technology.

Another key focus area is industry-based engineering projects and research as a means of providing assistance for manufacturing-related development and problem solving. The Chair encourages staff and student involvement in developing unique and innovative solutions to industry problems. Departmental staff members have been working with local automotive component supplier S&N Rubber in the development of a low-cost production cell for manufacturing moulds and dies. Undergraduate and postgraduate students are also involved in projects based at General Motors South Africa (GMSA) and other local companies in the automotive sector.

In 2011, five undergraduate projects were completed, as well as the commencement of two postgraduate projects. Included amongst these projects is the design of an intelligent station control system for an engine assembly line, which is being implemented in phases at the GMSA plant. Further initiatives to enhance student involvement in engineering design were prepared for implementation in 2012, particularly in terms of a society for young engineers and designers.

The Chair aims to balance the objectives of research and industry-based projects. Strong university-industry cooperation is being developed with GMSA through ongoing projects, which comprises a significant amount of short-term work in order to derive quantifiable benefits for both industry and academia. Research is the other key focus area to achieve the Chair's goals. During 2011, a collaboration between NMMU, GMSA and Aachen University (Germany) was established for research into advanced robotics applicable to the automotive industry and continues to build on current research activities. Five papers were published in international peer-reviewed conference proceedings during 2011, with work continuing into 2012. The collaboration with Aachen University in the fields of robotics and metrology has also resulted in the publication of a joint article in an international journal. Prof Gorlach is enthusiastic about the current and future prospects of the Chair and the team is working hard towards expanding the activities going into the future.



Reconfigurable machining centre developed by the GMSA Chair research group.

The GMSA Chair research group developed a reconfigurable machining centre, which is capable of performing conventional milling/drilling/boring operations with an automatic tool changing facility, as well as electric discharge machining of parts in a single set-up. This project is part of the Affordable Automation Strategy initiated by the Department of Science and Technology and supported by the Technology Innovation Agency. It is envisaged that the developed centre will be used by automotive component suppliers and specifically by local SMME's.

Earth Stewardship Science Chair



Earth Stewardship Science.

A new transdisciplinary science, called Earth Stewardship Science, is now emerging, which will integrate research on, and teaching in, our understanding of the resilience of Earth-Life and Social Systems. It will further help us, collectively, to better define and value our life-support system within which we will design new entrepreneurial avenues to mitigate, adapt, and manage the global commons, especially across Africa, and with everyone as stakeholder.



Prof Maarten de Wit

The Chair is to develop Earth Stewardship Science as a new concept at the Nelson Mandela Metropolitan University. The intention is to introduce undergraduate-based modules that will be relevant for students as they embark on university studies. Senior (postgraduate) activities in Earth Stewardship Science are also envisaged.

The Chair commenced mid-July 2011. Immediately upon arrival, Prof Maarten de Wit began to meet with each faculty, sharing the vision with key persons to gain support for the new focus. He also presented his vision to Manco and to the Deans Forum, and further hosted a workshop linked to Secondary Ion Mass Spectrometry (SIMS) in November 2011.

New DST/NRF Research Chairs

The South African Research Chairs Initiative (SARChI) is designed to significantly expand the scientific research base of South Africa in order to support implementation of national Research and Development (R&D) policies. NMMU was granted four Tier 1 Research Chairs and initiated a process to identify candidates to fill these prestigious positions. The four Chairs are:

Research Chair in Earth Systems Science

This research chair will broaden the current biodiversity/ecology/sustainability focus to include physical and chemical Earth processes. Research will be undertaken into the links between local, African, and global bio-geo systems, and between the current and past environment to develop a perspective on environmental evolution and anthropogenic impact and consequences. The Chair will pursue fundamental disciplinary research in the physical and chemical nature of Earth and planetary materials, and will also engage in research on the evolution and impact of solar system processes on Earth systems. Both practical and theoretical research will be undertaken, aimed at a holistic integration of natural and social science disciplines relevant to Earth systems and the human impact on them.

In addition to engaging with most departments in the Faculty, it is anticipated that the Chair will also work closely with the Sustainability Research Unit in the Science Faculty, as well as with the Africa Earth Observatory Network (AEON), which recently located to the NMMU. The potential for inter-disciplinary collaborative research is enormous.

Research Chair in Microfluidic Bio/Chemical Processing

This chair will focus on the use and development of microfluidic and other small production platform concepts in the chemical and biotechnology fields. Research undertaken by the Chair will be on the development of production processes using the advantages of micro- and small production devices. It is envisaged that this research will advance the current understanding of the chemical or biochemical mechanisms at work during chemical or bio-processing and then fitting those mechanistic requirements for optimum performance and control into a fit-for-purpose reactor technology. The Chair is expected to make a significant contribution to the ability of South Africa to derive benefit from developments in chemical/biochemical processing through basic and applied research and the training of postgraduate students.

Research Chair in Shallow Water Ecosystems

This research chair will undertake research to address the ecosystem functioning of shallow water ecosystems such as coastal wetlands, estuaries and surf zones, with particular emphasis on health and conservation to support management. This builds on an existing strength of NMMU, which has an established track record in research outputs and postgraduate training in estuaries, sandy beaches and surf zones and has already made a contribution to this field of knowledge internationally. Past research activities have focused on linking science, policy and management and it is envisaged that this will remain a focus of the Research Chair. New programmes will be advanced in fields of water quality management, ecotoxicology and coastal wetlands.

Research Chair in Law of the Sea and Development in Africa

This chair will undertake research on the legal regime governing the South African maritime zones and the exploitation of their resources, development in Africa and the law of the sea, including relevant indigenous law and marine tourism law as a way to promote development. The premise of the research is that further growth in Africa requires an adequate locally grown marine-law environment, which underpins safe and world-standard port and shipping activities to maximise international trade opportunities, and to ensure that Africa assumes its rightful place in international negotiations regarding exploitation and protection of marine resources. The Chair will provide a knowledge base from research, as well as increased human capacity in all African countries to make a contribution in the fast and increasingly complex contemporary developments in this field.

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 2011, there was a period of consolidation of research entities resulting in 26 registered research entities. At the highest level were institutes (three), followed by centres (nine) and units (fifteen). The entities fulfilled their mandates successfully during 2011 by producing high-level outputs in the following categories: peer-reviewed journal articles, books and book chapters, conference proceedings, Masters and Doctoral graduates and patents.

- Peer-reviewed journal articles - 169
- Books and book chapters - 16
- Conference papers - 168
- Masters and Doctoral graduates - 96
- Patents - 4

Name	Leader	Faculty
INSTITUTES		
Friction Processing Research Institute	Prof Danie Hattingh	EBEIT
Institute for Information and Communication Technology Advancement	Prof Rossouw von Solms	EBEIT
InnoVenton: Institute for Chemical Technology and Downstream Chemical Technology Station and its sub-entities	Prof Ben Zeelie	Science
CENTRES		
Centre for Educational Research, Technology and Innovation and its sub-entities	Prof Paul Webb	Education
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 for High Resolution Transmission Electron Microscopy	Prof Jan Neethling	Science
Centre of Expertise in Forecasting	Prof Igor Litvine	Science
Telkom Centre of Excellence and its sub-entities	Prof Janet Wesson	Science
UNITS		
Family Business Unit	Dr Margie Cullen	Business and Economic Sciences
Labour Relations and Human Resources Unit	Prof Dave Berry	Business and Economic Sciences
Unit for Applied Management Sciences	Prof Elroy Smith	Business and Economic Sciences
Unit for Economic Development and Tourism	Prof Richard Haines	Business and Economic Sciences
Unit for Professional Ethics	Prof Piet Naudé	Business and Economic Sciences
Intercultural Education Unit	Prof Nonnie Botha	Education
Unit for Visual Methodologies for Social Change	Prof Naydene de Lange	Education
Research and Outreach Unit for Technology Education	Prof Henk de Jager	EBEIT
Unit for Lean Process Development	Dr Ann Lourens	EBEIT
Cyclic Peptide Research Unit	Prof Pieter Milne	Health Sciences
Drug Utilisation Research Unit	Prof Ilse Truter	Health Sciences
Labour and Social Security Law Unit	Prof Adriaan van der Walt	Law
Coastal and Marine Research Unit	Dr Derek du Preez	Science
Sustainability Research Unit	Prof Christo Fabricius	George
ENTITIES REPORTING TO THE DEPUTY VICE-CHANCELLOR: RESEARCH and ENGAGEMENT		
HIV & AIDS Research 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

Leader: Prof R von Solms



IICTA has been operating in 2011 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 2011, which include five PhD's.

Five PhD students and five Masters students graduated in April 2011 and a further six candidates were successfully evaluated and will graduate in April 2012. Two additional staff members of IICTA that got rated by the NRF were Prof Darelle van Greunen and Dr Kerry-Lynn Thomson. Seven journal articles were published in accredited articles. Twenty-nine international conference papers and thirteen national conference papers were delivered.

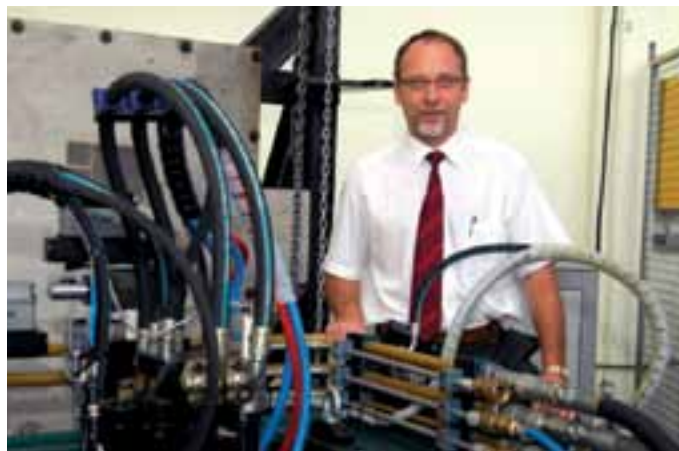
Friction Processing Research Institute

Leader: Prof DG Hattingh

The Friction Processing Research Institute (FPRI) aims to support the NMMU's mission to identify and serve the needs of the international/national friction processing community by contributing to the sustainable development through high-quality research, technology development and continued human resource development.

In 2011, the group won the National Science and Technology Forums - BHP Billiton Award for the category: "Research leading to an innovation by a team". Additional highlights within the field of

friction processing in 2011 include: the success of the International Friction Processing Seminar and Workshop conducted in August/September; the first commercial application of the WeldCore™ technology in September; and the longest Friction Stir Weld demonstration in October.



Institute for Chemical Technology and Downstream Chemicals Technology Station (InnoVenton)

Leader: Prof B Zeelie



During 2011, InnoVenton continued to implement specific strategic interventions as per its Board approved strategic plan to effect a deliberate shift in the ratios of its three KPA's. InnoVenton's Research and Development activities were dominated by the microalgae-to-energy project, a project that has become a Department of Science and Technology (DST) demonstration project and which is funded through two substantial sponsorships (DST through the TIA, and Eskom). Within the Teaching and Learning Key Performance Area (KPA), InnoVenton, in collaboration with industry and international training service providers, curricularated a new interdisciplinary diploma programme, the Diploma in Chemical Process Technology, which received HEQC approval in December 2011. Within its Engagement KPA, InnoVenton undertook eleven technology

development R&D projects on behalf of, and in collaboration with, SME and SMME stakeholders under its technology support activities. In addition, it provided expert analytical services to 262 clients, involving over 1600 test samples. Financially, InnoVenton has managed to maintain a sound position despite the undertaking of a major expansion of its facilities and capabilities (total investment of >R8 million). The entity is now well positioned to move forward to the next level.

CENTRES

Telkom Centre of Excellence

Leader: Prof J Wesson



The NMMU/Telkom Centre of Excellence 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. It is housed in the Departments of Computer Science and Information Systems and Physics in the Faculty of Science.

The Centre comprises of three units. The first one is the Distributed Multimedia Application Unit (DMA). Its main focus is to investigate the development of intelligent user interfaces (IUI's) for contact centre management and coordination. The sub-goals of this project are inter alia to develop visual interfaces and visual data mining tools to support the visualisation of customer profiles and history, contact centre information and trend analysis and demand forecasting.

The second leg of the Centre is the Optical Fibre Research Unit housed in a modern, well-equipped laboratory and in the Department of Physics of the Science Faculty. The Unit conducts research on the factors necessary for upgrading to the Next Generation Network (NGN) in South Africa. It also investigates the factors necessary for the deployment of "Fibre-to-the-Neighbourhood" (FTTX) in metropolitan areas in South Africa. Linked to this it studies the issues limiting high-speed optical fibre networks.

Photovoltaics represents the third unit in the Centre. It undertakes a detailed study of various aspects of solar energy module design and performance, in order to provide a University research base that will enable the industrial partners to better utilise energy resources. It aims to design and build a prototype Laser Beam Induced Current (LBIC) system for use in characterising solar cells and PV modules and linked to this to develop a prototype concentrator photovoltaic system for remote applications. Great emphasis is placed on developing human resources through the training of skilled graduates with expertise in the technical aspects of solar energy, for South Africa's present and future needs.

The Centre, in 2011, produced seven papers presented at international conferences and twenty-two papers presented at national conferences of which several were presented by students. There were eleven articles published of which all were published in ISI and IBSS journals. Five PhD students and eight research Masters students graduated during the review period. There were two patents registered and a total of R1 297 167 grant funding secured during 2011.

Centre for African Conservation Ecology

Leader: Prof G Kerley



The Centre for African Conservation Ecology (ACE) again performed well in 2011, with significant achievements in terms of research output, including 23 refereed scientific publications, one book and 27 conference presentations, with two Honours, 17 MSc and 12 PhD students busy with their degrees. Staff and students of CACE 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-focused, with a broad variety of funders supporting the Centre. Human resources remain strong and were boosted in 2011 through two additional academic staff joining the Centre. Research associates also serve to strengthen this aspect. The Centre is financially healthy, and has had considerable success in fulfilling its goals for the period 2007-2011, and has also successfully set out its strategic framework for the period 2012-2016.

Centre for Energy Research

Leader: Dr E van Dyk



The Centre for Energy Research (CER) performed well in 2011, with research outputs including three refereed publications, two international conference presentations, sixteen national conference presentations, two MSc and one PhD student graduates.

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. 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

Leader: Prof P Webb



Members in the Centre for Educational Research, Technology and Innovation (CERTI) published six articles in ISI and IBBS indexed journals and seven in DHET accredited journals. Seven articles were published as international conference proceedings, three book

chapters were written and published and one creative output was produced (see Visual Methodologies for Social Change Unit report). Six papers were presented at international conferences and six at national conferences. Two Masters degree studies by research, two by coursework and research, and four PhD studies were supervised to completion (the candidates graduated in April 2011). Eleven PhD student projects were supervised during the course of the year as well as three Masters degree studies. Six funded projects were run as planned. All units under the umbrella of the Centre ran within the financial means available to them.

Centre for Expertise in Forecasting

Leader: Prof I Litvine



At the launch of the Centre of Expertise in Forecasting, from left to right (front): Kirshnee Moodley, Farai Mlambo, Siphumlile Mangisa, Prof Igor Litvine, Edmund Ahame, Nenekazi Mkuzangwe. From left to right (back): Paul Swanepoel, Danie Venter, Calven van der Byl, Abel Motsomi, Thandekile Nyulu, Dr M.C. du Plessis.

Five Masters students and one PhD student graduated in the year under review. One of the students is now permanently employed at the NMMU. Others were also employed by industry and other South African universities. Seven presentations at international conferences and twelve presentations at national conferences were presented by the members of the Centre. A total of eleven articles in journals and technical reports were published. Activities of the Centre included training, workshops and national workshops (conference type) in Forecasting. Several grants were received from the NRF, and international relationships are growing (France, Norway, Ukraine). The first issue of the journal *FAME* was also released by the Centre. Financial status is sound and we expect the turnover to double in the next year and exceed R1 million.

Centre for the Advancement of Non-Racialism and Democracy

Leader: Mr A Zinn



Standing at the back from left to right: Mr Allan Zinn, Director: CANRAD and Dr Adriaan Lombard, FET Subject Advisor for History, PE District DoE with students from Pearson High School.

CANRAD celebrated a second year of functioning on 23 March 2012. Tremendous progress has already been made in terms of lodgement within the University and the Nelson Mandela Bay Metro. Their outputs in terms of SAPSE publications as well as engagement activities belie the small staff complement (four full-time).

The successfully piloted *The Herald*/NMMU Community Dialogues continued into 2012. Their "Scholarship of Engagement" approach with regards to socially engaged research has ensured deepening contact with at least three faculties.

CANRAD continues to build strong networks and partnerships locally, nationally and internationally to give effect to an important NMMU and national mandate in South Africa today.

Centre for High Resolution Transmission Electron Microscopy

Leader: Prof J Neethling

The Centre for HRTEM was officially opened on 11 October 2011 by the Higher Education and Training Minister, Blade Nzimande. All the electron microscopes and related instruments with a total value of R96 million have been successfully installed and commissioned in the new CHRTEM. The Master Funding Agreement between the NRF and NMMU was signed on 27 March 2012 and the process of advertising for Centre staff will start as soon as the Conditions of Grant document for the annual operating expenses of the CHRTEM is signed. This document has been finalised by the NRF on 23 April 2012.



Launch of HRTEM Centre, 11 October 2011: Switching on of HRTEM by DHET Minister Blade Nzimande. From left to right: Minister Blade Nzimande, Prof Derrick Swartz, Dr Albert van Jaarsveld, Judge Ronnie Pillay, Prof Jan Neethling and Ms Santie Botha.

The outputs (publications and students supported) of the Centre on 31 March 2012 were nine journal articles (all ISI and IBSS), 10 conferences (three international, of which two were published; seven national attended), one Masters degree (by research), and three Doctoral degrees.

Built Environment Research Centre

Leader: Prof W Shakantu



The purpose of the Built Environment Research Centre (BERC) is to conduct built environment industry originated research, facilitate the learning of industry sponsored MSc and PhD candidates, and engage in extensive collaboration with other research institutes regionally, nationally and internationally.

The NMMU Built Environment Research Centre (BERC) was officially recognised by a Senate Resolution in March 2011. The Centre's first task was to source external funding. This was achieved via R1 million per annum for three years funding from the Construction Industry Development Board. The Centre hosts three PhD students, two Masters, a postdoctoral fellow and a research associate.

In 2011, BERC researchers published four journal articles and thirteen conference papers, of which seven were international conference papers and six were national conference papers.

UNITS

Cyclic Peptide Research Unit

Leader: Prof PJ Milne

The Cyclic Peptide Research Unit (CPRU) has an established track record in terms of research outputs (both at postgraduate degrees and peer-reviewed publications), unfortunately the problem of lack of staffing has arisen resulting in a slower rate of research outputs. At present, Prof Milne is the only full-time lecturer in Pharmaceutical Chemistry and Veterinary Pharmacology and is supervising three PhD students, two MSc and one MPharm student. He is also the co-supervisor of two MSc students. This supervision, along with an increase teaching and administrative load (HoD: Department of Pharmacy) makes it increasingly difficult to publish research. This is unfortunate, as the programmes have shown significant promise in identifying potential active drugs that could benefit the industry and wellbeing of people.

Drug Utilisation Research Unit

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 health care resources, with specific emphasis on the management of medicines. Research outputs of DURU during 2011 included: eight international peer-reviewed publications, seven peer-reviewed articles in a professional journal, one MPharm student who graduated and 21 presentations at international conferences. Ilse Truter was the NMMU Faculty of Health Sciences Researcher of the Year based on her 2010 research output.

HIV & AIDS Research Unit

Leader: Dr J von der Marwitz

The NMMU HIV and AIDS research entity's most significant achievement being the successful presentations made at the SAHARA Conference and the networking with national and international colleagues involved in HIV and AIDS Research. The Unit appointed a research associate, Dr L Steenkamp a specialist dietician, who was instrumental in the facilitation of the nutrition workshop at the conference. The workshop was also conducted in collaboration with the PE Hospital Complex. The Unit formed part of the stakeholders involved in the coordination and planning of the conference and workshop, which was successfully held in November 2011.

Labour and Social Security Law Unit

Leader: Prof JA van der Walt

The Labour and Social Security Law Unit (LSSLU) continued to present and expand high-quality training and research output in the form of articles, seminars and conferences on Labour Law. During 2011, it specialised in Education Labour Law. It also set the scene for expansion of research and training in other SADC countries.

Unit for Economic Development and Tourism

Leader: Prof R Haines

The Unit for Economic Development and Tourism experienced distinct success during the period under review. It expanded the projects under its purview, showed a significant increase in terms of the various research outputs, and has attracted financially substantive projects for the near and middle terms. It is also providing the secretariat for three significant local and regional economic development ventures, namely the Eastern Cape Local Economic Development Education Forum; the HEI Local Economic Consortium; and the NMB Maritime Industry Cluster. Given the expansion of activities on most fronts, the question of upgrading the Unit to a Centre will be accorded serious consideration during the strategic planning exercise scheduled for later this year.

Coastal and Marine Research Unit

Leader: Dr D du Preez

During 2011, the IECM changed its name to the Coastal and Marine Research Unit (CMR). This was done in order to better reflect the goal of the CMR to conduct research in the coastal and marine environments to improve our understanding of them so that they can be better managed and sustainably utilised. The goal of the CMR is to conduct relevant research into the coastal and marine environments to ensure that these ecosystems will continue to provide all the amenities and resources for our generation and for many generations to come. To this end, the members of the CMR are conducting increasingly collaborative research into wetlands, estuaries, sandy beaches, rocky shores, mixed shores, Algoa Bay and offshore into the ocean as far as the Mozambique channel. The research includes fundamental research where gaps have been identified through to research related to management and rehabilitation of over-utilised resources. The members of the CMR have attracted sufficient funding to drive the research that they are doing and the CMR has reserve funds of just under R1 million that can be used to encourage and facilitate further research efforts.

Unit for Applied Management Sciences

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 in 2011: 43 international and national conference papers; 19 journal articles; 24 books and book chapters; 16 Masters and Doctoral degrees completed; 19 BCom/BTech treatises completed and eight other publications in 2011. Members received various research-related awards and grants.

Family Business Unit

Leader: Prof E Venter

During 2011, the Family Business Unit gained further momentum in realising its mission of becoming the leading Family Business Unit in Africa. The focus of the Unit, now in its second year, has been on building a reputation in the specific field through research outputs, supervision and engagement with family businesses and people who work in this field professionally. From a zero base, the Unit has managed to establish a database of 500 family businesses, deliver on its commitment to research and trained 12 Family Business Consultants this year. Other highlights and achievements for the year included:

- Hosting and launching a public event whose aim it was to make the Unit known to the public;
- Six papers were presented at international conferences, of which one received "The Best Paper Award" and two were presented at national conferences;
- There were four articles published in ISI and IBSS journals and two published in South African journals;
- One book was published; and
- Two Doctoral students are currently being supervised and two MBA students completed their treatises.

Unit for Visual Methodologies for Social Change

Leader: Prof N de Lange

The Unit for Visual Methodologies for Social Change was established towards the end of 2010 by the HIV and AIDS Education Research Chair, its mission being to advance the study of visual and participatory methodologies in education settings. Drawing on innovative research methodologies is key in the South African context, and particularly in the context of the HIV epidemic, shifting the boundaries of what counts as research and how it is disseminated. The work of the Unit is clearly located in a participatory paradigm and as such has the potential to contribute to social change. The outcomes and accomplishments of 2011, the first full year of the Unit, provide a firm base for extending the use of innovative research methodologies to more researchers and also to other disciplines and contexts. The research outputs produced were as follows: four international conference presentations, one national conference presentation, three journal articles accepted for publication and two published book chapters and one in press.

Unit for Professional Ethics

Leader: Prof P Naudé

The Unit for Professional Ethics has succeeded in producing research outputs, maintaining its teaching commitments in applied ethics in various academic programmes in the Faculties of Arts and Business and Economic Sciences and contributing to engagement activities with external stakeholders. The research outputs generated in 2011 were: three journal articles (one ISI and IBSS; two SAJ) and a book was submitted for publication.

Sustainable Research Unit

Leader: Prof C Fabricius

During 2011, the Sustainable Research Unit (SRU) focused on two key objectives: increasing publication outputs, raising awareness amongst students and the public on sustainability issues, raising additional enabling funds, and forming national and international partnerships. Outputs included four peer-reviewed papers, three popular articles and seven papers presented at symposia.

In addition, two public workshops and four public lectures on sustainability issues were delivered. Formal partnerships in the form of jointly funded projects and MoUs were formed with the Centre for Complexity at Stellenbosch University, South African National Parks and the Institute for Water Research and the Environmental Education and Sustainability Unit at Rhodes University. Informal research partnerships were forged with Stockholm University, CSIR, CSIRO in Australia, Eden District Municipality, Department of Environmental Affairs and the South African National Biodiversity Institute, while informal engagement partnerships were formed with emerging and commercial farmers, the South Cape business sector, Eden District Municipality, George Municipality, Department of Agriculture Forestry and Fisheries and Western Cape Agriculture. The SRU is going from strength to strength and has entered a phase of rapid growth.

Research and Outreach Unit for Technology Education

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. Some exciting projects during 2011 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-year students. The preliminary results obtained from this project are very promising. Blended Learning and Curriculum Design were two other major projects that ran during 2011. The outputs from the Unit increased to five articles and eight conference papers. Five new projects were identified for 2012, which will bring the total number of active research projects to nine. The Unit will continue to align its goals with Vision 2020 during the year 2012 in its pursuit to promote and enhance the scholarship of teaching and learning.

Research Capacity Development

NMMU continues to make substantial investments in initiatives aimed at realising Vision 2020, and its strategic vision to increase the research capacity of emerging researchers.

These initiatives have included the following:

Next Generation Academic Development Programmes

Two focused interventions were piloted during 2011 in an effort to address the need in higher education institutions to transform the academic workforce in order to meet the competencies required in academia in the 21st century.

The first programme, the Early Career Development Programme (ECDP), was piloted with 14 participants with representatives from each of the faculties. The ECDP aims to fast track the development of these academics in the areas of teaching and learning, research, and academic management.

The second programme, the NMMU's Next Generation Initiative aims to make a significant contribution towards growing a cohort of potential staff as part of the next generation of academics. The first four successful applicants were appointed as Associate Lecturers for a period of three years. These incumbents are from scarce skills academic programmes and form part of the University's succession planning in the identified disciplines.

During 2011, a number of capacity development interventions were offered to support staff and postgraduate students as follows:

- Research Capacity Development workshops, which included aspects of research project management, research career development, research supervision, and research methodology.
- Writing retreats aimed at increasing the research outputs, especially among emerging researchers (staff and post-graduate students).

Postdoctoral Fellowships

Nineteen Postdoctoral Fellowships were hosted by NMMU in 2011. Fellowships were funded by the NMMU Council, internal departments or units, and 12 fellowships were funded or co-funded by external funders including the NRF, Claude Leon Foundation and the MRC. NMMU's contribution in respect of fellowships totalled R1 273 853.

Profiled below are five postdoctoral fellows:

Dr Craig Tambling



Dr Craig Tambling is a NRF funded postdoctoral fellow currently working in the Centre for African Conservation Ecology (ACE), based in the Zoology Department. He is predominantly based in the Addo Elephant National Park, continuing long-term predator-prey research in collaboration with the SANParks. Dr Tambling's past research has revealed that buffalo have altered their behaviour to increase their ability to defend juveniles within herds. The Addo buffalo have amalgamated into larger breeding herds and now use open landscapes during dangerous times when lions are known to be most active. As a consequence lion predation on buffalo has declined significantly since the lion reintroduction in 2003.

Dr Tambling's current research projects include investigating the impact that large predators have on prey species; and models for large carnivore reintroductions into small-medium sized reserves. Dr Tambling is also involved in collaborative research with the Endangered Wildlife Trust (EWT) cheetah metapopulation project and with researchers from North Carolina State University (USA), and Queens University in Belfast (Northern Ireland) investigating cheetah foraging ecology. He also collaborates with researchers from George Mason University in Virginia (USA) and Lincoln Park Zoo in Chicago (USA), investigating the temporal responses of prey species to predator presence.

Dr Surekha Krishnan



Dr Surekha Krishnan with Ms Esther Akinlabi.

During her tenure, Dr Surekha Krishnan was mainly involved in two projects related to friction stir processing (FSP) / welding (FSW). The first focused on investigating the cryogenic treatment to improve wear properties of AISI H13 tool steel. This study aimed at comparing the wear behaviour of AISI H13 tool steel and Bohler K390 P/M steel (9% v) before and after cryogenic treatment. The second project focused on the improvement of corrosion resistance of pure copper for intrauterine devices.

Copper-containing IUDs are increasingly being used as an effective contraceptive. However, there appears to be several problems with coarse grained copper, such as the side effects from burst release of cupric ion during the first one to two months of implantation, low transfer efficiency of cupric ion from copper element and corrosion breakage. Despite great efforts to solve these problems, the burst release of cupric ion in the uterine environment is still an issue for immediate attention. This project aimed to produce fine grained copper with better bio-compatibility. Besides her involvement in the above projects, Dr Krishnan also gave expertise technical guidance to Doctoral student, Esther Akinlabi (who graduated in April 2011) and Masters student, Victor Ngea. She also published two articles on FSW.

Dr Marisa Botha



Dr Marisa Botha is a NRF funded postdoctoral fellow in Languages and Literature Studies. She conducts research on Antjie Krog's autobiographical fictional texts. She focuses on techniques of self-representation used by the autobiographical subject, and her movement between identities of daughter, mother and writer/poet. At the 2011 Annual NRF Postdoctoral Researchers' Forum, Dr Botha presented a poster on "Antjie Krog's Autobiographical Code". She also published four journal articles on the work of Krog. Dr Botha was a visiting scholar at the University of Pennsylvania (USA) during the first semester of 2012, where she was also a visiting scholar in the Alice Paul Center for Gender, Sexuality, and Women's Studies as the guest of Prof Rita Barnard. She presented at a graduate student conference with a paper on "*Shivering in the colour of human*": *The variety of voices in Antjie Krog's oeuvre*. At the recent American Comparative Literature Association, Dr Botha gave a lecture on translation in the South African context in a paper entitled: *Giving a voice to the victim: Translation as unifying strategy*.

Dr Botha was acknowledged by the NRF as a leading emerging researcher based on numerous accredited research articles at the relatively young age of thirty. She was also awarded (as only national recipient) the Elisabeth Eybers Prize for Young Researchers (worth R85 000 for research in the Benelux) by the South African Academy of Arts. Dr Botha will take up this scholarship in the Benelux during September and October 2012, liaising there with Prof Ena Jansen (University of Amsterdam), and Prof Luc Renders (University of Hasselt, Belgium).

Dr Richard Betz



A postdoctoral fellow in the Department of Chemistry, Dr Richard Betz, has contributed substantially to the research outputs of the Department. Dr Betz, who is an expert in X-ray diffractometer (XRD), and who graduated from the Ludwig Maximilians University Munich in Germany, has extensive experience in X-ray crystallography.

He was instrumental in setting up the new diffractometer from Brucker worth R4.5 million in 2011, which was installed in the Inorganic Chemistry section.

Dr Betz assisted with training staff and students in using the instrument to its full capacity. This expertise also led to the establishment of international and national collaborations with chemistry departments.

The acquisition of a new X-ray diffractometer in 2011 has enabled the Department to determine its own molecular structures, which previously had to be contracted out to other international departments.

Dr Betz also assisted in the creation of a new research field in the application of the lanthanides in metallo-medicine at the NMMU, and he was the co-promoter of the first MSc student who graduated in this field.

Dr Mathabo Khau



Dr Mathabo Khau joined the Faculty of Education as postdoctoral fellow to the HIV and AIDS Education Research Chair at the beginning of 2011.

Before pursuing further studies, she was a Science teacher and subject advisor in Lesotho where she was involved in curriculum design and development. She was also a national external examiner for Junior Certificate Science (Grade 10). She completed her PhD study *Women teachers talk sex: A gendered analysis of women teachers' experiences of teaching sexuality education in rural schools in the age of HIV and AIDS*, at UKZN. She employs participatory and visual methodologies in her research, which focuses on gender, sexuality, HIV and AIDS in Education. She is interested in sexual health and reproductive rights in relation to culture and religion. Since taking up her postdoctoral fellowship she has had two publications in 2011 and four publications forthcoming in 2012 (*Perspectives in Education, International Journal of Qualitative Methods, Sex Education*, and a chapter in a book, *Was it something I wore?*). As part of her postdoctoral work she has also embarked on a new study *Sexual identities and HIV & AIDS: An exploration of international students' experiences within a South African university*. She will be presenting papers based on this study at international and local conferences in 2012. She is also collaborating with Linköping University in Sweden on a gender and sexuality sensitisation project called "The Female Body", which will be based in rural Lesotho. Her success in 2011 has prompted an invitation to continue her postdoctoral fellowship in 2012.

Emerging Researchers

Renewable Energy



Dr Russell Phillips

Dr Russell Phillips focuses on renewable energy. He works with the wind energy research group, essentially in what may be regarded as applied engineering.

"Problem solving around renewable energy is what this country needs," he says. This area of research is vibrant and boundaries are always pushed, and new ideas tested. Dr Phillips is looking at recruiting students, especially those with a technological orientation, and having an understanding of wind energy and hydropower. He is wedded to the idea of producing renewable energy at a reasonable price.

He is busy on a project of trackers for solar panels. He patented the "wind turbine", and is researching Concentrated Solar Power (CSP) - working in this area with BTech students who tend to be technologically inclined. Some of the approaches they use involves heating the air, and storing it in the pebble bed.

"Problem solving around renewable energy is what this country needs," says Dr Phillips.

He is enabled by the fact that the Dean of the Faculty is supportive, and is "pro green energy".

He is currently collaborating with German universities on the Solar Car Project. The future is beckoning in terms of renewable energy research. This is a fast growing field, and will serve as a niche area in terms of his own future research plans.

National Identities



Dr Wendy Isaacs-Martin

Dr Wendy Isaacs-Martin focuses on religious and gender studies, as well as nationalism and national identity. Nationalism has many types, as well as national identity research.

Among the issues she is exploring is whether belief systems can be modified.

The fundamental question she is trying to answer is: "How does one build a strong national identity?". She is undertaking empirical work on national identity. Among the issues she is exploring is whether belief systems can be modified.

Her main achievements in the period under review included research on gender and xenophobia. This resulted in her publishing an article in an accredited journal. She has a mentor in the USA, and also works closely with Dr Petrus. Internationally, she collaborates with Dr Mamphela (Vassar University) in New York, USA.

The fundamental question she is trying to answer is: "How does one build a strong national identity?".

In future she will be working on a three-year project in the Eastern Cape, looking closely at the demographics of the Xhosa and Coloured populations in Port Elizabeth and Graaff-Reinet - more specifically fathoming how these groups internalise their national identity.

"Who do people perceive themselves as in these areas?" will be central in what she is investigating.

Professional Development



Ms Tobeka Mapasa

Ms Tobeka Mapasa is a Lecturer in the School for Initial Teacher Education responsible for the training of pre-service teachers. She is a practitioner-researcher studying in the main how her teaching practice can be improved. Ms Mapasa values excellence in her practice as well as in the practices of her students. This value, amongst others, is what motivated her to investigate how she can improve her practice to align it with her educational values in order to be in a position to provide an authentic and meaningful learning experience for the students under her research supervision.

Ms Mapasa values excellence in her practice as well as in the practices of her students.

Action research is a field that fascinates her, and this is what she would like to continue doing. She has benefitted from workshops conducted on how to analyse data, the reduced workload, and the financial assistance received from the University.

Her quest is recognition as an academic and she has realised that achieving a doctorate is one of the stepping stones. Ms Mapasa intends to work towards improving her position as an academic by supervising more students at postgraduate level, presenting at conferences, nationally and internationally, and publishing in accredited journals.

Research Associates

During 2011, a total of 93 Research Associates were registered within the various faculties at the NMMU. This group includes individuals who conduct research in collaboration with NMMU staff and postgraduate students, or may be former NMMU staff members who have either retired from the institution or have joined industry.

The appointment of research associates is a skills retention strategy implemented to tap into the expertise of more senior academics and to harness their skills in the nurturing of emerging researchers. Research associates provide mentoring to developing researchers, facilitate capacity development workshops, and provide research supervision.

Although the highest number of research associates are located within the Faculty of Science, there is an increasing trend to appoint associates across all faculties.

In 2011, research associates were responsible for just over 8% of the total number of accredited outputs.

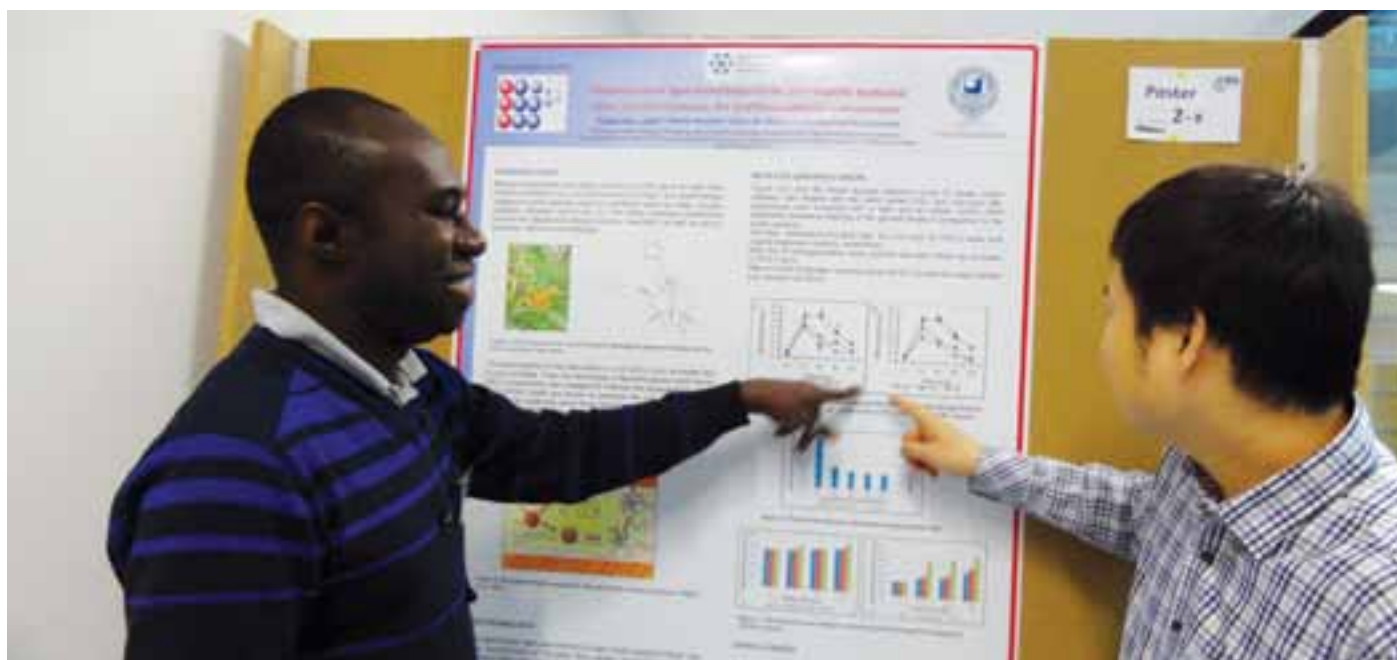
Erasmus Mundus Scholarship

NMMU is a member of the Erasmus Mundus (Ema2sa) consortium funded by the European Union, which involves five South African Universities (NMMU, UCT, CPUT, Stellenbosch and UWC) and eight European Universities (University of Leuven, Freie Universität Berlin, Pierre et Marie Curie Université Paris, Karolinska Institutet Stockholm, Masaryk University Brno, Universidad de Granada and University of Amsterdam).

The mobility programme offers opportunities for staff and students to spend between 3 - 36 months as research periods at one of the partner institutions in Europe.

Mr Frank Odei-Addo

One of the students who participated in the Erasmus Mundus Scholarship Programme was Mr Frank Odei-Addo. The research that was initiated for Mr Odei-Addo's visit was based on the two research groups' mutual interests. At the Freie Universität (FU) Berlin in Germany, Prof Rainer Müller has a vast amount of experience in the pharmaceutical industry with specific emphasis on pharmaceutical formulations and nanotechnology. The research group at NMMU focuses on the cardiovascular effects associated with diabetes. Their most recent work included investigating the effects of selected medicinal plants (more specifically a group of molecules known as terpenoids) and understanding their mechanism of action in diabetes, platelet function and coagulation markers. They have already completed both *in vitro* and *in vivo* studies on an isolated terpenoid as well as an organic extracts of the plant. The terpenoids have poor water solubility and thus have a limited bioavailability.



A discussion session at the annual CRS local chapter in Würzburg, Germany. Mr Odei-Addo is seen here explaining his poster presentation to one of the conference attendees.

The joint research proposal therefore proposed to transfer terpenoid compounds and plant extract into so called “nanocrystals”. This nanotechnology assists in making the compounds more available and effective in the body. Mr Odei-Addo’s visit to Berlin would therefore allow him to learn to prepare and optimise the nanocrystals in Berlin. On his return to South Africa he had to test the efficacy of the nanoemulsions that were prepared at the Freie Universität Berlin to determine if they would further enhance glucose uptake and insulin sensitivity as compared to marrubiin, the diterpinoid found in *Leonotis leonurus* plant extracts.

Mr Odei-Addo was able to attend the Controlled Release Society German local chapter conference in Würzburg, where he presented the work completed in Prof Müller’s laboratory, as can be seen in the photo on page 57.

“I gained a great deal of experience in the field of nanotechnology using the techniques involved in nanoformulations i.e.: (1) high pressure homogenisations, (2) laser diffractometry, (3) particle correlation spectroscopy, (4) zeta potential, (5) X-ray, microscopy, (6) tableting of products, and (7) Differential Scanning Calorimetry (DSC). Of great interest were the applications of these formulations in the field of cosmetics and medical research,” says Mr Odei-Addo.

An example of the homogenisers used is given in the figure below:



Homogenisers using high pressure to create nanoemulsions.



From left to right: Prof T Mayekiso, Prof Dr R Müller, Ms Stefanie Böhler, Mr Thomas Schad, Dr N Jooste and Dr Ranjita Shegokar.

Ms Marelize Marx



Ms Marelize Marx, another recipient of the Erasmus Mundus Scholarship Programme, is currently enrolled for a PhD in Education. The topic of her thesis is: *The transformative potential of dance education in South African schools*. Ms Marx joined Masaryk University in Brno in August 2011 and returned to South Africa at the end of April 2012. During her stay in Brno, she enrolled for a research methodology course presented by Dr Nadya Jaworski. This helped her to gain a deeper understanding of research methodologies and enabled her to conceptualise her own methodology. She also enrolled for courses in Cultural Sociology and Phenomenology. Her collaboration with Dr Vasetcka enabled her to get more clarity on a theoretical framework for her study. During her stay at Masaryk University, she attended an international conference on identity and also submitted an abstract for a forthcoming conference in Israel on *Cultural Sustainability, Social Cohesion and Global Education*. The paper that she intends to present is based on her doctoral research.

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**

Strengthened by NMMU's Vision 2020 and values dedicated to academic excellence, the Faculty of Arts commits itself to the highest standards of research and professional conduct and to the pursuit of a just society through its own accomplishments, the work of its faculty members and staff, and achievement of its graduates.

The Faculty of Arts regards the contributions of different departments within the Faculty and value faculty members' efforts as essential to the fullness of its intellectual life and to the continuous development of its distinctive intellectual heritage.

The Faculty of Arts seeks both to advance its place among the nation's finest humanities and social sciences and to bring to the company of its distinguished peers and contemporary society the richness of humanities and social sciences intellectual ideal of a mutually illuminating relationship between technological advances and natural science discoveries, whilst at the same time harnessing the dignity of humanity and preserving the planet Earth.

In this spirit, the Faculty of Arts regards the contributions of different departments within the Faculty and value faculty members' efforts as essential to the fullness of its intellectual life and to the continuous development of its distinctive intellectual heritage.

The Faculty of Arts pursues this view in two ways by striving to do its work:

1. By providing nationally and internationally significant research that advances insights and understanding, thereby both enriching culture and addressing important societal needs; and
2. By committing itself to advance the dialogue of relevance of humanities and social sciences in the development of an equitable nation.

The number of publications and research presentations from the Faculty of Arts continue to grow - indicating not only the persistent production by seasoned researchers, but also shows a gradual increase of the emerging

researchers gaining expertise and confidence in research and publishing.

I would like to take this opportunity to encourage all academic staff in the Faculty of Arts to continuously intensify activities in research and publication. We should seize whatever opportunity is available in applying for new grants and explore research collaboration with local and international partners. We should strive for a more creative and innovative research.

We are convinced that humanities and social sciences have a significant role to play in the development of human resources of our country and we can do it by capitalising on our strategies in research capabilities.

I would like to take this opportunity to encourage all academic staff in the Faculty of Arts to continuously intensify activities in research and publications.

Publications and research will ensure that the knowledge created through research is well disseminated for the benefit of society at large.

Prof Velile Notshulwana

Executive Dean: Faculty of Arts

Faculty Researcher of the Year



Prof Bert Olivier

As an undergraduate student, Prof Bert Olivier discovered philosophy more or less by accident, but has never regretted it. As he knew very little, philosophy turned out to be just up his street, as it were, because of Socrates' teaching that the only thing we know with certainty is how little we know.

Prof Olivier says if he had to identify the common element in all of his research it would probably be to say that it is the desire or wish to understand people's actions or behaviour, not only as it may be more or less directly observed, but also through the artefacts that they produce (such as artworks, architecture, cinema, literature, etc.) and the sometimes self-defeating, ecologically harmful economic practices they engage in. His current research involves:

- What motivates human behaviour/actions?
- What is the relationship between reason and irrational or unconscious motives?
- Why has the history of the world - particularly Western society - been characterised by the predominance of the drive for rational/scientific control of nature and society (which has resulted in social aberrations such as fascism, including apartheid, as well as an apparently ineradicable economic system that has created enormous wealth on the one hand, and equally enormous poverty on the other, let alone immeasurable ecological destruction)?
- What does the common root of technology and art (techné and poiesis) tell us about the prospects of initiating a process of rehabilitating nature-destructive technology and turn it into nature enhancing technology - that is, how can we transform the "cradle to grave" model into a "cradle to cradle" model? What do we learn from the arts about subliminal human fears and desires, refracted through the images and figures encountered there?

- What does communication in all its ramifications entail, and why are there so many pitfalls in human communication practices?

Among his achievements, the milestone of his career was reached when the Education Faculty at the University of KwaZulu-Natal (UKZN) invited him, on the basis of his work regarding ecology and capitalism, to present a keynote address at their annual colloquium. The invited keynote address at UKZN enabled him to bring together his research on poststructuralist conceptions of subjectivity (to understand human behaviour) and ecological degradation, even the possibility of collapse, in the context of urgent challenges facing educators.

Another milestone was achieved when Marie Palm, of the Norwegian Council for Africa, invited him to cross-post his blogs from the *Mail & Guardian Thoughtleader* website (many of them on themes related to his research project) onto the Council's Africa website, because they regard them as providing important information to their readers.

Among the highlights of the year were certainly the four papers he presented at overseas conferences, as well as the keynote address he was invited to deliver at the annual UKZN Education Colloquium. These were significant, because all of them represented the culmination of his research, until that time, on the difficult work of Deleuze and Guattari, whose critique of psychoanalysis is usually regarded as precluding any similarities with psychoanalytical thinkers.

The following helped him to attain his goals: firstly, at a personal level, an abiding interest in the need to understand events around him, both locally and internationally, but also an awareness of the urgency of communicating what any reasonably-informed, critically-reflective individual would regard as being imperative for people to take note of at the present stage of the history of the world. Secondly, at the material-institutional level, NMMU's Research Funding Policy has enabled him (and other researchers) to visit communicationally informative, like-minded colleagues (who are intellectual leaders) and attend multi-discipline oriented, enriching conferences overseas, as well as visit art-rich museums and experience architecture that would otherwise have remained inaccessible to him.

He shall continue his research along the trajectory outlined above, with the focus on a philosophical and psychoanalytical interpretation of human behaviour in relation to the threat posed by, among other things, excessive consumer practices on social and natural ecologies.

In addition, he believes that a great deal of work in philosophy departments worldwide consists of intellectual work that amounts to mere "finger exercises", and does not address the pressing questions of our time. Since its inception, genuine philosophy has always addressed important political, social, cultural and economic issues rooted in the time in which such philosophers lived. He believes this tradition should continue.

Faculty Emerging Researcher of the Year



Dr Theodore Petrus

Dr Theodore Petrus is a Senior Lecturer in Anthropology and teaches at both undergraduate and postgraduate levels. In terms of his research interests, he specialises in crime anthropology, cultural symbolism and issues of Coloured identity. Most of his interests lie with research as he feels that this is where he can make the most significant contribution towards the betterment of society. The research that he undertakes looks closely at reconciling culture and human rights, especially in a multicultural society such as the one we have in South Africa. Furthermore, Dr Petrus is working in an area of research that he describes as underdeveloped and in some instances groundbreaking.

Most of Dr Petrus' interests lie with research, as he feels that this is where he can make the most significant contribution towards the betterment of society.

In his future pursuits of research, he will be looking at the phenomenon of gangs in the northern areas of Port Elizabeth. His quest is "to understand the issues, before you can shed light on them".

Cyber Ethics and Social Media



Mrs Adelina Mbinjama-Gamatham

The main area of research for Mrs Adelina Mbinjama-Gamatham is cyber ethics focusing on helping the users of social media like Facebook and Twitter not to inadvertently use these media to slander and defame others based on ignorance. Her intention is to bridge the gap between law and social media. With her kind of research she will influence how communication media must change in the light of shifts in the use of social media. She has a quest to see people conduct themselves morally online, as they would offline. In her research she asked a sample of 150 people how they dealt with issues of cyber ethics and cyber criminality.

Mrs Mbinjama-Gamatham has a quest to see people conduct themselves morally online, as they would offline.

Apart from completing a Masters, Mrs Mbinjama-Gamatham has produced an article, which was published in the *Journal of Intercultural Disciplines*. She is currently supervising three students at Masters level. She has a burning quest to see the research that she conducts have relevance and application, resulting in technology being a teaching aid/tool. The research themes in the Faculty have helped her focus her energies.

Performing and Creative Arts Awards



Ms Mary Duker

Ms Mary Duker's interest lies in the study of visual arts in relation to linguistic and social theories - in the engagement between the artist and society, and the reception and reading of artworks by the different audiences for art. This interest informs her teaching, her academic engagement and her creative and research outputs.

Director of the School of Music, Art and Design, she was awarded a Creative and Performing Arts Award for her curating of Re.Sponse - an invited group exhibition with an accompanying catalogue of reflective essays. The exhibition was conceptualised as an interrogation and reinterpretation of the visual archive, and of history(ies), with contributions by selected contemporary artists, living and working in Nelson Mandela Bay.

The R12 million project has a R7 million value.

The curatorial strategy was to present a selection of works drawn from the Nelson Mandela Metropolitan Art Museum's (NMMAM) historical and modernist collections to the invited artists, and offer them the opportunity to select, reframe, reread and reinterpret a work that had particular appeal to them, and respond with an artwork of their own.

Her research thrust is a Mandela Bay Development Agency (MBDA) NMMU Arts Project, which is still ongoing. As an academic engagement activity, the project saw her working with collectives of NMMU students, alumni and community artists to install public artworks as part of the MBDA Route 67 project.

The R12 million project has a R7 million value. Whilst the project has actual outputs (the artworks installed into positions within the inner city area) and provides an entrepreneurial avenue for the associated artists, its underlying research focus is on the role that public art can play in reconstructing and transforming public expectations of the inner city (the project is part of a larger urban regeneration plan for the inner city area).

Ms Duker would like to express her gratitude to the Mandela Bay Development Agency Lotto Funding for inner city regeneration related art projects.

After showing at the NMMAM Gallery the exhibition, reconstituted in a travelling form, was invited to the William Humphries National Gallery, and the National Arts Festival in Grahamstown.

Working from the basis that readings of history and the visual archive are mutable, and are subject to a multiplicity of interpretations that shift over time, and that the artwork (as an autonomous text into which human discourse has been bound up into a material form and separated from its artist-author) can be read and interpreted by the viewer in a range of ways - each of the viewer-artists was invited to bring an "own" interpretation and reading to the work they selected. In the resultant exhibition, the responses and the original works were hung together in a visual dialogue.

Re.Sponse was a critical success and it evoked a positive public reaction, attracting a record attendance. It provoked discussion on the role of the visual archive and the museum in a postcolonial period; on the elevated status of work once it is received into the repository of the visual archive; on the politics of representation; on ways that the broad social currents of the time affect the production of and reading of visual texts, on the way the boundaries between artist as spectator-receiver, artist as respondent-interpreter and artist as creator had been blurred in this exercise. After showing at the NMMAM Gallery the exhibition, reconstituted in a travelling form, was invited to the William Humphries National Gallery, and the National Arts Festival in Grahamstown.

Her collaborators are the local MBDA Project Director, Dorelle Sapere; and National Trinity Sessions Johannesburg based public arts project team led by Marcus Neutsetter and Stephen Hobbs, who operate on an international platform.

Ms Duker's future research plans are associated project work (they have already generated and submitted a report on the role of the creative arts and industries as positive catalysts in urban upgrades), with specific reference to the Bird Street Belmont Terrace precinct in inner city Port Elizabeth, and are now engaged in the associated roll out of public arts projects.

She highlights that "one can relate projects like this to points raised in the recently circulated Charter for the Humanities document. The project has pertinence in terms of the following observation that there is a need to explore role(s) of the creative arts in society, to acknowledge and develop the entrepreneurial potential of the creative disciplines as part of the efforts to position the humanities in the national debate."



Ms Junita van Dyk

The nature of Ms Junita van Dyk's work is immensely diverse, yet the totality is a synthesis of practical musicianship, research, social responsibility and pedagogy, with choral studies and performance being its core component.

She is fortunate that her work with the NMMU Choir is recognised by the international choral community for its unique ability to successfully interpret both Western and African music.

One of the Spittal international judges, Robert Sund (Sweden) referred enthusiastically to the Choir's "sincerity...energy...and its ability to combine singing with vigorous African dancing - and the unusual and innovative theatrical presentation of the African folk music." He subsequently proposed that the NMMU Choir - successfully - be invited to perform at the International Federation for Choral Music Ninth World Choral Symposium in Argentina in 2011 - the highest choral accolade in the international choral arena. While practical performance constitutes a large portion of her work, it should be noted that a substantial amount of research goes into the preparation of new programmes, the learning of new repertoire, the commissioning of new South African compositions and presenting it on the world stage.

"As one of 26 invited choirs from all over the world our critically acclaimed performances at the Ninth World Choral Symposium in Argentina have led to several international invitations from, amongst others, the Choral Festival of Missoula, Montana, America Cantat VII Colombia in 2013 and the International Federation for Choral Music World Choral Summit in Beijing 2012," says Ms van Dyk.

Ms van Dyk is fortunate that her work with the NMMU Choir is recognised by the international choral community for its unique ability to successfully interpret both Western and African music.

The Choral Summit, which is part of the eleventh China International Choral Festival, will bring together international leaders to explore with Chinese conductors the commonality of the choral art as found in countries throughout the world. Here she shall conduct concerts and present major workshops on African music and performance practise to approximately 700 international choral conductors. In order to market the name of the University and the Metropole, they have produced a vibrant DVD combining not only the audiovisual but also giving exposure to the artworks at the Donkin Reserve.

One serendipitous outcome of this international exposure is the interaction with world choirs and tertiary institutions. In this regard they have had a highly successful *Austausch* (exchange) with Texas State University (USA), University of North Florida (USA) and St Cloud State University (USA), hosting them, organising concert tours and workshops in South Africa. In return they have had the opportunity to present master classes and conduct the choirs of Texas State and the University of Florida Singers (USA).

Over and above her choral responsibilities her research into adult music education has led her to develop a programme of fast tracking the learning of keyboard, aural and theoretical skills in an innovative, holistic and practical approach, which transforms the purely intellectual understanding into a tangible sensation and recognition of tonality without being burdened by the archaic colonial methodology, which tends to present the information in a quasi mathematical manner in a syllabus spread over several years. Ms van Dyk comments that with this new approach she is "able to teach the same amount of information in a truncated period of time."

Faculty Research Themes

- Transculturality and Performance and Practice
- Conflict and Transformation
- Urbanisation, Urbanism and the South African City
- Sustainable Architecture
- Architectural and Urban Conservation

International Visitors to the Faculty

- Prof Amy Kirschke - University of North Carolina, Wilmington, USA.
- Profs Arne Bjørhei and Kjell Magne Mælen - Tromsø University, Norway.
- Prof Phil Golson - Clearwater College, Florida, USA.
- Zurich Youth Orchestra and Kinderchor der Stadt Halle.
- St Cloud State University's (USA) University Choir.
- Prof Peter Preisendoerfer - Johannes Gutenberg Universität, Mainz, Germany.
- DRF/NRF sponsored research between a German and South African team on Entrepreneurship in Gqebera Township (Prof Peter Preisendoerfer and Prof FJ Bezuidenhout (NMMU)).
- Dr Okaka Dokotum, Head: English Department - Kyambogo University, Uganda - delivered a lecture on interfaces between reality and fiction in the film *Hotel Rwanda* in the module African Film (LMC 307) and a lecture to staff on a related topic, in September 2011.
- Profs Nancy Boyd-Franklin and Prof Anderson Franklin from the USA participated in the SAHARA Conference from 28 November to 2 December 2011.

Awards

- Stephanie Gouws received the Ford Premier Award for the Best Masters Degree by Dissertation (Social Sciences and Humanities), as well as the Vice-Chancellor's Medal for the Best Masters Degree by Dissertation.

Units from Journal Articles

Units from Journal Articles	
Name of Departments	Units
Language and Literature	14.50
Political and Governmental Studies	8.91
Applied Language Studies	7.83
Journalism, Media and Philosophy	7.50
Applied Design	2.17
Sociology and Anthropology	1.50
Architecture	1.00
Music	1.00
Arts Management	1.00
Architectural Technology and Interior Design	0.50
TOTAL	45.91

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 Resources

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

The Faculty uses its RTI strategic plan as the conceptual framework for steering and empowering the longer-term development of its research capacity and output. The strategic plan recognises three primary drivers for research development, namely: increasing staff capacity to do research, increasing postgraduate student numbers, and thirdly, developing a clear focus for research. During 2011, we continued to strengthen our initiatives in support of these three drivers. We are also encouraged by the early-phase results we have seen in terms of research outputs.

A number of initiatives were launched to support the first driver, namely research capacity. One challenge in this regard remains the high student-to-staff ratio (40+) across the different departments. In an attempt to provide staff with more time for research and research supervision the Faculty has created additional posts and is actively recruiting staff for vacant positions. Furthermore, the workload system of the Faculty is utilised to set aside time for staff to do research in a manner that is both fair and responsive to research needs. The sabbatical research facility also provides staff with dedicated time to do research, including for purposes of postgraduate studies. Assisting staff with converting research into publications was also recognised as a major need and to this end the Faculty has provided training interventions as well as arranged for inexperienced researchers to be partnered and mentored by more experienced colleagues. The Faculty has also introduced a number of initiatives aimed at recognising research including special incentives for publishing in high-quality accredited journals. A new Researcher of the Year category for Green/Sustainability Research has also been established.

In an attempt to provide staff with more time for research and research supervision the Faculty has created additional posts and is actively recruiting staff for vacant positions.

Growing the postgraduate student component of the Faculty remains a primary strategy for supporting its research development. While developing and introducing new postgraduate programmes and recruiting students remain essential, the availability of competent supervisors is recognised as a major limiting factor.

During 2011, the Faculty focused strongly on expanding and building its supervisory capacity through a range of initiatives, which included the recruitment of external supervisors, development interventions for supervisors and recognising supervision as a formal element of the workload of staff. A number of initiatives were also launched to support the throughput of Masters and Doctoral students, including the introduction of workshops and colloquiums.

The total number of research output units for the Faculty increased to 129 in 2011, the highest output ever and equating to a year-on-year growth of 33%.

The third driver for research development is supporting the development of new research themes. The Faculty has identified two central thematic areas, namely Local Economic Development and Ethics, Governance and African Leadership. The selection of these two thematic areas was influenced by the need for research as well as the available capacity and expertise within the Faculty. The intention is not to force-fit researchers into a centrally driven model of focus areas. Rather, we are confident that a thematic approach will attract researchers through the formation of teams, which will provide opportunities for previously untapped synergies and a developmental space for emerging researchers. We are also optimistic that the focus on specific research themes will have the added advantage of breaking down historical divides based on disciplines and structures and thus supporting the necessary multi-disciplinary approach required by complex societal problems.

We are also excited by the quantifiable early-phase results from our research-supporting initiatives. The total number of research output units for the Faculty increased to 129 in 2011, the highest output ever and equating to a year-on-year growth of 33%. The research units generated by the publication of articles increased by 40% over the same period - also an all time high. We have also seen a marked improvement in the throughput of postgraduate students with 119 students graduating with Masters degrees and 12 students graduating with Doctors degrees at the most recent graduation ceremonies. This represents a year-on-year growth of 21% in Masters graduates and a 50% increase in Doctoral graduates.

Prof Niekie Dorfling

Executive Dean: Faculty of Business and Economic Sciences

Faculty Researcher of the Year



Prof Piet Naudé

Prof Piet Naudé was the Director of the NMMU Business School until June 2011 when he assumed the Deputy Vice-Chancellor: Academic position at the NMMU. His research focuses on macro-ethical questions of justice in the fields of theology, economics, and ecology, and he has done extensive work on applied ethics in the fields of business and the medical profession. His most recent monograph on Christian confessions and contextual ethics, published in the USA, was awarded the 2011 Andrew Murray-Desmond Tutu prize for South African academic literature.

For this research period his work focused on human dignity in the context of Africa's history and contemporary situation. Dignity is closely related to justice. Three forms of "justices" are core to this challenge: distributive justice in the context of the global economy; gender justice in the face of oppression against women/children; and ecological justice that deeply affects not only ourselves as human beings, but the whole ecosystem on the Earth, which is for now our only home.

His most recent monograph on Christian confessions and contextual ethics, published in the USA, was awarded the 2011 Andrew Murray-Desmond Tutu prize for South African academic literature.

In terms of his research thrust, he is looking at ethics from the perspective of theology, philosophy, business and economics.

The question of his main research objective is approached via the prism of “justice” and how it is understood in distributive, cultural, political and ecological settings.

“For ethics in economics, I work with an international team under the auspices of ISBEE (International Society for Business, Ethics and Economics), and for my theological work, I cooperate with a network of scholars in Germany and The Netherlands”.

When posed the question of what his main research achievements were in 2011, he remarks: “I was re-awarded an Alexander von Humboldt Research Grant to work for six weeks in Germany on issues of economic justice. My monograph, *Neither calendar nor clock*, was published by a quality publishing house in the USA and the book was awarded the Andrew Murray-Desmond Tutu prize for academic literature in 2011.”

On the question of support, he recognises the financial and personal support structures, from the University, plus God-blessed health to work over weekends and holidays.

He has collaborators both nationally and internationally.

“For ethics in economics, I work with an international team under the auspices of ISBEE (International Society for Business, Ethics and Economics), and for my theological work, I cooperate with a network of scholars in Germany and The Netherlands”.

Prof Naudé plans to complete a monograph on essays in justice (to be published by Sun Press, hopefully by the end of 2013) and to work in a new team of international scholars on the issue of “human dignity and culture”. The NMMU provides extraordinary good research support, and he is thankful for opportunities to keep critical thinking alive.

Faculty Emerging Researcher of the Year



Dr Chantal Rootman

Dr Chantal Rootman is a Senior Lecturer in the Department of Business Management. She is conducting research on the relationship marketing and customer retention of firms, especially retail banks. Currently, the issue of customer-firm relationships is a debated topic in the business environment. Her research aim is to provide practical strategies and recommendations to firms on how to create and improve customer relationships - ultimately increasing customer satisfaction and ensure more successful firms.

Dr Rootman has published nine academic articles in several refereed and accredited national and international journals.

For example, her PhD study identified that the knowledgeability of bank employees, and the ethical behaviour of banks, are the two most important variables influencing the relationships banks have with their clients. In addition, her research revealed differences in the banking variables regarded important by clients versus those considered crucial by bank managers. Clearly, these differences in perceptions led to recommended strategies for implementation in banks. Her recent research also highlighted the differences in relationship marketing aspects between South Africa and other countries - with the purpose of providing insight to industries in South Africa to “learn relationship marketing lessons” from successful international firms, including banks.

She has published nine academic articles in several refereed and accredited national and international journals and has presented 16 papers at national at international research conferences. To date, 19 postgraduate student groups conducted their research under her supervision, including Masters and Honours students with research specialising in Marketing Management, Relationship Marketing and Financial Management.

Research Theme: Ethics and Governance

DBA student, Dr Alice Nyambura Koigi graduated at the 2011 graduation ceremony with her thesis entitled: *Improving organisational effectiveness of public enterprises in Kenya*. Her promoter was Prof Cecil Arnolds. Due to this study, Dr Koigi was appointed to a government review committee on public enterprises in Kenya.

Papers on this study were delivered at the following conferences:

- Fifth (5th) International Business Conference in Mauritius, September 2011.
- Eleventh (11th) International Conference on Knowledge, Culture and Change Management in Spain, June 2011.
- African International Business and Management Conference in Nairobi, Kenya, August 2011.

Units from Journal Articles

Units from Journal Articles	
Name of Departments	Units
Business Management	7.80
Economics	5.99
Marketing Management	2.99
Development Studies	1.33
School of Accounting	1.00
Industrial and Organisational Psychology	1.00
Business School	1.00
School of Management Sciences	0.33
TOTAL	21.44

International Visitors to the Faculty

International visitors to the Faculty	Contact staff member in Faculty	Date of visit	Nature of involvement/visit	Outcome of the visit
Prof SP Kamath Delhi, India		4 May 2011	To lecture to Industrial Psychology and Labour Relations Honours and Masters students on the topic of Human Resource Management and Applied Behavioural Sciences.	Opportunity for further liaison.
Prof Mark Anstey Michigan State University, USA		12 - 22 July 2011	Presented a series of lectures to Labour Relations and Human Resources Masters students on the topic of Labour Relations in a Global Environment and Conflict, Negotiation and Dispute Resolution.	Relationship ongoing: lectures will be repeated next year.
Prof Mayer University of Applied Sciences, Osnabrück, Germany	Prof Hosking	6 - 12 February 2011	Workshops and postgraduate supervision water research.	Workshops and presentations of their and our students on water research.
Dr Michael Brooks Middlesex University, UK	Prof Hosking	17 August - 7 September 2011	Teaching and water research.	Teaching EC306 and water research proposal submitted.

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**

The Faculty of Education experienced a very rewarding research year during 2011 that was reflected in many ways in the Faculty's activities.

Enrolments of MEd and PhD students in the Faculty have consistently increased over time to the extent that supervision capacity is almost at its optimum. This is viewed as a positive trend, as it has driven the Faculty to reconsider several aspects of its postgraduate delivery. The Faculty had to devise innovative supervision strategies that have been refined and adapted to accommodate the needs of students and supervisors and have also resulted in improved throughput rates. Other aspects that received attention were the recruitment and selection of students and the channelling of students into areas of supervision strength, also relating these to the new Faculty research themes.

Several initiatives to enable emerging postgraduate supervisors and researchers have been realised, such as writing retreats, seminars, research groups and research hubs. These initiatives have not only strengthened the research dimension in the Faculty, but have also stimulated interest in the scholarship of teaching and learning.

The Faculty had to devise innovative supervision strategies that have been refined and adapted to accommodate the needs of students and supervisors and have also resulted in improved throughput rates.

The significant number of visits from international researchers and the concomitant collaboration that has resulted from these visits is further evidence of the Faculty growing out of its research childhood into early adolescence. The internationalisation of research and the global awareness this brings to academics, augurs well for the development of the Faculty's national and international research standing.

More detail about the research involvement and outputs of the Faculty is presented in the paragraphs below.

Prof Denise Zinn
Executive Dean: Faculty of Education

Faculty Researcher of the Year



Prof Naydene de Lange

The 2011 Faculty Researcher of the Year, Prof Naydene de Lange, is the Chair of HIV and AIDS in the Faculty. She is also the Head of the Unit for Visual Methodologies, which focuses on visual participatory methodologies for social change and she has also initiated various communities of research practice. She has made a significant contribution to research in the Faculty during the period relevant to this award, in terms of publications and participation in both national and international conferences. Her contribution has also included supervising and mentoring new and emerging researchers. Through her work she has made a significant contribution to research in HIV/AIDS education and to the development of new methodologies and pedagogies in teaching and research, in particular the use of participatory visual methodologies.

Through her work, Prof de Lange has made a significant contribution to research in HIV/AIDS education and to the development of new methodologies and pedagogies in teaching and research, in particular the use of participatory visual methodologies.

Prof de Lange is recognised as a leader in the field of visual participatory research methodologies, especially in the field of HIV and AIDS. She believes strongly, together with thinkers such as McDermott, that “masses of small projects” have the potential to collectively add up to make a significant difference in society. Her research has covered various aspects of education, especially with disadvantaged communities and in a myriad of contexts, from fruit farms in the Langkloof to rural villages in the foothills of the Drakensberg. Her passion for the empowerment of people means that action and participatory research, is for her, research that makes sense in a complex society such as South Africa.

Faculty Emerging Researcher of the Year



Dr Christo Pienaar

Dr Pienaar is a Senior Lecturer and Head of the ACE (Special Needs in Education) as well as the ACE (HIV and AIDS in Teaching) programmes in the Faculty of Education. He is a qualified clinical and educational psychologist. He has become an active researcher in the field of Educational Psychology. He regularly presents papers at national and international conferences, publishes in accredited journals and supervises Masters and Doctoral students who specialise in Special Needs Education, Barriers to Learning, Inclusive Education, Learner Support, Teacher Support and Parental Support.

In addition, Dr Pienaar is involved in community-based research projects, one of which is registered with the NRF.

The Inclusive Education HUB was established by Dr Pienaar and four other colleagues. They were approached by a school in New Brighton to assist them with the implementation of inclusive education in their school and also with the barriers to learning that they experienced. Three other schools further approached them for support. The HUB was then established with the aim to conduct research on the implementation of inclusive education and the support needs of schools to implement this policy.

Dr Pienaar is involved in community-based research projects, one of which is registered with the NRF.

All schools were visited during the year and a needs analysis at each school was undertaken. Their research group appointed Ms Nokhanyo Mayaba as the convener of the HUB. A support programme at each school will be established next year.

Curriculum Implementation Faculty Research Highlights and Achievements



Prof Sylvan Blignaut

The main focus of his research is “teacher epistemology”: looking closely at how teachers teach in the classroom. What further triggers his curiosity is how teachers cope with the changed curriculum, especially the expectation that they need to change from teaching to facilitation. Using the concept “apprenticeship of observation”, Prof Blignaut examines how learners are disciplined in different contextual conditions. Social justice issues in education are explored using the lens of a “critical pedagogy”.

“Access is a huge thing in South Africa,” says Prof Blignaut and contends that “the system must allow all to surface to the top.”

His desire is to see a more human and humane society, which is egalitarian. He works with collaborators in Germany (Oldenburg) and was himself a Fulbright Scholar at the University of Washington, USA. He also works closely with Professor Michael Apple at the University of Wisconsin, USA.

He argues that “access is a huge thing in South Africa”, and contends that “the system must allow all to surface to the top”.

The 2011 research highlights in the Faculty were:

- The conferring of PhD degrees on five Faculty academics at the April 2011 NMMU graduation:

Dr Chris Dali

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

Dr Pam Austin

Title: *A values-based approach to promoting excellence in Mathematics Education.*

Dr Issa Badenhorst

Title: *The teaching of financial management principles to school leaders in disadvantaged schools.*

Dr Les Meiring

Title: *The impact of toys as educative curriculum material on pre-service primary school Natural Sciences teachers’ understanding of energy.*

Dr Percy Sepeng

Title: *Grade nine second-language learners in township schools: Issues of language and Mathematics when solving word problems.*

- Establishment in the Faculty of the online journal *Educational Research for Social Change*, which draws on approaches that have a strong focus on social change in the communities served by education.
- Establishment and official launch of the Centre for the Community School (CCS), with special guest Prof Pedro Noguera from New York University, USA, giving the keynote address.
- Establishment of the Manyano Network of Community Schools - a self-directed community of practice led by the principals of 14 schools. The Manyano schools have a direct link to CCS and are involved in research and programmatic activities with the Centre.
- Education forum on “UN/EQUAL EDUCATION: South Africa’s Quest for Equity and Excellence in Education” that was held at the Red Location Museum. It brought together voices from different education constituencies to talk about how equity and excellence can be achieved in schools with Dr Salim Vally, Senior Researcher at the Centre for Education Rights and Transformation at the University of Johannesburg as the keynote speaker.

Research Activities relating to the Faculty Research Themes



The “Wall of Hands” created by conference delegates at the SAHARA Conference hosted by NMMU. Adults and youth were prompted to use their hands in creating a message to show how to “turn the tide on HIV and AIDS”.

The Faculty reviewed their research themes during 2011 to reflect the changing focus of their work. The changing foci are well-established in some cases, while others are still emerging. These varying statuses are reflected in the nature of the activities and outputs of each research theme, as are briefly indicated below.

HIV and AIDS in Education: The driver of this theme is Prof Naydene de Lange. It focuses on research that addresses issues in HIV and AIDS education in primary, secondary and higher educational settings in general, and engages communities in research by drawing on participatory research methodologies. This is a well-established research theme that has gathered together a number of active researchers and therefore outputs around this theme were significant: 24 conference papers were read, five articles were published in accredited journals, nine book chapters and one book were published and one MEd student and one PhD student graduated during 2011. A workshop was conducted on Communities of Practice and the two conferences on HIV/AIDS referred to earlier, also happened under the auspices of this research theme. During 2011, four MEd and six PhD students were registered with topics in this theme.

Prof Denise Zinn is the driver of the theme on **Humanising Pedagogy**. The theme focuses on what it is that makes us human and how teaching and learning can extend and support that humanness. Humanising pedagogy has been adopted as the prevailing pedagogy in the Faculty and as such the work done in this research theme has strongly focused on the Faculty’s curriculum renewal project.

Potential groundbreaking work in the area of scholarship of teaching and learning is emerging from the work of scholars working in this research theme, which is also supported by a research hub with participants from in- and outside the Faculty. The outputs associated with this theme are therefore connected to curriculum renewal and will eventually also include publications. During 2011, seven MEd students and one PhD student were registered with topics in this theme.

The emerging research theme on **Schools and Community Partnerships** has Dr Allistair Witten as its driver. Much of the work of this theme takes place under the auspices of the Centre for the Community School (CCS) with Dr Witten as the Director of the Centre, which was launched during 2011. Current work is therefore of a preparatory nature, but this will eventually culminate in research outputs that focus on ways in which schools address some of the social challenges to schooling, the use of social capital to build school and community partnerships to support learners as well as the development of theoretical and practice-based models of school improvement that are relevant and responsive to the contextual realities of schools. At least some of the envisaged research will emerge from the school-improvement activities that CCS has implemented in the Manyano Network of Community Schools. During 2011, one MEd and three PhD students were registered with topics in this theme.

Education for Change and Social Justice: This theme has Prof Aletta Delpont as driver. It aims its research at addressing 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. It is an emerging theme in the Faculty and outputs associated with it are four papers at international conferences and two at national conferences, and one article in an accredited journal. During 2011, 28 MEd and 16 PhD students were registered with topics in this theme.

Teacher Professional Development: The driver for this theme was Dr Noluthando Toni, who has since left the NMMU. The Faculty is in the process of identifying an appropriate person to take over from her as driver. Work in this theme encompasses integrated and cross-sectional research on the nature and improvement of pre- and in-service teacher education. This is grounded in the Integrated Strategic Planning Framework for Teacher Education and Development in South Africa (2011 - 2025), which advocates for the development and improvement of quality of teachers and teaching. During 2011, 16 MEd and 16 PhD students were registered with topics in this theme.

Prof Paul Webb drives the research theme of **Science, Mathematics and Technology Education (SMTE)**. Its work deals in particular with Language and SMT Education, SMT Literacy, Indigenous Knowledge Systems and SMT Education, Environmental Education and Education for Sustainable Development, Technology and Integrated Computer Technologies in Education as well as Curriculum and Teacher Development in SMT.

This is a well-established theme in the Faculty and much of its work takes place in the Unit for Science, Mathematics and Technology Education and the Research Hub for SMTE. This theme was responsible for significant research activities, among them the South Africa - Sweden exchange, which include researchers at Uppsala University, Gothenburg University and NMMU. These collaborations have crystallised into three comparative research projects viz. argumentation and understandings of the nature of matter, writing genres in science and disciplinary literacy (physics). Two articles were published in ISI (accredited) journals, two in DoE accredited journals and seven papers were included in the proceedings of international conferences with topics that resonate with this theme. Additional to these, three PhD students and one MEd student who worked on research in this theme, graduated. During 2011, 12 MEd and three PhD students were registered with topics in this theme.

Conferences hosted and organised by the Faculty

Members of the Faculty hosted or co-hosted three conferences during 2011:

- Prof Naydene de Lange, with support from HEAIDS, hosted the HIV & AIDS Education Community of Practice Symposium, *Research Method and Pedagogy: Using Participatory Visual Methodologies*, Nelson Mandela Metropolitan University, 4 - 5 April 2011.
- Prof de Lange also co-hosted with Prof Moletsane (UKZN) and Prof Mitchell (McGill University), the Invitational Conference, *What difference does this make? The arts, youth and HIV & AIDS*, Durban, South Africa, 4 - 6 December 2011.
- Prof de Lange and Prof Lesley Wood co-hosted with Dr Kitila Mkumbo (University of Dar-es-Salaam), the HIV and AIDS Education Conference, *Envisioning Africa without HIV and AIDS: The role of Education*, Zanzibar, 27 - 28 September 2011.

Journal hosted by the Faculty

The *Educational Research for Social Change*, an online journal, is a Faculty initiative to promote educational research, drawing on approaches that have a strong focus on social change in the communities served by education. The journal invites research articles and conceptual papers, which draw on participatory and emancipatory paradigms and methodologies in engaging communities in research towards social change. The journal is peer-reviewed and provides a forum for the critical discussion of education from a variety of disciplinary perspectives, and for the dissemination of current research to a broad, cross-disciplinary audience of scholars, researchers and practitioners in the field of education. In 2011, the hard work of the three editors, Profs Naydene de Lange and Lesley Wood and Dr Andre du Plessis, paid off and lead to the first themed issue *Action Research: Its transformative potential*, being published in 2012.

Units from Journal Articles

Units from Journal Articles	
Name of Departments	Units
Initial Teacher Education	5.16
Continuing Professional Development	1.00
Educational Research and Engagement	10.16
TOTAL	16.32

International Visitors to the Faculty

Date of visit	Name(s) of visitors and contact staff member in Faculty	Nature of involvement/visit	Outcome of visit
January - December 2011	Dr Carol Rodgers (guest of Prof Denise Zinn).	Visited the Faculty as a Fulbright Scholar. She worked with the Faculty to explore and integrate their understanding of the concept of humanising pedagogies.	Facilitated the establishment of the Humanising Pedagogy Hub and assisted with the unfolding process of curriculum renewal in the Faculty.
14 - 18 February 2011	Prof Goran Lassbo and Dr Frank Bach (Gothenburg University, Sweden) visited Prof Paul Webb and Dr Raj Kurup.	They are involved in the joint research project on Scientific Literacy.	
21 February - 3 March 2011	Prof Lars Gunnarsson and Dr Kerstin von Brommsen (Gothenburg University, Sweden) visited Prof Nonnie Botha.	They had discussions on the Global University Research Project with the Faculty of Education.	An agreement was reached on the nature and management of this joint research project.
19 - 23 September 2011	Ms Nokhanyo Mayaba hosted Dr Torre Otterup (Gothenburg University, Sweden).	Part of the activities in the SA - Swedish Links Project coordinated by Prof Paul Webb.	
12 - 27 August 2011	Ms Ann-Charlotte Lindgren (Gothenburg University, Sweden) was hosted by Dr Laetitia Greyling.	They worked on joint research about VIG.	
9 - 11 May 2011	Dr E Kujawa (Dean of Education), Dr R Webster (DUC Project Leader) and Dr D Gosh (Assistant Dean of Science) from the Dominican University College, USA, were hosted by Prof Hugh Glover.	They held discussions on the joint DUC - NMMU project plan and planned for the envisaged follow-up visit in July 2011.	
4 - 6 April 2011	Prof Naydene de Lange hosted Prof Claudia Mitchell from McGill University, Canada.	She engaged in the HIV and AIDS community of practice and worked with a toolkit that uses a different lens for HIV and AIDS education.	
February - April 2011	Dr Berit Lundgren (Umea University, Sweden) was hosted by Prof Denise Zinn.	She carried out joint research with members of the Literature Hub and presented three papers at the RASA Conference.	
24 October - 4 November 2011	Prof Anne Hickling-Hudson (Queensland University of Technology, Australia) and Ms Sheila Lowe-Graham (Jamaica) were hosted by Prof Denise Zinn.	Their visit was funded by an NRF Ad Hoc Short Research Visit for Eminent Scientists Grant. Their work was in decolonising the teacher education curriculum, transformation and arts-based pedagogical projects.	

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**

In 2011, the Faculty managed to produce double the number of research outputs that it produced in 2007. The year under review, 2011, was an extremely successful year, one of the highlights being the graduation of 13 Doctoral students. The Faculty of Engineering, the Built Environment and Information Technology has a strong focus on applied research programmes. We believe that many of the current problems connected to our environment, social welfare, and standard of living can only be solved through a greater emphasis on advanced technological research. The Faculty has numerous partnerships with industry, is involved in a host of research projects, and actively participates in and initiates quality international research collaborations. We have enhanced our activities in the niche research areas of information security, user experience, computer networks, processes and component design for the manufacturing and automotive industries, friction processing technologies, and construction health and safety. Our striving towards research excellence gained remarkable impetus in 2011.

The Faculty believes that many of the current problems connected to our environment, social welfare, and standard of living can only be solved through a greater emphasis on advanced technological research.

Just to mention a few highlights, the Ford Motor Company has teamed up with Nelson Mandela Metropolitan University to enhance the development of engineering expertise in the Eastern Cape, through the establishment of the specialised Ford Engine Research Unit (FERU). In addition, the Built Environment Research Centre (BERC), in the School of the Built Environment, has been awarded host status for the coveted and prestigious Construction Industry Development Board (cidb) Centre of Excellence (CoE) in Construction Research and Development. The CoE was established to provide strategic leadership to construction industry stakeholders to stimulate sustainable growth, reform and improvement of the construction sector.

NMMU's eNtsa team won the 2011 National Science and Technology Forum (NSTF) Award for "Research leading to an innovation by a team". This award, which was made in acknowledgement of the WeldCore™ process, is for individuals/teams that have made outstanding contributions to science, engineering, and technology through research that has led to an innovation in South Africa. In addition, eNtsa and an engineering team from

Eskom signed an R11 million research contract linked to research and development to finalise and commercialise WeldCore™.

NMMU Racing became the first Formula Student team on the African continent to successfully compete in all static and dynamic events of the prestigious Formula Student Germany competition. DibaOne competed in Hockenheim, Germany, from 2 to 7 August 2011 and came 24th out of 78 teams in the endurance race. The Advanced Mechatronic Technology Centre (AMTC) and the VWSA-DAAD International Chair in Automotive Engineering initiated a Solar Vehicle Project, which will participate in a national competition in 2012.

Significant progress has been made in our research entities, as evidenced by the number of publications and postgraduate students. Prof Mikko Korpela from East Finland University has been appointed as honorary professor in the School of ICT. Three of our staff members have obtained NRF ratings, which brings the total number of rated staff in the Faculty to nine.

Multimillion-rand investments were made to upgrade our research equipment and platforms, which has placed NMMU among the leaders in the emerging niche research areas of renewable energy, human settlement development, green technologies, informatics for health development in Africa, advanced processing technologies for the aerospace and medical industries, and manufacturing process optimisation. In addition, we have increased our research staff capacity and strengthened links and partnerships with industry, research councils, and national and international universities. These strong partnerships have contributed to our research successes, and I would like to thank our partners for their support and ongoing commitment to NMMU.

Significant progress has been made in our research entities, as evidenced by the number of publications and postgraduate students.

Allow me 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 level. Their commitment to their research activities and studies is evident in our Faculty. Finally, the Faculty extends our appreciation to top management and the NMMU Research Department for their support and leadership.

Prof Henk de Jager

Executive Dean: Faculty of Engineering, the Built Environment and IT

Faculty Researcher of the Year



Prof Rossouw von Solms

Information Technology Professor, Prof Rossouw von Solms ascribes his research success to his passion for research. "I have been involved with research for the last twenty-two years and it has become a way of life. Basically everything in my professional life centres around research or research related aspects." Just about all the research he conducted was in the field of information security. He claims that the fact that he has fundamentally been involved with the same field of research has contributed a lot to his success.

He leads an internationally known research group in the field of information security. "I believe in working in group context. So much more information, ideas and initiatives are shared, debated and refined that eventually leads onto better research outputs." He further observes that by working in groups, the next generation researchers and supervisors are always assured of help, assistance and guidance. On the other hand, old ideas and practices are continuously tested and challenged for newer and more modern concepts and philosophies.

Prof von Solms leads an internationally known research group in the field of information security.

Prof von Solms' research record is quite impressive. He has authored or co-authored more than 50 articles published in peer-reviewed journals and more than 90 conference papers at both national and international conferences. He has been rated by the NRF since 1994 and currently rated in the B3 category. He is also a Certified Information Security Manager (CISM) and a Professional Member of the South African Computer Society.

Prof Von Solms stresses that he is actually an educator at heart. Being involved with research students does provide the opportunity to work on an individual basis with students and thereby making a difference; both in their individual lives as well as in the research discipline through research outputs produced.

Faculty Emerging Researcher of the Year



Prof Darelle van Greunen

The main area of research Prof Darelle van Greunen is focusing on is studying user experience in detail. She is essentially looking at the emotional experience of the user tapping into and using the experience of the 25 members in the ICT (Information and Communication Technologies) Department.

She is currently supervising 19 Masters and Doctoral students. This is a prolific record by any standard. The fundamental question she is responding to is: "How one can use technology to be a socio-economic enabler and liberator". Prof van Greunen is passionate about empowering rural communities. To a point that she spends time living among these communities - so that she does not thumb-suck what challenges they face.

Together with her Masters and Doctoral students, she is developing new ICT frameworks and models, and they do so from what is currently happening on the ground, thereby making their research groundbreaking.

User experience is a relatively new area, and there are few academics in South Africa focusing on this area. She borrows from what is taking place overseas, and makes it contextually relevant in application. Her research straddles many disciplines - ICT, education, health and rural development.

She cites ICT as a tool to enable users, for example: health care workers and their patients managing diseases and the administration of treatment, sms's are sent as reminders to the patient that it is time to take their medication.

Her proudest moment was graduating three PhD's in user experience. One of the students graduating worked on an international PhD on mobile user experience, focusing on mobile devices in the educational environment.

Prof van Greunen is passionate about empowering rural communities.

A further notable achievement in the period under review was having obtained her NRF rating. Looking ahead, she would like to be the "community champion addressing the real needs of real people".

Replication of the "Living Lab" concept is what she will continue putting under the spotlight. This is a community hub and an access point in the community.

User experience is a relatively new area, and there are few academics in South Africa focusing on it.

She is driven by passion to do so much, and has a positive mindset. She believes that if you have a good concept, money will follow.

Students she is currently promoting are from seven different countries. Local collaborators she is working with is the CSIR and all universities in South Africa. SAP research is among the highlights in the year under review. She also collaborates with Makerere University in Uganda, Alto (Finland), Nokia, and World Trade Centre.

She is mindful of the need of contributing to the sustainability of the environment.

Automotive and Related Manufacturing

NMMU made major research and innovative contributions during 2011 in the field of automotive and related manufacturing. Our contributions are set to enhance and enrich the progress of South Africa's industries in developing and exploiting technology to deliver innovative manufacturing solutions with a focus on the automotive and energy industries. In order to increase South Africa's prospects for improved competitiveness and economic growth, there is a great need for scientific and technological research, innovation and improved management models. This institutional research theme includes inter-disciplinary research in the Faculties of Science; Business and Economic Sciences; and Engineering, the Built Environment and Information Technology. 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 has increased the research capacity in this area. Research into laser metal forming, including metal cladding and forming, is growing in volume and is showing promising results.

NMMU's School of Engineering is renowned for its development of friction, hydro pillar and taper stud welding and has significant contract research projects for the energy-generation sector. Patents have been registered, and technology transfer via our Technology Transfer Office is in process. A team of engineers from eNtsa has successfully implemented the first commercial application related to the patented WeldCore™ technology, jointly developed by NMMU and Eskom. The application included the removal of a core sample and repair of the removal site by a Friction Taper Hydro Pillar Processing Platform developed specifically for this application at eNtsa. In addition, the eNtsa team won the 2011 National Science and Technology Forum (NSTF) award for "Research leading to an Innovation by a team".

Our contributions are set to enhance and enrich the progress of South Africa's industries in developing and exploiting technology to deliver innovative manufacturing solutions with a focus on the automotive and energy industries.

The NMMU Business School has continued its active research involvement in the automotive and related manufacturing sector during 2011, with a large number of research projects completed.

The Ford Motor Company has teamed up with NMMU to develop engineering expertise in the Eastern Cape. The parties reached an agreement on 15 February 2011, which will lead to the establishment of the specialised Ford Engine Research Unit (FERU), based

in the Department of Mechanical Engineering. The Advanced Mechatronics Technology Centre (AMTC) and the Volkswagen SA/DAAD International Chair, based in the School of Engineering, developed a Formula Student Car that participated successfully in Germany in 2011. Furthermore, they initiated the Solar Vehicle Project. The project involves the design and development of a solar-powered vehicle, which will enable students across a range of disciplines to conduct research into an exploding renewable energy market and to build on the base of accumulated learning.

The Nelson Mandela Metropolitan University hosted the *International Friction Processing Seminar* during the month of August 2011.

The one day seminar is aimed at presenting the fundamentals and current status of friction processing research. It aims to provide researchers and engineers an opportunity to review the current status of available friction processes and discuss the future possibilities of the technology.

In order to increase South Africa's prospects for improved competitiveness and economic growth, there is a great need for scientific and technological research, innovation and improved management models.

To conclude this seminar the NMMU hosted an International Friction Processing Workshop for industry, presented at the Beach Hotel, to discuss the strategic direction of friction processing research in South Africa. Discussions with international stakeholders and international collaboration teams aided in strategically aligning research activities and established possible research collaboration.

International guests and keynote speakers included:

Dr Wayne Thomas (TWI, UK), Prof Neil James (University of Plymouth, UK), Mr Lawrence Darby (Thompson Friction Ltd), Dr Tony Paterson (Aluminium Federation of Southern Africa) and Dr David Asquith (Sheffield University, UK).



From left to right: Prof Henk de Jager (ex-Executive Dean: Faculty of EBEIT), Prof Neil James (University of Plymouth), Prof Annelize Els-Botes (ex-Chairperson of the Friction Processing Research Institute), Dr Wayne Thomas (TWI Consultant - more popularly known within the engineering community as the "father of friction stir welding"), and Prof Danie Hattingh (Director of eNtsa).

Student Achievements

- **The Advanced Mechatronic Technology Centre (AMTC) and the Volkswagen Group/DAAD International Chair** in the NMMU School of Engineering has embarked on a project to build and drive a car that uses the sun for its driving power. The multi-disciplinary project will entail the design and development of a solar car by students across a range of study fields and will enable them to conduct research into the field of renewable energy. While building the car, engineering students will be given an ideal green platform from which to conduct future research for postgraduate studies.



- **Ewald Stieger**, postgraduate Information Technology student presented a paper at the *European Conference on Information Warfare and Security* in Tallinn, the capital of Estonia. The research paper, entitled: *Criteria for a Personal Information Security Agent* proposes a set of criteria for a software artefact that aims at influencing computer users towards more secure behaviour.
- German student **Juergen Kranz** is NMMU's first PhD Mechatronics student since the new engineering degree was introduced at the University in 2007. The former Reutlingen University student is examining intelligent automotive climate control for his dissertation.

First commercialisation application of the WeldCore™ technology

On Saturday, 3 September 2011, a team of engineers from eNtsa successfully implemented the first commercial application related to the patented WeldCore™ technology, jointly developed by NMMU and Eskom. This was done at the Rotek facilities in Johannesburg on a component with a R1.2 billion replacement value.

The application included the removal of a core sample and repair of the removal site by a Friction Taper Hydro Pillar Processing Platform developed specifically for this application at eNtsa.

The cylindrical core sample removed from the turbine rotor disk allowed Eskom engineers to accurately determine subsurface creep damage. This information provided adequate scientific evidence to create confidence in extending the service life of the current structure. This will consequently now lead to the postponement of capital expenditure and result in a major cost saving for Eskom.

This momentous event is the result of hard work and research, co-developed by eNtsa and Eskom, over the past eight years.



WeldCore™ process being performed on a turbine rotor disc.



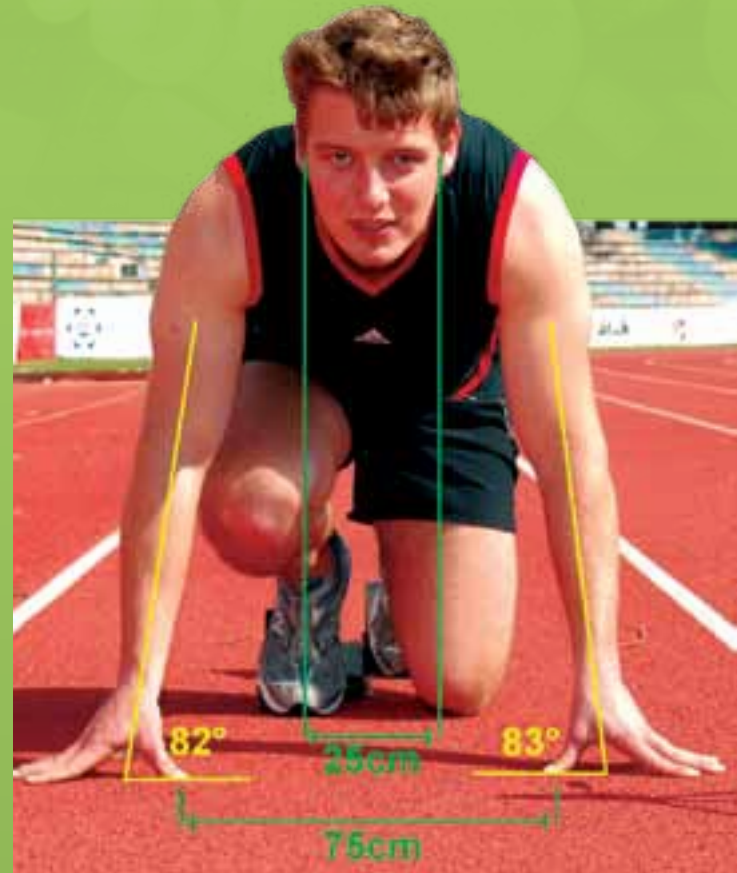
A HP (High Pressure) turbine that was subjected to the WeldCore™ Process.

Units from Journal Articles

Units from Journal Articles	
Name of Departments	Units
Construction Management	6.33
Mechanical Engineering	5.32
Information Technology	3.49
Mechatronics	1.28
TOTAL	16.42

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

Acting Dean's Overview



**Prof Rosa du Randt,
Acting Executive Dean:
Faculty of Health
Sciences**

The Faculty of Health Sciences' mission of providing high-quality training opportunities to students to ultimately meet the health and wellness demands of the community as health professionals, cannot be achieved without research. During 2011, staff and students from the six departments in the Faculty contributed to the NMMU's research endeavours and notably improved on the previous year's performances. Two research themes guided the research agenda of the Faculty in 2011, namely that of "health and disease management responsive to regional needs" and "optimising lifespan development and performance". Each department identified subthemes that aim to answer questions related to either or both of the two identified Faculty themes and which address national imperatives.

The Faculty firmly believes that research is important both for the generation of new knowledge and for the purposes of informing our teaching and learning.

The Faculty is proud of its three NRF rated researchers: Prof Mark Watson (B3), Prof Ilse Truter (C2) and Prof Pieter Milne (C3). The latter two colleagues each head the only two research units in the Faculty. Prof Truter is the Head of the Drug Utilisation Research Unit, which focuses on pharmacoepidemiology (the study of the use of medicines and the prevalence of disease states in large groups of people) and addresses in particular questions pertaining to drug utilisation patterns, pharmacoeconomics and pharmacovigilance. Prof Milne who heads the Cyclic Peptide Research Unit addresses issues pertaining to drug design, development and optimisation. The Cyclic Peptide Research Unit also collaborates closely with the Department of Biochemistry and Microbiology, where the focus is on traditional medicine and the use of plants in medicine. Both Prof Truter and Prof Milne contribute substantially to the Faculty's research theme of "health and disease management responsive to regional needs". Prof Truter was also identified and honoured as the Faculty of Health Sciences Researcher of Year based on her extensive research outputs of 2010. Prof Watson, our NRF B3 rated researcher, on the other hand, focuses his research on the Faculty's second theme, namely that of "optimising lifespan development and performance" with an emphasis on career psychology. Prof Watson collaborates extensively with two internationally renowned researchers in the same field, Prof Mary McMahon from Queensland University (Australia) and Prof Jenny Brimrose from Warwick University (United Kingdom).

Together they have published extensively in the past and in 2011 they focused on producing a book entitled: *Career Counselling and Constructivism*, as well doing presentations at international conferences and other research forums. In total, these and other researchers in the Faculty for the year 2011 produced 28 research articles, five books (four of which were produced by staff from the Nursing Science Department), 20 papers and 17 posters at international research conferences and six papers and four posters at national research conferences.

The Faculty's fifteenth (15th) annual Student Research Conference in 2011, proved to be a great success with 13 podium and five poster presentations offered. The highlight of this event was the keynote address: "Across the Miles: International Collaborative Research" presented by Prof Watson and his two international collaborators, Prof McMahon and Prof Brimrose, sharing with the Faculty's postgraduate students their journey to success in research in their particular field of specialisation.

Researchers in the Faculty produced 28 research articles, five books (four of which were produced by staff from the Nursing Science Department), 20 papers and 17 posters at international research conferences and six papers and four posters at national research conferences.

The Faculty also houses a substantial postgraduate student component and we are very pleased that the year 2011 saw 41 Masters degree and three Doctoral degree students completing their studies and qualifying for graduation. We firmly believe that research is important both for the generation of new knowledge and for the purposes of informing our teaching and learning. We are therefore proud of the Faculty's achievements in this regard.

Prof Rosa du Randt

Acting Executive Dean: Faculty of Health Sciences

Faculty Researcher of the Year



Prof Ilse Truter

Prof Ilse Truter's research focuses on the management of medicine. It includes studies on the prescribing and usage patterns of medicine, the cost of medicine, identifying the potential abuse and misuse of medicine, factors related to why and how people use medicine and also on other non-pharmacological systems of healing. The research is termed "Pharmacoepidemiology", and includes drug utilisation and pharmaco-economic studies amongst others. In addition to Pharmacoepidemiology, she is also involved in various Pharmacy Practice and Clinical Pharmacy research projects.

Her main research objective is to determine whether medicine is used rationally and cost-effectively, in other words, to determine whether patients and consumers are getting the best possible treatment for their disease state or condition at an affordable price, and to also determine whether patients are using their medication optimally. These studies will become increasingly important as South Africa moves towards a system of National Health Insurance (NHI).

Prof Truter's main research objective is to determine whether medicine is used rationally and cost-effectively.

Her main research achievements in 2011 include, apart from her unit's (DURU) research outputs, eight international peer-reviewed publications, seven peer-reviewed articles in a professional journal, a chapter in a book, an MPharm student who graduated and 21 presentations at international conferences. She was also invited to serve on a NRF SARCHI Panel and was privileged to attend four international research conferences.

She was further invited to chair and judge poster and podium presentations at conferences.

The first PhD thesis in the Faculty of Health Sciences came from her student, George Dranitsaris, a Canadian citizen. He graduated in April 2012.

Prof Truter says that: "the NRF Incentive Funding for Rated Researchers has greatly assisted me. It allowed me to attend international conferences, to be exposed to the most recent developments in my research area and to learn new research skills. I also received an NMMU Research Theme Grant, which allowed us to develop a new BPharm 4 elective module in Drug Utilisation - four posters have been accepted for presentation at an international conference in October 2012 based on the research that these students have conducted".

Prof Truter is collaborating with North-West University, specifically Prof Martie Lubbe and her team (medicine usage patterns) and Dr Johan Lamprecht and his team (clinical pharmacy). Internationally, her unit DURU has been involved in a multi-country research project on renal cell carcinoma, and is also involved in the establishment of an African chapter for the International Society for Pharmacoepidemiology (ISPE). Prof Truter also serves on the Special Interest Group for Drug Utilization Research of ISPE.

Prof Truter says her future research plans are to further develop DURU and to increase its research outputs. It is also hoped that skills development workshops will be presented based on knowledge gained from research projects.



Prof Ilse Truter receiving "The Academy of Pharmaceutical Sciences Best Publication Award in Pharmacy Practice" for the sixth time since 1995 at the recent Academy Conference in Grahamstown for a publication that she co-authored with one of her PhD students that appeared in the *European Journal of Cancer* in 2011.

Faculty Emerging Researcher of the Year



Prof Diane Elkonin

Prof Diane Elkonin says her main research thrust lies within the field of health psychology with specific attention to HIV and AIDS. Her Masters research component (1992) was one of the early studies on knowledge attitudes and behaviour of students towards HIV and AIDS. It has developed from there to programme development and evaluation, experiences of PLWA and caregivers of PLWA, to assessing attitudes of students towards voluntary counselling and testing, adherence to antiretroviral medication, and more recently the phenomenon of orphan-headed households. Two current Doctoral students are respectively focused on the development and evaluation of intervention programmes for health care workers, and secondly, health seeking behaviours of PLWA who utilise traditional medicines. This latter study is being conducted in Zimbabwe.

"I am fortunate to be in a supportive environment where there is a strong focus on research excellence within my department," says Prof Elkonin.

Developing out of this has been a growing focus on psychofortology and stress and coping studies with diverse populations, including PLWA, the elderly person with diabetes mellitus, parents of CP children, intensive care nurses and so on. As an adjunct to her specific teaching interest in the profession of psychology, she has published two national articles on the training and education of the registered counsellor, and two international articles on the use of religion and spirituality in therapy and training of psychologists.

The focus of her research has been towards exploring health seeking behaviours in a variety of populations, focusing on salutogenesis or what keeps people healthy in the face of pathology or challenge. The research question specifically towards HIV and AIDS would be focused on the phenomenon of an entirely preventable infection like HIV becoming the pandemic it has become, specifically in Sub-Saharan Africa, and why the predictions of 20 years ago have come to fruition in spite of the levels of knowledge regarding transmission and the costly interventions which have been rendered. The continued objective is to explore the psychological aspects of populations to discover what personality characteristics or psychological interventions can be utilised to prevent the continued spread of HIV.

In 2011, she supervised or co-supervised six Masters treatises.

"I am fortunate to be in a supportive environment where there is a strong focus on research excellence within my department. In addition, I have worked closely and collaboratively with a colleague on publications and supervision and this has been a fruitful partnership. I also have a good working relationship with the HIV and AIDS Unit at NMMU specifically with Dr von der Marwitz and this has allowed for collaboration and consultation opportunities," says Prof Elkonin.

Prof Elkonin further comments that her future research plans include a growing number of Doctoral students showing interest specifically in the field of HIV and AIDS in Africa. One student is from Zimbabwe and one in the process of being registered, from Malawi. She would also like to focus on the development of this international collaboration specifically with Doctoral students in order to increase international publications.

Lifespan Career Development



Prof Mark Watson

Prof Mark Watson's overall thrust is career development over the lifespan. Presently this involves researching a wide range of individuals ranging from children, adolescents and young adults through to older women between the ages of 45 and 65 years of age. The research questions vary according to the phase of the lifespan explored. With children and adolescents he is primarily interested in how their career thoughts develop as well as their knowledge of the world of work. Over time these developmental life stages of childhood and adolescence should move from more fantasy to reality-based career aspirations but this is often not the case. Indeed, secondary school leavers often choose future careers from a very limited and idealistic base. With women he has been more interested in their retrospective understanding of the career transitions they have experienced over their lifespan. This involves qualitative research that attempts to develop a grounded theory approach towards our understanding of women's career development.

Prof Watson served on the editorial boards of three international journals during 2011.

One achievement is his list of publications, which includes an international journal article with a further four articles in press, the publication of a book by Nova Science in New York with a second due for publication in 2012, four published book chapters with a further six book chapters in press and an invitation to write seven book chapters. In addition, a book proposal of which he will be co-editor has been accepted for publication by Routledge.

He served on the editorial boards of three international journals during 2011. He believes in understanding enablers systemically.

"Research does not happen in a vacuum. It requires finances, infrastructural support, collegial support and proactive institutional research management. I have been fortunate in receiving such systemic support.

In particular, my B rating with the NRF has provided sustained funds that have allowed me to travel and network as well as research collaboratively," says Prof Watson.

National and International Research Projects

Nursing Science

Nursing Science was involved in two major projects in 2011 and their postgraduate numbers were quite significant.



Prof Dalena van Rooyen

1. Mental Health Project

The Department of Nursing Science (DNS) has been involved in an international research project with the Public Health Department at the University of Gothenburg, Sweden. The project is entitled: "Barriers to health care and the right to health for persons with mental illness in South Africa: How can access and the right to health be improved?" It is an example of another multi-disciplinary research project that the DNS is involved in. This project links with the DNS's mental health research theme. The project is ongoing and is due to be completed in 2013. The Principal Investigators for this project are Prof Dalena van Rooyen of the NMMU DNS together with Prof Lena Andersson from the University of Gothenburg, Sweden.

2. Mobile Health Information Systems (MHIS) Project

The Department of Nursing Science (DNS) has also been involved in a project together with the NMMU Department of Computer Science and initiated by a multi-disciplinary conglomerate, seeking to determine the effectiveness of hand-held computing devices used in Primary Health Care settings. The Mobile Health Information Systems (MHIS) pilot project is driven by a public-private partnership, comprising of national and international stakeholders. This project links with the DNS's health information systems research theme. The project is ongoing and at the end of 2011 the project was awarded further funding for it to continue in 2012. The Project Lead from the DNS for this project is Dr Essie Ricks.

3. Postgraduate Enrolments

In 2011, we had two PhD graduates, including one staff member, Dr Portia Jordan. We also had seven Masters graduates and 31 Honours graduates in 2011.

Furthermore, there were 20 PhDs, 54 Masters and 36 Honours students who registered in 2011.

International Visitors to the Faculty

Date of visit	Name(s) of visitors and contact staff member in Faculty	Nature of involvement/visit	Outcome of visit
Nursing Science Throughout the year	Mr A Pollard (Survival Technologies) CP: Ms E Smith	Consult regarding simulation equipment and related technologies	Support educators/ students by providing state-of-the-art training aids
23 January/4 June	Mr B Gebru (Boston, USA) CP: Dr E Ricks	Research consultation and management: developing a Mobile Health Information System for professional nurses	Proposal drafted and time plan finalised
14 February	Dr S Silverman (USA) CP: Ms S du Rand	Workshop on "using coaching in nursing education"	Learning to use alternate and creative training strategies
27/28 March	Dr Lambert/Mr van Nugeteren (University of Johannesburg) CP: Dr P Jordan	Consultants: develop new EMC programme	Finalised EMC curriculum - waiting for approval
13 March	Dr L Siefert (University of North Carolina, USA) CP: MS S du Rand	Workshop on "assessment practices"	Learning to better monitor and evaluate students' academic performance using alternate measures
17 April	Dr A Crichton (Bhisho) CP: Prof RM van Rooyen	Discussion concerning the training of new health care profession	BEMC is currently in the planning phase. Negotiations are underway with regard to the training of clinical associates
23 - 26 April	Dr L Andersson (University of Gothenburg, Sweden) CP: Mr K Topper	Collaboration concerning the Swedish-RSA Mental Health Research Project	Finalised time plan: articles to be submitted for 2012
13 - 30 May	Mr G Gillitzer and Ms R Larsen (College of Saint Benedict and Saint John's University, USA) CP: Dr P Jordan and Ms M Williams	Student and academic staff exchange programme with the purpose of internationalisation, networking and benchmarking for both universities	Cultural and clinical learning experience gained by both parties
14/15 May	CHENMA (Collaboration for Higher Education for Nursing and Midwifery in Africa) Partners: NEPAD (The New Partnership for Africa's Development), NMMU (DNS), Brazzaville (Congo), University of KwaZulu-Natal (UKZN) CP: Dr S James	Develop education and training programmes to prepare specialist nurses and midwives (postgraduate programmes, in particular Magister level) in the three West African Francophone countries	Planning is underway

Date of visit	Name(s) of visitors and contact staff member in Faculty	Nature of involvement/visit	Outcome of visit
6 June	Ms I Rani, Ms S Kaur, Ms S Shankur, Dr S Singh (Max Health - India) Ms L Fletcher, Dr S Vasuthevan (Life Health Care - RSA) CP: Prof RM van Rooyen	Strategic analyses of involvement regarding the monitoring and moderation of the LHC Nursing Academy	Clearly defined roles, expectations, and goals regarding the DNS's responsibilities
12 June	Mr J Seoloane and Ms N Stemela (Children's Hospital, Johannesburg) CP: Dr P Jordan	Assist with the planned nurse education and development intervention before the hospital opens, as well as monitoring future performance	A five-year nursing strategy has been mapped out that will see to the adequate nurse staffing of the hospital
7 - 14 August	Dr M Edmonds (Jacksonville University, USA) CP: Ms S du Rand	Student and academic staff exchange programme with the purpose of internationalisation, networking and benchmarking for both universities	Cultural and clinical learning experience gained by both parties
13 - 17 August	NLN (National League for Nurses) Ms J Willhaus (USA) CP: Prof RM van Rooyen	Clinical Simulation Leadership Academy	
13/14 August	Prof C Fouche (New Zealand) CP: Dr D Morton	Workshop on "intervention research"	Thorough understanding of intervention research and clarity on staff doctoral studies
August/September (dates still to be finalised)	Ms L Middleton (Mzuzu University, Malawi) Two/three faculty members funded by Nursing Education Partnership Initiative (NEPI) and coordinated by Columbia University, USA CP: Prof RM van Rooyen/ Dr P Jordan	1) Experience SBT first-hand 2) Learn about developing strategic and operational plans for clinical skills laboratories and SBT and how to integrate this into curricula 3) Have the opportunity to discuss their vision with NMMU Nursing staff, and benefit from feedback and counsel	Still to meet
1 September - 30 November	Ms T Thorsdalen (Agder University, Norway) CP: Ms K Gerber	Student and academic staff exchange programme with the purpose of internationalisation, networking and benchmarking for both universities	Cultural and clinical learning experience gained by both parties
3 - 16 September	Mr T Immenroth CP: Ms S du Rand	Lecturing: Trauma Management (Management in Emergency Rooms)	Staff exchange
17 September - 17 November	Mr J Nome (Stord University, Norway) CP: Mr H Willemse	Student and academic staff exchange programme with the purpose of internationalisation, networking and benchmarking for both universities	Cultural and clinical learning experience gained by both parties

Date of visit	Name(s) of visitors and contact staff member in Faculty	Nature of involvement/visit	Outcome of visit
October - November (two weeks)	Prof T Fleige CP: Ms S du Rand	Lecturing: Economic topics of Health Management	Staff exchange
25 October - 26 October	Prof K Mhyre (Ostfold University, Norway) CP: Ms N Rall	Discuss the possibilities of developing a new student and academic staff exchange programme for 2013 with the purpose of internationalisation, networking and benchmarking for both universities	Goal: Secure international partnership
November	Dr M Harris (Northeastern University, USA) CP: Prof RM van Rooyen	Discuss the possibilities of developing a new student and academic staff exchange programme for 2013 with the purpose of internationalisation, networking and benchmarking for both universities	Potential for future international collaboration
Human Movement Science March - July 2011	Prof Meredith Harrison (Northeastern University, Boston, USA) CP: Prof R du Randt and Dr C Walter	Fulbright scholarship recipient visiting the Department of HMS to do collaborative research regarding HIV and Exercise	One article, two international conference presentations, and five community workshops hosted
Psychology October 2011	Dr Mary McMahon (University of Queensland, Australia)	Research writing/Keynote address	Book chapter and article, keynote address
October 2011	Prof Jenny Bimrose, the Institute of Employment Research (University of Warwick, UK) CP: Professor Mark Watson	Research writing/Keynote address	Book chapter and article, keynote address

Units from Journal Articles

Units from Journal Articles	
Name of Departments	Units
Human Movement Science	3.16
Pharmacy	2.48
Psychology	2.33
TOTAL	7.97

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**

The Faculty of Law has as one of the strategic objectives the creation of an environment that is conducive to research and innovation. Like previous years, the year 2011 was important in the cementing of a research culture that embraces and encourages all of our academic staff to conduct research in their chosen field of law. Our mentorship arrangements have now matured, hence the next cycle of mentorship arrangements will be started in 2012.

The broadening of our research base started in 2009 and I am certain that the research spirit that exists in the Faculty will continue to bear fruit and advance our legal scholarship.

It was also encouraging to see the efforts of our honorary professor, Prof Eltjo Schrage and our visiting professor Prof Pieter Badenhorst. Prof Eltjo Schrage wrote on bribery in the context of Private Law, as well as the role of Private Law in promoting social justice, which was the culmination of his inaugural address featured in the *2010 Annual Report*. Prof Pieter Badenhorst published six accredited articles in 2011 in the field of Mineral Rights and Property Law, which made a significant contribution to the body of knowledge in this field of law.

The broadening of our research base started in 2009 and I am certain that the research spirit that exists in the Faculty will continue to bear fruit and advance our legal scholarship.

There were some notable "firsts" in 2011. The research and legal writing on the law of the sea penned by Professor Patrick Vrancken during the last two decades culminated in the publication in 2011 of *South Africa and the Law of the Sea* published by Martinus Nijhoff Publishers (Boston and Leiden). The work was described by Prof J Dugard in his foreword as:

"...unquestionably the most comprehensive monograph on a branch of international law as it is applied in South Africa. It is thoroughly researched, well-written and carefully presented. It will guide South African legal practitioners, policy-makers, legislators, teachers and students of law, environmentalists, historians and all those involved in the law of the sea. But it also has an appeal to non-South Africans interested in the law of the sea as it provides a full picture of how the law of the sea has developed in one country and how international law rules shape national law. In this sense it is a unique study."

This monograph, a first for the Faculty, provided the basis for another "first". With the support of the Department of Research Management, the Faculty submitted a successful application for the awarding of a SARChI Chair on the Law of the Sea and Development in Africa. The Chair will undertake research on the legal regime governing the South African maritime zones and the exploitation of their resources, development in Africa and the law of the sea, including relevant indigenous law, and marine tourism law as a way to promote development.

All four departments within the Faculty finalised their research themes aligned with the Faculty research theme of "legal research in response to societal needs". The golden thread, to wit, "law, equity and justice", is apparent. This culminated in interesting research undertaken by some of our legal scholars that is aligned to this theme. This includes, inter alia, the research of Prof Avinash Govindjee on the assistance for the unemployed from a constitutional perspective, arguing for the introduction of a right to work. Dr John Von Bonde's research dealt with the legal position of victims of crime in both national and international law, dealing with the recognition of restorative justice in the South African criminal justice system. He also conducted research on certain aspects of the Prevention of Organised Crime Act 121 of 1998 that aims to dislodge the fruits of criminal activity from the hands of criminals.

Some of the academic staff started their doctoral studies in 2011. Adv Razaana Denson, Mr David Abrahams and Ms Lynn Biggs are all pursuing doctoral studies linked to this theme. Adv Denson's LLD is a comparative exposition of Islamic law relating to the Law of Husband and Wife. Mr David Abrahams' Doctoral thesis is on the meaning and limits of the prohibition of collective punishment in International Humanitarian Law and Human Rights Law. Ms Lynn Biggs's LLD is an evaluation of the impact of the Consumer Protection Act 68 of 2008 on the relationship between the franchisor and franchisee. More detail on this exciting research around the theme of law, equity and social justice will be featured elsewhere in this *Annual Report*.

With the support of the Department of Research Management, the Faculty submitted a successful application for the awarding of a SARChI Chair on the Law of the Sea and Development in Africa.

The Department of Private Law once again showcased their research and organisational abilities with the hosting of the third *Private Law and Social Justice Conference*. The conference was organised by Prof André Mukheibir, HOD of Private Law.

The highlight was the keynote dinner speech delivered by retired Constitutional Court Justice Yvonne Mkgoro. Justice Mkgoro emphasised the critical role that legal academics play in assisting the courts by providing cutting-edge research that courts can rely on in the delivery of judgments.

Other conferences and seminars included the *Labour Law Seminars* organised by Prof Adriaan van der Walt, HOD of Mercantile Law and Head of the Labour and Social Security Law Unit. Furthermore, a symposium on anti-corruption was held in October 2011, organised by Prof Deon Erasmus, HOD of Criminal and Procedural Law.

The Faculty of Law values and recognises the contributions made by all its legal scholars, hence the Faculty held its third "Law Oscars" in early December 2011. I would like to use this opportunity to thank all the legal scholars in the Faculty who so tirelessly contributed to our research mission and vision despite their challenging teaching and engagement activities.

Prof Vivienne Lawack-Davids

Executive Dean: Faculty of Law

Faculty Researcher of the Year



Prof Avinash Govindjee

Prof Avinash Govindjee is an Associate Professor in the Department of Public Law and Deputy Head of the Labour and Social Security Law Unit in the Faculty of Law. He has been involved in a range of social-security related projects for various South African Government departments and agencies.

His research focus is, broadly speaking, on human rights law, with particular attention being paid to issues pertaining to poverty, unemployment and inequality. His core research area is in the field of social security law.

He endeavours to interrogate the role of law in addressing the triple challenge of poverty, unemployment and inequality, with special focus on the constitutionalisation of law, socio-economic rights realisation, labour law and social security law. One of his research objectives is to consider the appropriate role of the courts in facilitating social transition in the country.

Prof Govindjee endeavours to interrogate the role of law in addressing the triple challenge of poverty, unemployment and inequality, with special focus on the constitutionalisation of law, socio-economic rights realisation, labour law and social security law.

He was contracted by the Institute for Social Law and Policy (ISLP) to develop a new adjudication framework for social security in South Africa. This work culminated in a policy document being submitted to the Department of Social Development in November 2011 and serving before the Inter-Departmental Task Team on Social Security. As Faculty Researcher of the Year (2011) he: co-published chapters

in three internationally published books during 2011, the last in a series of three articles relating to the redesign of the Unemployment Insurance Fund was published in the *Stellenbosch Law Review*, two other articles were authored and published in other accredited South African law journals, he also delivered seven papers at national/international conferences, the majority by invitation.

Prof Govindjee collaborated mainly with Prof MP Olivier, the Director of the Institute for Social Law and Policy; Prof O Dupper, Professor of Law at Stellenbosch University, and Dr R Kruger of Rhodes University during the year in question.

He plans to co-edit a book on affirmative action in India and South Africa, in addition to co-publishing a series of contributions on the social security position of non-citizens in South Africa.

Faculty Emerging Researcher of the Year



Mr David Abrahams

Mr David Abrahams is a Lecturer in the Department of Public Law and an Associate of the Labour and Social Security Law Unit in the NMMU's Faculty of Law. His area of research covers the much needed realisation on the African continent and the Middle East that protection of fundamental human rights of victims (mostly women and children) during armed conflict is pivotal. He believes that more research in this area of international law needs to be undertaken. Mr Abrahams also serves on the Editorial Board of the *African Journal on International Humanitarian Law*.

According to Mr Abrahams, violations of human rights and other international laws often occur during armed conflict. "On the ground" responses from humanitarian organisations are sometimes impeded by the war-torn country's political situation and/or the nature of the conflict itself. While much research is being undertaken in this area of law, the violations continue, necessitating more research.

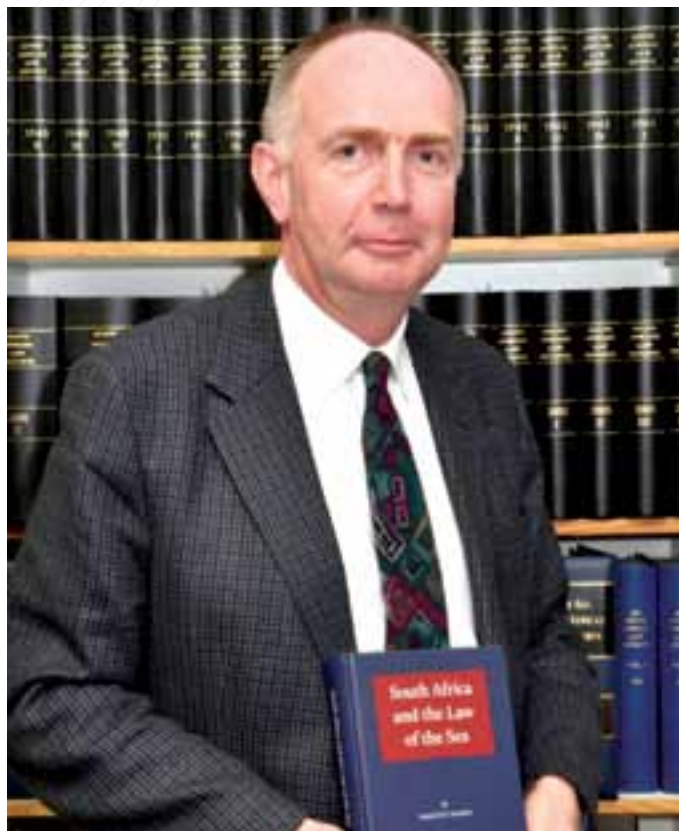
Mr Abrahams' area of research covers the much needed realisation on the African continent and the Middle East that protection of fundamental human rights of victims during armed conflict is pivotal.

Mr Abrahams observes that the Faculty of Law's mentorship programme has to a large extent been very helpful in aiding his research. He has been very fortunate to have had Prof Avinash Govindjee as his mentor.

He is currently registered for his doctoral studies and the title of his PhD is: *The Meaning and Limits of the Prohibition of Collective Punishment in International Humanitarian Law and (possibly) Human Rights Law*. It is often the case that, during an armed conflict soldiers as members of the armed forces, and dissidents or rebel groups, engage in the practise of collective punishment. These acts range from house demolitions, military raids, damage to infrastructure, closures and curfews, and may include economic sanctions; the list is not a *numerus clausus*. Often states that engage in these acts raise the argument that their conduct amounts to mere countermeasures to already existing brutal attacks from the opposing party to the conflict. No doubt that there are strict prohibitions against collective punishments in international humanitarian law, international human rights law, and international criminal law. Yet states continue to engage in the practise of collective punishment, or at least (arguably) allow rebel groups who might be under that state's control, to engage in acts of collective punishment. This leads to an array of questions: Are there situations where a state may legitimately engage in collective punishment? Under what circumstances? Is the prohibition of collective punishment in international law absolute? Are there any limitations to the prohibition? Do the international instruments provide a concise definition of the concept "collective punishment"?

To date, the Rome Statute of the International Criminal Court does not include collective punishment as a war crime. It is interesting to note that the Special Court for Sierra Leone is probably the only court since Nuremberg that has given consideration to the concept of collective punishment. Despite their arguably being a customary prohibition on collective punishment, the question is whether the Rome Statute needs to be amended to include and list the crime specifically, or whether underlying acts (under the guise of collective punishment) are sufficiently addressed by existing enumerated war crimes.

Monograph: South Africa and the Law of the Sea



Prof Patrick Vrancken

Being at the confluence of the Atlantic Ocean, the Indian Ocean and the Southern Ocean, South Africa plays a considerable role in the smooth running of maritime commerce and the diverse efforts to ensure the sustainable development of the marine environment. Professor Vrancken's monograph, *South Africa and the Law of the Sea* brings together the many threads of the rich South African marine law tapestry by covering both the public international law as context and the details of South African marine law and policy within their African framework. The result is a tool to foster implementation, coordination and further research at the domestic level as well as a platform to facilitate comparative work to strengthen Africa's jurisprudence and influence in maritime matters.

Diversity in Law

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. Her current research for her LLD seeks to provide a possible solution whereby legislation regulating Muslim Personal Law (MPL) can be implemented in South Africa notwithstanding the apparent conflict existing between MPL and the rights contained in the Bill of Rights. In order to achieve this, an in depth study of the philosophy underlying the principles of Islamic law is being undertaken.

Advocate Denson's current research for her LLD seeks to provide a possible solution whereby legislation regulating Muslim Personal Law (MPL) can be implemented in South Africa.

The research undertaken will also attempt to provide various solutions as to how MPL can be implemented in South Africa without compromising either the rights contained in the Bill of Rights or Islamic law. To this extent, a study of the draft Muslim Marriages Bill will be undertaken in order to determine which aspects of the proposed Bill are not in conformity with the general principles of Islamic law. Proposals will also be submitted in an attempt to remedy those sections of the proposed Bill that are deemed to be Shari'ah non-compliant. The manner in which foreign countries have succeeded in the implementation of Islamic law and state law will also be taken into account when making proposals as to how this can be successfully achieved in South Africa without compromising the fundamental principles of Islamic law.

Journal hosted by the Faculty: *Obiter*



Ms Hilda Fisher (left) and Prof Adriaan van der Walt (right).

Obiter is published under the auspices of the Faculty of Law. It is a Department of Education accredited journal publishing articles on topical legal issues and legal research and appears three times per year.

The first publication of Obiter was published in 1979.

Since 1993, Prof Adriaan van der Walt, HOD of Mercantile Law, is the Editor of *Obiter* while Ms Hilda Fisher, presently the Dean's secretary, has typeset the journal since then. The Deputy Editor is Prof Shannon Hootor, from the University of KwaZulu-Natal, and other members of the Editorial Committee are the following members of the Faculty of Law: Ms Lindi Coetzee, Prof Avinash Govindjee, Prof Elmarie Knoetze and Mr Stephen Newman. *Obiter* also has the benefit of the counsel of an Editorial Board consisting of eminent legal scholars from South Africa and The Netherlands.

The first publication of *Obiter* was published in 1979, and was started by a group of LLB-students with Patrick Scott as Editor. He is currently Senior Counsel at the Port Elizabeth bar. After a few years, staff members of the University's Faculty of Law took over the editing and publication of the journal, with Prof AC Cilliers as Editor until Prof Van der Walt took over.

Since its inception, *Obiter* has grown into a respected and well-known general law journal in South Africa and contributions from academics of all South African universities as well as practitioners are published after a rigorous peer-review process. Increasingly, international scholars also submit contributions to the journal.

At the NMMU, *Obiter* is often referred to as the “in-house journal” of the Faculty of Law. However, even before its accreditation by the Department of Education several years ago, it was published by the Faculty and edited mostly by members of the NMMU Faculty of Law, but it is not an in-house journal any longer. In Volume 1 of 2012, for example, the only contribution from an NMMU staff member is an article by Prof Avinash Govindjee on the constitutional right to education, a comparative study, co-authored with Dr E Taiwu, a Nigerian academic.

The publication of *Obiter* plays an important role in enhancing the profile of the Faculty in the legal environment in South Africa. The journal is presently available in hard copy or in an electronic format by subscribing to Sabinet.

International Visitors to the Faculty

Date of visit	Name(s) of visitors	Nature of involvement/visit
August 2011	Emeritus Professor Elto Schrage (University of Amsterdam, The Netherlands) and Visiting Professor Pieter Badenhorst (Deakin University, Australia).	Delivered papers at the third <i>Private Law and Social Justice Conference</i> .

Units from Journal Articles

Units from Journal Articles	
Name of Departments	Units
Private Law	9.50
Public Law	4.16
Criminal and Procedural Law	3.00
Law Management	2.00
Mercantile Law	1.00
TOTAL	19.66

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

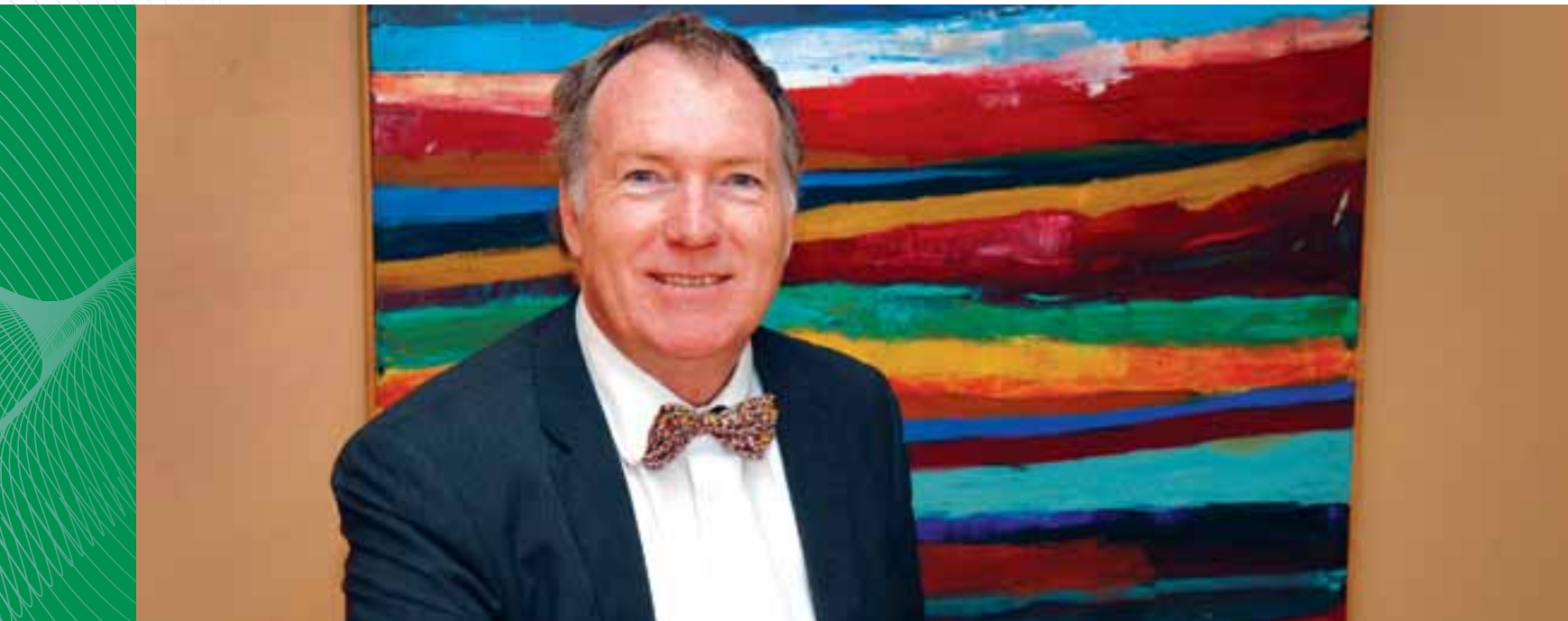
Department of Computing Sciences
Department of Mathematics and Applied Mathematics
Department of Physics
Department of Statistics

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**

Significant research highlights make 2011 stand out as a year of great accomplishment for the Faculty of Science. While some of these highlights are listed here and in other parts of the Report, it must be mentioned that there are many in the Faculty - too many to list, who have played a key role in creating an atmosphere within the Faculty where research students can develop their research skills under expert supervision and mentorship. As a result of the solid support from Faculty members, our postgraduate student numbers have increased, our graduations have increased, our publication outputs are at a record high for the Faculty, the number of staff with completed doctorates is the highest to date, we have a record number of research associates who have chosen to be linked to the Faculty, and the external funding allocated to the Faculty for research and engagement projects has increased. All this is in support of realising the Vision 2020 Strategic Plan of the University.

The relocation of the Africa Earth Observatory Network (AEON) to our University under Prof Maarten de Wit's guidance represents a milestone of great significance for the NMMU.

The Faculty is very proud to have been able to attract Prof Maarten de Wit to the NMMU, as the first recipient of the newly created Chair of Earth Stewardship Science. A Geologist of international renown with an A1 rating from the NRF, Prof de Wit brings to the NMMU a wealth of experience in research and postgraduate student training. Already, a number of Honours, MSc, PhD and postdoctoral students have been drawn to the NMMU to work with Prof de Wit and have registered for their studies under his guidance. As the founder of the Africa Earth Observatory Network (AEON), the relocation of AEON to our University under his guidance represents a milestone of great significance for the NMMU, the benefits of which will be felt by our students for many years to come. His vision is to also establish a "Commons" linked to Earth Stewardship Science, where students can interact with each other and with Faculty, tackling relevant issues of great scientific and social concern. He joins Botanist Prof Richard Cowling as the two A1 rated researchers at the NMMU.

A major research highlight for the Faculty was the establishment of the Centre for High Resolution Transmission Electron Microscopy (HRTEM), and the opening of the purpose-designed building on 11 October 2011. With over 100 delegates including foreign dignitaries gathering for the event, the official opening by the Minister of Higher Education and Training was a wonderful occasion of celebration. In the few months since its launch, the Centre under the directorship of Prof Jan Neethling has attracted students and researchers from across the country and some very significant research findings have resulted from the studies conducted. With four state-of-the-art electron microscopes and an array of support instrumentation, the Centre is able to conduct detailed studies on a wide range of materials in the physical and biological sciences, which would previously simply not be possible in South Africa.

Also of significance was the launch of the Centre of Expertise in Forecasting on 3 June 2011. Under the directorship of Prof Igor Litvine, the Centre will develop sophisticated models to forecast energy needs of the country. Given the current energy crisis facing South Africa, the work of the Centre is strategically important for the country's further economic development and security.

A major research highlight for the Faculty was the establishment of the Centre for High Resolution Transmission Electron Microscopy (HRTEM).

The Faculty was delighted that three of our applications submitted to the NRF in September 2011 for SARChI Chairs have been approved. These additional Chairs will add to the two existing Chairs (in Nanophotonics and in Maths Education) in the Faculty and will provide us with considerable expertise in key research areas.

While the overall number of publications for the Faculty has increased, special mention must be made of the record number of publications from academics and students in the Department of Chemistry in 2011. This may be directly attributed to the installation of significant research equipment (including a new X-ray diffractometer and a nuclear magnetic resonance system). The funding came from an Efficiency Grant released by the Department of Higher Education and Training in 2010. The equipment has enabled our Chemistry Department to also support other universities in the region who do not have access to such equipment.

Our Department of Mathematics and Applied Mathematics hosted a joint conference of the South African Mathematical Society (SAMS) and the American Mathematical Society (AMS) in November 2011. Attended by a few hundred delegates including many foreign academics and students, the conference gave our Department

exposure as one of the leading Mathematics Departments in South Africa. We congratulate Prof Geoff Booth (Chair of the organising committee) and his team for such a resounding success.

The Faculty was delighted that three of its applications submitted to the NRF in September 2011 for SARChI Chairs have been approved.

While many of our staff acted as worthy ambassadors for the Faculty and the NMMU during 2011, I would like to specifically mention two persons - both in our Department of Zoology, whose achievements are worth celebrating. Dr Pierre Pistorius was chosen as one of six South African researchers to spend one month on Prince Edward Island. Totally uninhabited and isolated in the South Atlantic, this South African island is visited once every four years for scientific studies, much of which is focused on identifying the long-term changes brought about by global warming. Dr Pistorius' recognised expertise in the field of marine birds made him a key member of the team. Secondly, Dr Nomakwezi Mzilikazi was invited by the Alexander von Humboldt Foundation to be an Honorary Ambassador for the organisation in South Africa. As a Humboldt Fellow and having spent a year in Germany at Marburg University in 2006/7, Dr Mzilikazi is worthy of this honour. We are proud of the recognition she will bring to the Faculty and the NMMU.

Prof Andrew Leitch

Executive Dean: Faculty of Science

Faculty Researcher of the Year



Prof Tommy Gerber

Prof Tommy Gerber has been a member of the academic staff in the Department of Chemistry for the past 30 years. He is currently a Professor of Inorganic Chemistry and Head of the Department. He loves lecturing, and his duties include teaching the large first-year Chemistry classes.

He is also passionate about his research, which involves the coordination chemistry of technetium and rhenium and their application as diagnostic and therapeutic agents in nuclear medicine - one could say it is research to do with isotopes in the fight against cancer. For this work he was recently presented with the "Atoms for Peace" medal by the Russian Nuclear Society for research which benefits humankind. With his students he is the author of well over one hundred papers in scientific journals.

He has published well over two hundred scientific papers in international chemistry journals, most of which were co-authored with colleagues as well as Masters and Doctoral students that he supervises each year. The year under review, 2011, was a record year in terms of publication outputs for Prof Gerber, 57 of his journal articles were submitted to the Department of Higher Education for subsidy purposes.

Prof Gerber was recently presented with the "Atoms for Peace" medal by the Russian Nuclear Society for research which benefits humankind.

Prof Gerber's research involves the use of metal compounds in medicine. His main research objectives are to make new metallic complexes, which may find application in the therapy of cancer and the early detection of Alzheimer's disease.

His main research achievements in 2011 were on the synthesis of a class of rhenium compounds, which is totally new and unique and has never been evaluated for their activity. New instruments like the X-ray diffractometer and the nuclear magnetic resonance spectrometer; an excellent postdoctoral student Richard Betz; good PhD students and technical support from Dr Eric Hosten (Scientific Officer in Chemistry) and Mr Henk Schalekamp (Technician in Chemistry) helped him to achieve great success in 2011.

He collaborates with Dr Peter Mayer from the Ludwig Maximilian University in Munich, Germany. Prof Gerber states that his future research plans involve the evaluation of the coordination chemistry of the lanthanoids for their potential as therapeutic agents.

His main research achievements in 2011 were on the synthesis of a class of rhenium compounds, which is totally new and unique and has never been evaluated for their activity.

He highlights that the only way to make a significant impact in research is to work on projects close to the coal-face. In order to do this, one needs international collaboration and exposure. Publishing in high profile international journals is of utmost importance, and the attendance of international conferences is more important than just studying the literature. "One should never be afraid of criticism on one's work, or be afraid to say 'I don't know', or ask for help," he comments.

Faculty Emerging Researcher of the Year



Dr Ernst Ferg

Dr Ernst Ferg is Senior Lecturer of Physical and Polymer Chemistry. His research field is focused on the electrochemistry of lead-acid batteries, for which he continues to receive funding from industry each year. He also collaborates with chemists at other institutions working on lithium-ion batteries. He is currently supervising five Masters students and one Doctoral student in the Faculty. Dr Ferg focuses on the areas of Battery Chemistry, Material Chemistry and Powder X-ray Refraction.

His main research efforts are expended in the car battery industry - hence his collaboration with Willard Batteries. Exploring and probing the hydrogen economy is key for him and his research students. They use specialised techniques for analysing small batteries, for example the Electrochemical Impedance Spectroscopy (EIS).

His research pursuits have benefitted from being sponsored by the industries. The Department of Trade and Industry has also funded their research.

His future research endeavours will focus on the Lead Acid Battery (car battery). He collaborates with RSR Technologies, which is key in lead manufacturing internationally.

Dr Ferg focuses on the areas of Battery Chemistry, Material Chemistry and Powder X-ray Refraction.

Dr Ferg is enabled to carry out his research effectively by a well-equipped laboratory, and students he can recruit for further studies. Students with better prospects to succeed in this area seem to be those who starts with a Diploma, then move to a BTech, and finally a Masters degree in technology. This seems a recommended trajectory for students in this area of research. Dr Ferg plans to undertake further research work with the ALBC (Advanced Lead Battery Consortium).

His future research efforts will continue to be in the area of battery manufacturing and he is currently supervising a Doctoral student in the area of material development.

Trying to encourage students to be interested in chemistry, and to do further studies in chemistry is proving to be a daunting challenge at the moment. As he expends energy in the lead battery research, he also does not want to lose touch with carting out research in other areas of chemistry. It is finding time and space to pursue both streams of research, which he must navigate going forward.

Marine Predators and Ecosystem Functioning



Dr Pierre Pistorius

Dr Pierre Pistorius is a Senior Lecturer in the Department of Zoology and has built up extensive experience as a scientist, both locally and internationally. He worked and contributed to scientific endeavours in several countries including Norway where he spent a year (2004) working at the Norwegian Institute for Nature Research (NINA) in Trondheim. He is currently collaborating widely in the global arena, and has established a productive research network. His research is primarily focused on marine top predators and on what they can tell us about the state of our changing marine environment - to allow for better resource management. To date he has published in the region of 50 peer-reviewed scientific articles, mostly in international journals, and has an H-factor of 12.

Dr Pistorius is interested in a wide range of aspects associated with marine biodiversity and conservation. He is currently focusing a large part of his research on the population ecology and behaviour of marine top predators. These include seabirds, seals and sharks, which he studies along the Southern and Eastern Cape, at the subantarctic Prince Edward Islands and at the Falkland Islands.

Dr Pistorius worked and contributed to scientific endeavours in several countries including Norway where he spent a year (2004) working at the Norwegian Institute for Nature Research (NINA) in Trondheim.

As a population ecologist, he is interested in causative factors governing changes in population numbers in marine top predator species, largely within a conservation context. He is also interested in the foraging behaviour of top predators, as well as the use of marine top predators as indicators of the state of the marine environment. Identifying ecosystem boundaries and focusing research and monitoring efforts at these boundaries often provide information reflective of change in the entire system. Life-history variables in top predators are often responsive to changes in the environment. The study of these variables potentially provides a cost-effective alternative to assessing ecosystem constituents lower down in the food chain.

His main research achievements in 2011 included two MSc students, which graduated in 2012 as well as being co-supervisor for an MTech student. He was externally funded for a two week research visit to the University of Montpellier, France, and was invited to partake in a prestigious research expedition to Prince Edward Island as part of a group of six scientists.

Dr Pistorius serves on the editorial board of two scientific journals (*African Journal of Marine Science* and *ISRN Zoology*) and he was invited to become an external member of the Centre of Excellence at the Percy FitzPatrick Institute for African Ornithology (UCT).

Dr Pistorius comments that he was fortunate enough to spend two years on Marion Island researching southern elephant seals, followed by a year in Norway working as a research biologist, two years as a research officer on Aldabra in the Seychelles and a year as conservation officer at the Falkland Islands. All of these opportunities were fundamental to his training as a scientist and has allowed him to establish a wide collaborative network.

As a population ecologist, he is interested in causative factors governing changes in population numbers in marine top predator species, largely within a conservation context.

Dr Pistorius' future research plans involve him being a co-investigator for two programmes at Marion Island on seabirds and he is planning on dedicating more time on research projects at Marion Island.

In March 2012, he will be stationed at Marion Island to set up an automated monitoring system for rockhopper penguins, as they have identified a host of important questions that need answering to try and avoid the continued decline of some penguin and albatross species. Closer to home he plans to extend his focus to the use of Marine Protected Areas as a management tool.

Microalgal Ecology



Dr Phumelele Gama

Dr Phumelele Gama is a Lecturer in Botany, his research interests centre around estuaries, the ecology and sustainability of wetlands, plant biotechnology and the physiology of Honey Bush tea. Understanding the geology and hydro-geomorphology of wetlands continues to be his area of pursuit. He is currently addressing the impact of microalgae on estuaries - especially the success of algae and the demise of pollutants.

Dr Gama is currently addressing the impact of microalgae on estuaries.

In the year under review, he published a booklet, and delivered a paper at the University of KwaZulu-Natal. Dr Gama will continue with his research on estuaries, Honey Bush tea and a project done in collaboration with the Coega Development Corporation.

International Visitors to the Faculty

Date of visit	Name(s) of visitors and contact staff member in Faculty	Nature of involvement/visit	Outcome of visit
2 October - 13 November 2011	Dr Abimbola Sowemimo (Prof Maryna van de Venter)	ALC funded collaboration: anticancer and anti-inflammatory activities of medicinal plants from Nigeria and South Africa	Article in the <i>Journal of Ethnopharmacology</i>
11 - 13 August 2011	Prof Jan Tytgat, Laboratory of Toxicology, University of Leuven (K.U. Leuven), Leuven, Belgium (Prof Ryno Naude)	Study of venoms secreted by South African cone snails	One peer-reviewed publication appeared in <i>Peptides</i> in 2012 and a second publication was accepted for publication in <i>Peptides</i> in July 2012
May 2011	Professor Wojeich Meilicki (Prof C Frost)	Collaboration	Ongoing
27 February - 5 March 2011	Prof Nelson Rernandez (Contacting Dr Gill Dealtry)	Discussion and development of research collaborations and presentation of seminars to UG, PG and Science Faculty	Continued collaboration and planning of joint work
8 - 9 November 2011	Prof N Balakrishnan (McMaster University, Canada) (Dr Sharp)	Visited Department and presented seminars at NMMU (and whilst here, visited Rhodes)	Seminars to staff and postgraduate students
2 February	MUT and Client (Gary Dugmore/Ben Zeelie)	Algae project	Discussions
2 February	Tsala Agri Humansdorp meeting with Mt King of Sanlam (Gary Dugmore)	Exploring and seeking to understand the workings of the laboratory University runs for soil/water/plant/etc. testing.	Discussions and visit
2 February	Richard Nzuzi and Associates (Gary Dugmore)	Viewing the set-up of the Gomery Road Campus gas supply system	Inspection and discussions
11 March	TIA Communications Mng Visit to TS (Gary Dugmore)	InnoVenton/DCTS specific discussions on our local programme of events/signage around the new building and the major projects	Discussions
15 March	Various* (Ben Zeelie) *Jackie Badenhorst, Erika Jordaan, Renate Roux-van der Merwe, Akash Anandraj, Anette Mienie, Kugen Permaul, Suren Singh, Faizel Bux, Raj Laloo, Dheepak Maharaj	Biofuels workshop	Workshop
1 April	Own Production Facility (Gary Dugmore)	Manufacturing biodiesel from waste vegetable oil	Discussions: possible project
2 April	Omnia (Ben Zeelie)	Algae experiments	Project progress
6 April	University of Warwick, UK (Ben Zeelie)	Collaboration between NMMU and University of Warwick	Discussions
7 April	P. Clarke (Gary Dugmore)	Citriodora oil conversion	TIA project
21 April	LG Sonic, Circle Link (Ben Zeelie)	Coal fines beneficiation	Discussions

Date of visit	Name(s) of visitors and contact staff member in Faculty	Nature of involvement/visit	Outcome of visit
6 May	P. Clarke (Gary Dugmore)	Citriodora oil conversion	TIA project
10 - 11 May	InnoVenton Advisory Board (Various companies) (Margriet Bosma)	Topics for discussion and/or for approval included the Fuel Chemicals Platform; board self-assessment; and the 2010 Annual Board Report	As per subject
12 May	Chicory SA (Pty)Ltd (Gary Dugmore)	Extraction and purification of Inulin	TIA project
27 May	TIA - Dr Tsakani Mthombeni General Manager: Energy (Ben Zeelie)	Energy contact meeting	Discussions
31 May	AIDC (Ben Zeelie)	Facility visit - Regional Innovation Forum networking initiative	Visit and tour of InnoVenton
1 June	NetEnergy (Ben Zeelie)	Algae project	Discussions
9 June	Chicory SA (Pty) Ltd (Gary Dugmore)	Extraction and purification of Inulin	TIA project
13 June	Solar23 (Gary Dugmore)	Trialkoxysilane process	Discussions possible TIA project
7 July	TIA - Blessed Okele, Melody Dlamini and Lendy Letimela (Ben Zeelie)	Algae project	TIA algae-to-energy project discussions
8 July	Chicory SA (Pty) Ltd (Gary Dugmore)	Inulin project	TIA project
19 July	NetEnergy (Ben Zeelie)	Coal Fines and Algae Liquefaction	Discussions
20 July	TIA (MB)	Marketing and branding	Fact finding
28 July	TIA and Anglo American - Zoleka Ngcete (TIA) and Anglo American delegates (Ben Zeelie)	Algae project	Discussions
2 September	Sasol (Gary Dugmore)	Vanadium oxidation project	Discussion: project for Sasol
19 September	Eskom (Ben Zeelie)	Algae project	Discussions
20 - 21 September	NWU (Ben Zeelie)	Possible collaboration	Discussions
28 September	SAA (Ben Zeelie)	Collaboration opportunities	Discussions
29 September	Chicory SA (Pty) Ltd (Gary Dugmore)	Inulin extraction	TIA project

Date of visit	Name(s) of visitors and contact staff member in Faculty	Nature of involvement/visit	Outcome of visit
3 October	North-West University (Ben Zeelie)	Visit to InnoVenton facilities	Visit
7 October	CPUT (Ben Zeelie)	Visit to InnoVenton facilities	Visit
13 October	TIA (Margriet Bosma and Gary Dugmore)	Station visit	Visit
19 - 20 October	Swiss Lab (Shawn Gouws)	Training for InnoVenton staff on new Grabner instruments	Short Course
18 November	Faurecia (Gary Dugmore)	Recycling process for plastics	Discussion possible project
21 November	InnoVenton Advisory Board (Various Companies) (Margriet Bosma)	InnoVenton Business Plan 2012	Meeting
6 December	K Mashigoane (Gary Dugmore)	DDAC and other	TIA project

International Visitors who visited A rated researcher, Prof Maarten de Wit:

1. **Professor Harald Furnes:** Department of Earth Science and Centre for Geobiology, University of Bergen, Norway. Joint AEON - CfG project on early Earth and the origin of the Barberton greenstone belt, Makonjwa Mountains, Mpumalanga.
2. **Dr David Bell:** Research Scientist, School of Earth and Space Exploration and the Department of Chemistry and Biochemistry at Arizona State University, Tempe, USA. Collaborative research projects in Earth System Science and formation of early Earth continents.
3. **Professor Francois Guillocheau:** Department of Geosciences, University of Rennes, France. Collaborative project on the evolution of Phanerozoic Geology of Africa and the topography of contemporary Africa (TOPO-Africa programme); and co-leader of the !Khure Africa bilateral programme, South Africa-France.
4. **Professor Brian Horsfield:** Head Geochemistry, GFZ German Research Centre for Geosciences, Potsdam, Germany. Co-leader of the Earth Systems Science programme Inkaba yeAfrica bilateral programme South Africa-Germany.
5. **Dr Micheal Wiedenbeck:** Research Scientist GFZ-Potsdam, Germany. Presenter of Short Course in SIMS (Secondary Ion Mass Spectrometry), November 2011. Part of AEON-GFZ project to establish a virtual SIMS laboratory at NMMU.
6. **Professor Becky Flowers:** Department of Geological Sciences, University of Colorado, Boulder, USA. Joint AEON-UoC project on thermochronology and exhumation history of southern Africa.

Units from Journal Articles

Units from Journal Articles	
Name of Departments	Units
Chemistry	58.17
Zoology	19.13
Botany	14.87
Biochemistry and Microbiology	14.81
Physics	10.93
Geosciences	8.67
Department Natural Resource Management, George Campus	4.34
Mathematics and Applied Mathematics	3.00
Science Faculty Management	2.93
Statistics	1.82
Textile Science	1.81
InnoVenton	1.00
TOTAL	141.48

Conferences hosted at NMMU

NMMU hosted a number of national and international conferences.



Dr Nancy Boyd-Franklin, Rutgers University (USA).

The sixth Social Aspects of HIV and AIDS Research Alliance (SAHARA) Conference took place from 28 November to 2 December with the following theme: *Are we turning the tide of HIV/AIDS? - Social, Political and Economic landscape of HIV prevention and response*. SAHARA was established in 2001 with the vision of reducing the number of new HIV infections through the promotion of collaborative research and dissemination of evidence-based information for prevention, care and impact mitigation. The conference brought together researchers, policy makers, donors and international organisations, civil society, and communities (including people living with HIV/AIDS). Keynote speakers were: Mr Bertrand Audoin, Executive Director: International Aids Society (IAS) in Geneva, Switzerland; Minister Sekai Holland, Minister of State in the Prime Minister's Office, Zimbabwe; Dr Anderson Franklin from Boston College, USA and his wife Dr Nancy Boyd-Franklin from Rutgers University, USA; and Dr Sam Fiedman, National Development and Research Institutes, USA.

The NMMU Construction Management 40 Conference, organised by the Department of Construction Management, took place from 27 to 29 November. Given that the Department of Construction Management focuses on the education of construction managers and construction project managers, the conference addressed the practice of these two disciplines. Main topics included issues on career promotion, construction economics, diversity, ethics, gender and multicultural issues to name a few. The conference provided an international forum for researchers and practitioners from developed, developing and underdeveloped nations to address fundamental construction management and construction project management issues. Keynote addresses were given by prominent individuals in the construction industry, to name a few: Prof Raymond Nkado, President of the South African Council for the Project and Construction Management Professions; Dr Rodney Milford, Programme Manager: Construction Industry Performance at the Construction Industry Development Board (cidb); and Prof Pantaleo Rwelamila, Professor of Project Management at the Graduate School of Business Leadership (GSBL), University of South Africa (UNISA).

The second Joint Congress of the South African Mathematical Societies (SAMS) and American Mathematical Societies (AMS) was held at NMMU from 29 November to 3 December. The conference provided good opportunities for South African mathematicians and particularly postgraduate students to network with their colleagues from around the world. A total of 314 delegates from 25 countries attended the congress. A feature of the congress was the large number of postgraduate students who participated (105 in total). The guest speaker at the conference dinner was the South African Deputy Minister of Science and Technology, the Honourable Derek Hanekom.

The Higher Education Learning and Teaching Association of South Africa (HELTASA) Conference was hosted by NMMU on the Missionvale Campus from 30 November to 2 December. The conference theme was: *Crossing borders for change in Southern African Higher Education*. The conference was attended by 337 delegates representing academic developers, academics, top management and institutional decision makers. Keynote addresses were given by Prof Donald Hanna, who currently holds a faculty position at the University of Wisconsin, USA; Prof Piet Naudé, Deputy Vice-Chancellor: Academic at NMMU; and Prof Jonathan Jansen, Vice-Chancellor of the University of the Free State. The invited speaker was Emmanuel Sibanda, Senior Manager of the Statistical Information and Research (SIR) Unit at Umalusi.

Prof Andre Mukheibir organised the third annual Private Law and Social Justice Conference on 22 and 23 August. NMMU welcomed speakers from all over the country as well as from Amsterdam, Australia and Finland. The keynote address was delivered by former Constitutional Court Judge Yvonne Mokgoro.

Doctorates

The citations represent a concise, yet crisp capturing of some of the research sampled. Covered in these citations are research findings encompassing a broad spectrum of research endeavours across the faculties.

The contextually relevant, current and solution-oriented findings speak - inter alia - to issues such as the contribution of Xhosa initiation practices to moral regeneration, performance management models, poverty reduction strategies, dehydration of cyclohexane, optimising polymer solutions, and looking at the success factors of professional and business women in South Africa.

NMMU has consistently made strides towards increasing the number of doctoral graduates thereby making a meaningful contribution towards the knowledge economy. This is the result of a strategic drive to recruit doctoral students nationally and internationally across a wide spectrum of disciplines and professions. Profiled in this section are doctoral graduates who participated in the Doctoral Dissemination Series. The Doctoral Dissemination Series is intended to provide new doctoral graduates an opportunity to share their research findings with the scholarly community as well as refine their papers for potential publication in accredited journals under the guidance of an editor of a Department of Higher Education and Training (DHET) accredited journal.

Luvuyo Ntombana



Anthropology

An investigation into the role of Xhosa male initiation in moral regeneration.

This research study, conducted in Mdantsane (East London), Whittlesea (Hewu), Njiveni (Libode) and Cala, sought to investigate the role of the amaXhosa male initiation in moral regeneration focusing on socio-cultural, educational and religious aspects related to moral values. The role of the amaXhosa male initiation as a rite of passage from boyhood to manhood, how it was viewed in the past, its impact upon the initiates and its contribution to the moral upholding of values were investigated. It was further intended to establish whether Westernisation and urbanisation had brought a shift of meaning and emphasis to the current initiation practice and, if so, to what extent has the ceremony departed from traditional norms and what challenges has the ceremony to face at present.

Research findings suggested that in the past the amaXhosa male initiation played a role in the instruction of moral values. However, this study identified a shift of meaning in the practice, which has been more evident in urban than in rural areas. The shift suggested that the instruction role has changed in prominence and there is less emphasis on teaching and appropriate adult behaviour. Instead, there are numerous negative influences such as abuse of alcohol and drugs, promiscuity among the youth and disobedience towards elders. It is argued that revisiting the teachings surrounding male initiation may contribute to productive debates on how young males are taught morality in today's society. Furthermore, if the Xhosa male initiation could be contextualised, it could play a role in the instruction of boys as they graduate to manhood and could contribute to moral regeneration in South Africa.

Bernadette Nambi



Business Administration

A performance management model for universities in Uganda.

The rationale for institutional performance management is to satisfy stakeholder expectations by ensuring effective and efficient service delivery. Most of the previous research on institutional performance management has been conducted in a "Western world" context and was aimed at organisations with a profit-making motive. The study addressed institutional performance management at public universities in a developing country (Uganda), and as such made an original contribution to the existing body of knowledge. Public universities in Uganda face strong competition from a proliferation of private tertiary educational institutions and need to guard against being perceived as mediocre.

The study was conducted at four public universities in Uganda and involved interviews with senior administrators and heads of department, as well as a survey among staff at various levels at the four institutions. It also investigated the extent to which public universities in Uganda implemented performance management and the challenges faced by these universities in implementing performance management. Key factors for successful performance management implementation as well as acceptable performance indicators were also identified.

The study revealed that public universities in Uganda typically lacked a formal performance management environment or performance culture, provided limited scope for employee engagement and communication, and faced structural and institutional governance challenges. The study has implications for policy development, strategic planning, performance management implementation and continuous improvement, not only for universities in Uganda, but for African universities in general.

Jacqueline Okiria Ofwono



Development Studies

An evaluation of the implementation of decentralisation of the World Bank's operations on poverty reduction in Uganda.

This thesis scrutinises, by way of a detailed and critically nuanced case study, the strategic shift by the World Bank to a decentralised approach as outlined in the organisation's *Strategic Compact*. Central to the case study is an evaluation of the implementation of the strategy with regard to poverty trends in Uganda. The candidate questions the contention of a number of critics that the World Bank's decentralisation approach in Uganda has been a signal of failure.

The thesis employs a primarily qualitative approach and it includes two central and interlocking sections: the first comprises an extensive review of the relevant literature and an accompanying conceptual framework followed by a methodological and methods discussion; whilst the second section builds on the concepts in the first section and develops an analytical case study of Uganda.

The main findings are that the World Bank has not been ineffective in the delivery of its mission and its decentralisation strategy, and that the implementation of the *Strategic Compact*, while not having a direct causal relationship with poverty alleviation, did have a correlative impact on the reduction of poverty in Uganda.

The study also provides informative material on the changes in World Bank strategy with regard to the Bank's office in Uganda with particular reference to shifts in strategies, policies and procedures, as well as accompanying organisational changes. This level of analysis feeds into the contemporary body of scholarship on the discourses and practices of the Bank in its national and international operations.

Batsho Mpuhlu



Chemistry

Vapour phase oxidative dehydrogenation of cyclohexane on microstructured reactors.

This study evaluated the oxidative dehydrogenation of cyclohexane in a micro-structured reactor containing a wall-coated iron-modified vanadium phosphate catalyst.

The properties and performance of various iron-modified vanadium phosphate catalysts for the oxidative dehydrogenation of cyclohexane were studied. In so doing, he established a firm scientific basis for the interpretation of results from follow-up work using the wall-coated catalyst systems. He made use of a number of advanced analytical techniques such as powder X-ray diffraction to characterise the behaviour of the vanadium based catalysts during short- and long-term dehydrogenation reactions. A micro-structured reactor containing reaction channels of a few micro-metres were coated with the desired catalyst and the said catalytic reactor tested against the state-of-the-art fixed-bed catalytic reactor for the oxidative dehydrogenation of cyclohexane. By running the oxidative dehydrogenation reaction at less than stoichiometric ratios of oxygen, the candidate was able to show, for the first time, that the iron-modified vanadium phosphate catalyst is capable of switching seamlessly from oxidative dehydrogenation to normal dehydrogenation. By intensifying the reaction conditions in the micro-structured reactor, the candidate showed that the effect of micro-structuring, which results in much larger surface area to volume ratios in the micro-structured reactor than in a fixed-bed reactor, results in a near quantitative conversion of cyclohexane to cyclohexene and benzene compared with around 20% conversion in the fixed-bed reactor despite using five times less catalyst.

Valencia Jacobs



Textile Science

Optimising the polymer solutions and process parameters in the electrospinning of chitosan.

Nanotechnology, involving research at the atomic, molecular or macromolecular levels, is aimed at developing the novel nano-scale structures and devices for commercial applications. The impact of this technology on human life is becoming increasingly important, owing to the unique properties, notably larger surface area, smaller diameter and high pore volume. Nanofibres are finding wide applications in fields including wound care, health care and tissue engineering.

In this study the processing, optimisation and antibacterial properties of electrospun chitosan nanofibres were investigated.

Chitosan, a natural biopolymer and a derivative of chitin, is widely used as an antimicrobial agent due to its high biodegradability, nontoxicity, and antibacterial properties. In the optimisation study the electrospinning parameters important for obtaining uniform nanofibres were identified. In terms of biocidal properties, better antibacterial activity was observed against *S. aureus* than against *E. coli* and *C. albicans*. *S. aureus* bacterial culture showed good cell adhesion and spreading for the chitosan membrane. The chitosan-silver nanofibres exhibited the best antimicrobial properties, i.e. greater minimum inhibitory concentration (MIC), followed by silver nanoparticles and then chitosan nanofibres, suggesting a synergistic effect between the chitosan and silver nanoparticles.

The outcome of the research provides the basis for exercising better control on the properties and morphology of electrospun chitosan nanofibres. Furthermore, the biocidal effects of chitosan, chitosan-silver nanofibres and silver nanoparticles were successfully investigated, thereby providing a platform to bridge the gap between the properties of the traditional wound dressings and the high-tech wound dressings, by using nanofibres considered to be ideal for wound dressing.

Leda van der Post



Computer Science

Creating a space for integrative education within the sciences.

This thesis documents an action research project that was carried out within the Department of Computing Sciences at the Nelson Mandela Metropolitan University from January 2010 to December 2011. The overall aim of the research was to foster an environment in which academics could explore ways to teach in an innovative way using an integrative approach to education.

The research project followed the living theory approach to action research. A living theory action research project allows the researcher to investigate her own teaching, and develop a theory of practice. The theory of practice can be applied to the issues under investigation, to improve the situation or solve problems. At the same time, the theory of practice can contribute to the body of knowledge within the academic domain of the research.

The results of the research (the living theory) describe the process by which an effective and enthusiastic community of practice, dedicated to improving the academics' teaching and learning practice, was developed. The living theory is applicable to academics within a scientific discipline, desiring to explore and improve their education practice. The description of the living theory includes an analysis of the development process of the research group, typical characteristics of the environment or "space" of such groups, and useful and practical action strategies that other academics in the sciences can use to create a similar community of practice.

This research has significantly improved the teaching techniques of the participants from the Departments of Computing Sciences and Mathematics, and has significant practical and scientific implications for improving education in the sciences and for future research in this field.

Marianne Doubell



Business Management

Factors contributing to the success of professional and business women in South Africa.

Contemporary research on the business advantage of gender diversity yields evidence that the equal representation of women on corporate boards is linked to increased performance and productivity, leading to higher profitability. Benefits include the market intelligence of women on women's products and methods for reaching a diverse customer base. However, the notable underrepresentation of women in executive and decision-making positions is a clear indicator that women's career advancement remains barricaded. Several government initiatives and interventions aimed at women's advancement, including the enactment of Equal Opportunity and Employment Equity legislation, have not achieved the desired impact, pointing to the need for further interventions.

This study of factors contributing to the career success of women who have overcome barriers and advanced to top positions in business and the professions, demonstrated that the main contributing factors to women's career success are personality traits; a supportive internal organisational culture; and organisational initiatives aimed at eradicating barriers.

This thesis expands the empirical body of research and knowledge on factors contributing to the success and those inhibiting the career progression of women. It is indicated that the advancement of more women to executive positions can be accelerated through a number of interventions. Internal organisational support factors and government interventions are recommended for inclusion in development initiatives for the achievement of gender equity.

The thesis alerts organisations and government to their social responsibility for transforming mindsets and diversifying their boardrooms. It furthermore has the potential to guide initiatives aimed at equal gender representivity in the workplace.

Priscilla Gitonga



Education

The contribution of hip hop to the construction of personal identities of South African female late adolescents.

The aim of this study was to explore the nature of hip hop's contribution to the identity construction of female late adolescents in South Africa. By using participatory research methods, Ms Gitonga enabled the participants to engage with their sense of identity in the context of hip hop music. The research revealed that hip hop music does indeed contribute to the process of personal identity construction of the female late adolescents who participated in the study. It does so by compelling the adolescent to think about herself in relation to her continual self, which draws from her past, present, and future, her interactional self, both at the personal and social levels, and her situational self. The appeal of hip hop to her cognitive capabilities is enhanced through the strong link that hip hop has with her emotions.

With this study, Ms Gitonga managed to provide empirical evidence of hip hop as a meaningful resource for the female late adolescent as she constructs her identity. As such, the findings of this study negate the public notion of hip hop as being a bad influence on young people and provide proof of its significant role in the lives of South African female late adolescents.

This study also highlights the significance of hip hop music in education settings, due to its fundamental communicative capabilities, which can be effectively utilised in the classroom situation. This study clearly strengthens educational research, especially research aimed at the liberation and emancipation of female late adolescents in South Africa.

Doctorates

■ Faculty of Arts

DOCTOR PHILOSOPHIAE

ASMAH-ANDOH, Kwame

(Public Administration)

EFFECTIVE AND EFFICIENT PERFORMANCE MANAGEMENT IN LOCAL GOVERNMENT, WITH REFERENCE TO THE CACADU DISTRICT MUNICIPALITY

Promoter: Prof PS Botes

BUKAE, Nkosi Makhonya

(Conflict Management)

AN ANALYSIS OF THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY (SADC) PREVENTIVE DIPLOMACY IN THE KINGDOM OF LESOTHO: A CASE STUDY

Promoter: Dr L Snodgrass

Co-promoter: Prof PW Cunningham

JJUMBA, Robert Joseph

(Public Administration)

A CRITICAL ASSESSMENT OF DECENTRALISATION AND SERVICE DELIVERY IN WAKISO AND NAKASEKE DISTRICTS, UGANDA

Promoter: Prof K Raga

Co-promoter: Prof JD Taylor

MAPHAZI, Nondumiso

(Public Administration)

A CRITICAL ANALYSIS OF THE ROLE OF PUBLIC PARTICIPATION IN GOVERNANCE AND SERVICE DELIVERY WITH SPECIFIC REFERENCE TO THE BUFFALO CITY MUNICIPALITY

Promoter: Prof JD Taylor

Co-promoter: Prof TV Mayekiso

MBANGA, Sijekula Larrington

(Public Administration)

AN EVALUATION OF THE NATURE AND EXTENT OF ALIGNMENT BETWEEN STRATEGIC PERFORMANCE PLANS OF SELECTED EASTERN CAPE PROVINCIAL GOVERNMENT DEPARTMENTS AND THE PROVINCIAL GROWTH AND DEVELOPMENT PLAN: 2004 - 2014

Promoter: Prof HJ Nel

Co-promoter: Prof K Raga

MORTON, David Gerard

(Sociology)

A CRITICAL ASSESSMENT OF THE QUALITY OF COMMUNITY HOME-BASED CARE

Promoter: Prof TV Mayekiso

Co-promoter: Prof PW Cunningham

NTOMBANA, Luvuyo

(Anthropology)

AN INVESTIGATION INTO THE ROLE OF XHOSA MALE INITIATION IN MORAL REGENERATION

Promoter: Prof HC Pauw

WRIGHT, Bianca Maria-Teresa

(Media Studies)

GAMES AS COMMUNICATION: AN ANALYSIS OF ADVERGAMING IN SOUTH AFRICA

Promoter: Prof DJ Jordaan

Co-promoter: Dr J Wozniak

■ Faculty of Business and Economic Sciences

DOCTOR COMMERCII

DUH, Helen Inseng

(Business Management)

MONEY ATTITUDES AND MATERIALISM AMONG GENERATION Y SOUTH AFRICANS: A LIFE-COURSE STUDY

Promoter: Prof FW Struwig

Co-promoter: Prof NE Mazibuko

ZINHUMWE, Cephas

(Business Management)

TRAVELLING SHOPPERS' PERCEPTIONS ON THE COMPREHENSIVE SERVICE CAPE WITHIN THE SOUTH AFRICAN RETAIL ENVIRONMENT

Promoter: Prof NE Mazibuko

DOCTOR OF BUSINESS ADMINISTRATION

MBURU, Peris Njoki

DETERMINANTS OF CUSTOMER SATISFACTION AND RETENTION: A SURVEY OF THE BANKING INDUSTRY IN KENYA

Promoter: Prof H van Zyl

Co-promoter: Dr MDM Cullen

NAMBI, Bernadette

A PERFORMANCE MANAGEMENT MODEL FOR UNIVERSITIES IN UGANDA

Promoter: Dr A Werner

Co-promoter: Prof DM Berry

DOCTOR PHILOSOPHIAE

OKIRIA OFWONO, Jacqueline Jane

(Development Studies)

AN EVALUATION OF THE IMPLEMENTATION OF DECENTRALIZATION OF THE WORLD BANK'S OPERATIONS ON POVERTY REDUCTION IN UGANDA

Promoter: Prof R Haines

DOCTOR TECHNOLOGIAE: HUMAN RESOURCES MANAGEMENT

PAUL, Gary William

*STRATEGIES TO CREATE AN ORGANISATIONAL CULTURE CONDUCIVE
TO EFFECTIVE PERFORMANCE MANAGEMENT IN A POST-MERGED
ENVIRONMENT*

Promoter: Prof DM Berry

PHILOSOPHIAE DOCTOR COMMERCII

DODD, Nicole Marguerite

(Industrial Psychology)

*CORE SELF-EVALUATIONS, RACIAL EVALUATION AND LEARNING
AMONGST ZULU STUDENTS AT THE UNIVERSITY OF ZULULAND*

Promoter: Prof R Snelgar

DOUBELL, Marianne

(Business Management)

*FACTORS CONTRIBUTING TO THE SUCCESS OF PROFESSIONAL AND
BUSINESS WOMEN IN SOUTH AFRICA*

Promoter: Prof FW Struwig

KASEKE, Nyasha

(Economics)

THE COST OF ELECTRICITY OUTAGES IN ZIMBABWE

Promoter: Prof SG Hosking

KWAGALA, Milly

(Business Management)

*MANAGEMENT AND PERFORMANCE INDICATORS OF MICRO-FINANCE
INSTITUTIONS IN UGANDA*

Promoter: Prof FW Struwig

Co-promoter: Dr S Viviers

MSUTHWANA, Vusumzi Michael

(Business Management)

*THE BUSINESS SUSTAINABILITY OF AN AUTOMOTIVE REFINISH PAINT
DISTRIBUTOR*

Promoter: Prof M Tait

Co-promoter: Prof NE Mazibuko

TURYAKIRA, Peter

(Business Management)

*CORPORATE SOCIAL RESPONSIBILITY: A COMPETITIVE STRATEGY FOR
SMALL AND MEDIUM-SIZED ENTERPRISES IN UGANDA*

Promoter: Prof E Venter

Co-promoter: Prof EE Smith

Faculty of Education

DOCTOR EDUCATIONIS

OOSTHUIZEN, Lizette Clarise

*DESIGNING A STRATEGY TO BRING ABOUT A GREATER PROFESSIONAL
CONFIDENCE FOR EDUCATORS BY IMPROVING THEIR INVOLVEMENT
IN THEIR OWN CONTINUOUS PROFESSIONAL DEVELOPMENT*

Promoter: Prof JL Geldenhuys

PHILOSOPHIAE DOCTOR EDUCATIONIS

BOTHA, Adele

*INTERVENTIONS FOR ENHANCING THE MATHEMATICS TEACHING
PRACTICE OF GRADE FOUR TEACHERS IN THE NELSON MANDELA
METROPOLITAN AREA*

Promoter: Dr RE Gerber

GITONGA, Priscilla Nyawira

*THE CONTRIBUTION OF HIP HOP TO THE CONSTRUCTION
OF PERSONAL IDENTITIES OF SOUTH AFRICAN FEMALE LATE
ADOLESCENTS*

Promoter: Prof AC Delport

Co-promoter: Dr MN Toni

LEONARD, Samantha Lee

*SCIENTIFIC LITERACY AND SUSTAINABLE DEVELOPMENT:
DEVELOPING SCIENTIFIC LITERACY IN ITS FUNDAMENTAL AND
DERIVED SENSES*

Promoter: Prof P Webb

TANUI, Julius Gordon

*TOWARDS COMMUNITY ENVIRONMENTAL EDUCATION USING
CURRENT INSTITUTIONAL RESOURCES, GIS AND REMOTE SENSING,
AND LOCAL KNOWLEDGE: A CASE OF THE NANDI HILLS AND NANDI
FORESTS, WESTERN KENYA*

Promoter: Prof P Webb

WEVERS, Nicolaas Ebenhaezar Jacobus

*THE MANAGEMENT OF LEARNERS WHO EXPERIENCE BARRIERS TO
LEARNING IN MAINSTREAM PRIMARY SCHOOLS IN THE EASTERN
CAPE*

Promoter: Prof JL Geldenhuys

■ Faculty of Engineering, the Built Environment and Information Technology

DOCTOR TECHNOLOGIAE: OPERATIONS MANAGEMENT

ADEDEJI, Adeyemi Charles

ENHANCING THE ROLE OF THE KAIZEN SUGGESTION TOOL IN SOUTH AFRICAN LEAN AUTOMOTIVE COMPANIES OF THE EASTERN CAPE

Promoter: Prof JJ Pieterse

MUND, Klaudia

THE INTRODUCTION OF A LEAN PRODUCT DEVELOPMENT PROCESS TAILORED FOR THE SOUTH AFRICAN AUTOMOTIVE INDUSTRY

Promoter: Prof JJ Pieterse

VAN DER MERWE, Karl Robert

THE DEVELOPMENT OF A LEAN CULTURE MEASUREMENT TOOL

Promoter: Prof JJ Pieterse

Co-promoter: Dr AS Lourens

PHILOSOPHIAE DOCTOR

BOTHA, Adèle

(Information Technology)

A FRAMEWORK TO ENHANCE THE MOBILE USER EXPERIENCE OF AN M-LEARNING INTERACTION

Promoter: Prof D van Greunen

Co-promoter: Prof ME Herselman

FUNCHALL, David McGaughey

(Information Technology)

AN ADAPTIVE MODEL FOR SMALL, MEDIUM AND MICRO INFORMATION TECHNOLOGY ENTERPRISES IN SOUTH AFRICA

Promoter: Prof ME Herselman

Co-promoter: Prof D van Greunen

FUTCHER, Lynn Ann

(Information Technology)

AN INTEGRATED RISK-BASED APPROACH TO SUPPORT IT UNDERGRADUATE STUDENTS IN SECURE SOFTWARE DEVELOPMENT

Promoter: Prof R von Solms

MOSTERT-PHIPPS, Nicolette

(Information Technology)

HEALTH INFORMATION TECHNOLOGIES FOR IMPROVED CONTINUITY OF CARE: A SOUTH AFRICAN PERSPECTIVE

Promoter: Prof D Pottas

Co-promoter: Prof M Korpela

PIDERIT, Roxanne

(Information Technology)

A MODEL FOR ENHANCING TRUST IN SOUTH AFRICAN AUTOMOTIVE SUPPLY CHAINS THROUGH INFORMATION TECHNOLOGY

Promoter: Prof S Flowerday

Co-promoter: Prof R von Solms

YERATZIOTIS, Alexandros

(Information Technology)

A FRAMEWORK TO EVALUATE USABLE SECURITY IN ONLINE SOCIAL NETWORKING

Promoter: Prof D van Greunen

Co-promoter: Prof D Pottas

PHILOSOPHIAE DOCTOR IN CONSTRUCTION MANAGEMENT

DU TOIT, Willem Johannes

THE RELATIONSHIP BETWEEN HEALTH AND SAFETY AND HUMAN RISK TAKING BEHAVIOUR IN THE SOUTH AFRICAN ELECTRICAL CONSTRUCTION INDUSTRY

Promoter: Prof JJ Smallwood

EMUZE, Fidelis Abumere

PERFORMANCE IMPROVEMENT IN SOUTH AFRICAN CONSTRUCTION

Promoter: Prof JJ Smallwood

GASA, Zanele Bridgette Nompumelelo

MEASURING THE COMPETITIVENESS OF SMALL, MEDIUM AND MICRO ENTERPRISES THROUGH THE USE OF THE REGISTER OF CONTRACTORS

Promoter: Prof W Shakantu

Co-promoter: Prof JJ Smallwood

JIMOH, Richard Ajayi

SUSTAINABLE STRATEGIES FOR HOUSING CO-OPERATIVES IN SOUTH AFRICA

Promoter: Prof JJ van Wyk

■ Faculty of Health Sciences

DOCTOR OF PHILOSOPHY IN NURSING

JACOBS, Ruwayda

A PSYCHO-EDUCATIONAL PROGRAMME TO FACILITATE THE MENTAL HEALTH OF ADOLESCENT GIRLS WHO ARE VICTIMS OF VERBAL BULLYING

Promoter: Prof J Strümpher

Co-promoter: Prof I Wannenburg

DOCTOR TECHNOLOGIAE: BIOMEDICAL TECHNOLOGY

WICKENS, Nicolas John

HISTOPATHOLOGICAL CHANGES IN MALE WISTAR RATS MAINTAINED ON WATER-BASED EXTRACT OF SUTHERLANDIA FRUTESCENS

Promoter: Prof N Smith

Co-promoter: Prof S Roux

PHILOSOPHIAE DOCTOR

DRANITSARIS, George

(General Health Sciences)

DEVELOPMENT OF A VALUE BASED PRICING INDEX FOR NEW DRUGS IN METASTATIC COLORECTAL CANCER

Promoter: Prof I Truter

Co-promoter: Prof MS Lubbe

■ Faculty of Science

DOCTOR TECHNOLOGIAE: CHEMISTRY

MPUHLU, Batsho

VAPOUR PHASE DEHYDROGENATION OF CYCLOHEXANE ON MICROSTRUCTURED REACTORS

Promoter: Prof B Zeelie

Co-promoter: Dr G Dugmore

PHILOSOPHIAE DOCTOR

DDUMBA, Hassan

(Applied Mathematics)

REPULSIVE-ATTRACTIVE MODELS FOR THE IMPACT OF TWO PREDATORS ON PREY SPECIES VARYING IN ANTI-PREDATOR RESPONSE

Promoter: Prof JYT Mugisha

Co-promoter(s): Prof JW Gonsalves and Prof GIH Kerley

GORDON, Nnette

(Botany)

THE PAST AND PRESENT LIMNOLOGY OF THE SOETENDALSVELI WETLANDS, AGULHAS COAST, SOUTH AFRICA

Promoter: Prof J Adams

Co-promoter: Prof F Garcia-Rodriguez

JACOBS, Nokwindla Valencia

(Textile Science)

OPTIMISING THE POLYMER SOLUTION AND PROCESS PARAMETERS IN THE ELECTROSPINNING OF CHITOSAN

Promoter: Prof RD Anandjiwala

Co-promoter: Prof M Maaza

KNOETZE, Steyn

(Chemistry)

DEVELOPMENT OF NOVEL CANCER TARGETING AGENTS

Promoter: Prof JGH du Preez

Co-promoter: Prof CW McClelland

KOORSSE, Melisa

(Computer Science)

AN EVALUATION OF PROGRAMMING ASSISTANCE TOOLS TO SUPPORT THE LEARNING OF IT PROGRAMMING: A CASE STUDY IN SOUTH AFRICAN SECONDARY SCHOOLS

Promoter: Prof CB Cilliers

Co-promoter: Prof AP Calitz

MACIEJEWSKI, Kristine

(Zoology)

EXPLORING THE LINKAGES BETWEEN BIODIVERSITY CONSERVATION AND ECOTOURISM IN PROTECTED AREAS

Promoter: Prof G Kerley

MANJORO, Munyaradzi

(Environmental Geography)

SOIL EROSION AND SEDIMENT SOURCE DYNAMICS OF A CATCHMENT IN THE NGQHUSHWA DISTRICT EASTERN CAPE PROVINCE, SOUTH AFRICA: A SEDIMENT FINGERPRINTING AND REMOTE SENSING APPROACH

Promoter: Prof V Kakembo

Co-promoter: Prof K Rowntree

MUGURO, Kennedy Mwaura

(Physics)

EFFECTS OF POLARIZATION IN A DISTRIBUTED RAMAN FIBRE AMPLIFIER

Promoter: Prof AWR Leitch

MUNISHI, Linus Kasian

(Zoology)

THE INFLUENCE OF GENETIC RELATEDNESS ON SOCIALITY AND DEMOGRAPHY OF FEMALE AFRICAN ELEPHANTS

Promoter: Prof G Kerley

Co-promoter: Dr C Foley

SCHOLTZ, Brenda Mary

(Computer Science)

A FRAMEWORK FOR THE ADOPTION OF ENTERPRISE RESOURCE PLANNING (ERP) SYSTEMS IN HIGHER EDUCATION

Promoter: Prof A Calitz

Co-promoter: Prof C Cilliers

SINGH, Akash

(Computer Science)

DESIGNING ADAPTIVE INTERFACES FOR ENTERPRISE RESOURCE PLANNING SYSTEMS FOR SMALL ENTERPRISES

Promoter: Prof JL Wesson

SJÖLANDER, Morné Rowan

(Mathematical Statistics)

TIME SERIES MODELS FOR PAIRED COMPARISONS

Promoter: Prof I Litvine

TALLA, Kharouna

(Physics)

THE DEVELOPMENT OF MOCVD-GROWN MgZnO FOR UV PHOTONIC APPLICATIONS

Promoter: Prof JR Botha

Co-promoter: Prof MC Wagener

VAN DER POST, Leda Helen Jess

(Computer Science)

CREATING A SPACE FOR INTEGRATIVE EDUCATION WITHIN THE SCIENCES

Promoter: Dr NLO Cowley

Co-promoter: Dr L Barnard

VAN TONDER, Bradley Paul

(Computer Science)

ENHANCED SENSOR-BASED INTERACTION TECHNIQUES FOR MOBILE MAP-BASED APPLICATIONS

Promoter: Prof JL Wesson

VOSLOO, Mathys Christiaan

(Zoology)

NETWORKS ANALYSIS OF TROPHIC LINKAGES IN TWO SUBTROPICAL ESTUARIES ALONG THE SOUTH-EAST COAST OF SOUTH AFRICA

Promoter: Prof D Baird

Research Masters

■ Faculty of Arts

MAGISTER ARTIUM

BLOEMIERS, Gary Elroid

(Political Studies)

AN EVALUATION OF POLITICAL PARTICIPATION BY COLOURED PEOPLE IN PORT ELIZABETH: 1994 - 2009

Supervisor: Ms EE Draai

BUCZYNSKI, Jennifer Ann - CUM LAUDE

(English)

AN ANALYSIS OF THE FICTIONAL REPRESENTATIONS OF TRAUMA IN ELIAS CANETTI'S "AUTO-DA-FE"

Supervisor: Dr N Smith

DE WET, Michelle

(French)

FICTION AS HISTORY: A STUDY OF THE EVOLUTION OF WOMENS ROLES IN THE 20TH CENTURY IN SELECTED NOVELS BY MARIE-PAUL ARMAND

Supervisor: Dr H Thomas

DOUGLAS, Greig Paul

(English)

THE COLUMNIST AS TRICKSTER: SATIRE AND SUBVERSION IN LITERARY JOURNALISM

Supervisor: Dr M Crous

Co-supervisor: Prof L Hibert

KIRKBY, Daniela Maree

(Political Studies)

AN ANALYSIS OF HUNTINGTON'S THIRD WAVE THEORY

Supervisor: Dr J Steyn-Kotze

KOEN, Dewald

(Afrikaans and Dutch)

'N ONTLEDING VAN JOAN HAMBIDGE SE REISGEDIGTE IN VISUMS BY VERSTEK / AN ANALYSIS OF JOAN HAMBRIDGE'S TRAVEL POEM IN HER COLLECTION VISUMS BY VERSTEK

Supervisor: Dr ML Crous

LAMB-DU PLESSIS, Shena - CUM LAUDE

(Conflict Transformation and Management)

EXPLORING THE CONFLICT NARRATIVES OF YOUTH AT RISK: THE UMZI WETU PROGRAMME, PORT ELIZABETH

Supervisor: Dr L Snodgrass

NOTSHE, Lwandlekazi

(IsiXhosa)

UPHONONONGO NZULU LOKUSETYENZISWA KOLWIMI OLUCENGAYO NGABALINGANISWA KWINCWADI KA Z.S. QANGULE ETHI, 'AMAZA' NEKA A.M. MMANGO ETHI, 'UDIKE NOCIKIZWA'

Supervisor: Dr L Kwatsha

STOLTZ, Wessel

(Afrikaans and Dutch)

'N ANALISE VAN DIE GEBRUIK VAN SATIRE IN DRIE EIETDSE TEKSTE VAN MARLENE VAN NIEKERK / AN ANALYSIS OF THE USE OF SATIRE IN THREE CONTEMPORARY TEXTS BY MARLENE VAN NIEKERK

Supervisor: Dr M Crous

MAGISTER ARTIUM IN MEDIA STUDIES

DONIAN, Jennalee - CUM LAUDE

FROM TEXT TO SCREEN AND SCREEN TO TEXT: A JAKOBSONIAN APPROACH TO JOSEPH CONRAD'S HEART OF DARKNESS (1902) AS MEDIATED BY FRANCIS FORD COPPOLA'S APOCALYPSE NOW (1979)

Supervisor: Prof G Olivier

DU PLESSIS, Maxeen Cavell

AN EXPLORATORY STUDY OF SOCIAL MEDIA AS A LEARNING TOOL AT THE NELSON MANDELA METROPOLITAN UNIVERSITY

Supervisor: Mrs A Mbinjama-Gamatham

Co-supervisor: Dr H Fourie

MAGISTER TECHNOLOGIAE: FINE ART

FULLER, Michele

REVIEWING MEDIUM: PAINT AS FLESH

Supervisor: Mr D Jones

MAGISTER TECHNOLOGIAE: GRAPHIC DESIGN

CADLE, Bruce Sydney - CUM LAUDE

PROPOSING A BEST PRACTICE CURRICULUM FOR THE GRAPHIC DESIGN PROGRAMME AT NELSON MANDELA METROPOLITAN UNIVERSITY

Supervisor: Dr H Saayman-Hattingh

MUSHOHWE, Knowledge

AN ANALYSIS OF SELECTED POLITICAL CARTOONS PUBLISHED DURING ZIMBABWE'S 2008 HARMONISED GENERAL ELECTIONS

Supervisor: Ms IO Economou

Co-supervisor: Dr H Saayman-Hattingh

MAGISTER TECHNOLOGIAE: PHOTOGRAPHY

CORDIER, Astrid

THE INFLUENCE OF 1950S FASHION PHOTOGRAPHERS, RICHARD AVEDON AND IRVING PENN ON PHOTOGRAPHERS MATTHEW ROLSTON

Supervisor: Mr G Meyer
Co-supervisor: Mr B Cadle

■ Faculty of Business and Economic Sciences

MAGISTER ARTIUM DEVELOPMENT STUDIES

CHEN, Shih-Hwa - CUM LAUDE

BUILDING EMPLOYEE VALUE PROPOSITION FOR ATTRACTING AND RETAINING TALENT IN LARGE ORGANISATIONS IN SOUTH AFRICA: A CASE STUDY OF SOUTH AFRICAN REVENUE SERVICE

Supervisor: Prof M Brooks
Co-supervisor: Prof R Haines

OLAIFA, Ayodeji Haruna

THE IMPACT OF PENSION FUND INVESTMENTS ON ECONOMIC DEVELOPMENT IN SOUTH AFRICA

Supervisor: Mr RJ Wood
Co-supervisor: Mr I Mouchili

MAGISTER ARTIUM (INDUSTRIAL AND ORGANISATIONAL PSYCHOLOGY)

PADDEY, Michelle - CUM LAUDE

AN INVESTIGATION INTO SOUTHERN AFRICAN UNIVERSITY STUDENTS' USE OF PROACTIVE COPING STYLE

Supervisor: Prof RJ Snelgar

MAGISTER COMMERCII

CLOETE, Leann

(Economics)

DETERMINING THE WILLINGNESS-TO-PAY FOR THE REMOVAL OF A LOCAL UNDESIRABLE LAND USE

Supervisor: Prof M du Preez

GONGXEKA, Vuyokazi

(Business Management)

EMPLOYEE PERCEPTIONS OF SELF-EMPLOYMENT

Supervisor: Dr S Farrington

LETELE-MATABOOE, Makatleho Julia - CUM LAUDE

(Business Management)

AN INVESTIGATION INTO THE FACTORS INFLUENCING NON-FAMILY EMPLOYEES' COMMITMENT TO FAMILY BUSINESSES

Supervisor: Dr S Farrington

LILLAH, Riyaadh - CUM LAUDE

(Business Management)

ENVIRONMENTAL LITERACY - A GAP ANALYSIS

Supervisor: Dr S Viviers

MAGOBIANE, Siyathemba Emmanuel

(Economics)

WILLINGNESS TO PAY FOR WATER QUALITY IMPROVEMENT IN THE SWARTKOPS ESTUARY

Supervisor: Prof S Hosking

MWANYISA, Tafadzwa

(Business Management)

THE RELEVANCE OF RELATIONSHIP MARKETING ON THE SUSTAINABILITY OF ZIMBABWEAN BANKS

Supervisor: Prof M Tait

NDAVI, Theresa Watwii

(Economics)

EXCHANGE RATE MISALIGNMENT AND ECONOMIC GROWTH IN KENYA

Supervisor: Dr M Ocran

NYIKA, Farai Donald

(Economics)

AN EMPIRICAL ANALYSIS OF THE AUSTRIAN BUSINESS CYCLE THEORY WITH RESPECT TO SOUTH AFRICA

Supervisor: Prof F Bismans

Co-supervisor: Dr P le Roux

QABHOBHO, Thobekile

(Economics)

MODELING ECONOMIC BEHAVIOUR IN SOUTH AFRICA'S INFORMAL RETAIL TRADE SECTOR: THE CASE OF PORT ELIZABETH

Supervisor: Dr M Ocran

VAN VUUREN, Elda - CUM LAUDE

(Business Management)

VARIABLES INFLUENCING SPONSORSHIP INITIATIVES: A SOUTH AFRICAN PERSPECTIVE WITHIN CORPORATE BUSINESSES

Supervisor: Prof M Tait

VISSER, Ilze

(Business Management)

IMPACT OF SOCIAL MEDIA ON THE BRAND IMAGE OF A HIGHER EDUCATION INSTITUTION

Supervisor: Prof E Venter

Co-supervisor: Dr G Sharp

VON SOLMS, Woudi

(Business Management)

UTILIZING GEOCACHING TO REDUCE OBESITY AND INCREASE TOURISM

Supervisor: Prof M Tait

MAGISTER TECHNOLOGIAE: BUSINESS ADMINISTRATION

MOHAMED, Hassan - CUM LAUDE

SOCIAL MEDIA USE AMONG NMMU STUDENTS

Supervisor: Prof FW Struwig

ROODT, Kendra-Lynn

STRATEGIES FOR VALUE CREATION IN A POST MERGED ORGANISATION

Supervisor: Dr M Mey

TAI HING, Paul - CUM LAUDE

RESEARCH INTO ENTREPRENEURSHIP AND SMALL BUSINESS IN SOUTH AFRICA: CURRENT STATUS AND FUTURE CHALLENGES

Supervisor: Prof FW Struwig

MAGISTER TECHNOLOGIAE: HUMAN RESOURCES MANAGEMENT

MOONSAMY, Sivabakiam Maduray - CUM LAUDE

ANALYSIS OF A HUMAN CAPITAL PLAN FOR THE SOUTHERN REGION OF ESKOM DISTRIBUTION

Supervisor: Prof P Poisat

THERON, Antonie Van Straaten - CUM LAUDE

THE IMPACT OF HRM PRACTICES ON THE PSYCHOLOGICAL CONTRACT DURING A PSYCHOLOGICAL RECESSION

Supervisor: Prof P Poisat

MAGISTER TECHNOLOGIAE: MARKETING

AMOAH, Felix

CUSTOMER RELATIONSHIP MANAGEMENT PRACTICED AT KOSAB

Supervisor: Dr JM Burger

ASIEDU, Benjamin

AN EVALUATION OF EFFECTIVE CUSTOMER CARE MANAGEMENT AT BUFFALO CITY MUNICIPALITY: A CASE STUDY

Supervisor: Dr JM Burger

JONAS, Altouise Glowdean

THE INFLUENCE OF PERSON- AND MARKETING-RELATED VARIABLES ON CONSUMERS' PURCHASING OF ENVIRONMENTALLY-FRIENDLY PRODUCTS

Supervisor: Prof L Radder

SHROSBREE, Laura Tania

THE CHARACTERISTICS OF THE MODERN TOURIST IN THE NELSON MANDELA METROPOLE

Supervisor: Prof L Radder

Faculty of Education

MAGISTER EDUCATIONIS

GOVENDER, Bernadette - CUM LAUDE

AN EXPLORATION OF THE USE OF ACTION RESEARCH AS A TOOL TO ASSIST SCHOOL LEADERS TO ADDRESS ISSUES THAT IMPACT NEGATIVELY ON SCHOOL FUNCTIONING

Supervisor: Prof L Wood

KAVARI, Jackson-Hain Jakavaza Katjiwan

EXAMINING THE KNOWLEDGE AND PRACTICES OF LEARNER-CENTRED METHODS OF TEACHING BY SELECTED ACCOUNTING TEACHERS IN NAMIBIA

Supervisor: Prof L Wood

RENSBURG, Cheryl Dawn - CUM LAUDE

SELF-REFLECTION ON HOW MY PERSONAL COMMUNICATION, INTERACTION AND RELATIONSHIP STRUCTURES IN THE CLASSROOM AFFECT LEARNING

Supervisor: Dr AJ Greyling

WHALE, Susan Gaye

USING LANGUAGE AS A RESOURCE: STRATEGIES TO TEACH MATHEMATICS IN MULTILINGUAL CLASSES

Supervisor: Dr ML Webb

WRETHMAN, Roxanne - CUM LAUDE

AN EVALUATION OF THE RESILIENT EDUCATORS (REDS) INTERVENTION IN AN UNDER-RESOURCED EASTERN CAPE SCHOOL

Supervisor: Prof L Wood

Faculty of Engineering, the Built Environment and Information Technology

MAGISTER TECHNOLOGIAE: ENGINEERING: ELECTRICAL

NDIMURWIMO, Alexis

OPTIMISED SMALL SCALE REACTIVE COMPENSATION FOR ESKOM'S ALBANY-WESLEY 66/22 kV TRANSMISSION LINE

Supervisor: Dr RT Harris

Co-supervisor: Mr AG Roberts

PARMAR, Hiten

DEVELOPMENT OF A PROGRAMMABLE ENGINE MANAGEMENT SYSTEM FOR A FORMULA STUDENT RACE VEHICLE

Supervisor: Prof TI van Niekerk

MAGISTER TECHNOLOGIAE: ENGINEERING: MECHANICAL**NGEA NJOUME, Victor**

CHARACTERISING THE STRUCTURAL INTEGRITY OF MECHANICAL FORMED LOW CARBON STEEL

Supervisor: Prof PJ McGrath

OYEDEMI, Kayode Olusola

AN INVESTIGATION INTO INCREASING THE GAP TOLERANCE IN FRICTION STIR WELDED JOINTS OF AA6082-T6

Supervisor: Dr H Lombard

Co-supervisor: Prof PJ McGrath

PENTZ, Willem Gerhard

DEVELOPMENT OF REPAIR PROCEDURE FOR ROTOR STEEL MATERIAL (26nIcRmOv145) BY FRICTION HYDRO PILLAR PROCESSING

Supervisor: Prof DG Hattingh

Co-supervisor: Mr L von Wielligh

MASTER OF ENGINEERING IN MECHATRONICS**BUYS, Stefan**

EVENT DRIVEN WIRELESS IP

Supervisor: Prof TI van Niekerk

COETZEE, Antonie - CUM LAUDE

THE DEVELOPMENT OF A MULTI-THREADED PROGRAMME FRAMEWORK WITH SCRIPTING AND REAL-TIME SUPPORT FOR INDUSTRIAL APPLICATIONS

Supervisor: Prof TI van Niekerk

HOMANN, Gregor

PRECONDITION MEASUREMENT AND CONTROL SYSTEM FOR A COMBUSTION ENGINE IN A VEHICLE

Supervisor: Prof TI van Niekerk

Co-supervisor: Prof KFG Holdack-Janssen

OLUFAYO, Oluwale Ayodeji

TOOL WEAR MONITORING SYSTEM USING ACOUSTIC EMISSION

Supervisor: Prof K Abou-El-Hossein

Co-supervisor: Prof TI van Niekerk

OTIENO, Timothy

SHAPE MEMORY ALLOY ACTUATOR FOR MACHINING

Supervisor: Prof K Abou-El-Hossein

MAGISTER TECHNOLOGIAE: INFORMATION TECHNOLOGY**DE LANGE, Mariska - CUM LAUDE**

GUIDELINES TO ESTABLISH AN E-SAFETY AWARENESS IN SOUTH AFRICA

Supervisor: Prof R von Solms

JANSSON, Kenny Olof Robert - CUM LAUDE

A MODEL FOR CULTIVATING SOCIAL ENGINEERING RESISTANCE WITHIN A COMMUNITY

Supervisor: Prof R von Solms

MANINJWA, Prosecutor Mvikeli

MANAGING AN INFORMATION SECURITY POLICY ARCHITECTURE: A TECHNICAL DOCUMENTATION PERSPECTIVE

Supervisor: Dr K-L Thomson

Co-supervisor: Prof R von Solms

NGAYE, Zonke - CUM LAUDE

USER EXPERIENCE METRICS FOR DR MATH®

Supervisor: Prof D van Greunen

NTLATYWA, Phumezo

FACTORS THAT INFLUENCE THE CHOICE OF PRIVACY SETTINGS ON SOCIAL NETWORKING SITES

Supervisor: Prof RA Botha

Co-supervisor: Mr B Haskins

SHOZI, Nobubele Angel

FACTORS AFFECTING THE USE OF MOBILE DEVICES FOR REMOTE DATA COLLECTION IN HOME-COMMUNITY BASED CARE

Supervisor: Prof D Pottas

Co-supervisor: Mrs N Mostert-Phipps

STIEGER, Andreas Ewald

A FRAMEWORK FOR THE DEVELOPMENT OF A PERSONAL INFORMATION SECURITY AGENT

Supervisor: Prof R von Solms

SWANEPOEL, Eranee

A MODEL FOR E-VOTING IN DEVELOPING COUNTRIES: A SOUTH AFRICAN PERSPECTIVE

Supervisor: Dr K-L Thomson

Co-supervisor: Prof D van Greunen

TYALI, Sinovuyo

AN INTEGRATED MANAGEMENT SYSTEM FOR QUALITY AND INFORMATION SECURITY IN HEALTH CARE

Supervisor: Prof D Pottas

VAN DER WESTHUIZEN, Eldridge Werner

A FRAMEWORK FOR PERSONAL HEALTH RECORDS IN ONLINE SOCIAL NETWORKING

Supervisor: Prof D Pottas

Co-supervisor: Mr R Harmse

■ Faculty of Health Sciences

MAGISTER ARTIUM

BEZUIDENHOUT, Hanlie Pearl

(Human Movement Science)

THE BODY MASS INDEX OF SIX TO NINE YEAR OLD BLACK AFRICAN CHILDREN IN A RURAL TOWN IN MPUMALANGA

Supervisor: Dr M Baard

BUBB, Tanielle Carmen

(Psychology)

THE PSYCHOLOGY OF ADULTS RECOVERING FROM SUBSTANCE USE DISORDERS

Supervisor: Prof JG Howcroft

Co-supervisor: Ms O Brown

KITCHING, Philip Herman - CUM LAUDE

(Psychology)

A PSYCHOBIOGRAPHICAL STUDY OF JOHN WINSTON LENNON

Supervisor: Prof LA Stroud

Co-supervisor: Prof JG Howcroft

KRAMER, Mark - CUM LAUDE

(Human Movement Science)

PLANTAR PRESSURE AND IMPULSE PROFILES OF STUDENTS FROM A SOUTH AFRICAN UNIVERSITY

Supervisor: Prof R du Randt

Co-supervisor(s): Dr P Olivier and Mr DJL Venter

MUDEGE, Solomon Mufudzi - CUM LAUDE

(Human Movement Science)

FACTORS ASSOCIATED WITH SUCCESSFUL TALENT DEVELOPMENT IN SOUTH AFRICAN SOCCER PLAYERS

Supervisor: Prof R du Randt

RAFFAN, Ryan Phillip

(Human Movement Science)

GAZE BEHAVIOUR PATTERNS OF UNDER 19 LEVEL RUGBY UNION PLAYERS DURING ONE-ON-ONE DEFENSIVE PLAY

Supervisor: Prof R du Randt

Co-supervisor: Mr DJL Venter

SIMS, Gwenivere

(Human Movement Science)

PLANTAR FORCE DIFFERENCES BEFORE AND AFTER AN ULTRA ENDURANCE EVENT

Supervisor: Prof R du Randt

Co-supervisor(s): Dr P Olivier and Mr DJL Venter

MAGISTER CURATIONIS

WOLDEHAWARIAT, Negat

EXPERIENCE OF OPERATING ROOM NURSES IN THEIR WORK ENVIRONMENT AT A STATE HOSPITAL IN ETHIOPIA

Supervisor: Prof J Strümpher

Co-supervisor: Dr H de Mendonca

MAGISTER PHARMACIAE

HARPER, Bianca-Anne Lillian

SALE OF SCHEDULE TWO MEDICATIONS IN COMMUNITY PHARMACIES IN THE PORT ELIZABETH REGION

Supervisor: Ms SF Burton

Co-supervisor: Ms L Kritiotis

MUSHUNJE, Irvine Tawanda

WILLINGNESS TO PAY FOR PHARMACIST PROVIDED SERVICES DIRECTED TOWARDS REDUCING RISK OF MEDICATION RELATED PROBLEMS

Supervisor: Ms SF Burton

NGUGI, Pearl Wambui - CUM LAUDE

RESPONSE AND ADHERENCE OF HIV POSITIVE WOMEN TO CERVICAL CANCER TREATMENT

Supervisor: Ms S-A Boschmans

Co-supervisor: Ms N Kubashe

SAUGUR, Anusooya

MANAGEMENT OF TYPE 2 DIABETES MELLITUS - A PHARMACOEPIDEMIOLOGICAL REVIEW

Supervisor: Ms L Kritiotis

Co-supervisor: Ms SF Burton

MAGISTER SCIENTIAE

MILNE, Marnus - CUM LAUDE

(General Health Sciences)

THE MEDICINAL CHEMISTRY OF CYCLO (PHE-4CI-PRO) AND CYCLO (D-PHE-4CI-PRO)

Supervisor: Dr J Dealtry

Co-supervisor: Dr G Killian

NDUNG'U, Susan Wanjiru

(General Health Sciences)

THE MEDICINAL CHEMISTRY OF CYCLO (PHE-4F-PRO) AND CYCLO (D-PHE-2CI-PRO)

Supervisor: Prof PJ Milne

QHOLA, Lipolelo

(General Health Sciences)

THE MEDICINAL CHEMISTRY OF CYCLO (D-PHE-4I-PRO) AND CYCLO (L-PHE-4I-PRO)

Supervisor: Prof PJ Milne

MAGISTER TECHNOLOGIAE: BIOMEDICAL TECHNOLOGY

TEGHA, Gerald Loiswayo - CUM LAUDE

DETECTION AND IDENTIFICATION OF PLASMODIUM SPECIES CAUSING MALARIA IN MALAWI USING RAPID DIAGNOSTIC TESTS

Supervisor: Prof N Smith

Co-supervisor: Ms DD Kamwendo

TILI, Siphokazi Pamphilia

OBSERVED PATHOLOGICAL CHANGES IN MALE WISTAR RATS AFTER CO-TREATMENT OF TYPE II DIABETES WITH METFORMIN AND SUTHERLANDIA FRUTESCENS

Supervisor: Prof N Smith

Co-supervisor: Prof S Roux

MAGISTER TECHNOLOGIAE: ENVIRONMENTAL HEALTH

MANINGA, Kapaipi Mainess

WASTE SERVICES PROVIDED BY COMMUNITY-BASED ENTERPRISES IN THE NGOMBE PERI-URBAN SETTLEMENT AREA - LUSAKA, ZAMBIA

Supervisor: Dr HJ Maarschalk

Faculty of Law

MAGISTER LEGUM

DU PLESSIS, Emma Kate - CUM LAUDE

(Public Law)

THE CONSTITUTIONAL RIGHTS OF "BENEFACITOR CHILDREN" AND "SAVIOUR SIBLINGS" TO BODILY INTEGRITY AND AUTONOMY

Supervisor: Prof A Govindjee

Co-supervisor: Adv G van der Walt

METUGE, Denning Ngomele

(Mercantile Law)

CARRIAGE OF GOODS BY SEA - FROM HAGUE TO ROTTERDAM: SAFER WATERS

Supervisor: Mr SP Newman

TIRY, Zaahira Moosa

(Public Law)

POLITICAL PARTIES IN SOUTH AFRICAN LAW

Supervisor: Prof PHG Vrancken

Faculty of Science

MAGISTER COMMERCII

VAN DER BYL, Calven Vincent

(Statistics)

A STATISTICAL MODEL FOR VALUATION OF RESIDENTIAL PROPERTY IN THE NELSON MANDELA METROPOLITAN AREA

Supervisor: Prof IN Litvine

MAGISTER SCIENTIAE

BAATJIES, Lucinda - CUM LAUDE

(Biochemistry)

IN VITRO CYTOTOXIC EFFECTS OF SELECTED NIGERIAN MEDICINAL PLANT EXTRACTS ON CANCER CELL LINES

Supervisor: Prof M van de Venter

BEETS, Simone Yvonne - CUM LAUDE

(Computer Science and Information Systems)

USING INFORMATION VISUALIZATION TECHNIQUES TO SUPPORT WEB SERVICE DISCOVERY

Supervisor: Prof JL Wesson

BRAZIER, Wayne

(Zoology)

ENVIRONMENTAL CUES AND SENSORY PREFERENCES DRIVING NEST SITE SELECTION IN LOGGERHEAD TURTLES, CARETTA CARETTA, NESTING IN MAPUTALAND, SOUTH AFRICA

Supervisor: Dr R Nel

BROOKS, Lancelot Lucretius

(Chemistry)

SYNTHESIS OF BROMOCHLOROMETHANE USING PHASE TRANSFER CATALYSIS

Supervisor: Prof G Dugmore

Co-supervisor: Prof B Zeelie

CLOHESSY, Chantelle May - CUM LAUDE

(Mathematical Statistics)

EVALUATION OF NOISE LEVELS OF MICRO-WIND TURBINES USING A RANDOMISED EXPERIMENT

Supervisor: Dr G Sharp

Co-supervisor: Dr FJ Vorster

CROZIER, Jacqueline Louise - CUM LAUDE

(Physics)

CHARACTERISATION OF CELL MISMATCH IN PHOTOVOLTAIC MODULES USING ELECTRO-OPTIC TECHNIQUES

Supervisor: Prof EE van Dyk

Co-supervisor: Dr FJ Vorster

DAS, Sweta

(Textile Science)

QUALITY ISSUES RELATED TO APPAREL MERCHANDISING IN SOUTH AFRICA

Supervisor: Prof L Hunter

DHLADHLA, Busisiwe Irene Relebohile

(Biochemistry)

ENUMERATION OF INSECT VIRUSES USING MICROSCOPIC AND MOLECULAR ANALYSES: SOUTH AFRICAN ISOLATE OF CrleGV AS A CASE STUDY

Supervisor: Prof G Dealtry

Co-supervisor(s): Prof M Lee and Dr S Moore

DHLIWAYO, Nyaradzo

(Geography)

SOCIO-ECONOMICAL IMPACTS OF BIOGAS PRODUCTION: A CASE OF DUFUGA BIOGAS PROJECT, GWERU DISTRICT, ZIMBABWE

Supervisor: Dr A de Wit

DOTY, Anna Catherine

(Zoology)

ASPECTS OF HETEROTHERMY IN FOUR AFROTROPICAL BAT SPECIES

Supervisor: Dr N Mzilikazi

FINCA, Andiswa

(Geography)

MODELING TRENDS IN EVAPOTRANSPIRATION USING THE MODIS LAI FOR SELECTED EASTERN CAPE CATCHMENTS

Supervisor: Prof V Kakembo

Co-supervisor: Dr A Palmer

GROBLER, Barend Adriaan - CUM LAUDE

(Botany)

A SYSTEMATIC CONSERVATION ASSESSMENT AND PLAN FOR THE BAAKENS RIVER VALLEY, PORT ELIZABETH

Supervisor: Prof EE Campbell

Co-supervisor: Dr D du Preez

JOUBERT, Jean-Pierre

(Computer Science and Information Systems)

AC3P: AN ARCHITECTURE USING CLOUD COMPUTING FOR THE PROVISION OF MATHEMATICAL POWERPOINT CONTENT TO FEATURE PHONES

Supervisor: Prof J Greyling

Co-supervisor: Prof C Cilliers

KAISER, Sabina Marie Luise

(Zoology)

TEMPORAL PATTERNS IN THE DIET OF BOTTLENOSE DOLPHINS, TURSIOPS ADUNCUS, OFF THE KWAZULU-NATAL COAST OF SOUTH AFRICA

Supervisor: Dr PA Pistorius

Co-supervisor: Dr S Plön

KASELOWSKI, Tanja - CUM LAUDE

(Botany)

PHYSIO-CHEMICAL AND MICROALGAL CHARACTERISTICS OF THE GOUKAMMA ESTUARY

Supervisor: Prof JB Adams

Co-supervisor: Dr W Roets

KUHN, Kirsti

(Chemistry)

A STUDY OF THE COORDINATION BEHAVIOUR OF THE LANTHANIDE SERIES WITH OXYGEN - DONOR LIGANDS

Supervisor: Prof T Gerber

Co-supervisor: Dr R Betz

LOUW, Merika

(Botany)

REPRODUCTIVE AND STRESS PHYSIOLOGY OF THICKET SPECIES: TOWARDS INCREASING BIODIVERSITY IN REHABILITATED AREAS

Supervisor: Prof EE Campbell

Co-supervisor: Dr D du Preez

MAFU, Lubabalo Rowan

(Chemistry)

BENEFICIATION OF GLYCEROL FROM BIO-ALGAE AND VEGETABLE OILS

Supervisor: Dr G Dugmore

Co-supervisor: Prof B Zeelie

MANGISA, Siphumlile

(Mathematical Statistics)

STATISTICAL ANALYSIS OF ELECTRICITY DEMAND PROFILES

Supervisor: Prof IN Litvine

MINNAAR, Etienne Gerald

(Physics)

THE MICROSTRUCTURAL AND ANALYTICAL CHARACTERIZATION OF PLASMA DISSOCIATED ZIRCON

Supervisor: Prof JH Neethling

Co-supervisor: Prof ME Lee

MKENTANE, Kwezikazi - CUM LAUDE

(Chemistry)

THE DEVELOPMENT AND OPTIMISATION OF A FORMULATION THAT FACILITATES THE PROCESS OF DETANGLING BRAIDS FROM AFRICAN HAIR

Supervisor: Dr NM Vorster

Co-supervisor: Mr C Bosma

MOODLEY, Kirshnee - CUM LAUDE

(Mathematical Statistics)

THE FITTING OF STATISTICAL DISTRIBUTIONS TO WIND DATA IN COASTAL AREAS OF SOUTH AFRICA

Supervisor: Prof IN Litvine

MOTSOMI, Abel Pholo

(Mathematical Statistics)

STATISTICAL TOOLS FOR CONSOLIDATION OF ENERGY DEMAND FORECASTS

Supervisor: Prof IN Litvine

NDZUKUMA, Doctor Sibusiso

(Mathematical Statistics)

STATISTICAL TOOLS FOR WIND ENERGY POTENTIAL

Supervisor: Prof IN Litvine

NGUNDZE, Unathi Andisa - CUM LAUDE

(Mathematical Statistics)

STATISTICAL COMPARISON OF INTERNATIONAL SIZE-BASED EQUITY INDEX USING A MIXTURE OF NORMAL DISTRIBUTIONS

Supervisor: Dr G Sharp

NONDODA, Sibulele Phefumlela

(Botany)

MACROPHYTE DISTRIBUTION RESPONSES TO DROUGHT IN THE ST LUCIA ESTUARY

Supervisor: Prof JB Adams

NUNES, Monique

(Botany)

MICROALGAE AND MACROPHYTES AS INDICATORS OF ECOLOGICAL HEALTH IN THE GREAT BRAK ESTUARY

Supervisor: Prof JB Adams

Co-supervisor: Dr W Roets

PEREIRA, Melanie Claire

(Biochemistry)

THE MOLECULAR ANALYSIS OF THE INTERACTION SURFACE BETWEEN SCD23 AND THE BETA-2 INTEGRINS, CD11B AND CD11C

Supervisor: Prof V Oosthuizen

Co-supervisor: Prof M van de Venter

POTGIETER, Gail Christine - CUM LAUDE

(Zoology)

EFFECTIVENESS OF LIVESTOCK GUARDING DOGS IN NAMIBIA FOR CONSERVATION AND LIVESTOCK PRODUCTION

Supervisor: Prof G Kerley

Co-supervisor: Dr L Marker

PRINSLOO, Shireen

(Botany)

THE DISTRIBUTION AND DIVERSITY OF MACROALGAE IN SELECTED ESTUARIES ALONG THE EASTERN CAPE COAST, SOUTH AFRICA

Supervisor: Prof EE Campbell

Co-supervisor: Prof J Bolton

ROSSOUW, Claire Angela

(Chemistry)

THE ACCELERATED LIFE CYCLE TESTING AND MODELLING OF LI-ION CELLS USED IN ELECTRIC VEHICLE APPLICATIONS

Supervisor: Prof E Ferg

Co-supervisor: Prof P Loyson

RYKLIFF, Rabiah

(Zoology)

*POPULATION DYNAMICS OF THE GREAT WHITE SHARK**CARCHARODON CARCHARIAS AT MOSSEL BAY, SOUTH AFRICA*

Supervisor: Dr PA Pistorius

Co-supervisor(s): Dr N Strydom and Mr R Johnson

SAMS, Ivan

(Computer Science and Information Systems)

USING MULTI-TOUCH INTERACTION TECHNIQUES TO SUPPORT COLLABORATIVE INFORMATION RETRIEVAL

Supervisor: Prof JL Wesson

Co-supervisor: Dr D Vogts

SCHULTZ, Ross Dane

(Physics)

ON THE DESIGN OF CONCENTRATOR PHOTOVOLTAIC MODULES

Supervisor: Dr FJ Vorster

Co-supervisor: Prof EE van Dyk

SIMPSON, Brenton

(Chemistry)

MODELLING OF THE CRYSTALLIZATION PROCESS OF HIGHLY CONCENTRATED AMMONIUM NITRATE EMULSIONS

Supervisor: Prof E Ferg

Co-supervisor: Prof I Masaova

SINGH, Karishma

(Botany)

POPULATION DYNAMICS OF THE ZUURBERG CYCAD AND THE PREDICTED IMPACT OF CLIMATE CHANGE

Supervisor: Prof EE Campbell

Co-supervisor: Dr D du Preez

SMITH, Janis Suzanne - CUM LAUDE

(Geography)

A SPATIAL AND TEMPORAL ANALYSIS OF ELEPHANT INDUCED THICKET DEGRADATION IN ADDO ELEPHANT NATIONAL PARK

Supervisor: Prof V Kakembo

Co-supervisor: Prof G Kerley

VAN DER HOLST, Kyle Wim

(Microbiology)

*THE ROLE OF *pacC* IN *Aspergillus Flavus* NRRL3357 AS DETERMINED BY RNA INTERFERENCE*

Supervisor: Dr BM Somai

VAN DE VEN, Tanja Maria Francisca Nicole

(Zoology)

PHENOTYPIC PLASTICITY OF METABOLIC RATE IN A BIRD SPECIES

(EUPLECTES ORIX)

Supervisor: Dr N Mzilikazi

Co-supervisor: Prof AE McKechnie

VELDKORNET, Dimitri Allastair

(Botany)

MORPHOLOGICAL VARIATION AND DIVERSITY OF SOUTH AFRICAN

ESTUARINE MACROPHYTES

Supervisor: Prof JB Adams

WENTWORTH, Julia Claire

(Zoology)

TRENDS IN LARGE CARNIVORE DIETS IN THE ADDO ELEPHANT

NATIONAL PARK, SOUTH AFRICA

Supervisor: Prof G Kerley

Co-supervisor: Dr CJ Tambling

WOLMARANS, Karien

(Botany)

BIOMASS AND COMMUNITY VARIABILITY OF PHYTOPLANKTON OF

SANDY BEACH SURF-ZONES

Supervisor: Prof EE Campbell

Co-supervisor: Dr D du Preez

MAGISTER TECHNOLOGIAE: AGRICULTURE**BADENHORST, Daniel**

OORSAAIPRAKTYKE EN VESTING VAN EENJARIDGE RAAIGRAS IN

LUSERNWEIDING

Supervisor: Mr R Celliers

Co-supervisor: Dr PR Botha

Patent Applications Filed

DE KLERK, J. & GRANT, S.I.E. Expandable mechanism for selectively adjusting the footprint of a reversibly expandable apparatus. South African provisional patent application (2011/8140).

HERRMANN, D. & VAN NIEKERK, T.I. Component handling device. South African provisional patent application (2011/00730).

HATTINGH, S.D.W. Antiparasitic agent for treating birds. South African provisional patent application (2011/03870).

MKENTANE, K. & VORSTER, N. Hair treatment composition. South African patent application (2011/04055).

MUSARA, V., WU, L. & LEITCH, A.W.R. Polarisation mode dispersion emulator apparatus. South African patent application (2011/01617).

MÜLLER, P.H., MÜLLER, R.B. & SAVAGE, L. Grading structural planks, boards and the like. South African provisional patent application (2011/04683).

SMITH, F. A method for mitigating single event upsets caused by single event transient in volatiles FPGA'S. South African provisional patent application (2011/07719).

SMITH, F. A method for mitigating single event upsets in combinational electronic circuits. South African provisional patent application (2011/07718).

SMITH, F. A method for mitigating single event upsets in sequential electronic circuits. PCT Application (PCT IB2011/000640).

VON SOLMS, R., VAN NIEKERK, J.F. & POTGIETER, M. System and method for secure transacting. South African provisional patent application (2011/06998).

WAGENER, M.C., BOTHA, J.R. & WAGENER, V. Method and apparatus for determining dopant density in semiconductor materials. South African patent application (2011/06897).

WESSON, J.L. & VAN TONDER, B.P. Tilt interaction in mobile devices. South African provisional patent application (2011/06484).

ZEELIE, B., DUGMORE, G.M. & BARNARD, J.P. Process and system for the production of micro-algae, bio-oil and secondary products. South African patent application (2011/07644).

ZEELIE, B. & DUGMORE, G.M. Carbonaceous fines beneficiation using micro-algae and related processes. PCT Application (PCT/IB2011/001884).



Government Gazette

REPUBLIC OF SOUTH AFRICA
Pretoria, 22 December 2011
No. 31745
THE PRESIDENT
It is hereby notified that the President has assented to the following Act, which is hereby published for general information:
Act No. 21 of 2011: Intellectual Property Rights from Publicly Financed Research and Development Act, 2011.

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing (day/month/year)	22 July 2010 (22-07-2010)
FOR FURTHER ACTION	See paragraphs 1 and 4 below
International filing date (day/month/year)	21 March 2010 (21-03-2010)

NELSON MANDELA METROPOLITAN UNIVERSITY

Exhibitions and Performances

Vice-Chancellor's Evening:

The Vice-Chancellor's Evening was arranged in conjunction with the Department of Marketing. It included musical performances by the NMMU Choir and students and staff of the Department of Music, a cultural group performance by La Strada Choir, and a preview of Professor Cleone Cull's Exhibition (Athenaeum, 21 September 2011).

Exhibitions presented by the School:

- **RE.SPONSE:** Art Exhibition at William Humphries National Art Gallery, Kimberley (February - March 2011).
- **RE.SPONSE:** Art Exhibition at National Arts Festival, Arena Programme, Settlers Monument (30 June - 10 July 2011).
- **NMMU CONTEMPORARY:** Art Exhibition at Ron Belling Gallery (21 June - 15 July 2011).
- **SASOL Regional Finals:** Art Exhibition (20 - 25 July 2011).
- **Walking Between Worlds:** Prof Cleone Cull, Sabbatical Exhibition, Athenaeum (September - October 2011).
- **Michele Fuller:** Masters Examination Exhibition, Athenaeum (November 2011).
- **Collective:** Graduate student exhibition (October - November 2011).

External exhibitions: staff, students and recent alumni:

- **Incoko (Conversations):** ARTEC Gallery; 30 May - 5 June 2011; Bantu Mtshiselwa, Mary-Ann Kella and Mkhonto Gwazela (MTech students).
- **A Continuous Thread Exhibition:** ARTEC Gallery; 1 - 11 March 2011; Bev de Lange (MTech alumnus).
- **Bongo Mei and Thembaletu Mnquanyama Exhibition and performance:** Alliance Française, May 2011.
- **ARTEC New Signatures Exhibition:** ARTEC Gallery; 5 - 25 March 2011; students exhibited.
- **4 Blind Mice:** Irie Gallery; four alumni; Christo Booth, Mond Goniwe, Mawande Mase, Pieter Ragadoo and invited artist, Andy Higgins.

- **200 ARTISTS:** Art Exhibition at Athenaeum (17 June - 31 July 2011).
- **SKIN:** Art Exhibition at the Nelson Mandela Metropolitan Art Museum (15 June - 10 July 2011).
- **FINDING KAGGEN:** Art Exhibition at ARTEC (28 June - 15 July 2011).
- **Fractions Exhibition:** Montage Gallery; Thys Cillers, Mary Duker, Andrieta Wentzel, Amanda Snyman and David Jones.

Performances:

- **St Cloud State University and NMMU Choirs:** Dutch Reformed Church (DRC) - 5 March 2011.
- **St Cloud State University Choir:** South Campus Auditorium - 9 March 2011.
- **Brass Studio Concert** - 20 April 2011.
- **Piano Studio Concert** - 4 May 2011.
- **Russian Jewels:** Concert with Liske Potgieter and Mariel Ilusorio - 15 May 2011.
- **Jazz Studio Concert** - 25 May 2011.
- **Charles Bryars Scholarship Concert** - 7 June 2011.
- **NMMU Department of Music in collaboration with Rhodes University Music Department,** Chamber Music concerts in Grahamstown on 23 July and in PE on 26 July 2011.
- **Prof E Albertyn solo performance** with the *Eastern Cape Philharmonic Orchestra* (ECPO).
- **Woodwind Studio Concert** - 14 September 2011.
- **Jazz Concert** - 19 October 2011.
- **Piano Studio Concert** - 12 October 2011.
- **Prestige Concert** - 25 October 2011.
- **Organ Studio Concert:** Dutch Reformed Church in Summerstrand - 27 October 2011.
- **Brass Studio Concert** - 19 November 2011.

Publications

■ Faculty of Arts

DHET Accredited Journal Articles

ASMAH-ANDOH, K. 2011. Improving performance in local government with citizen participation. *Administratio Publica* 19(4), pp. 118 - 133.

AYLIFF, D.H. 2011. Researching the effects of teaching grammar rules to English second language adult learners. *South African Journal of Higher Education* 25(3), pp. 397 - 411.

BOTHA, M.E. 2011. Outobiografie en poësie in Antjie Krog se *Gedigte 1989-1995*. *Stilet* 23(2), pp. 121 - 144.

CROUSE, M.L. 2011. Adriaan Van Zyl: *Memorandum: Marlene Van Niekerk*. *South African Journal of Art History* 26(3), pp. 27 - 34.

CROUSE, M.L. 2011. Wilhelm Knobel: 'n Psigotiese siektebeeld in digterlike taal. *Stilet* 23(2), pp. 145 - 156.

DRAAI, E.E. & RAGA, K. 2011. Client satisfaction and trust in the South African public service. *Africa Insight* 41(2), pp. 84 - 97.

ECONOMOU, I., SAAYMAN-HATTINGH, H. & MUSHOHWE, K. 2011. The effect of media law on selected Zimbabwean editorial cartoons during Zimbabwe's 2008 harmonised general elections. *South African Journal of Art History* 26(1), pp. 23 - 40.

HARDMAN, T.J. 2011. Understanding creative intuition. *De Arte* 83, pp. 22 - 32.

HARRAN, M. 2011. Dominant feedback practices: Shaping engineer literacy perceptions. *Journal of Engineering, Design and Technology* 9(1), pp. 85 - 109.

HARRAN, M. 2011. What higher education students do with teacher feedback: Feedback-practice implications. *South African Linguistics and Applied Language Studies* 29(4), pp. 419 - 434.

HARRAN, M., KNOTT, A. & WEIR, C. 2011. Responding electronically to students drafts on campus: Dis/encouraging dialogue? *South African Journal of Higher Education* 25(7), pp. 1359 - 1377.

HIBBERT, L. & CROUSE, M. 2011. Selecting literature for beginner readers in South Africa. *Per Linguam* 27(2), pp. 99 - 110.

HIBBERT, L. 2011. Language development in higher education. Suggested paradigms and their applications in South Africa. *Southern African Linguistics and Applied Language Studies* 29(1), pp. 31 - 42.

ISAACS-MARTIN, W.J. 2011. National identity and economic nationalism: Can an economic perspective reinforce nationalism and nation building? *Africa Insight* 41(1), pp. 59 - 70.

ISRAEL, H.F. 2011. I am an African. I speak an African language: Cultural dimensions of African development and learning from others. *International Journal of African Renaissance Studies - Multi-, Inter- and Transdisciplinarity* 6(1), pp. 107 - 120.

JANSE VAN VUUREN, H.E. 2011. 'n Besinning oor 'n benadering tot 'n uitgestorwe kultuur: Die /Xam koloniale argief. *Stilet* 23(2), pp. 157 - 166.

JANSE VAN VUUREN, H.E. 2011. " 'n Almanak van klippe": Laatwerk en Breyten Breytenbach se *Die beginsel van stof (laat-verse, sprinkaanskaduwees, aandtekening)*. *Litnet Akademies* 8(3), pp. 1 - 19.

KLOS, M.L. 2011. Genre pedagogy in the mediation of socially-situated literacies acquisition - the experience of apprentices in higher education community of practice. *Journal for Language Teaching* 45(1), pp. 132 - 151.

KLOS, M.L. 2011. The struggle for textual conventions in a language support programme. *Southern African Linguistics and Applied Language Studies* 29(1), pp. 55 - 65.

KONIK, A. 2011. From ruination to renewal: The critical value of a proto-crystalline regime in German expressionist cinema. *South African Journal of Art History* 26(2), pp. 15 - 44.

NOTSHULWANA, V. 2011. Expanding opportunity through intentional equity. *Africa Insight* 41(2), pp. 142 - 159.

OLIVIER, B. 2011. "Sustainable" architecture and the "law" of fourfold. *South African Journal of Art History* 26(1), pp. 74 - 84.

OLIVIER, B. 2011. Eros and love: Eros and life. *Phronimon - Journal of the South African Society for Greek Philosophy and the Humanities* 12(1), pp. 41 - 63.

OLIVIER, B. 2011. Facebook, cyberspace, and identity. *Psychology in Society* 41, pp. 40 - 58.

OLIVIER, B. 2011. Film as communicational mediation of the ecological crisis: *Avatar* and *The Road*. *Communicare - Journal for Communication Sciences in South Africa* 30(1), pp. 66 - 85.

OLIVIER, B. 2011. Interconnectedness and process in Cleone Cull's visual art. *South African Journal of Art History* 26(3), pp. 104 - 116.

PETRUS, T. & ISAACS-MARTIN, W.J. 2011. Reflections on violence and scapegoating in the strike and protest culture in South Africa. *Africa Insight* 41(2), pp. 49 - 61.

POTGIETER, Z. 2011. Song in Gold Pavilions: Ronald Stevenson on music (Review article). *Musicus* 39(1), pp. 104 - 107.

RAGA, K. & NANO, N. 2011. Legislative and administrative directives governing procurement procedures. *African Journal of Public Affairs* 4(1), pp. 130 - 147.

RAGA, K., TAYLOR, J.D. & ALBRECHT, W. 2011. Challenges for developmental local government and public participation in contemporary South Africa. *Administratio Publica* 19(1), pp. 149 - 168.

SAAYMAN-HATTINGH, H. 2011. Visually representing social change - the South African social documentary photographer and the struggle. *Communitas - Journal for Community Communication and Information Impact* 16(2011), pp. 191 - 206.

SAAYMAN-HATTINGH, H.K. & GAEDE, R.J. 2011. Photographer autonomy and images of resistance: The case of South Africa during the 1980s. *Visual Communication* 10(4), pp. 499 - 525.

SHAI, W., PILLAY, P., RAGA, K. & TAYLOR, J.D. 2011. An overview of the link between ward committees, development and community participation with reference to the Nelson Mandela Bay Municipality. *Administratio Publica* 19(2), pp. 115 - 128.

SNODGRASS, L. & POTTS, G. 2011. The interface between human needs and environmental protection: The case of Thyspunt, South Africa. *Africa Insight* 41(1), pp. 143 - 155.

STEYN-KOTZE, J. & TAYLOR, J.D. 2011. Refugee perceptions of the Port Elizabeth Refugee Reception Centre. *Africa Insight* 41(1), pp. 88 - 110.

STRYDOM, G. & JANSE VAN VUUREN, H.E. 2011. "Sonder agtergrondgedruis en tussenkoms van die skrywerstem?": Ingrid Winterback se *Die boek van toeval en toeverlaat* (2006). *Stilet* 23(2), pp. 102 - 120.

STRYDOM, G.L. & JANSE VAN VUUREN, H.E. 2011. Die marginale subjekposisie van die Afrikaanse skrywer - Etienne van Heerden se *Asbesmiddag* (2007). *Litnet Akademies* 8(3), pp. 1 - 23.

TERBLANCHE, H.I. 2011. Taal- en kulturele wisselwerking tussen Vlaandere en Suid-Afrika tydens die apartheidsjare: 'n Oorsig. *Suid-Afrikaanse Tydskrif vir Kultuurgeskiedenis* 25(1), pp. 131 - 147.

TERBLANCHE, L. & JORDAAN, D.J. 2011. 'n Fantasiema-analise van Maas se artikel 666 is net 'n syfer. *Communitas - Journal for Community Communication and Information Impact* 16, pp. 171 - 190.

THOMAS, I.M.B. 2011. Incorporating media into the French curriculum. *Journal for Language Teaching / Tydskrif vir Taalonderrig* 45(1), pp. 24 - 32.

VOSS, A.E. 2011. "How are these things related that such deep union should exist between them all?": The textual integrity of *The Story of an African Farm*. *Journal of Literacy Studies / Tydskrif vir Literatuurwetenskap* 27(1), pp. 43 - 64.

VOSS, A.E. 2011. The stranger as story-teller: Gypsies and others. *Shakespeare in Southern Africa* 23, pp. 31 - 42.

WRIGHT, B.M. 2011. Beyond product placement: A model for advergame as viral marketing tool in South Africa. *Communicare - Journal for Communication Sciences in South Africa* 30(1), pp. 47 - 65.

Chapters in Books submitted to DHET for subsidy purposes

JANSE VAN VUUREN, H.E. 2011. Antjie Krog: Towards a syncretic identity in: CHAPMAN, M. & LENTA, M. (Eds). *SA Lit. Beyond 2000*. UKZN Press, KwaZulu-Natal, South Africa.

SNODGRASS, L. & OBIKA, J. 2011. Re-integrating former child soldiers into their communities in northern Uganda: A case study in: KONDLO, K. & EJIUGU, C. (Eds). *Africa in Focus: Governance in the 21st Century*. HSRC Press, Cape Town, South Africa.

STEYN-KOTZE, J. & SWART, G. 2011. Resolving conflict in Africa: In search of sustainable peace in: MPOFU, E. (Ed). *Counseling People of African Ancestry*. Cambridge University Press, New York, USA.

WOZNIAK, J. 2011. Contesting the electricity supply in South African media in: HYDE-CLARKE, N. (Ed). *Communication and Media Ethics in South Africa*. JUTA, Cape Town, South Africa.

Conference Papers submitted to DHET for subsidy purposes

CADLE, B. Are we there yet? Graphic design's next destinations. *20/20 Design Vision: Conference Proceedings of the 6th International DEFSA Conference: Johannesburg, South Africa, 7 - 8 September 2011*.

DUKER, M. From 'Banking' to 'Stockvel': A critical reflection on the development of literacies programmes for entrance level theory of art and design students. *20/20 Design Vision: Conference Proceedings of the 6th International DEFSA Conference: Johannesburg, South Africa, 7 - 8 September 2011*.

ECONOMOU, I.O. The problem with plagiarism. *20/20 Design Vision: Conference Proceedings of the 6th International DEFSA Conference: Johannesburg, South Africa, 7 - 8 September 2011*.

ISRAEL, H.F. Engineering soft skills? My responsibility. A case study at the Nelson Mandela Metropolitan University. *Proceedings of the 1st Biennial Conference of the South African Society for Engineering Education (SASEE)*: Stellenbosch, South Africa, 10 - 12 August 2011.

■ Faculty of Business and Economic Sciences

DHET Accredited Journal Articles

ADENDORF, C.M. & BOSHOF, C. 2011. The impact of culture-related factors on good governance in Greek family business in South Africa. *South African Journal of Business Management* 42(2), pp. 1 - 14.

BARNARD, S., KRITZINGER, B. & KRÜGER, J. 2011. Location decision strategies for improving SMME business performance. *Acta Commercii* 11, pp. 111 - 128.

BYARUGABA, J.M., TAIT, M. & BOSCH, J.K. 2011. Users and providers perceptions about the quality of service in the mobile telephone industry - the case of Uganda. *Journal of Contemporary Management* 8(1), pp. 239 - 264.

DICKEN, M.L. 2011. Population size of neonate and juvenile dusky sharks *Carcharhinus obscurus* in Port of Ngqura, South Africa. *African Journal of Marine Science* 33(2), pp. 255 - 261.

DICKEN, M.L., PARKER-NANCE, S. & SMALE, M.J. 2011. Sessile biofouling on tags from recaptured raggedtooth sharks (*Carcharias taurus*) and their effects on tagging studies. *Marine and Freshwater Research* 62(4), pp. 359 - 364.

DU PREEZ, M. & HOSKING, S.G. 2011. The value of the trout fishery at Rhodes, North Eastern Cape, South Africa: A travel cost analysis using count data models. *Journal of Environmental Planning and Management* 54(2), pp. 267 - 282.

DU PREEZ, M. 2011. The opportunity cost of travel time in recreational fishing demand analysis: A South African case study. *Journal for Studies in Economics and Econometrics* 35(1), pp. 45 - 57.

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■ George Campus

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Research Support

Department of Research Management

The Department of Research Management (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

The Department of Research Capacity Development (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

The Department of Innovation Support and Technology Transfer (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.

Finance Department

The Department of Finance has created 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. In 2011, a total of 122 students and staff members made use of this service.

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.

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: **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 Programs Information Network (SPIN). During 2011, 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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The background of the page is a deep blue color. Overlaid on this are several large, flowing, wavy lines in a lighter blue or cyan hue. These lines create a sense of movement and depth, resembling stylized waves or abstract architectural forms. On the left side of the page, there is a solid red vertical rectangular bar. To the right of this bar, in the lower-left quadrant, is a block of white text.

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