On 1 January 2004, KwaZulu-Natal’s two major tertiary institutions, the University of Natal and the University of Durban-Westville, merged to form the University of KwaZulu-Natal (UKZN). The new university incorporates five campuses: Howard College and the Nelson R. Mandela School of Medicine in Durban, the Westville Campus (pictured on this page), the Pietermaritzburg Campus, and Edgewood College in Pinetown.

UKZN is now the country’s largest contact university, with more than 43 000 students, 6 000 staff members and an annual budget of approximately R2 billion. It is distinguished in the quality of education it offers, in its research activities, and in its development and service programmes.

UKZN has a worldwide reputation and all degrees awarded are internationally recognised. The University’s formal links, exchange programmes and collaborative teaching and research programmes with other universities span the globe. A large number of Memoranda of Understanding, such as the Memorandum linking UKZN with the Mumbai-based Indian Institute of Technology, explore the potential for the exchange of intellectual property, staff and students.

UKZN aims to be a truly South African university that reflects the society in which it is situated, not only in terms of race, gender and class, but also in terms of values and priorities, and how it responds to social needs.

UKZN has identified HIV/AIDS as its strategic research priority. Its core functions of teaching, research and service, across all five campuses, incorporate its determination to confront the epidemic and to serve the needs of society in an AIDS-affected world.

As an institution of higher learning, UKZN is committed to academic excellence, innovation in research, and critical engagement with society. It is the leading South African University in terms of academic staff equity, with a sophisticated equity acceleration programme that has attracted considerable donor funding.

With its mission to be the Premier University of African Scholarship, the University of KwaZulu-Natal draws inspiration from its African identity and takes seriously its responsibilities towards the development of the African continent.
## Contents

### Messages
- A message from the Office of the Vice-Chancellor and Principal 2
- A message from the Office of the Deputy Vice-Chancellor (Research, Knowledge Production and Partnerships) 3

### Director’s Report
- The Research Enterprise 4
  - The Research Office
  - Development of Research Policies
  - The University of KwaZulu-Natal Press
  - The Doris Duke Medical Research Institute
- Research Barometer 8

### Strategic initiatives
- HIV/AIDS 10
- Water 11
- Economic Development 11
- African Literary Studies 12
- Conservation 12

### Nurtured Research Areas
- Traditional Herbal Medicines 13
- Forestry 13
- Marine Biology 14
- Bioethics 15
- Smart Materials 15
- Genetics 16
- Jazz 16

### Awards
- 2004 Book Prizes 44
- 2004 Fellowship Awards 46
- Vice-Chancellor’s Research Award 48
- Fellows of the University of KwaZulu-Natal 49

### Research Highlights
- **Rooted in Africa** 18
  - Championing traditional African agriculture 18
  - Developing natural insecticides 19
  - Ensuring healthy livestock 21
  - Recognising the value of herbal medicine 22
- **Science and Nature** 23
  - Campaigning for scientific unity 23
  - Investigating climate change in Africa 24
  - Understanding the link between age and immunity 26
  - Promoting good, clean business sense 27
  - Uncovering the secrets of chemical compounds 28
- **Scientific Responses to HIV/AIDS** 29
  - Searching for the AIDS vaccine 29
  - Attacking the pandemic on multiple fronts 30
  - Understanding the relationship between breastfeeding and HIV transmission 31
- **The Changing Family** 33
  - Investigating the use of condoms among married couples 33
  - Learning from migrant workers 34
  - Examining fatherhood in South Africa 36
- **Globalising South African Experiences** 37
  - Globalising democracy education 37
  - Understanding the psychology of racism 38
  - Setting global standards for social work education 40
- **Into the Future** 41
  - Preparing for a wireless future 41
  - Examining an expanding universe 42
Together with teaching and service, research is one of the cornerstones of the University of KwaZulu-Natal. Research has been enshrined as a principle of the University’s mission statement. This means that we recognize that through research the university is able to maintain and enhance its impact on society and contribute directly to the development and welfare of South Africa and the African continent. But, it also means that the university is committed, through its research, to engaging the world.

It is through research therefore, that we excel as an institution, enhance quality of life and place our nation on a globally-competitive path. Today’s fundamental investigations will provide tomorrow’s knowledge, determining the quality of life for future generations. Research provides ideas, possibilities, opportunities, excitement and hope for the future.

In South Africa today there are a number of issues that deserve our uncompromised intellectual attention: HIV/AIDS, hunger, crime, poverty, racial discord, to name but a few. As an antidote to ignorance, research is an enormously powerful tool. As academics, we have a duty to interrogate these issues and report our findings with courage, integrity and independence. In this way we contribute to the intellectual and societal growth of democracy in South Africa.

The recent merger of the former Universities of Durban-Westville and Natal has created a new institution with even greater academic expertise and intellectual resources at its disposal, and this strength has manifested itself recently in the University’s impressive research productivity ratings. UKZN is among the four South African universities rated among the top 500 in world; it is also the 2nd research-rated among South African universities as measured by the national Department of Education’s SAPSE Units. With its vision to be the Premier University of African Scholarship, I believe the new university is poised to reveal to the world just how much of a contribution Africa has to make to global knowledge and development.

Professor Malegapuru William Makgoba

PROFESSOR MALEGAPURU WILLIAM MAKGOBA:
An African contribution to global knowledge and development.
The year 2005 will be remembered as the year in which the merger that gave rise to the University of KwaZulu-Natal entered a new phase, one in which UKZN began to define for itself the kind of university it is going to be. This is an exciting challenge, since the creation of a new higher education entity provides its people, its staff and students, with the possibility of re-imagining ‘the university’ and understanding better its relationship with society. Nowhere is this more relevant and pertinent than in the definition of its research enterprise. Central to this is to define what it means for UKZN to be a premier institution of African scholarship. And this is an extraordinary time and context in South Africa for a university to be engaging in such discussions.

UKZN has much to build on. The most recent data from the Department of Education indicates that UKZN is the second largest producer of published research among South African universities. This is a wonderful achievement.

The University has defined a set of Strategic Research Initiatives which allow it to link systematically with some of the key challenges of the nation, among these HIV/AIDS, Economic Development, Biodiversity, Water, Forestry and Bioethics. In each of these Initiatives there are large projects of scholarship and knowledge production and in each case, dynamic interfaces between the researchers, policymakers and civil society. Some of these are described in this Research Report. UKZN settles into its Vision, it is building new ones while sustaining existing partnerships with local, provincial and national government structures, industry, civil society organisations and non-governmental organisations.

The progress of UKZN towards consolidating and building its fundamental research profile continued at a good pace in 2005 with many new initiatives. Led by Professor Francesco Petrucionne, the School of Physics landed a very substantial Innovation Fund grant for the establishment of a Centre for Quantum Cryptography. Professor Gerhard Mare, one of UKZN’s most senior sociologists, is in the process of constructing a Centre for the Critical Study of Race and Identity. Professors Victor Verijenko (Mechanical Engineering) and Nithaya Chetty (Physics) are spearheading the development of a Centre for Smart Materials. At a time when there are such powerful forces pushing institutions of higher learning towards being increasingly product-related, the continued growth of fundamental science is extremely important.

2005 also represents the year in which South African universities have been challenged to adopt new and innovative approaches to substantially build the national cohort of doctoral graduates. For UKZN, this depends fundamentally on nurturing and building close relationships between this university’s research enterprise and its postgraduate education. Several excellent examples of innovation in the organisation of graduate education have taken root.

The essential ingredient of a university research system such as UKZN is its people – its research leaders, researchers, technicians, administrators and postgraduate students. It is critically important for the sustainability of the system that it works hard to produce a supportive, enabling research environment and an ethos that is firmly woven into the texture of the institution. While ensuring that its senior research leaders are free in an enabling environment to be highly productive, the institution is supportive and nurturing of its younger researchers and students upon the shoulders of whom the future of South Africa’s research system rests.

Professor Ahmed Bawa, Deputy Vice-Chancellor (Research, Knowledge Production and Partnerships)
Professor Salim Abdool Karim, Pro-Vice-Chancellor (Research)
The Research Enterprise

The Research Enterprise at the University of KwaZulu-Natal is wholly committed to providing a nurturing environment for research that benefits the province, the country and the continent of Africa. Further, it is committed to expanding its global links and ensuring the research that emanates from the University has tangible African roots. The research philosophy embraces both ‘blue sky’ imperatives and applied research, which contribute to the ideal of African scholarship, wherever possible through partnerships with the community.

UKZN is recognised as one of South Africa’s pre-eminent research institutions. It provides a dynamic environment for all facets of research including basic, applied and medical research.

Several of its academic staff members are recognised as international leaders in their disciplines. There are University-wide links with leading global institutions at individual, Department, School and College levels, as well as across disciplines and faculties. The full spectrum of research is encouraged and supported, from curiosity-driven research to application-based and participatory action research with community partners.

Collaborative partnerships that have been developed with industry, business, government, local communities and international institutions and agencies have become increasingly critical to most research.

The University is committed to increasing the number of postgraduate students from the current one-third of the total student registration. This challenge has been taken up at strategic level. There is a strong emphasis on team research and senior academics take pride in mentoring graduate students to develop skills in critical appraisal and independent thought.

The University is keenly aware of its responsibility to society. KwaZulu-Natal provides fertile soil for researchers and embodies both opportunities and challenges for development and growth in South Africa. The University actively encourages practical research that will improve the quality of life of the citizens of the region, and the country as a whole. This outcomes-driven approach has led to the setting up of interdisciplinary Centres of Excellence, devoted to particular projects and often involving collaboration with institutions from around the world.

The following pages of this report highlight the increasing optimising of funding opportunities being garnered, with one result being that UKZN’s phalanx of NRF-Thuthuka grant-holders now represent the largest grouping among South Africa’s tertiary institutions.

UKZN’s Research Enterprise has identified both strategic research areas and research areas ‘in need of nurturing’, representing either existing or potential Centres of Excellence. Rooted in the concept of African scholarship, the overall objective emphasises both contributing to scholarship and the resolution of Africa’s challenges through building resources that are intrinsically African, while recognising the continent’s place in the ‘global village’.

This report highlights some of the University’s academics who have been especially prolific during the period under review, or who have made exceptional contributions to UKZN’s strategic or nurtured research initiatives.

The following pages focus on the fact that KwaZulu-Natal, in South Africa, on the African continent, and within its historical context, provides unique perspectives for critical analyses. UKZN’s scientists and researchers are perfectly placed to investigate, across disciplines, diverse issues. We look at harvesting indigenous knowledge for agricultural, food security and medicinal applications; we have a unique geographical position to study the galaxy and to challenge global concerns such as tropospheric ozone and climate change; the province is in a critical position in terms of the HIV/AIDS pandemic; its juxtaposed ‘first world’ and ‘second economy’ location impacts economic development and sustainable use of resources such as water; and it provides a socio-political niche for Humanities’ investigations into issues such as the psychology of race, and masculinity and fatherhood.

Together, these represent a microcosm of the vibrant Research Enterprise under way at the University of KwaZulu-Natal.
The Research Office

The Deputy Vice-Chancellor (Research, Knowledge Production and Partnerships) is principally responsible for establishing an environment that promotes high research quality and productivity.

To do this, the Research Office, headed by the Deputy Vice-Chancellor, is responsible for the management and nurturing of research. The Research Office assists researchers in submitting grant applications to statutory research-funding agencies such as the National Research Foundation, as well as to major international research and philanthropic agencies. The allocation of the University Research Fund for research purposes and for the purchase of equipment is managed by the Research Office. The research productivity of the University is also collated annually for submission to the national Department of Education. The Research Office encourages international research collaborations, prepares memoranda of agreement to enable these collaborations, and develops the contracts and agreements to ensure research obligations are adequately met and intellectual property is effectively managed.

Development of Research Policies

In the second half of 2004, 13 Working Groups were appointed by the Vice-Chancellor, Professor Makgoba, and the then DV-C (Research), Professor Salim Abdool Karim.

Each Working Group had to consider an aspect of research policy, guided by a set of relevant questions. The Working Group (WG) members were all active researchers, whose experience and background covered a wide range. Each WG Chair produced a written report, and towards the end of the year these reports were presented at a Workshop that included the WG Chairs and an additional member of each WG, as well as the members of the interim University Research Committee. The thirteen reports were subsequently edited and combined into a set of seven draft policy documents as follows:

| Research Policy I: | Framework |
| Research Policy II: | Developing, Retaining and Rewarding Researchers |
| Research Policy III: | Collaborative Research and Strategic Research Initiatives |
| Research Policy IV: | Institutes, Centres and Units |
| Research Policy V: | Postgraduate Research |
| Research Policy VI: | Research Ethics |
| Research Policy VII: | Contracts and Intellectual Property |

These draft policy documents were scrutinized by the Research Office, and after amendment, put before the Executive for in-principle consideration. Due to the importance of postgraduates to the University, the document on Postgraduate Research has been referred to a task team for expansion, and in particular to consider the possible setting up of a Postgraduate Office. Professor Bawa, the new DV-C for Research, Knowledge Production and Partnerships, will take the next step in the process of consulting with the University research community before taking the policies to Senate and Council for approval as University policies.
The University of KwaZulu-Natal Press

Formerly the University of Natal Press, the UKZN Press is by far the largest university press in South Africa. It has a national and international reputation for publishing books relevant to South Africa and the African continent as a whole, and recent titles have extended the boundaries of accessible knowledge in South African history, literary studies, economics, sociology, politics and the natural sciences. About a third of the books published by the Press are authored by UKZN academics.

The academic publishing business is a demanding environment that requires products to be edited and designed to exacting international standards. The UKZN Press has responded to this challenge with a list of impressive books over the past few years. This commitment to quality in the selection of titles, rigorous editorial standards and good design has paid off in the establishment of a list that is more than sustainable in economic terms.

With the human resources to publish about 25 books a year, the Press has to be selective, but this limitation of output has allowed the Press to concentrate on the quest for excellence in academic publishing.

Recent titles include:

**Sociology**
- Transition from Below by Karl von Holdt (2003)
- Transforming Robocops by Monique Marks (2005)

**Literary Criticism**

**History**
- Writing in Crisis by Stefan Helgesson (2004)
- The Maphumulo Uprising by Jeff Guy (2005)
- Restless Identities by Paul La Hausse (2000)

**Sociology and Economics**
- Elite Transition by Patrick Bond (2005)
- Season of Hope: Economic Reform under Mandela and Mbeki by Alan Hirsch (2005)
- Beyond the Apartheid Workplace edited by Edward Webster and Karl von Holdt (2005)

**Natural Sciences**
- Caring for Natural Rangelands by Ken Coetzee (2005)
The Doris Duke Medical Research Institute

The Doris Duke Medical Research Institute (DDMRI) at the Nelson R. Mandela School of Medicine opened on 29 July 2003. It is the site of crucial HIV/AIDS research, and significant breakthroughs have already been made. Particularly notable is the painstaking collaborative work with our international partners that has led to the identification of immune-system genes that appear to play a key role in the body’s defence against HIV.

The R40 million Institute was funded primarily by the Doris Duke Charitable Foundation, with additional grants by Pfizer (SA), the 13th World AIDS Conference Trust, the governments of Flanders and Japan, Investec Securities, the Victor Daitz Foundation and the Stella and Paul Lowenstein Trust. The University of KwaZulu-Natal provided seed funding of R6.5 million.

DDMRI is equipped with ten state-of-the-art specialist laboratories. The level P3 laboratory, designed to international specifications, is the only one of its kind in the southern hemisphere. The HIV/AIDS Information Gateway, a cutting-edge information system, supplies up-to-the-minute information on new findings and technology that can be accessed 24 hours a day by medical personnel and researchers worldwide.

In addition to its HIV/AIDS research, DDMRI provides much-needed scientific capacity to confront the other debilitating diseases that affect sub-Saharan Africa’s most vulnerable people: tuberculosis, malaria and malnutrition. Specialist study is under way into the prevention, management and control of opportunistic diseases such as pneumonia, diarrhoea and brain and blood infections that accompany HIV/AIDS. DDMRI also plays host to studies into uniquely African environmental conditions that impact upon epidemiology.

The level of international collaboration and quality of research programmes that DDMRI attracts is already having profound consequences for global science. DDMRI is a distinctively African research institute that demonstrates the University’s commitment to being the premier university of African scholarship.

The quality of research programmes that DDMRI attracts is already having profound consequences for global science.
Research Barometer

The University of KwaZulu-Natal’s available resources for research are used primarily to create an enabling, supportive research environment in which researchers can compete nationally, and internationally, for research grants and contracts.

A second thrust is developing younger researchers to take their place within the new generation of research leaders, and promoting national and international collaboration and partnerships.

A summary of funding secured for research in 2004 is presented in Figure 1. It demonstrates that the external component was five times the University’s internal budget. Details of the statutory funding, which is almost equal to the internal budget, is shown in Figure 2, with the NRF by far the major funder. The distribution for the various NRF programmes is shown in Figure 3.

Recent successes

In 2002 a strategic decision was taken to base internal research funding to staff members on an incentive-driven productivity payout system. This has been successful.

The system not only credits publications such as journal articles, books and chapters in books but also recognises the role of staff members in graduating masters and doctoral students. It also accommodates creative contributions for disciplines in which research output in the form of publications is not the norm. The system was designed in response to the new funding formula, in which the bulk of research funding by a higher education institution is generated through South African Post Secondary Education (SAPSE) publications and graduating Masters and doctoral students.

The attractive payouts to staff have resulted in greater productivity and have encouraged staff to be more responsible in reporting outputs arising from their research activities. Consequently, in 2003 UKZN produced the second largest number of SAPSE units. The positive trend in overall research output for the University is shown in Figure 4 (overleaf) where, for purposes of comparison, we show the performance of the five leading universities in South Africa.

UKZN’s focused programme to develop the next generation of research leaders has also been successful. In partnership with the National Research Foundation (NRF), it has 70 staff members as grant-holders on the Thuthuka Programme, which is specifically designed to develop research capacity among South African
citizens. Of all the higher education institutions in South Africa in 2005, UKZN had the largest number of grant-holders (Figure 5).

In parallel, the Research Office supports an additional 65 staff members towards doctoral studies, or establishing post-doctoral research niche areas, through internal Competitive Grant funding.

**Challenges**

- To develop a new and comprehensive set of research policies aimed at creating an enabling, supportive environment to advance and expand the conduct of research, with an emphasis on major global and local scientific advances as well as on the quantity of research outputs.
- To provide the necessary resources and infrastructure for the Ethics Committee and its three sub-committees to function efficiently.
- To enhance the Research Office’s ‘customer-centred’ approach through closer links with the Colleges in facilitating School-level efforts to improve research productivity.

**New directions**

- The creation of a new Office for Contracts, Technology and Entrepreneurship to promote technology transfer and entrepreneurship.
- The creation of a new Postgraduate Office as a ‘one-stop shop’ to meet the unique needs of postgraduates and enhance the throughput of Masters and doctoral students, in response to the Department of Education’s new funding formula.

**Strategic Initiatives and Nurtured Research Areas**

The University has identified the following Strategic Research Initiatives:

- HIV/AIDS
- Water
- Socio-economic development
- African Literary Studies
- Conservation.

Research areas being nurtured as potential strategic initiatives include:

- Herbal Medicine
- Forestry
- Marine Biology
- Bioethics
- Smart Materials
- Genetics
- Jazz Music.

**FIGURE 3:**

Nearly half of the NRF funding went to focus area grants, with a third going to THRIP.

**FIGURE 4:**

The positive trend in overall research output, in comparison with other top institutions, is shown in figure 4.

**FIGURE 5:**

Of all the higher education institutions in South Africa, UKZN has the largest number of NRF Thuthuka grantholder.
HIV/AIDS

As the pre-eminent academic institution at the epicentre of the HIV/AIDS epidemic in South Africa, UKZN has taken up the challenge of providing leadership and undertaking research to enhance and strengthen the broader societal response. This leadership role in research, and a groundbreaking comprehensive AIDS programme for students and staff, serve as the cornerstones of the University’s AIDS Plan.

Partnerships include networking and collaborating with AIDS researchers at other South African academic institutions. In developing partnerships at a global level, the University strives to nurture international institutional partnerships, such as the long-standing relationship with Nottingham and Harvard universities. The University’s AIDS Strategic Research Initiative includes several well-established HIV research groups and projects:

- **HIVAN (HIV/AIDS Networking Centre)**
  Led by Professors Jerry Coovadia and Eleanor Preston Whyte, it facilitates networking in HIV/AIDS-related biomedical and social science research.

- **CAPRISA (Centre for the AIDS Programme of Research in South Africa)**
  A multi-institutional team led by Professor Salim Abdool Karim, it undertakes research on HIV epidemiology, pathogenesis, prevention and treatment. It has a large Fellowship training programme. CAPRISA is funded by the US National Institutes of Health.

- **HEARD (HIV Economics and Research Division)**
  Led by Professor Alan Whiteside, its several international and local projects investigate the socio-economic impact of AIDS.

- **HAVEG (HIV/AIDS Vaccine Ethics Group)**
  Led by Professor Graham Lindegger, it conducts research and training on the ethical aspects of HIV vaccine trials.

- **The HPP (HIV Pathogenesis Program)**
  Led by Professors Bruce Walker, Philip Goulder, Photini Kiepiela and Jerry Coovadia, it conducts research into HIV immunology and pathogenesis, predominantly in children.

- **Infant feeding and HIV**
  One of the world’s leading groups on research into infant feeding and HIV, in particular the role of exclusive breastfeeding, is based at the Doris Duke Medical Research Institute (DDMRI), Africa Centre, and the Medical School (Paediatrics & Child Health).

- **The AACTG (Adult AIDS Clinical Trial Group)**
  Led by Professor Umesh Laloo, it is part of the NIH-funded network of units conducting trials of therapeutics for HIV infection and its complications in adults.

  Led by Professor Quarraisha Abdool Karim, it builds scientific capacity in HIV/AIDS and tuberculosis research in several countries in Southern Africa.

- **The Africa Centre**
  Based in Hlabisa and the Doris Duke Medical Research Institute, it conducts research on breastfeeding and ARV drug resistance.
The University of KwaZulu-Natal is an internationally acknowledged leader in multidisciplinary and multi-sectoral water research. Water-related research is undertaken in several faculties and University-based projects and research programmes.

The Centre for Environment, Agriculture and Development (CEAD) studies the use and conservation of African natural resources, wealth creation and sustainable agriculture.

- The Soil-Plant-Atmosphere Research Unit, Estuarine Resource Management is led by Professor Mike Savage. It specialises in micrometeorology and agrometeorology (plant-water and soil-water relations).

- The School of Biological and Conservation Sciences studies biological limnology with particular reference to man-made lakes and integrated catchment management.

- The School of Bioresources Engineering and Environmental Hydrology focuses on process studies, land-use impacts, design hydrology and integrated water resource assessment.

- The Institute of Natural Resources (iNr) is an associate Institute of the University of KwaZulu-Natal. It provides applied research into and management of water resources, decision-support tools for estuaries, freshwater management and water conservation.

- The Pollution Research Group, led by Professor Chris Buckley, develops cleaner water production using process engineering tools, with expertise in membrane technology, waste minimisation, effluent management and processing.

In addition to these larger groupings on water research there are several other initiatives, notably on wetlands, community interactions and sanitation, estuary-related research, radar-rainfall relationships and flood forecasting, and water and public health.

Research grants in the field of water amount to R20-million per annum from international funders including the Ford Foundation, EU, UNESCO and national agencies such as Umgeni Water and the eThekwini Municipality.

### Economic Development

Economic development is a national priority and the University makes full and innovative use of its existing capacity in this regard.

- The Economic Development Research Initiative (EDRI) is led by Professor Vishnu Padayachee and aims to strengthen and enhance applied, and policy-relevant, research in the field.

  In early 2004 EDRI sponsored a course in Stata, a statistical programme for data analysis, for staff and students. The course aimed to improve researchers’ familiarity with the software necessary to access and process data.

  EDRI is currently focusing on racial, gender, urban-rural economic and livelihood inequalities in South Africa, and continues to ask what the relationship is between the growth and spatial distribution of the public and private economic sectors. This research encompasses the formal and informal economy, the nature of poverty, the characteristics of poor areas, and socio-economic empowerment.
Biodiversity

The University has a wide capacity across a range of disciplines from Law, Economics and Social Sciences, through to Biological Science, and a core of committed role-players.

- The Conservation Initiative was born in mid-2003 out of the Inland Invertebrate Initiative, with major stakeholders including the Environmental Law Unit, MBA in Conservation, The Centre for Environment and Development, the Centre for Environmental Management and the Amarula Elephant Research Programme.

Two focal projects have been identified for the Conservation Initiative: to develop a comprehensive Research Focus around the Greater St Lucia Wetland Park (GSWP), a world heritage site, in partnership with the GSWP Authority, Ezemvelo KZN Wildlife, and other research institutions; and to link closely with Government, parastatal organisations and NGOs with an interest in Biodiversity Conservation.

The GSWP is a flagship conservation area for South Africa, being the country’s first World Heritage Site, and the area represents most of the issues relating to conservation practice. Its establishment has resulted in changes in land-use practice and rehabilitation of land use.

The National Environmental Management Biodiversity Bill, the Coastal Zone Management Bill and the Protected Areas Bill all place new responsibilities and skills demands on government. The University is ideally placed to provide such skills, both in an advisory capacity and through teaching.

Among the leaders of the Conservation Initiative are Professor Rob Slotow, of the School of Life and Environmental Sciences, and Professor Michael Kidd, of the Institute of Environmental Law.

Ethics and Bioethics

Research ethics and ethics in the general academic field are the subject of intensive development all over the world. Problems in biomedical research, research involving animals, research in the human sciences and other academic fields is of very wide interest. A substantial part of this interest is in the field of bioethics.

A 2004 colloquium discussed the relevance of different Western bioethics approaches to the African setting. The University of KwaZulu-Natal is in a position to take a lead in this field.

- Nelson R. Mandela School of Medicine. Activities in bioethics, under the leadership of Professor Ames Dhai, aim to train a core group of Bioethics and Medical Law experts in bioethics teaching in health sciences curricula, research ethics, policy development, health care management and hospital ethics.

- The Unilever Ethics Centre. Led by Professor Martin Prozesky, it builds ethics capacity both inside and outside the university by offering courses, seminars and workshops, doing research, offering consulting services and building partnerships.

- South African Research Ethics Training Initiative (SARETI). Led by Dr D Wassenaar, this multidisciplinary training programme in health research ethics, in collaboration with the School of Public Health and Health Systems at the University of Pretoria, has health research ethics consultancies in South Africa, Nigeria, Malawi, Kenya and the EU.
**HIV/AIDS Vaccines Ethics Group (HAVEG).**
Led by Professor G Lindegger, its ethics research project is funded by a competitive grant from the South African AIDS Vaccines Initiative (SAAVI) of the Medical Research Council (MRC).

**UNAIDS African AIDS Vaccine Programme:**
Ethics Law and Human Rights Working Group (AAVP ELH). Led by Dr D Wassenaar, this project aims to build capacity in African countries to critically review the complex ethical issues associated with HIV/AIDS vaccine trials.

**Forestry**

Forestry is an important part of the South African economy, and KwaZulu-Natal is central to its various aspects such as wealth of forest-dependent rural communities, natural resources, conservation and tourism, processing, value adding and export of timber and forest products.

While working together with its partners and stakeholders, government agencies, the private sector, non-governmental organisations and other institutions, the Institute for Commercial Forestry Research on the Pietermaritzburg Campus will become a focal point for:

- building capacity in forestry through education and training;
- addressing issues relevant to forestry through research and supporting policy formation;
- disseminating information on forestry through publications, technology transfer and outreach activities.

While the University has a base of expertise, the vision of the new Centre for Forestry Research cannot be achieved without developing strategic partnerships that will provide a critical mass of skilled researchers of international calibre. Four groups with interests in forestry are located on the University campuses:

- **The Forestry and Forest Products Research Centre** is a joint venture between the CSIR and the University of KwaZulu-Natal. It provides services in wood quality, solid wood processes, pulp and paper technology and IT solutions.

- **The Institute of Commercial Forestry Research**
  Two regional centres are located in Sabie and Kwambonambi. Its focus is innovation in plantation silviculture of eucalypts, pines and acacias, hardwood nutrition, sustainability, tree improvement and growth and yield modelling.

- **The Institute of Natural Resources.** An Associate Institute of the University of KwaZulu-Natal, it promotes the wise and sustainable use of natural resources through the integration of conservation and development.

- **The Land Use Hydrology Group** focuses on the hydrological effects of land-use change.
African Literary Studies

The University is recognised as a national and international leader in African literary studies and its resources are world-renowned.

Several of its scholars are acknowledged for their groundbreaking publications and conference participation in a field that incorporates comparative literature, translation and intercultural communication and postcolonial studies into its overall scope of southern African literary culture.

- **The Centre for African Literary Studies** is a world resource that facilitates African literary scholarship while contributing to research potential. It proposes, particularly, to advance the study of African literature at the University of KwaZulu-Natal.

- **The Berth Lindfors African Library** is a major resource housed at the Centre for African Literary Studies (CALS) on the Pietermaritzburg campus. Bibliographer Hans Zell, who was asked to describe and value the Lindfors set, called it “a rare and quite unique collection, unparalleled in the world”. Also on the Pietermaritzburg campus is another venue of scholarly value, the Alan Paton Centre. In Durban, scholars benefit from the resources – particularly of oral literature – in the Campbell Collections of the Killie Campbell Africana Library.

Besides wide dissemination in international journals, research at UKZN in the field is consolidated in several large NRF projects. The journal, Current Writing, enjoys an international reputation in its encouragement of new challenges to debates in African literary studies.

Marine Biology

The merger of the two universities unifies a critical mass of productive research staff undertaking research in Marine Biology.

Marine Biology has been identified as a key area of excellence within the School of Biological and Conservation Sciences, and has been prioritised as a growth area. The School of Biological and Conservation Sciences is creating a Programme in Marine Biology at the Undergraduate Level to complement existing programmes at Honours and Masters Level.

The University’s location facilitates the development of a unique marine biology programme that will service requirements from neighbouring Indian Ocean Rim countries. Its links with the South African Association for Marine Biological Research (SAAMBR) and other institutes conducting marine research within the province, have led to the development of a number of research programmes. A collaborative partnership with the Oceanographic Research Institute (ORI), it has the status of a research institute of the University. Stronger links are being negotiated, including the stationing of postgraduate students in Marine Biology at ORI.

Areas of research include:

- **The Estuarine Research Programme**. Currently one of the most prominent research areas within the UKZN marine science community, estuaries are arguably the most threatened of all South African marine ecosystems. A large research programme is under way at the St Greater St Lucia World Heritage Site, which will increase the profile of marine biology research at the University.
The Sea Predator Research Group focuses primarily on applied research investigating human impacts on sharks and cetaceans. A recent study investigated the ecological processes driving the annual migration of sardines along the east coast of South Africa, popularly known as the ‘sardine run’. Multi-disciplinary research is conducted through national and international collaboration.

Ecophysiology of plants. The overall purpose of this research is to understand how plants adapt to stress in inter-tidal and marine environments. Efforts have focused on the ecophysiology of mangroves and salt marshes along the eastern seaboard.

Herbal Medicines

The launch of the African Health Care System recognised the role indigenous healers play in the provision of health care in South Africa.

A Memorandum of Understanding between the University of KwaZulu-Natal’s Nelson R. Mandela School of Medicine and the indigenous healers of KwaZulu-Natal was formalised at a workshop held in Durban. The partnership is incorporated in the KwaZulu-Natal Progressive Primary Health Care (KZNPHC) Project. Structures are to be established and traditional healers will be trained in counselling and testing of patients. Traditional healers’ herbs will undergo thorough examination before they can be billed safe for administration. Some traditional healers will be able to administer HIV/AIDS anti-retrovirals as part of their healing and patient care.

In the School of Chemistry on the Pietermaritzburg Campus, a research group has been involved in the chemistry of traditional herbal medicines for more than 15 years. Recent emphasis has been on the chemistry and pharmacology of indigenous plants used for reproduction.

In the Department of Dermatology, at the Nelson R. Mandela School of Medicine, studies led by Dr Ncoza Dlova are carried out on the chemical analysis of indigenous plants used for skin rejuvenation by Black South African women. New methods to protect skin from photodamage are necessary if we are to conquer skin cancer and photo-aging.

The study was aimed at characterisation and elemental analysis of local plants used for rejuvenation and sun protection. A prospective study was conducted between 2003 - 2004.

Smart Materials

Led by Professor Victor Verijenko, the Centre for Composite and Smart Materials and Structures is concerned with developing new technologies based on ‘smart’ materials, which are materials that have multiple responses to a single input.

Material discovered by the group is currently used in a number of different applications. These include smart bolts and fasteners, smart rock anchors for mining applications, passive load cells, and smart composite materials. All the applications have been developed to the point of commercial prototypes. The group has recently obtained one patent and is preparing several more patent applications. The research has been funded through a prestigious Innovation Fund Grant, and the next step will be the commercialisation of the developed technology.

While working on this project, young researchers are exposed to cutting-edge technology and are given an opportunity to study towards and complete their masters and doctoral studies.
Genetics

The University of KwaZulu-Natal possesses a wide range of expertise in human genetics, microbial genetics, animal genetics and breeding, plant genetics and breeding, cytogenetics, population genetics, quantitative genetics, plant and animal biotechnology and genomics.

Research interests in the School of Biochemistry, Genetics and Microbiology, led by Professor E Kormuth, are focused on the following:

- **Modelling and Breeding Strategies.** Computer simulations are developed and can be used by breeders and researchers to aid in the prediction of the outcome and success of any proposed breeding strategy.

- **Conservation Genetics.** Research is focused on investigations into the phenotypic and genetic diversity of indigenous populations of crane species, Cape parrots and bird diversity; analysis of indigenous sheep and the Damara, forestry generics, and plant mutagenesis.

- **Microbial Genetics.** Research is focused on resistance to antimicrobial substances within the genera of Streptococci, Staphylococci and Enterococci.

- **Science Education Research Group (S.E.R.G.).** Novel teaching strategies are developed using scientific guidelines to facilitate meaningful learning of complex genetic phenomena. Innovative computer simulations are developed to enable students to learn in a constructive manner.

- **Human Genetics and Immunogenetics.** The aim of this study is to investigate genetic regulation of humoral and cellular immune response by identification of human susceptibility genes to TB and the role of MHC(HLA system).

- The amalgamation of the departments into the School of Biochemistry, Genetics, Microbiology and Plant Pathology brought together people interested in various aspects of Mycobacterium tuberculosis research.

Other research projects within the School are linked to molecular genetics and immunology. The Discipline of Biochemistry focuses on *malaria vaccine development* kinases and regulation of the Malaria cell-cycle and Trypanosomosis targeting proteases as pathogenic factors. The goal is to design new drugs and a vaccine to combat or prevent the disease.

Jazz

Jazz music epitomises black cultural achievement in the modern world globally and it has a long history in South Africa. The Music Department became the first in Africa to introduce a degree in Jazz Studies in 1983 and soon became the academic home for jazz talent from all over South Africa.

- **The Centre for Jazz and Popular Music (CJPM).** Headed by Professor Darius Brubeck, it was created in 1989 as a centre within the School of Music. An internationally acclaimed facility for jazz teaching and public concerts and an organisational base for music activity reaching far beyond the University, it has been commissioned to organise South African representation at many international events. In 2004, staff, former students and students performed in Denmark, England, France, the Netherlands and the United States. The centre has organised bi-annual conferences of the South African Association for Jazz Education since 1992.
RESEARCH HIGHLIGHTS

Rooted in Africa
- Championing African traditional agriculture
- Developing natural insecticides
- Ensuring healthy livestock
- Recognising the value of herbal medicine

Science and Nature
- Campaigning for scientific unity
- Investigating climate change in Africa
- Understanding the link between age and immunity
- Promoting good, clean business sense
- Uncovering the secrets of chemical compounds

Scientific Responses to HIV/AIDS
- Searching for the AIDS vaccine
- Attacking the pandemic on multiple fronts
- Understanding the relationship between breastfeeding and HIV transmission

The Changing Family
- Investigating the use of condoms among married couples
- Examining fatherhood in South Africa
- Learning from migrant workers

Globalising South African Experiences
- Setting global standards for social work education
- Globalising democracy education
- Understanding the psychology of racism

Into the Future
- Preparing for a wireless future
- Examining an expanding universe
Rooted in Africa

Speaking at his inauguration as Vice-Chancellor of the University of KwaZulu-Natal, Professor Malegapuru Makgoba said: “The African University draws its inspiration from its environment, as an indigenous tree growing from a seed that is planted and nurtured in African soil.” UKZN scholars like Professors Albert Modi, Mark Laing, Ignatius Nsahlai and John Ojewole are giving life to this metaphor. Their work on the importance of African plants, traditional medical knowledge, methods of agriculture and animal husbandry are both a significant contribution to the global store of knowledge and a contribution to the upgrading of the total human resources of the nation.

Championing traditional African agriculture

Dr Albert Modi is driven by a determination “to give something back to the community”. His aim, as a crop and seed scientist, is to qualify and quantify agricultural indigenous knowledge to improve production for small-scale farmers.

He is concerned with both the value of scientific investigation into seeds and the invaluable contribution seeds could make to the South African economy and food security challenges of Africa. His research is performed under standard field conditions and within controlled environments at the University, the only institute in the country that focuses on seed science from an agricultural point of view.

Dr Modi’s investigations in 2004 examined traditional methods of cultivating and storing madumbis, a traditional KwaZulu-Natal crop also known as taro, amadumbe (madumbi), cocoyam, dasheen, or ‘mammy’. This tubular root or corn, from the Colocasia esculenta plant, was the subject of two papers he published nationally. These showed the value of indigenous methods in agriculture and were to be presented at the African Crop Science Congress in Uganda, early in December 2005. In addition, an MSc study on agronomic aspects of madumbi production was completed under his supervision in 2004, and another on germplasm characterisation is in progress.

Much of Dr Modi’s research takes place in situ among members of sometimes far-flung, always rural, communities. It is among African traditions and cultures that he has discovered a wealth of indigenous knowledge that can be used to benefit both impoverished communities and society more broadly.

He initiated a far-reaching empowerment scheme to support and develop organic food production through a collaboration with the Ezemvelo Farmers’ Organisation and the now defunct Assegai Organics. This resulted in a cooperative of some 200 farmers who now supply major retailers, such as Woolworths, with organically grown madumbis. The cooperative also produces sweet potatoes, baby potatoes and green beans.

Much of the present-day appeal of the madumbi for commercial markets lies in its method of cultivation. Traditional African farming methods are in line with the principles of modern organic farming that preclude the use of synthetic fertilisers and pesticides. Organic foodstuffs are highly sought-after, especially by high-income consumers throughout the world, not least in South Africa.

“In the rural setting, traditional growing methods result in higher nutritional values and increased

Albert Modi is a senior lecturer in the School of Agricultural Sciences and Agribusiness on the Pietermaritzburg campus,  ModiAT@ukzn.ac.za
Exploiting indigenous knowledge to bring madumbis to the tables of wealthy city-dwellers has resulted in direct economic benefits for individual community members – and an increased status for indigenous African foods.

- resistance to drought,” says Dr Modi. “In addition, traditional crops are relatively simple to grow. Exploiting indigenous knowledge to bring madumbis to the tables of wealthy city-dwellers has resulted in direct economic benefits for individual community members – and an increased status for indigenous African foods.”

Dr Modi is committed to both making a contribution to the global store of knowledge and serving community development needs.

Developing natural insecticides

Insects pose a most significant biological threat to world agriculture. Importing chemical insecticides places significant pressure on the economy and is often out of reach of small and subsistence farmers.

Most insecticides are toxic agrochemicals and, on top of this, insecticide resistance problems are increasing. “Africa, with its vast, untapped resource of indigenous insect-pathogenic microbes, holds the key,” says Professor Mark Laing. His investigations have led to the establishment of one of the world’s largest insect biocontrol groups, to ensure full advantage is taken of these African resources.

Professor Laing’s areas of special research interest and expertise include both biological control agents and the use of silicon in agriculture. He is the Director of the African Centre for Crop Improvement (ACCI), which has as its vision: ‘Africans solving Africa’s food problems in Africa’. The Rockefeller-funded ACCI is, over a period of five years, training 39 African PhD students who will return to their countries of origin equipped with plant breeding knowledge to tackle food security challenges.

Aimed at developing commercial bioinsecticides based on indigenous entomopathogenic microbes such as fungi, viruses, bacteria and nematodes, Bioinsecticides Project 41404 combines the disciplines of entomology, plant pathology, industrial microbiology and fungal taxonomy. The partners are the Agricultural Research Council’s (ARC) Small Grain Institute (SGI) and Plant Protection Research Institute (PPRI), together with the University of KwaZulu-Natal and a company, Plant Health Products (Pty) Ltd. The project is supported by seven field collaborators, mainly entomologists, who represent five ARC institutes and two private sector institutions, Rooibos Limited and the South African Sugar Research Institute (SASRI).

A centralised quarantine facility has been established to isolate, screen and test indigenous microbial control...
agents for insect control locally and abroad. The unit conforms to guidelines proposed by the United States Department of Agriculture’s Animal and Plant Health Inspection Service. It is the only one of its kind in South Africa dedicated to handling both insects and insect pathogenic entities. The facility has been certified by the South African Department of Agriculture.

Patentable techniques for the commercial mass production of suitable organisms and patentable formulations that address adverse environmental conditions, agrochemical compatibility and prolonging shelf life are being developed through this project.

“The development of local biopesticides will contribute to long-term sustainability and food security, through providing affordable and environmentally sound pest control options for both commercial and small-scale farmers,” says Professor Laing. “Job creation will occur through the commercial expansion required for developing new products. Indirectly, jobs will be created through an expanding agricultural sector, increasingly supported by the availability of bioinsecticides.”

Professor Laing explains that bioinsecticide development will also increase the country’s export potential of, in addition to fruit and vegetables, novel products such as rooibos tea and Aloe spp. (used in health products). Currently this export opportunity is not fully maximised as a result of strict insecticide residue limits imposed by the European Community.

Professor Laing believes that, given the demand for safe foodstuffs, international opposition to the use of chemical pesticides and both a national and international paucity of bioinsecticides (other than Bt), the potential utilisation of results stemming from the project are substantial. “With the newly developed capacity to produce fungal and bacterial biocontrol agents, the potential to develop and successfully market these commercial products – locally, nationally and especially in the rest of Africa – are substantial,” he says.

Another key area that Professor Laing is investigating is a combination of silicon and biological control. While the element silicon (Si) is considered a plant nutrient ‘anomaly’ by many plant scientists, Professor Laing says Si is absorbed as silicic acid from soil at levels several times higher than those of other essential micronutrients. Silicon applications to silicon-deficient soils have been shown to enhance soil fertility, permanently remove aluminium toxicity, improve soil physical properties, increase photosynthesis, improve resistance to lodging, diseases and pests, regulate transpiration and nitrogen uptake, increase tolerance to toxic elements and to drought, and reduce frost damage. The role of Si in agriculture is becoming increasingly important, particularly with regards to sustainable production, he says. “Without soluble silicate, plant tolerance to drought, disease and insects is severely reduced, with crucial implications – particularly in Africa, where roughly 70% of the soils are silicon-deficient.”

In recent years Professor Laing has attracted some R54 million in funding from the NRF’s Innovation, THRIP and Main funds, industry partners and the Rockefeller Foundation, for, broadly, biological control, wastewater research and the ACCI project.
Ensuring healthy livestock

Professor Ignatius Nsahlai is investigating strategies to improve the use of roughage-based diets among ruminants to find optimum methods and feeds to ensure healthy goats, sheep and cattle, particularly among subsistence and smallholder farmers.

A Cameroonian by birth, he holds a BSc and Maîtres degree from the University of Yaounde (Cameroon) and a Postgraduate Diploma and PhD from the University of Reading (UK). Currently, he serves as part of an international team responsible for facilitating and mentoring the Sub-Saharan Africa Challenge Programme of FARA (Forum for Agricultural Research in Africa).

Professor Nsahlai's research interests include supplementation with non-conventional feeds (browse and herbaceous legumes) for ruminants traditionally fed low-quality crop residues. His focus is on maximising and modelling the availability of nutrients in feedstuffs to ruminant livestock, and in determining energy and protein requirements.

At present, his core inquiry is into identifying microbial ecosystems that are capable of digesting fibre more efficiently. His research field exemplifies cross-discipline inquiry and has validity for biochemists, geneticists and grassland scientists, as well as other animal and poultry science specialists.

"It is crucial for food security in Africa that vibrant and sustainable ruminant husbandry and agricultural practices are fostered," says Professor Nsahlai.

His research in 2004 centred on predicting metabolizable energy and protein requirements for maintenance and production of pre-weaning, lactating, growing and mature goats. He also examined voluntary feed intakes by lactating, growing and mature goats.

An area of particular concern for Professor Nsahlai is ensilage as a means of reducing the concentration of cyanogenic glycosides in the pods of Acacia sieberiana, and the effect of additives on silage quality. Cyanogenic glycosides are anti-nutritional components capable of releasing hydrogen cyanide, a respiratory poison that has been reported to be responsible for the death of livestock. "Our objective was to improve the nutritive value of the pods of Acacia sieberiana by reducing their contents of cyanogenic glycosides and to examine the influence of various levels of added molasses and urea on the aerobic stability of the silage," he explains.

Professor Nsahlai’s research found that ensiling ground pods for 45 days was enough to reduce the cyanide content to non-toxic levels – and produced silage which was aerobically stable. Including additives was found to further improve the quality of the silages.

Professor Nsahlai is deeply involved in agricultural land use planning and development in the Ncalu, Kingsley and Ekuphumuleni communities in KwaZulu-Natal.

He has honed his skills in developing community-based agribusiness and in the identification of opportunities for improving dairy production.

"The 'second economy', made up of people in the informal sector, the unemployed and the poor, deserve our very best efforts," says Professor Nsahlai.

Ignatius Nsahlai is Programme Director: Animal and Poultry Science in the School of Agriculture and Agribusiness on the Pietermaritzburg campus. nsahlai@ukzn.ac.za
Recognising the value of herbal medicine

Plants have been used for medicinal purposes from ancient times. Today, plant products are employed as therapeutic remedies in a variety of healthcare settings worldwide. In developing countries, most people rely on traditional health practitioners and medicinal plants for their daily healthcare needs.

Throughout the world, plant products are gaining popularity as ‘alternative and complementary therapies’. However, scientifically sound clinical or laboratory experimental data are lacking for many of the plant materials, their extracts and bioactive constituents. Globally, increasing interest has prompted greater scientific study on the properties and uses of medicinal plant materials, and raised concerns about their quality, safety and efficacy.

The floral biodiversity of South Africa provides traditional health practitioners with an impressive pool of natural pharmacy. Plants are used to prepare herbal medicines (phytomedicines) for a plethora of human ailments. Many African medicinal plants have been credited with curative and therapeutic attributes. However, only a few such claims have been authenticated.

Professor John Ojewole has examined some commonly used South African medicinal plants for their chemical constituents and pharmacological activities to establish a scientific basis for their folkloric, ethnomedical uses. He has produced research-based evidence that validates some pharmacological and ethnomedical claims relating to the healing powers of the African potato, marula and other local medicinal plants.

Hypoxis hemerocallidea (previously known as Hypoxis rooperi) is widely used in southern African traditional medicine as a remedy for an array of human ailments. The tuberous rootstock of the plant, (the corm), which is popularly known as the ‘African potato’, has been used for centuries as a muthi (isiZulu word for medicine). The humble African Potato has been promoted as a ‘miracle’ and ‘wonder’ plant medicine for various modern diseases. Studies by Professor Ojewole and members of his research team have shown that Hypoxis hemerocallidea corm possesses analgesic, anti-inflammatory, hypoglycaemic and other pharmacological properties, and that its antidiabetic potential may be useful in the management of adult-onset, non-insulin-dependent, type-2 diabetes mellitus.

Professor Ojewole’s recent study was prompted by claims by some traditional health practitioners in KwaZulu-Natal that decoctions and infusions of African Potato were remedies for managing, or controlling, hypertension and some cardiac disorders. He and his colleagues set out to investigate the cardiac and antihypertensive (hypotensive) effects of Hypoxis hemerocallidea corm aqueous extract (APE) in laboratory, experimental animal paradigms. He found that African Potato aqueous extract causes bradycardia and transient hypotension in mammalian experimental models, suggesting that the herb might be used as a natural supplementary remedy in some cases of cardiac dysfunctions and in essential hypertension. “This finding lends pharmacological support to the anecdotal uses of African Potato in the management and/or control of certain cardiac dysfunctions and essential hypertension in some rural communities of southern Africa,” said Professor Ojewole.

“Our investigations have established that there are pharmacological justifications for the inclusion of certain local herbs and plant parts in some African traditional medicinal recipes, and have emphasised specifically that there is an urgent need to isolate, identify and characterise the pharmacologically-active compounds from the numerous African medicinal plants that have shown positive antiparasitic and other therapeutically useful properties.”

John Akanni Oluwole Ojewole is a Senior Professor of Pharmacology and Discipline Chair/Head of Pharmacology Discipline in the School of Pharmacy & Pharmacology on the Westville campus. ojewolej@ukzn.ac.za
Science and Nature

How do the discoveries of scientists impact on ecological and social environments, and who do they serve? According to Professor Makgoba, global issues like climate change and environmental destruction “prompt radical introspection from all of us about the course humanity is charting”. Philosopher David Spurrett argues that there is a need for a greater sense of purpose and intellectual unity among the academic community. Environmental scientists Roseanne Diab and Chris Buckley demonstrate the important role of academic research in combating the impacts of human behaviour, while laboratory researchers Alain Assounga and Deresh Ramjugernath demonstrate that behind every scientific intervention lies painstaking empirical research.

Campaigning for scientific unity

David Spurrett is a philosopher who prefers controversy to complacency, just as he prefers science to common sense. Many of his pronouncements – such as his attacks on common sense – are calculated to challenge conventional thinking. He insists that scientists should commit unreservedly to “the project of explaining the world”.

The ‘common sense realism’ with which we approach most of our daily tasks is too parochial and unstable to form the basis for academic study, argues Professor Spurrett, and yet it is still very pervasive in the academic world. One of the reasons for this is that the structure of our universities continues to perpetuate the centuries-old division between the natural sciences on the one side, and the social sciences and humanities on the other. More than just an academic division of labour, this dualism has served to entrench the notion that the natural sciences alone are qualified to deal empirically with cause and effect, while the humanities are relegated to the study of ‘meaning’ and ‘interpretation’.

Professor Spurrett argues that not only is the traditional distinction between the natural sciences (concerned with causality) and the human sciences (concerned with meaning) no longer relevant or useful – it is no longer even credible. Academic study in the 21st century requires its practitioners to come to terms with sophisticated explanations and analytic tools that draw freely from a range of disciplines.

An example of this is evolutionary game theory (EGT), “a theoretical apparatus that unifies the domains of microeconomics, parts of political science, of psychology and major parts of biology”. EGT is concerned with strategic behaviour, and its models have been applied to such subjects as the economic behaviour of individuals, the activities of viruses and the study of depression. As Professor Spurrett argued in a 2004 conference presentation to the Academy of Science of South Africa, “the range of these applications quite simply wreaks havoc upon any attempt to draw a clean line between the natural and social sciences”.

“Whatever branch of academic enquiry we are involved in,” says Dr Spurrett, “our endeavours should be complementary. We all inhabit the same world and it is our job to find out how it works. As academics we should be answerable, if not to common methodologies, at least to a common vision. This, perhaps, is where philosophers have a distinctive contribution to make – we are the ones whose calling it is to speculate and worry about these things.”

Judging from the international interest generated by his work, much of it done in collaboration with Alabama
Professor Roseanne Diab’s 85 refereed journal papers, with another ten either submitted or in preparation, have firmly identified her as a national specialist in atmospheric pollution and tropospheric ozone climatology. Her teaching and research interests in the Atmospheric Sciences are critical to the international debate on climate change and, in particular, the vulnerability of the people of Africa to such change.

Africa’s diverse mixture of sources of ozone precursor gases – biomass burning, lightning, biogenic emissions, biofuel use and urban-industrial emissions – make it a unique continent for the study of tropospheric ozone, one of the major contributing greenhouse gases. Coupled with a large land-mass in the tropics that favours photochemical reactions because of the strong solar radiation inputs and high atmospheric humidity, Africa may be described as a unique natural laboratory. Professor Diab’s research takes full advantage of this phenomenon in a region being explored as a giant natural photochemical reactor, with some of the highest springtime tropospheric ozone values across the globe.

Her current area of concern is understanding the variability of tropospheric ozone, which is making practical contributions to the local and international climate change debate. She hosted a successful international workshop on Tropospheric Ozone over Africa in January, 2004 and Professor Diab’s research has resulted in a request for South Africa to host the next Commission on Atmospheric Chemistry and Global Change (CACGP) conference in 2006.

Her recent work, together with graduate students, on the classification of tropospheric ozone profiles is poised to make a significant contribution to improved understanding of dynamical and photochemical influences on tropospheric ozone. It provides a unique way of summarising the variability inherent in the vertical distribution of ozone and has been widely acclaimed.

Research into ozone, which began as part of a collaborative project involving close liaison with the SA Weather Services, shifted focus when Professor Diab assumed leadership. The emphasis moved from stratospheric ozone and Antarctica, to tropospheric ozone, first over South Africa and then over Africa and the southern hemisphere, as issues related to long-range transport of pollutants began emerging. The concurrent emergence of new satellite platforms and availability of global data sets supported the shift to a global focus and helped establish international collaborations.

Professor Diab’s prime concern is with understanding the relative contributions of a range of sources and the role of dynamic factors, such as the large-scale anticyclonic circulation in the buildup of tropospheric ozone over the continent. Through long-range transport, the impacts of polluted air masses are experienced considerable distances downwind from the source regions. Some of the air mass transport paths that are being investigated are those from Europe towards North Africa and those from central and southern Africa towards the east.

Professor Diab established national recognition with
Professor Diab’s findings will hopefully be translated into policy aimed at controlling the emissions of anthropogenically created pollutants into the atmosphere, thereby addressing the climate change issue and contributing towards environmental sustainability.

Her vision is to compile a tropospheric ozone budget for the continent of Africa, to distinguish the relative roles of different contributions, both photochemical and dynamic. These findings can then be translated into policy aimed at controlling the emissions of anthropogenically created pollutants into the atmosphere, addressing the climate change issue and, as such, contributing towards environmental sustainability.

Her research has demonstrated the close relationships between tropospheric ozone and synoptic weather systems, particularly cut-off lows; explored the role of stratospheric-tropospheric exchange (STE) of ozone in subtropical regions where it was previously thought STE had a very minor role to play in the ozone budget; and contributed towards an understanding of the relative roles of biomass burning, urban-industrial sources and STE in the tropospheric ozone budget over southern Africa.

Professor Diab collaborates closely with some of the world’s foremost tropospheric ozone specialists, including those at NASA-Goddard. Her ongoing collaboration with colleagues at the University of Reunion on long-range transport of ozone from the African subcontinent to the Indian Ocean has led to cooperation across a much broader front. This resulted in the donation of a Light Detection and Ranging system (LIDAR) to the University.

Roseanne Diab is a Senior Professor in the School of Environmental Sciences and Director of the Centre for Environmental Management, in the Faculty of Science and Agriculture on the Howard College campus. diab@ukzn.ac.za
Understanding the link between age and immunity

A paper by leading immunologist Professor Alain Assounga has been recognised as a major work that constitutes a basis for understanding age-related changes in immune function.

The study, co-authored with Carol M Warner, was titled *Transcription of major histocompatibility complex class 1 ( Kb) and transporter associated with antigen processing 1 and 2 genes is up-regulated with age.* It was supported by a National Institutes of Health grant. Professor Assounga was a recipient of a Fellowship award from John L. Archibald.

“Our immune system evolves throughout life. This is evidenced by the different ways in which our body responds to various diseases according to age. The major histocompatibility molecules are responsible for recognising foreign antigens/molecules and presenting them to other cells for further processing, including destruction,” explained Professor Assounga.

“We have established that MHC molecules increase on the cell surface of lymphocytes, according to age. We have now established that the increase occurs at the level of messenger RNA (molecular level), meaning that it is an increased expression of the gene, rather than a simple accumulation of proteins. This increase is also seen in the messenger RNA of proteins that transport the MHC molecules for processing.”

This finding sheds light on understanding how the body processes its immune defence mechanisms. A good understanding will help in the design of drugs to improve immune defence.

Another investigation shows deposits of Beta 2 microglobulin in skin is an important contribution to the characterisation of amyloidosis (a disorder in which insoluble protein fibres are deposited in tissues and organs, impairing their function) in chronic renal failure patients. Professor Assounga’s studies revealed that the failure of haemofiltration to prevent Beta 2 microglobulin amyloidosis helped to obtain a better understanding of Beta 2 microglobulin metabolism in chronic renal failure. This study underscored the need for more research exploring other avenues.

His investigation into adult polycystic kidney disease (ADPKD) in Congolese patients established that liver cysts in ADPKD patients follow a family pattern, and triggered further research in this field.

Among ongoing research projects is a study of adult polycystic kidney disease genes among patients in KwaZulu-Natal and Congo; a study of immunological memory during papilloma virus and HIV infection; a study of HIV nephropathy and a study of immunological memory and tolerance in kidney transplant patients.

Research contracts under way include multi-centre research on a new phosphate binder in haemodialysis patients and isolation of peripheral blood mononuclear cells in HIV patients.

Professor Assounga’s PhD dissertation on memory lymphocytes showing a high level of MHC class 1 protein on the cell surface won the 1992 Science Recognition Award from the Clinical Immunology Society of America.

“This study may explain the difference in immune response between naive and memory lymphocytes,” he said.

Lymphocytes are made up of a naive lymphocyte population (which includes lymphocytes that have not been exposed to any foreign materials) and memory lymphocytes, which have been exposed and react strongly to subsequent exposures to known antigens. Professor Assounga found that the age-related increase of HLA class I is due to an increase in the population of memory lymphocytes.

Alain Assounga is Acting Head of the Department of Medicine and occupies the Chair of Nephrology at the Nelson R. Mandela School of Medicine. assoungaa@ukzn.ac.za
Promoting good, clean business sense

Companies not only reduce their use of natural resources and their impact on the environment but also make substantial financial savings when they implement cleaner production practices.

The Cleaner Textile Production Project is a joint initiative between the Danish Government (DANIDA), the South African Department of Environmental Affairs and Tourism (DEAT), the Department of Trade and Industry and the Pollution Research Group (PRG).

The initial three-year project supported the implementation of a number of initiatives to promote the concept of cleaner production within the textile industry in South Africa. These included the use of activated carbon to remove colour and enable re-use of water, the use of reverse osmosis to provide clean water for wet processing and the use of liquor displacement devices to save water in dyeing. Other outcomes of the project were the optimisation of counter-current washing processes, the eco-labelling of textile products and the re-use of cooling water.

The companies reaped significant benefits and the results were shared with other companies to encourage implementation elsewhere in South Africa. Savings in the region of R54 million a year were identified for 28 textile companies and, of these, 16 companies had saved R20 million a year. The savings came from reduced water use (and therefore reduced effluent production), energy, chemical and raw material use, as well as other consumables.

The PRG is a member of a project steering committee for a parallel project that intends to bring the same benefits to the metal-finishing industry.

The PRG has carried out contract research for the Water Research Commission, the National Research Foundation, Eskom Technology Group, Sasol Technologies (oil and chemicals from coal), Umgeni Water, the Innovation Fund, DANCED (Danish Cooperation for Environment and Development) and National Power (UK). The PRG has been a member on two European Union environmental projects.

Professor Buckley is a key government and parastatal advisor. He is on the National Water Advisory Council and both the Privatisation and Free Basic Water task teams. He was a member of the Cleaner Production task team which prepared input for the Department of Science and Technology’s national strategy for the Manufacturing sector. He served on the Department of Water Affairs and Forestry (DWAF) project steering committee for the Water Conservation and Demand management strategy for the Industry, Mining and Power Generation sector. He co-authored the DWAF’s Receiving Water Quality Guidelines – Industrial Editions. His international cooperative research project partners include Imperial College (UK), Politecnico di Milano (Italy), Technical University (Denmark), University of Zimbabwe, INSA/LAAS-CNRS, Toulouse, Vivendi and General des Eaux.

A report he produced on Environment and Industrialization in sub-Saharan Africa for UNIDO was incorporated into the 2004 Industrial Development Report. He was also a South African representative at the European Cleaner Production Roundtable in Denmark, the Asia Pacific Cleaner Production Roundtables in Australia and the African Cleaner Production Roundtable in Nairobi and Morocco. He is a member of the scientific committees of three international, and many national, conferences and he is an active member of the International Water Association, the Water Institute of Southern Africa and the South African Institution of Chemical Engineers.

Chris Buckley is a Research Professor in the School of Chemical Engineering and head of the Pollution Research Group (PRG), on the Howard College campus. buckley@ukzn.ac.za
Uncovering the secrets of chemical compounds

Just as social scientists need to understand the behaviour of the individual in the context of the group, so chemical engineers have to be sure of the physical properties of individual substances, how they mix with others, how they contribute to the group they belong to, and how they are likely to react under certain conditions.

More often than not, existing literature does not provide the chemical engineer with experimental values for the components he or she is dealing with, and measuring each component is prohibitively expensive, time-consuming and, sometimes, impossible. It is therefore not surprising that chemical engineers are always on the lookout for new and better methods of estimating the physical and chemical properties of the components they are working with.

This kind of estimation is of great value in the design or simulation of chemical, biochemical and environmental systems – such as a chemical plant – where great numbers of components are involved. Pure components are easier to deal with, and their properties can be relatively easily derived by looking at them in groups – the so-called ‘group-contribution’ method. Until recently, determining the properties of mixtures has been a lot more difficult.

But these difficulties are now falling away, thanks to the work of Professor Deresh Ramjugernath of the School of Chemical Engineering and a team of senior student researchers led by Yash Nannoolal. They have developed an exciting new group contribution method for the estimation of the properties of difficult-to-measure non-electrolyte organic compounds. The team’s point of entry into this exacting task is the boiling point of each individual component.

“If you can determine the physical properties of a substance by looking at its underlying chemical structure, you are obviously on a winning wicket,” says Professor Ramjugernath. “Boiling points are a great place to start. From these you can extrapolate your modeling to other properties, such as vapour pressure, critical properties, viscosity and so on. When you are looking at chemical processes, especially those which have an environmental impact – such as oil refinery processes – you can apply modelling to determine the environmental fate of a substance under certain conditions.

“Once we understand the physical nature of chemical substances, we are able to ensure that concentrations remain within parameters that are environmentally safe, and we are able to store them more safely. In the event of spillage the substance will partition itself into the environment, contaminating the atmosphere, the water, the soil and even living organisms, according to known partition coefficients. Knowledge of the structure and properties of the substance will help us to know how to go about cleaning up and what to clean first.”

The fleeting equilibrium between liquid and gaseous states is a subject of endless fascination for Professor Ramjugernath. As a postgraduate student, he worked with vapour-liquid equilibrium (VLE) and liquid-liquid equilibrium systems, paying close attention to the behaviour of the liquid phase at very high temperatures and pressures. VLE data provide a window into the molecular nature of mixtures and facilitate the development of thermodynamic models. The current research into boiling points is an extension of these interests.

Combining known experimental data for some 2850 components with highly sophisticated mathematical formulations, Professor Ramjugernath’s group contribution model, utilising nothing more than the molecular structure of the compound, has proved highly successful in estimating the boiling point of nonelectrolyte organic compounds, and has proved to be far more accurate and reliable than other currently used methods. In addition, the extrapolation of the method will facilitate the prediction of other component properties.

Deresh Ramjugernath is the Director of the Thermodynamics Research Unit, School of Chemical Engineering, Howard College campus. ramjuger@ukzn.ac.za
Searching for the AIDS vaccine

There are a number of different strains of the human immunodeficiency virus (HIV), and there are also some individuals who are genetically better equipped to fight the virus and retard the progression of the disease. These realisations underlie an internationally acclaimed research project into HIV pathogenesis led locally by Dr Photini Kiepiela of the HIV Pathogenesis Programme (HPP) at the Doris Duke Medical Research Institute (DDMRI) at UKZN’s Nelson R. Mandela Medical School.

AIDS vaccine research is a specialised activity, requiring sophisticated, purpose-designed technology and highly trained research technicians and scientists. The DDMRI is one of three research centres in South Africa capable of undertaking the exacting processes involved in this crucial – and very expensive – aspect of HIV/AIDS research. Working with internationally acclaimed immunologists Professor Bruce Walker, of AIDS Partners Research Centre, Harvard Medical School, Professor Philip Goulder of Oxford University and UKZN’s Professor Hoosen Coovadia, the HPP team of researchers are undertaking a groundbreaking study into the ways in which the human body responds to HIV. The study has identified genes within the immune system that play a key role in defending the body against HIV.

According to Professor Goulder, “this study identifies a genetic battleground where the struggle between HIV and the human immune response occurs”. A prerequisite for the design of an HIV vaccine is to...
understand precisely what causes the immune system to succeed or fail against HIV. The study therefore aims to understand how the virus disables the immune system. One of the ways it does this is by rapidly mutating, so that the immune system’s ability to recognise the virus, or parts of the virus, is compromised. But there are parts of the virus that do not mutate so easily, or where mutation is likely to be more costly to it. It will be at these weak links in the makeup of the virus that the vaccine attack will be concentrated.

The development of a vaccine is further complicated by the fact that not all human beings have the same immune response genes. To a significant extent, these differ from one ethnic group to another. For instance, the B4201 allele is prevalent among the Zulu/Xhosa populations of KZN. In parallel to this is the difficulty presented by the fact that different strains of HIV are prevalent among the various populations of the world. In Europe and North America, the clade B virus is predominant, while in India, Asia and southern Africa, the clade C is predominant. In Central Africa, both the Clade C, D and Clade A viruses occur. The obvious effect of all this is that no global HIV vaccine is possible.

Located at the epicentre of the global Clade C virus, the HPP at the DDMRI is well-placed to conduct this research into HIV pathogenesis. The research project on which Dr Kiepiela’s 2004 paper, published in Nature, as well as co-authored papers in Nature Medicine and the Journal of Experimental Medicine, are based, involves detailed genetic examinations of 375 Zulu and Xhosa HIV-infected patients at three Durban hospitals. The mere size of the sample, to be increased to 600 for the group’s next research paper, is enough to ensure the international significance of this study.

One reason why the public is not generally aware of the importance of this ground-breaking research is that the concepts involved are difficult for the layperson to understand. What is clear, however, is that the global war against HIV/AIDS is entering a new phase, and the battlefields where the death toll is the greatest, here in KwaZulu-Natal, are also likely to be the sites where some of the most important victories will be gained.

According to Harvard University’s Professor Bruce Walker, ‘the AIDS crisis will only be solved with the development of an effective vaccine’. The long hours of concentrated scientific work that are required to make such a vaccine a reality are already being logged in the quiet laboratories of the DDMRI. Here, an increasingly skilled cadre of research technicians, postgraduate students and world-renowned immunologists are working on what will hopefully be one of the great medical achievements of the 21st century.
Understanding the relationship between breastfeeding and HIV transmission

While breastfeeding is a route of HIV transmission from an HIV-infected mother to her infant, it is also an important pillar of child survival. It is the ideal way to feed an infant and it provides a unique biological and emotional basis for child development.

Associate Professor Anna Coutsoudis is recognised as a leading expert in Mother To Child Transmission (MTCT) of the HIV virus. In 2001 she founded – and remains chairperson of – iThemba Lethu, a programme that addresses the needs of children threatened by HIV/AIDS. She designed and implemented the first community-based breastmilk bank in South Africa at iThemba Lethu, an innovation that has now spread to several centres in the country.

Investigating, quantifying and balancing the risk with innovative strategies have been at the core of this prolific scientist’s research for more than a decade.

Professor Coutsoudis’ stance on encouraging HIV-positive mothers in resource-poor communities to breastfeed exclusively for the first six months of an infant’s life was recently vindicated by research carried out in Zimbabwe. The ZVITAMBO study highlighted that exclusive breastfeeding in the early months resulted in a four-fold reduction in risk of transmission.

The need to lower this risk further is the subject of parallel research, and she is at the vanguard in investigating innovative solutions for the infant-feeding dilemmas that HIV-infected mothers face. She has examined factors that increase the risk of HIV transmission during breastfeeding. While she is concerned with strategies to reduce the risks, Professor Coutsoudis readily concedes that many questions remain unanswered.

“Until further research results are available, women should be encouraged to follow the UNAIDS guidelines,” she says. These are: “When replacement feeding is acceptable, feasible, affordable, sustainable and safe, avoidance of all breastfeeding by HIV-infected mothers is recommended, otherwise, exclusive breastfeeding (EBF) is recommended during the first months of life.”

Professor Coutsoudis is spearheading the Safer Breastfeeding Programme to reduce some of the known risk factors associated with HIV transmission. Her operational research has found that mothers enrolled in the Safer Breastfeeding Programme had less breast pathology than is usually reported for HIV-infected women. “Antiretroviral therapy to the mother and/or infant is likely to offer the possibility of maintaining breastfeeding as a safe option for HIV-infected women,” said Professor Coutsoudis.

Professor Coutsoudis and the Breastfeeding and HIV International Transmission Study Group’s Late postnatal transmission of HIV-1 in breast-fed children: an individual patient data meta-analysis found that the overall risk of late postnatal transmission was 0.74% per month of non-exclusive breastfeeding. It also found that this was

Anna Coutsoudis is Associate Professor in the Department of Paediatric and Child Health at the Nelson R. Mandela School of Medicine. coutsoud@ukzn.ac.za
Inactivation of HIV in breast milk allows breastfeeding to continue while reducing the risk of postnatal transmission of HIV, and may be usefully applied in circumstances such as for premature infants, or while a mother recovers from mastitis.
The Changing Family

One of the aims of the University is to advance scientific and scholarly knowledge by “criticising and extending the traditional boundaries and views of the world”, according to Professor Makgoba. Such an extension is vividly evident in the changing structure and role of the South African family, presenting formidable challenges to the social researcher. How families cope with the threat of HIV/AIDS, how men adapt the traditions of fatherhood to the demands of modern life, and how the fragmented families of migrant workers function as social and economic units, are some of the complex questions that challenge social and economic researchers Pranitha Maharaj, Robert Morrell and Dorrit Posel.

Investigating the use of condoms among married couples

Asking your partner to use a condom within a marriage or a committed sexual relationship is tantamount to accusing him or her of unfaithfulness or admitting your own infidelity. This is the finding of a major social research project among married and cohabiting couples in KwaZulu-Natal.

While this finding may not be very surprising, it has sombre implications in the province at the epicentre of the world HIV/AIDS pandemic since, according to Dr Pranitha Maharaj of UKZN’s School of Development Studies, “a significant and growing proportion of all HIV infections are transmitted through sexual intercourse with a spouse or regular sexual partner”.

Dr Maharaj’s research project involved a household survey, conducted among rural and peri-urban isiZulu-speaking people in 1999 and early 2000, by specially trained field staff. More than 1 000 interviews were combined with 40 in-depth interviews and focus group discussions, constituting an impressive combination of qualitative and quantitative research methods.

The survey was complicated by the fact that the distinction between married and unmarried cohabitating partnerships is somewhat blurred in Zulu culture. As in other African societies, Zulu marriage is a long and complex process. The requirement of lobola (bride-price) means that marriage is often preceded by long periods of cohabitation. The majority of the study’s cohabiting couples had lived together for several years, and most had at least one child.

While the study found that condom use is less acceptable in marriage than in nonmarital relationships, it also showed that there is a growing determination, particularly among women, to insist on condom use for their own protection. “Slowly, and despite continuing widespread disapproval of condom use within marital and cohabiting relationships, sexual behaviour appears to be adapting to the severe HIV epidemic in KwaZulu-Natal”, write Dr Maharaj and Professor Cleland in a joint 2004 paper published in Studies in Family Planning.

Risk, and the perception thereof, play a vital role in self-protective behaviour. In a related paper, published in 2004 in the African Journal of AIDS Research, Dr Maharaj explores the question of risk and the individual’s ability to adopt condom use as a risk-reducing strategy. It is clear that poverty and the concomitant lack of power among women plays a key role. “Many women in the rural areas face financial hardships that severely constrain their ability to adopt risk-reducing strategies”.

The difficulty that women face, particularly rural women whose husbands are away in urban areas for prolonged periods of time, is that the initiation of condom use is related to a lack of trust, and is therefore inherently accusatory. “For this reason, people of both sexes regard it as offensive and suggestive of infidelity,” according to Dr Maharaj.

Pranitha Maharaj is a Research Fellow in the School of Development Studies on the Howard College campus. maharajp7@ukzn.ac.za
While the study found that condom use is less acceptable in marriage than in nonmarital relationships, it also showed that there is a growing determination, particularly among women, to insist on condom use for their own protection.

To Dr Maharaj, “Often the resistance to condom use is strongly related to its negative association with illicit sex and prostitution. As one rural male focus group participant said, ‘If my regular partner gives me a condom, I cannot accept it. It means she is a prostitute.’ Attempts to initiate condom use by married or regular partners ‘might create tensions, anger, and confrontation’. For these reasons, argues Dr Maharaj, many women are understandably reluctant to insist on condom use with their regular partners.

Predictably, negative attitudes towards condom use are not found to the same extent in non-marital or casual relationships, especially if both partners perceive a risk of HIV infection. HIV/AIDS prevention programmes have successfully created widespread public awareness and 92% of respondents knew where condoms could be obtained. Knowledge of condoms is high in South Africa compared to many other sub-Saharan countries, and seven out of 10 respondents agreed that condoms protect against the risk of pregnancy and HIV infection. Nearly 80% of respondents felt that it was acceptable for an unmarried woman to ask her partner to use a condom. Among married couples, this figure dropped to 43% (men) and 60% (women). Many women use condoms exclusively for protection against infection, and prefer to use other forms of contraception, especially injectibles, for protection against pregnancy, because they prefer a contraceptive method that they can control.

The picture that emerges from the research is of widespread resistance to the use of condoms in marriage and cohabiting partnerships. Unfortunately, notes Dr Maharaj, condom-promotion efforts that have focused largely on premarital and nonmarital relationships have tended to reinforce their association with illicit sexual conduct. Nevertheless, the study does show that women are beginning to take more control of their own sexual health. Dr Maharaj concludes: “The results from this study challenge the stereotype of women who are powerless to protect themselves from HIV infection by their partners.” She feels that her findings are “moderately positive” and that the barriers to condom use within marital and cohabiting partnerships may not be as immutable as many commentators have claimed.

Learning from migrant workers

In a paper published in the World Bank Economic Review in 2003, a team of US academics (Bertrand et al, 2003) concluded that social pensions “could produce a reduced willingness to participate in the labour force”. Translated into everyday language, this sounds uncomfortably like the common prejudice that “welfare makes people lazy”. Bertrand et al used data from South Africa’s first comprehensive national household survey (1993) to demonstrate that social pensions have a negative effect on employment rates among people of working age who live with pensioners.

Given the debates that are raging around the social impact of neo-liberal economic policies in the world today, the scientific presentation of such an idea in the World Bank’s own journal unsurprisingly resulted in some consternation among South African economists who support government’s social welfare policies. According to renowned UKZN economist Professor Dorrit Posel: “The political implications of this are obvious – this research could be used to strengthen the anti-welfare position that social assistance can have a negative effect on labour supply.”

Dorrit Posel is an Associate Professor in the School of Economics and Management Studies on the Westville campus. posel@ukzn.ac.za
“The social pension actually encourages people, particularly women, to move out of home and look for work.”

In collaboration with fellow UKZN economist Professor James Fairburn and Professor Frances Lund of the UKZN School of Development, Professor Posel set out to investigate the validity of Bertrand’s interpretation. “We went back to the data. And we discovered, as is so often the case, that certain ways of defining things can lead to certain kinds of conclusions. The Bertrand paper had excluded absent migrant family members from their definition of what constitutes a household. But temporary labour migration has been a feature of our economy for more than a century. What we have experienced in this country is a kind of ‘circular migration’, where migrants have retained membership of their households of origin, and where the migrant’s membership in the household has been sustained by remittances. When we took these non-resident migrant family members into account, the picture was quite different. Our conclusion was that the social pension actually encourages people, and particularly women, to move out of home and look for work.”

According to Professor Posel, “how households are defined is particularly important here in South Africa, simply because household membership and resource sharing often transcend the physical boundaries of the home. We don’t only have extended families; we also have extended households.”

Far from encouraging ‘economic dependency’, pensions, particularly in female-headed rural households, may do the opposite. Professor Posel and her colleagues were able to show that the regular income provided by a pension allows grandmothers to care more effectively for large extended families, while younger women are freed up to join the male members of their families in the search for employment in urban areas. By identifying the different ways that pensions impact on male and female migrants, Professor Posel and her colleagues are able to present a deeper and more nuanced understanding of the South African family and the fluid households that are the norm in rural areas.

“We don’t have a vested interest,” said Professor Posel when asked what makes the work of academic economists important. “The social pensions debate illustrates both the importance of data (such as those provided by nationally representative household surveys) in economic research, and how these data may be open to agenda-driven interpretation.” The debate about labour market performance in the run-up to the 2004 national elections provides another example. The controversy generated by the government’s claim of a two million nett increase in employment figures from 1995 to 2003 prompted Professor Posel and two colleagues in Economics, Dr Daniela Casale and Ms Colette Muller, to interrogate employment trends in post-apartheid South Africa. They verified the government’s claim of a two million job increase, but in interrogating the consistency of the data used, they showed also that this should be seen as the upper-bound of employment growth. “A more robust estimate would be considerably smaller,” says Professor Posel.

When talking about her work, Professor Posel brings to her conversation a dazzling variety of references, demonstrating that contemporary economics is much more than an arcane process of number-crunching. Rather, it ranges freely across a range of allied disciplines, from psychology to genetics. In particular, the ‘socio-biological’ aspect of her work connects the abstract activity of mathematical modelling to the nitty-gritty real world of people’s lives.

In a recent paper published in Nature, Professor Posel, together with co-author Professor Samuel Bowles, examine whether genetic relatedness influences the altruistic behaviour of migrant workers. They argue that data on remittances sent by migrant workers to their families of origin allow an explicit test of genetic models of human behaviour, such as the notion of ‘kin-altruism’. The paper argues that migrant remittances provide “a rare window into the allocation of resources within a household” – something not usually measured in social surveys. They found an element of ‘kin determinism’, but hasten to add that this is far from the whole picture.

The link between households and labour markets is crucial to economic research. In this context the economic behaviour of migrant workers is of great interest. But, as in all areas of scholarship, scientific rigour in the management and interpretation of research data is essential. Without it, even the most brilliant piece of research can be discredited. Her commitment to this kind of rigour has earned Professor Posel a NRF President’s award (2001) and the Vice-Chancellor’s Research Award (2004).
Examining fatherhood in South Africa

Changes in ‘traditional’ family structure have brought to the fore the need for re-evaluations of assumed familial norms such as the nuclear family. These include the development of gay and lesbian parenting, the rise of single-parent, female-headed and child-headed families.

“This question has become more urgent in the era of HIV/AIDS, where many households are deprived of the presence of adults by death or acute illness,” says Professor Robert Morrell.

He teaches courses on gender and education at Honours and Masters levels in the Faculty of Education and supervises Masters and Doctoral students. He is involved in the Gender Studies Programme and takes part in teaching programmes at the Nelson R. Mandela School of Medicine. Among his current research interests are post-colonial masculinities in school, gender, sexuality and HIV prevention in schools, parenting and fatherhood.

Professor Morrell played an integral role in The Fatherhood Project, a Human Sciences Research Council (HSRC) initiative that aimed to recognise, encourage and support men’s care and protection of children. As a part of this project Professor Morrell, together with Linda Richter of the HSRC, co-edited *Baba? Men and Fatherhood in South Africa*.

He also contributed a chapter, titled *Fathers, Fatherhood and Masculinity in South Africa*, in which he examines the link between fathers and masculinity and draws on South African examples to illustrate what is, in fact, a complex subject that belies the superficially assumed ‘obvious connection’ between fathers and masculinity.

He begins by exploring the distinctions between fathers and fatherhood and examines the connection between childhood, manhood and fatherhood. He investigates how fatherhood is positioned in debates about good and bad fathers, from the perspective of the politics of masculinity.

In exploring the fatherhood to manhood relationship, he considers issues such as the link between the physical act of conceiving a child and the processes of accepting and performing a fatherhood role, and ‘absent’ fathers in various guises and within various contexts. Fathers in society and the politics of fatherhood are examined in the context of women’s oppression and feminism.

“Is fatherhood necessarily implicated in gender inequality? Do men use their position as fathers to oppress women? Or does the assumption of fatherhood produce men who are more responsible, more tolerant, and more supportive of gender equality? These are key questions in considering how fatherhood is related to constructions of masculinity,” says Professor Morrell.

Professor Morrell concluded that while fatherhood is an integral element in the construction of masculinities, it is interpreted in different ways and both history and material conditions place constraints on how men understand and express fatherhood.

“Masculinities that value both responsibility and caring should be fostered. Such masculinities should steer away from the claim that fatherhood gives men power over women and children, and justifies authority and tyranny.

“When men accept the fatherhood role, in whatever form, they also contribute to the broader goals of gender equity. Fatherhood should be a role that integrates men into families, rather than separating them from children, women and other men.”

In 2004 Professor Morrell was appointed as a member of a ministerial task team to advise on gender equity in education. He is also a member of a NRF specialist committee formed to evaluate researchers.


Robert Morrell is a senior Professor in the School of Education at Edgewood campus. morrell@ukzn.ac.za
Globalising South African Experiences

“South Africa has much to teach the world. As we work towards a new order, a new discourse about racism and a new discourse for sustainable and sustained development, we cannot afford to be trapped in the stale dichotomies of old and new, north and south, traditional and modern,” said Professor Makgoba at his inauguration. UKZN academics like David McQuoid-Mason, Vishanthie Sewpaul and Kevin Durrheim are making their mark on international academic platforms where the lessons learned through decades of racial struggle and conflict resolution are proving to be profoundly valuable to societies attempting to come to terms with issues of human rights, inequality and diversity.

PROFESSOR MCQUOID-MASON receiving a UNESCO award for Human Rights Education in 2004 for his work on human rights education in South Africa and around the world, from Dr Koichiro Matsuura, the Director-General of UNESCO, Bangkok, Thailand.

Globalising democracy education

“In developing countries, law schools can play a crucial role,” says Professor David McQuoid-Mason, President of the Commonwealth Legal Education Association representing over 600 law schools in 35 Commonwealth countries, and the founder of South Africa’s Street Law Programme. “Where legal services provided by the state to the poor are rudimentary, law schools can supplement these, and at the same time help to educate ordinary people about the law, human rights and democracy.”

South African law schools have helped to promote a ‘rights culture’ by providing access to civil and criminal courts and educating the public about their legal rights. Today, we tend to take our Constitution for granted, forgetting that the rights that it entrenches have not been available to the majority of South Africans until fairly recently.

In an article in the Journal of Juridical Science, Professor McQuoid-Mason describes how the pioneers of legal aid in South Africa were law students and lecturers at the Universities of Cape Town, the Witwatersrand and Natal, who set up the country’s first law clinics on these campuses in 1972 and 1973. These plucky legal activists clashed repeatedly with the authorities, but by the end of the 1970s, there were law clinics in most South African law schools. In the 1980s law schools and legal academics began to focus in a more programmatic way on the problems of access to justice for the disenfranchised majority, and an Association of University Legal Aid Institutions was founded. The ‘Street Law’ concept was introduced to South Africa by Professor McQuoid-Mason and Professor Edward O’Brien, who was the co-founder of the American programme at Georgetown University, in 1972. They also convinced the Association of Law Societies of South Africa to fund the production of

David McQuoid-Mason is a Professor in the Faculty of Law on the Howard College campus and Acting Director of the Centre for Socio-Legal Studies. mquoidm@ukzn.ac.za
of a series of user-friendly, practical law textbooks. By the end of the 1980s Street Law had spread to most of the country’s law schools. Legal non-governmental organizations, such as the Centre for Socio-Legal Studies at the University of Natal, provided services and training in the fields of human rights, criminal justice, public legal education and paralegal training.

“What sets law schools in developing countries apart from those in developed countries is that the former have a special duty to serve their communities,” argues Professor McQuoid-Mason. “This is because they often operate as a privileged island in a sea of scarce resources, particularly when it comes to providing access to justice for the poor.” While South African legal aid clinics are no longer ideologically at odds with the state, they still have their hands full, dealing with poverty-related legal problems in the areas of health, housing, welfare and education, “in part due” according to Professor McQuoid-Mason, “to a failure by the new democratic order to deliver.”

In 1994, the Legal Aid Board funded pilot university law clinics, in a scheme designed to render legal services to indigent persons by providing contracts of community law service for law graduates. The cost of cases handled in this way is less than half of the normal cost. These state-funded clinics have now been incorporated into ‘legal aid justice centres,’ throughout the country.

“In general,” according to Professor McQuoid-Mason, “these initiatives have strengthened South Africa’s human rights culture and have assisted in the improvement of the administration of justice in the country. The South African experience shows that law schools in the developing world can make a significant contribution to access to justice.”

In an article in The Windsor Yearbook of Access to Justice, Professor McQuoid-Mason argues that a key lesson learnt from the South African experience under the apartheid was that, provided that it is presented in an ostensibly neutral manner and supported by influential members of the legal fraternity and educational departments, “human rights can be taught in the most hostile of environments.”

Professor McQuoid-Mason is an inveterate globetrotter, and has taken his inspiring Street Law message to embattled colleagues in every corner of the globe. In 2004 alone, he presented papers at conferences in Cairo, Baghdad, Vilnius (Lithuania), Quetta (Pakistan), Chisinau (Moldova), Krakow (Poland), Gibraltar, Bishkek (Kyrgyzstan), Auckland, Ulaanbatar (Mongolia), Lilongwe (Malawi), and Comilla (Bangladesh). In recognition of his tireless efforts, he was awarded a UNESCO Special Mention for Human Rights education in 2004.
distinguish between attitudes and expressions, reflects their contention that “it is impossible to measure prejudice independently of expressions”.

“Instead of focusing on a narrow class of unequivocal racist expressions, as previous researchers have done, we are more interested in forms of racist evaluation that operate via equivocation, contradiction and subtlety,” says Professor Durrheim.

“In the very act of answering our questions, interviewees are involved in a process of making, justifying and defending their evaluations. Discursive psychology is able to account for the variability and subtlety of their responses. It also accounts for the difference between what they say and how they act.”

Over the course of three years, Professor Durrheim and his colleague have collected a large number of in-depth interviews with black and white groups of beachgoers in which respondents discuss their experiences of desegregation. These interviews demonstrate that the lived experience of desegregation is vastly different for blacks and whites and that “a gulf of meaning” separates the responses of blacks and whites.

According to Durrheim and Dixon, most white interviewees experienced desegregation “as black invasion, with Whites being swamped, crowded or pushed out of space”. Black interviewees, on the other hand, experienced desegregation “in terms of white flight (from blacks).”

In a related paper published in 2003 in the British Journal of Social Psychology, Durrheim and Dixon describe “complex patterns of beach usage” at Scottburgh beach during the holiday season. Photographs of the pattern of beach usage show socio-spatial behaviours of contact and avoidance during the course of a crowded day at the beach. These images vividly demonstrate that whites used the beach early in the day, clustered together, and gradually left the beach as Blacks arrived in greater numbers.

Despite this pattern of socio-spatial behaviour, most interviewees insisted that they had “no problem” with racial contact. As one white interviewee said: “If people behave, there is no problem whatsoever.” According to Durrheim and Dixon, white interviewees base their opposition to desegregation on what they claim are “universal principles of proper behaviour”, saying that they prefer segregation “not primarily because they object to racial contact but because they believe that desegregation on the beach will bring about a loss of privacy and will expose them to threat and unmannerly conduct”.

Durrheim and Dixon point out that these “are not the kind of expressions that could be included in attitude scales as clear indicators of racism.” Racial stereotypes are implied rather than explicitly stated, and for this reason are best studied qualitatively. The discursive approach to the study of the psychology of racism allows researchers to appreciate how “attitudes are woven into the fibre of social and individual life”.

Durrheim and Dixon conclude: “The problems with white interviewees’ accounts of being pushed out is not that they are impelled by covert racial prejudice, but that they enact a continuing sense of entitlement to a white preserve in Africa.”

They suggest that one way to enhance interaction in an integrated society would be to attract whites to historically black spaces by investing in these spaces and making them desirable. This could assist in changing “the racial patterns of invasion, flight, and succession” which are still so evident in post-apartheid South Africa.
Setting global standards for social work education

When asked by the world’s leading social work bodies to chair their Global Qualifying Standards Committee, Professor Vishanthie Sewpaul’s first reaction was one of “shock and horror”.

“On first hearing about the possibility of formulating global standards for social work education and training, I was appalled by what I thought to be far too presumptuous and ambitious a project. I immediately questioned its potential to reinforce Western imperialism and hegemonic discourses and expressed my reservations about getting engaged in such a process.”

“I gave the Board all my reasons for not getting involved,” she recalls, “but their reply was that my sensitivity to these issues made me the ideal person for the job. I then embarked on a process of consultation with colleagues across the globe. To my surprise, I found that the majority of our colleagues were in favour of developing global standards for social work teaching. This gave us the mandate we needed to proceed.”

Professor Sewpaul’s work draws attention to the economic and political structures within which social work is required to function in the world today. She gives the sense of social work as an embattled discipline, caught between its traditional ethos of philanthropic care-giving, a more recently evolved sense of social work as an emancipatory discipline, and the demands of a public sector that is strongly influenced by market-driven and managerialist discourses.

“Issues regarding human justice, human rights, citizenship and democracy cannot be addressed within the restricting language of markets, profits, individualism, competition and choice,” writes Professor Sewpaul. “We need to create opportunities for the development of critical consciousness and for transformative action.”

The invitation to chair the Global Standards Committee provided just such an opportunity. Historically, the notion of global standards has constituted “a totalising discourse”, but the work of the committee under Professor Sewpaul’s leadership steered away from “the pursuit of homogeneity and standardisation” towards a method that values process as highly as product, acknowledges the diversity of specific contexts to which its work applies, and pays close attention to the use of language, to ensure that “hegemonic discourses” are not perpetuated.

The international definition of social work stresses the need for social change, for problem solving in human relationships “and the empowerment and liberation of people to enhance well-being”. It also insists that the principles of human rights and social justice are fundamental to social work. In its application of the notion of global standards, the committee opted for “aspirational tenets” rather than laid-down minimum standards, circumventing the “huge problems” associated with the diversity of situations that social work practitioners and educators around the world find themselves in. “We placed a constant emphasis on the importance of considering locally specific historical, socio-economic and political contexts,” reflects Professor Sewpaul.


Vishanthie Sewpaul is head of the Social Work Programme in the School of Social Work and Community Development on the Howard College campus. sewpaul@ukzn.ac.za
Into the Future

According to Professor Makgoba, new knowledge helps us “to understand more fully the past, the present and the future of our planetary existence and other questions we have about our origins, and our destiny. As a community of scholars, as a university, we celebrate and support this quest.” Professor Fambirai Takawira’s Centre for Excellence in Radio Access Technology and Professor Sunil Maharaj’s Astrophysics and Cosmology Research Unit are just two research projects at UKZN where the challenges of the future are being enthusiastically met by academic staff and senior research students.

Preparing for a wireless future

“Wireless technology occupies centre stage in the world of electrical engineering today”, says Professor Fambirai Takawira, who heads up the Centre of Excellence in Radio Access Technology (CRAT) in the School of Electrical, Electronic and Computer Engineering. The Centre was established in 1997, through an agreement between the University, Telkom and Alcatel.

Most of us are aware that our cellphones and other handheld devices will play an increasingly important role in our lives in the world of the 21st century, where connectivity is paramount and the network is the dominant paradigm. We are already faced with a bewildering proliferation of new devices that are transporting us into a futuristic world of total connectivity. Professor Takawira and his colleagues and graduate students in CRAT belong to an informal global network of scientists who are all working on aspects of the problem of connectivity. “We are all faced with a fairly huge problem and all over the world people are chipping away at it from different angles,” says Professor Takawira.

“We are concerned with the underlying technology that is required to make networks work better, so that entrepreneurs can take these new networks and apply them in the development of new services,” he explains. “While our research has many commercial applications, it is not commercially driven. To have to wait for commerce to call on us with their needs would be too limiting. Rather, our task is to identify and tackle technical challenges that are inhibiting the development of future services, while at the same time keeping an eye on what’s happening in the marketplace.”

The UKZN scientists have chosen to focus on the challenge of how to ensure quality of service (QoS) in the transmission of data, and how to get the various wired and wireless networks to interface with each other. In a digital world flooded with zillions of bytes of data, the main problems facing scientists are how to order and organize this flood of data, and how to schedule the transmission of competing data messages in such a way as to avoid a cybernetic Tower of Babel.

The tools that are being developed will serve as a cornerstone of the so-called Fourth Generation (4G) wireless systems. With much higher speeds of data transfer and vastly enhanced data-carrying capacity, these new systems presage an era of total global information mobility, and existing technologies, such as cellular telephony, paging and messaging, the Internet and broadband data management, provide the platform on which the wireless future will be built.

A constant challenge is how to minimize errors in data transmission and maintain an acceptable quality of service (QoS) when different technologies converge on a common interface. “One of our key strengths lies in the development of new algorithms that can correct the errors that happen in a communication channel,” says Professor Takawira. “As you probably know, all data

Fambirai Takawira is Director of the Centre for Radio Access and Rural Technologies on the Howard College campus. ftakaw@ukzn.ac.za
Professor Sunil Maharaj is the director of the Unit, and members of ACRU include Dr Gareth Amery, Dr Catherine Cress, Dr Kesh Govinder, Dr Megan Govender and Dr Kavilan Moodley. External members are Professor Roy Maartens, the Director of the Institute for Cosmology & Gravitation at Portsmouth University, and Professor Naresh Dadhich, Director of the Inter-University Centre for Astronomy and Astrophysics, in Pune, India. The presence of such high profile external members is an indication of the international prominence the unit has achieved.

The research interests of the unit are extensive, including both theory and observations. Professor Maharaj said that from the great wealth of observational data now available, detailed studies of galaxies and clustering are under way. “These studies will help to constrain cosmological models and the amount of dark matter in the universe.”

Also significant is their work investigating fluctuations in the amplitude and angular cosmic microwave spectrum, “which provides a window into the physics of the early universe”.

Integrated access technologies will allow the user to move seamlessly from a cellular environment, to a wireless local network, to a wired environment.

Examining an Expanding Universe

The Astrophysics and Cosmology Research Unit (ACRU), was created in 2004 to stimulate research and advance our understanding of the structure and evolution of stars, galaxies and the universe.

The objective is to create a premier African centre of international repute for academic and research excellence by encouraging scientific inquiry at the frontiers of astrophysics and cosmology.

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Sunil Maharaj, of the School of Mathematical Sciences, is the Director of the Astrophysics and Cosmology Research Unit (ACRU).

maharaj@ukzn.ac.za
the physics of the early universe."

Since the theory of general relativity and the Einstein
field equations provide the mathematical background
for much of modern physics, members of the unit are
generating and studying the properties of solutions in
relativistic theories that are physically relevant.

An important area of study in modern astrophysics
is the structure and evolution of relativistic stars. The
gravitational behaviour, redshift profiles and temperature
ranges of compact ultra-dense stars and radiating
relativistic stars are being studied and compared to
astronomical objects.

The broad goals of ACRU are to promote
research in astrophysics and cosmology to advance
understanding of the universe and the diverse range of
structures that it contains, and to increase awareness of
astrophysics and cosmology by informing the public of
developments in these fields.

It aims to achieve these goals through building
a strong research programme centred on academic
staff, postdoctoral researchers, postgraduate students,
affiliated researchers and visitors. ACRU organises
regular colloquia, technical seminars and journal club
meetings, as well as larger workshops and conferences.
Members have strong links with local institutions and
collaborations with leading international research
groups.

"ACRU aims to be an active contributor to the
national endeavour to strategically position South Africa
within the global astronomy community," said Professor
Maharaj.

He adds that the formation of ACRU has been
timely, with astronomy becoming a focused thrust at a
national level.

"ACRU identifies strongly with this recognition of
astronomy as a focus area in South Africa. The South
African government has jointly funded the construction
of the Southern African Large Telescope (SALT) and
is backing the South African bid to host the Square
Kilometre Array (SKA).

"We aim to make a significant scientific contribution
to these facilities as well as to the national endeavour
to advance astronomy," says Professor Maharaj. A
number of postgraduate students are working on both
theoretical and observational projects that have direct
relevance to this initiative.

The Unit has been successful in generating funds
from UKZN, the National Research Foundation, the
South African Astronomical Observatory and from
international linkages with the United Kingdom, the
United States and France. These funds are being used to
hold international conferences, local workshops, to fund
bursaries for postgraduate students and for students
and staff to travel to overseas universities to broaden
their research backgrounds.

Ryan Warne, an MSc student working on cosmic
microwave background with Dr Kavilan Moodley, spent
three months at Princeton University in an exchange
programme. ACRU has been awarded two postdoctoral
fellowships funded jointly by the South African
Astronomical Society and UKZN, called the SAAO-
UKZN Fellowships in Astronomy. The first recipient of
this fellowship is Dr Nathan Roche, from Instituto de
Astronomia in Mexico.

"ACRU aims to be an active contributor to the
national endeavour to strategically position South Africa
within the global astronomy community," said Professor
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2004 Book Prizes

Women Writing Africa: The Southern Region

This landmark collection presents, documents and historically contextualises oral and written literature by South African women from the mid-19th century to the present. While some of the authors presented, like Bessie Head and Doris Lessing, are well-known, others have rarely been heard. The book shines light on a literary landscape that has never before been this clearly seen.

The selected texts range from communal songs and folktales to letters, diaries, political petitions, court records, poems, essays and fiction. They provide an extraordinarily vivid picture of women’s lives throughout a turbulent history, and record the courageous roles played by women in ensuring cultural continuity and resisting repression.

Work and family, the cruelty of colonialism, the horrors of war and the struggles for liberation are described in texts originally produced in 20 languages, representing six countries in the region: Botswana, Lesotho, Namibia, South Africa, Swaziland and Zimbabwe.

Each extract is accompanied by a brief historical background. The editors’ introduction sets the broader historical stage and explores the many issues involved in collecting and combining oral and written literature from diverse cultures in one volume.

Unprecedented in its scope and achievement, Women Writing Africa: The Southern Region is the result of a decade of research and is likely to become an indispensable resource in the study of women’s history, culture and literature, both in Africa and worldwide.

Zulu Names
By Adrian Koopman
University of Natal Press, 2002

This book, a monograph on the onomastic (naming system) of the Zulu language, is the first of its kind to be published in Africa. It places the naming system of the Zulu people within its immediate cultural context, its linguistic and literary contexts, and within the broader African context. The relationship between Zulu onomastics and Zulu oral poetry is discussed, and the book also includes discussions of aspects of Zulu culture and beliefs, such as ancestral spirits (amadlozi) and the practice of ilobolo.

Professor Koopman is an internationally recognized authority on Zulu names and naming systems. His academic dissertations and articles are extensively quoted in studies of African onomastics. He is the director of the Onomastics Studies Unit on the Pietermaritzburg campus, Vice-president of the Names Society of South Africa and editor of the journal Nomina Africa.

Zulu Names is the product of more than 20 years of research, and is targeted at both academic and general readers with an interest in African and Zulu history, culture and language. According to one reviewer, the book “is an extremely valuable onomastic contribution and should be on the shelves of all practising and casual names scholars in southern Africa and elsewhere. Zulu life and traditions come to the fore beautifully through the wealth of name data”.

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The Political Philosophy of Needs

Based on his doctoral thesis at Cambridge University and accepted for publication by Cambridge University Press, the world’s leading publisher in the field of political philosophy, Dr Hamilton’s monograph has been described as “an impressive work of scholarship” notable for its “technical brilliance” and “sophisticated conceptual analysis”.

Although for the most part a highly abstract treatise which presents an independent, “path-breaking” argument critical of the major traditions of political philosophy, the monograph is nevertheless grounded by a concluding analysis of the South African constitution of 1996.

Dr Hamilton’s central argument is that the conceptual architectonic of contemporary political thought, founded upon a philosophical impasse between Kantianism and Utilitarianism, is restrictively focused on the concepts of rights and preferences. At the beginning of the 21st century, he argues, we need to think about politics in different terms: the concept of ‘human needs’ should be moved to the centre stage of political discourse.

Dr Hamilton’s conception of human needs is challenging: he argues that the evaluation of needs must be located within a more general analysis of institutions, and can be used to justify forms of coercive authority that are directed towards political and social transformation.

The book develops a thorough-going critique of all approaches to needs that are based on conceptions of rights, and includes critiques of influential recent work by Len Doyal, Ian Gough and Amartya Sen, the Nobel Laureate in Economics who co-supervised the doctoral thesis from which the book emerged.

The James Stuart Archive of Recorded Oral Evidence Relating to the History of the Zulu and Neighbouring Peoples
Volume Five
Edited by C.de B. Webb and J.B. Wright
Killie Campbell Africana Library Manuscript Series, 2001

Launched in 1970 by the late Professor Colin Webb, a distinguished historian at the University of Natal, the Stuart Papers Project aims to edit and publish all the recorded oral histories gathered by James Stuart, a magistrate and official in the Natal colonial service between 1897 and 1922.

After 1922, Stuart relocated to England, where he set about compiling historical testimonies from some 200 informants whom he had interviewed during the course of his work in Natal. Killie Campbell, the founder of the library which bears her name, acquired Stuart’s files after the Second World War, and a steadily growing interest in them among historians led to Professor Webb’s publication project, officially endorsed by the University of Natal in 1970.

In 1971, John Wright was appointed as Professor Webb’s assistant, and together they edited the first four volumes of the Archive. Professor Wright, of the School of Human and Social Studies on the Pietermaritzburg campus, continued with this work after Professor Webb’s in 1992, and Volume Five was published by the University of Natal Press in 2001.

The James Stuart collection is widely regarded as one of the most important sources of historical evidence on the history and culture of Zulu-speaking people from the mid-18th to the early 20th century, and has revolutionised the study of Zulu history. Stuart was fluent in Zulu, and his notes often moved interchangeably between English and Zulu. All these Zulu passages are translated for the benefit of non-Zulu speaking researchers.

According to one reviewer, “Volume Five arrives at a time when increasing numbers of scholars instinctively consult the archive for the most comprehensive ethnographies of KwaZulu-Natal. In the last decade they have used evidence from Stuart’s informants to propel South African historiography into unmarked terrain.”
2004 Fellowship Awards

The University Council may, on the recommendation of the Fellowships Selection and Awards Committee, award Fellowships annually for distinguished academic achievement.

Nominees must be members of the permanent academic staff who have held an appointment at the University for a continuous period of three years prior to the closing date for nominations. They must have distinguished themselves in performance or in academic work of such high quality as to merit special recognition.

The originality and creativity of the nominee as manifested in research work or in other applications of the discipline is considered with publications (or their equivalent) as the main evidence of original, distinguished academic work. Public presentation of work in the performing arts and in the fine arts is also recognised as being equivalent to research and publication.

Three awards were made in 2004.

Professor Roseanne Diab
School of Environmental Sciences

Professor Roseanne Diab is a graduate of the University of Natal. After completing an MSc in Geography at the University, she moved to the University of Virginia, Charlottesville USA, where she obtained a PhD in Environmental Sciences in 1983. At the time of the award she was the Head of the School of Life and Environmental Sciences.

Professor Diab is recognised as one of South Africa’s foremost atmospheric scientists. She has won national international acclaim for her research in atmospheric pollution and tropospheric ozone climatology. Her accomplishments in the field of tropospheric ozone has resulted in her election to the ISCU, Commission on Global Pollution and Atmospheric Chemistry (CACGP), and an invitation to co-author an assessment of Southern Hemisphere tropospheric ozone for the UNEP/WMO Global Ozone Assessment for 1998. She has also been the recipient of a number of prestigious awards, such as a Fulbright senior research scholarship, an Ernest Oppenheimer sabbatical leave grant and a Rockefeller Foundation residency at the Bellagio Centre in Italy. She has inspired a research ethos in her many graduate students, providing opportunities for them to work at laboratories abroad and present papers at international conferences.

According to a leading scholar in the field: “While she established her excellent national research reputation in South Africa in air pollution and wind power potential climatology, it has been Professor Diab’s work in the last 10 years on tropospheric ozone that has brought her international recognition. Her research in this field, begun at the time of the SAFARI-92 international collaborative project, has produced an outstanding body of work. The excellence and innovative nature of her research in this field has been recognised by her ongoing research collaboration with some of the leading international scientists in this field, in particular Dr Ann Thompson of NASA Goddard Space Flight Centre in the USA”.

The University has many reasons to be proud of the work of Professor Diab.

The excellence and innovative nature of her research in this field has been recognised by some of the leading international scientists in this field.
Professor Dulcie Mulholland  
School of Chemistry

She is regarded internationally as the voice of authority in the field of medicinal plant chemistry in South Africa.

Professor Dulcie Mulholland. Head of the School of Pure and Applied Chemistry at the time of the award, obtained her qualifications at the University of Natal, culminating with the award of the PhD in Chemistry in 1979. She has made an enormous contributions to the University and the wider community in her teaching and her internationally recognised research into natural products, her studies of medicinal plants and her collaborations with traditional medical practitioners. She has an outstanding record in the training of research students, having thus far successfully supervised 18 Masters and 12 Doctoral degrees.

Professor Mulholland has been invited as a keynote speaker at several international conferences, and also as a visiting professor at the Universities of Amsterdam and Nijmegen (Netherlands), University of Munich (Germany), University of Lausanne (Switzerland) and the University of Barcelona (Spain).

In assessing her as a researcher, a renowned scholar states: “Some measure of the excellence of Professor Mulholland’s efforts in her field can be gauged from her success in being awarded substantial research grants, her invitation to take on the editorship of the Journal of Ethnopharmacology. At a comparatively young age she is now regarded internationally as the voice of authority in the field of medicinal plant chemistry in South Africa.”

The scholarly nature of Professor Mulholland’s work coupled with her international recognition and outstanding success with graduate students made her a deserving candidate for this prestigious award.

Professor Norman Pammenter  
School of Biological and Conservation Sciences

His wide-ranging papers have made fundamental contributions in many fields.

Professor Norman Pammenter has served the University with distinction both as a teacher and a researcher, starting in 1973 as a research assistant. After completing a BSc Honours degree in Chemistry, he broadened his interest into plant science and obtained a PhD in the field from Leeds University (UK).

Professor Pammenter has presented keynote addresses or plenary lectures at several international conferences and workshops, and has been invited as a visiting professor at universities in Europe and the USA, including the prestigious Outstanding Scientist Hospitality grant from the University of Firenze, Italy. He is a dedicated lecturer and supervisor, having successfully supervised or co-supervised 26 Masters and 10 Doctoral students.

In assessing him as a researcher, one of his referees states: “Professor Pammenter is the quintessential scientific investigator, able to discern from a morass of facts and suppositions a clear practical route to eliminating alternatives through well-designed and executed experiments. The clear evidence of this ability is to be seen in his wide-ranging papers which have made fundamental contributions in many fields.”

Another leading scholar comments: “He has greatly influenced the early careers of many plant physiology students in South Africa who will continue his fine tradition of high-quality scholarship.”

In an academic career spanning 30 years, Professor Pammenter has served the University with distinction.
Professor Dorrit Posel has a PhD in Economics from the University of Massachusetts. She is Associate Professor in the School of Economics and Finance. Professor Posel has identified a number of specific questions within the broad research area of labour markets and households. She has emphasized not only knowledge of the key statistical package for household survey analysis (STATA), but also the importance of rigorous data management and critical attention to how information is collected. The research thus far has been highly successful, resulting in a number of published articles, conference and workshop papers and presentations (both international and local). Much of her research conducted or initiated over the past few years has focused on socio-economic concerns in South Africa, with relevance not only to academic audiences but also to those involved in policy. For example, her 2002 research on labour migration persuaded Statistics South Africa (the official statistical agency in South Africa) to reintroduce a module on labour migration in official national household surveys. In terms of the value of her work to South Africa, Professor Posel’s research has important implications for policy formulation in addition to its academic value. In recent years, innovative research has recast the way labour market issues are analysed.

Professor Posel’s scholarly work provides excellent examples of these new research directions. Socially important forms of employment that were ignored or treated simply as ‘residual’ categories now receive much-needed attention. She has a justly deserved international reputation as a dynamic, creative and highly productive economist who is using state-of-the-art statistical techniques to analyse the most important issues facing South Africa. Professor Posel was a recipient of the prestigious NRF President’s Award in 2001 and the National Science and Technology Forum Award in 2002.

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Fellows of the University of KwaZulu-Natal

Prof S E Drewes, Chemistry (P), awarded 1989, retired 1996
Prof R J Haines, Chemical & Physical Sciences (P), awarded 1989
Prof R G Harley, Electrical & Electronic Engineering (HC), awarded 1989, retired 2001
Prof A S Mathews, Law (P), awarded 1989 (Decreased 1993)
Prof J van Staden, Botany & Zoology (P), awarded 1989
Prof L W Baker, Surgery (MS), awarded 1990, retired 1992
Prof M Chapman, English (HC), awarded 1990
Prof R Hunter, Geology (P), awarded 1990, retired 1992 (Deceased 1999)
Prof J R L Milton, Law (P), awarded 1990, retired 2000
Prof Y K Seedat, Medicine (MS), awarded 1990, retired 1995
Prof M N Tainton, Grassland Science (P), awarded 1990, retired 1993
Prof M Prozesky, Human & Social Science (P), awarded 1991
Prof E Schulze, Biosources Eng & Env Hydrology (P), awarded 1991, retired 2003, extended Dec 2005
Prof G L Maclean, Zoology & Entomology (P), awarded 1992, retired 1997
Prof M J Samways, Botany & Zoology (P), awarded 1993, Left
Prof S Adali, Mechanical Engineering (HC), awarded 1993
Prof K Bharuth-Ram, Faculty of Science (W), awarded 1993
Prof R Bharuthram, Faculty of Science (W), awarded 1993
Prof W M Freund, Economic History (HC), awarded 1993
Prof P Berjak, Life & Env Sciences (HC), awarded 1994, retired 2001, extended Dec 2004
Prof H M Coovadia, Paediatrics & Child Health (MS), awarded 1994, retired 2000, extended Dec 2003
Prof R E Raab, Chemical & Physical Scs (P), awarded 1994, retired 2003
Prof P H J Rijkenberg, Applied Env Scs (P), awarded 1994, retired 2003
Prof J V Robbs, General Surgery (MS), awarded 1994
Prof C J Ballantine, Music (HC), awarded 1995, retired 2003, extended Dec 2007
Prof J Moodley, Obstetrics & Gynaecology (MS), awarded 1995, retired 2002, extended Dec 2005
Prof K G Tomascelli, CCMS (HC), awarded 1995
Prof H Bajina, Faculty of Science (W), awarded 1996
Prof N Bhana, Graduate School of Business (W), awarded 1996, Left
Prof J M Burchell, Law (P), awarded 1996, Left
Prof M R Cooper, Faculty of Science (W), awarded 1996, Left
Prof R E Klitgaard, Economics (HC), awarded 1996, Left
Prof KB Nürnberger, Theology (P), awarded 1996, retired 1999
Prof M J Savage, Applied Env Science (P), awarded 1996
Prof K D Bhoola, Pharmacology (MS), awarded 1997, retired 2000
Prof C M Breen, INR (P), awarded 1997, retired 2003
Prof H C Swart, Maths & Stats Sc (HC), awarded 1997, retired 2003, extended Dec 2004
Prof F S Bell, Geological Computer Science (HC), awarded 1998, retired 2000
Prof R M Gous, Agric Sc & Agribusiness (P), awarded 1998
Prof J P C Laband, Human & Social Sc (P), awarded 1998, 2002,
Prof D I D Attwell, Language, Culture & Comm (P), awarded 1999, Left
Prof T A Ford, Pure & Applied Chemistry (HC), awarded 1999, retired 2000, extended Dec 2006
Prof B N Wolstenholme, Agric Sci & Agribusiness (P), awarded 1999 (as HRA), retired 1998
Prof R Chetty, Pathology (MS), awarded 2000, Left
Prof M J Daymond, English (HC), awarded 2000, retired 2000, extended Dec 2005
Prof A A Haefele, Surgery (MS), awarded 2000
Prof M A Adhikari, Paediatrics (MS), awarded 2001
Prof D A McQuoid-Mason, Law (HC), awarded 2001
Prof L Richter, Psychology (P), awarded 2001
Prof K S Satyapal, Faculty of Health Sciences (W), awarded 2001
Prof V E Verijenko, Mechanical Engineering (HC), awarded 2001
Prof J S Field, Chemical & Physics Sc (P), awarded 2002
Prof J J McCarthy, Graduate School of Business (W), awarded 2002, Left
Prof M R Perrin, Botany & Zoology (P), awarded 2002
Prof A Rocke, Anaesthetics (MS), awarded 2002
Prof W D Geach, School of Accountancy (W), awarded 2003
Prof J J Guy, Historical Studies (HC), awarded 2003
Prof J U Jacobs, Graduate Studies (HC), awarded 2003
Prof G M Mody, Dept. of Medicine (MS), awarded 2003
Prof G Naidoo, School of Botany (W), awarded 2003
Prof V Padayachee, School of Development Studies (HC), awarded 2003
Prof R Diab, School of Life & Environmental Sciences (HC), awarded 2003
Prof J J Goy, Historical Studies (HC), awarded 2003
Prof J U Jacobs, Graduate Studies (HC), awarded 2003
Prof G M Mody, Dept. of Medicine (MS), awarded 2003
Prof G Naidoo, School of Botany (W), awarded 2003
Prof V Padayachee, School of Development Studies (HC), awarded 2003
Prof R Diab, School of Life & Environmental Sciences (HC), awarded 2004
Prof D Mulholland, School of Pure & Applied Chemistry (HC), awarded 2004
Prof N W Pammeter, School of Life & Environmental Sciences (HC), awarded 2004
Prof C Appleton, School of Life & Environmental Sciences (HC), awarded 2005