



# IMPACT

RESEARCH AND OUTREACH AT THE  
UNIVERSITY OF CAPE TOWN 2007

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# IMPACT

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## Our Mission Statement

Our mission is to be an outstanding teaching and research university, educating for life and addressing the challenges facing our society.

**Educating for life means that our educational process must provide:**

a foundation of skills, knowledge and versatility that will last a life-time, despite a changing environment;  
research-based teaching and learning;  
critical enquiry in the form of the search for new knowledge and better understanding; and  
an active developmental role in our cultural, economic, political, scientific and social environment.

Addressing the challenges facing our society means that we must come to terms with our past, be cognisant of the present, and plan for the future.

**In this, it is central to our mission that we:**

recognise our location in Africa and our historical context;  
claim our place in the international community of scholars;  
strive to transcend the legacy of apartheid in South Africa and to overcome all forms of gender and other oppressive discrimination;  
be flexible on access, active in redress, and rigorous on success;  
promote equal opportunity and the full development of human potential;  
strive for inter-disciplinary and inter-institutional collaboration and synergy; and  
value and promote the contribution that all our members make to realising our mission.

**To equip people with life-long skills we must and will:**

promote the love of learning, the skill of solving problems, and the spirit of critical enquiry and research; and  
take excellence as the bench-mark for all we do.

We are committed to academic freedom, critical scholarship, rational and creative thought, and free enquiry. It is part of our mission to ensure that these ideals live; this necessarily requires a dynamic process of finding the balance between freedom and responsibility, rights and obligations, autonomy and accountability, transparency and efficiency, and permanence and transience; and of doing this through consultation and debate.

*This Mission Statement was formulated by a Working Group of the University Transformation Forum and was affirmed and adopted at a University Assembly on April 24, 1996*

# opening new doors



**Academics do not have easy lives. Gone are the times when they could spend endless days in the laboratories and libraries, foraging for priceless scraps of data, pursuing those longed-for eureka moments. Now, much more is expected of them. Many have substantial teaching loads and piles of paperwork, be it students' theses or applications for funding and grading. That's all part and parcel of life at a modern-day South African university.**

UCT, as a research-led university, can justly take pride in the quantity and quality research that is generated by its scholars and students. This work spans all disciplines and subjects, and ranges from the abstract to the everyday. We have researchers scouring the skies for clues to the beginnings of the universe, or trawling banks of surveys for patterns of poverty. The impact of this work is felt broadly, touching on communities from Khayelitsha to Kirstenbosch, Gugulethu to Gordon's Bay. And beyond.

And the research is getting the recognition it deserves. Following the 2005/2006 round of ratings by the National Research Foundation (NRF), UCT boasted 262 rated researchers in total, more than any other institution in the country. It also had more rated researchers in four of the six NRF categories, including the A-ratings for leading international researchers and the increasingly coveted P-ratings for young researchers who show the potential to become future leaders in their fields. And, for good measure, no fewer than 31 researchers received ratings for the first time. Little wonder we swaggered a little.

This edition of Impact offers a snapshot of some of the work being done at UCT. As such, it must be noted that the work covered here is but a drop in the ocean. With the recent surge in post-graduate registrations, we can but assume that we are experiencing a boom in research.

In this edition we have chronicled research on new HIV vaccines and food allergies, Shakespeare's place in education in South Africa, genetically modi-

fied maize crops, poverty, the way the courts would interpret the legal concept of delict, and the discovery of new species of lobsters and new ocean currents, among many other stories. A broad sweep, you would agree!

The challenges ahead, though, are many. We have to strike a better balance between the research – the lifeblood of a university – and other demands made on our academics. We need to source more funding for research. Increasingly, universities are being called on to play a greater role in regional and national development.

I hope that, by looking through these pages, you will recognise the substantial role that we already play through our research.

**Vice-Chancellor and Principal  
Professor Njabulo S. Ndebele**

# ukuvula iingcango ezintsha



**Ubomi abululanga kubafundi bemfundo ephakamileyo. Ladlula ixesha apho ababafundi babechitha iintsuku ezingapheliyo kwiizindlu zokuphanda okanye kumathala eencwadi befula bekhangela ulwazi olunqabileyo, bekhangela loo mizuzu ka-ndiyifumene. Ngoku kulindeleke lukhulu kubo. Uninzi lwabo lunemithwalo yokufundisa kwaneemfumba yomsebenzi ongamaphepha. Konke oku kuyingxenyeyobomi bezimini kwiyunivesithi yaseMzantsi Afrika.**

I-UCT njengeyunivesithi ekhokelwa zezophando ineqhayiya ngezina nohlobo lophando olwenziwa ngabafundi bethu. Lo msebenzi ungxabalaze kuzo zonke iingqeqesho nezifundo kwaye zisuka kwezingaphathekiyo ukuya kwezemihla ngemihla. Sinabaphandi abakhuhla izibhakabhaka bekhangela imikhondo yesiqalo sendalo kwanamahlu ovavanyo emifuziselo yobuhlwempu. Impembelelo yalo msebenzi ivakala ngokubanzi, ichaphazela abahlali abasuka eKhayelitsha uyakuma eKirstenbosch, eGugulethu ukuya eGordon's Bay nangaphesheya.

Kwaye ezophando lufumana uku-

nakanwa okufanelekileyo. Emva kwamahlelo ka-2005/2006 zeSiseko Sophando seLizwe (NRF), i-UCT yaqhayisa ngabaphandi abangama-262 bebonke, ngaphezu kwawo onke amaziko eMzantsi Afrika. Kwaye sinabaphandi abahamba phambili kwiindidi ezine kwezintandathu zeNRF, oku kuquka iindidi ezingu-A zabaphandi bamazwe ngamazwe kwanodidi olunqwenelwayo olungu-P labaphandi abasebatsha ababonakala benesakhono senkokheli kumacandelo abakuwo. Ukwandisa amanani ethu abaphandi abagqwesileyo kwezindidi zahlukileyo awakho ngaphantsi kwama-31. Kungoko sihamba ngokuziqhenya nje kancinci.

Olu shicilelo lwe-Impact likunika umfanekiso wemisebenzi eyenziwa e-UCT. Ngoko ke, kufuneka niqaphele ukuba le imisebenzi ibhalwe apha lichaphaza nje lo msebenzi owenziwayo. Ngokutsha nje, amanani ababhalisela izifundo zezidanga eziphezulu sinako ukucinga ukuba unyuko lwamanani kwezophando.

Kweli candelo, sikunika incwadi yengxelo yezehlo yophando yamayeza akhusela abantu kwi-HIV kwanokwaliwa kokutya okuthile yimizimba

yethu, indawo kaShakespeare kwimfundo yaseMzantsi Afrika, amazimba amvelo iguquliweyo, ubuhlwempu, indlela iinkudla eziyitolika ngayo ingqikelelo yomthetho i-delict, kwanokufunyanwa kohlobo olutsha lwesilwanyana saselwandle esifana nonoonkala kwanemisinga emitsha yolwandlekazi. Umxube obanzi ngokwenene!

Mininzi kodwa imiceli mngeni ezayo. Kufuneka sixhathise ngcono ezophando - oyena ndoqo weyunivesithi - nezinye imfuneko zabafundi beyunivesithi. Kufuneka sandise ingxowa-mali ukulungiselela ezophando. Ngakumbi nangkumbi, iiyunivesithi kufuneka zidlale indima enkulu kulwakhiwo lwezithili nesizwe.

Ndiyathemba ukuba ngokujonga la maphepha alandelayo uyakuqphela indima ebonakalayo kwezophando.

**UMncedisi weNtloko yeYunivesithi neNqununu  
UNjingalwazi Njabulo S. Ndebele**

# nuwe deure geopen



**Akademici het dit lank nie meer maklik nie. Verby is die tye toe hulle al hul dae in laboratoria en biblioteke kon deurbring, snuffelend na kosbare brokkies data, immer op die spoor van daardie euforiese eureka!-oomblik. Teenswoordig word baie meer van hulle verwag. Talle het aansienlike doseerladings en hope papierwerk, ongeag of dit nou studenteverhandelings of aansoek om befondsing en gradering is. Dit maak alles deel van die lewe aan 'n hedendaagse Suid-Afrikaanse universiteit uit.**

Die Universiteit van Kaapstad, as navorsinggerigte instansie, kan tereg trots wees op die hoeveelheid en gehalte van die navorsing wat deur ons geleerde navorsers en studente gedoen word. Hierdie werk omsluit alle dissiplines en onderwerpe, van die abstrakte tot die alledaagse. Ons het navorsers wat die hemelruim fynkam vir leidrade oor die begin van die heelal, terwyl ander hul verdiep in opnames om patrone van armoede te bepaal. Die impak van hierdie werk strek wyd en raak gemeenskappe van Kirstenbosch tot Khayelitsha, Gordonsbaai tot Gugulethu. En verder.

En hierdie navorsing geniet al hoe meer die erkenning wat dit verdien. Na 2005/2006 se evaluerings deur die Nasionale Navorsingstigting spog die Universiteit van Kaapstad tans met 'n totaal van 262 gegradeerde navorsers, meer as enige ander instansie in die land. Die universiteit het ook meer gegradeerde navorsers in vier van die ses kategorieë van die Nasionale Navorsingstigting, waaronder die A-graderings vir toonaangewende internasionale navorsers en die toenemend gesogte P-graderings vir jong navorsers wat die potensiaal toon om toekomstige leiers op hul gebied te word. En om alles te kroon, het nie minder nie as 31 navorsers graderings vir die eerste keer ontvang. G'n wonder ons is effe windmakerig nie.

Hierdie uitgawe van Impact bied u 'n blik op aspekte van die navorsing wat aan die UK gedoen word. Die werk waaroor hier uitgewei word, is egter maar net die oortjies van die seekoei. Danksy die onlangse reusetoename in nagraadse registrasies kan ons aanvaar dat ons tans midde 'n oplewing op navorsingsgebied is.

In hierdie uitgawe kan u meer lees omtrent navorsing oor nuwe MIV-entstowwe en voedselallergieë, die plek van Shakespeare in die Suid-Afrikaanse onderwys,

geneties veranderde mielies, armoede, die wyse waarop howe die konsep van deliktereg sal interpreteer, en die ontdekking van nuwe kreef spesies en oseaanstrome, om maar enkele artikels te noem. Inderdaad leesstof vir uiteenlopende belangstellings.

Daar wag egter talle uitdagings op ons pad. Ons moet 'n beter balans handhaaf tussen navorsing – 'n universiteit se lewensbloed – en ander eise wat aan ons akademië gestel word. Ons behoort meer befondsing vir navorsing te vind. Daar word ook in toenemende mate van universiteite verwag om 'n groter rol in streeks- en nasionale ontwikkeling te speel.

Ek vertrou dat u, terwyl u deur hierdie uitgawe blaai, die omvangryke rol sal sien wat ons reeds by wyse van ons navorsing speel.

**Vise-kanselier en Prinsipaal  
Professor Njabulo S. Ndebele**

# project to safeguard south african statistics

**Two units in the Faculty of Commerce are taking on a project that will ramp up the quality of statistical information in South Africa.**

DataFirst Survey Data Archive and the Southern Africa Labour and Development Research Unit (SALDRU) have been awarded R2.5 million by the US-based Mellon Foundation for a project to assess the quality of South African statistical data.

Matthew Welch of DataFirst and SALDRU's Professor Martin Wittenberg will lead the project, casting an eye over a decade's worth of data, taken from surveys conducted by the government statistical agency Statistics South Africa (Stats SA). This data monitors the conditions of and changes in the South African economy, and includes the annual surveys of the SA Labour Force, the five-yearly Income and Expenditure Surveys, and the annual General

Household Surveys datasets.

The purpose of the project is to re-analyse official statistics and create a forum for data users (including Stats SA) for discussion on how to use existing data from the South African surveys optimally to ensure that reliable inferences are drawn from it.

The project will be an important point of liaison for discussion on the quality of South African data and its optimum use for sound research.

The project will make the Stats SA data more usable by assessing changes to the methods used to collect the survey data and analyse the results. Because of changes to these over the years, the periodic surveys are not always comparable, and users of the survey data need to be aware how it should be used to ensure reliable findings.

"We will be listing the strengths and weaknesses of different surveys," said

**Reliable national economic data is vital for accurate research on which to base sound economic policies.**



Wittenberg, SALDRU's deputy director.

Reliable national economic data is vital for accurate research on which to base sound economic policies. Without a clear understanding of the survey techniques employed, and changes to these over time, researchers are at a loss to tell if the perceived changes reflect actual growth in the economy, or simply changes in the survey methods employed.

"This will be a big step forward in understanding how the economy changes," said Wittenberg.

Welch, who heads the DataFirst Data Archive, said that findings from the project will be available from the DataFirst website, making this site an important source of information for researchers around the world.

**MYOLISI GOPHE**



# financial model set to change investment theory

**From its 1960s  
genesis as his doctoral  
dissertation topic,  
Sharpe's Capital Asset  
Pricing Model became  
a linchpin of modern  
investment.**

**A financial engineering paper that won the Best Paper Award at the 2006 International MultiConference of Engineers and Computer Scientists in Hong Kong is set to change our understanding of one of the fundamentals of modern portfolio theory investment, the Capital Asset Pricing Model.**

The paper's authors are Dr Nafees Hossain and his thesis supervisors, Professors Cas Troskie and Renkuan Guo, of the Department of Statistical Sciences.

"We believe that the empirical evidence and discoveries of our paper are of colossal importance to the investment community," Troskie said.

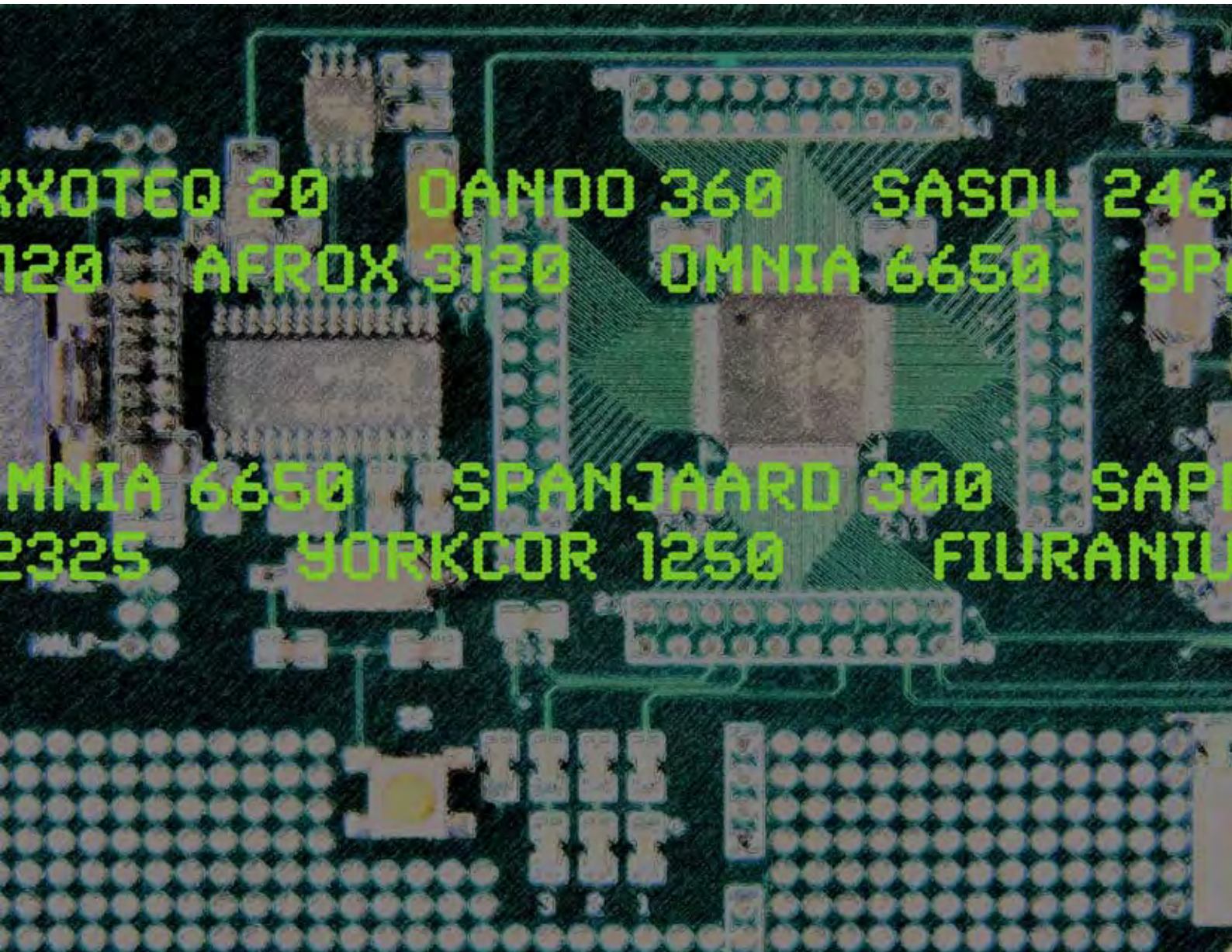
"It's also an excellent example that postgraduate students can generate high-quality publications during their studies," Guo added.

The Capital Asset Pricing Model theory influences how investors value securities and is based on Nobel laureate Professor William Sharpe's multiple index model.

From its 1960s genesis as his doctoral dissertation topic, Sharpe's Capital Asset Pricing Model became a linchpin of modern investment.

His model works on the assumption that security returns are related to each other solely through responses to a few common factors. These could be economic factors (interest rate, exchange rate, economic growth, etc), or characteristic of assets (dividend yield, firm size, etc).

Sharpe's theory was rooted in economist Harry Markowitz's seminal work on risk and return, one that presented a so-called "efficient frontier of optimal investment". This advocated a diversified portfolio to reduce risk (the don't- ▶



put-your eggs-in-one-basket theory), but didn't adequately develop a practical means of assessing how various portfolio holdings operate together.

Years ago, Markowitz had suggested that Sharpe investigate his portfolio theory as a thesis project. Sharpe did so, connecting a portfolio to a single risk factor, simplifying Markowitz's work and developing his "heretical notion" of investment risk and reward, one that became known as the Capital Asset Pricing Model.

The model caused quite a stir among investment professionals in the 1960s, and in 1990 Sharpe shared the Nobel Memorial Prize in Economic Sciences with Markowitz and Merton Miller, a University of Chicago economist.

Now Hossain's paper, *An Application of Principal Components Analysis to Portfolio Optimisation under the Sharpe Multiple Index Framework*, improves Sharpe's theory, providing a more refined risk-return structure in portfolio analysis - with significant potential to change the way investment decisions are made.

In statistics, principal components analysis is a technique for simplifying variable or factor structure by reducing high-dimensional analysis to a lower one.

"Our paper investigates the behaviour of efficient frontiers under two developed index portfolio frameworks: the Sharpe Multiple Index and the Improved Sharpe Multiple Index," Hossain said.

Using the principal components ap-

proach, they were able to construct a risk-return structure closer to the true risk-return structure for a portfolio of stocks on the Johannesburg Stock Exchange under both the Sharpe Multiple Index and Improved Sharpe Multiple Index formulations.

Empirical results show that the Sharpe Multiple Index model gives an inaccurate risk structure of an investor's financial portfolio.

"Our paper reveals and confirms a fundamental fact in financial market theory and practices: that existing Sharpe Index models - single or multiple - can either underestimate or overestimate the portfolio efficient frontier," Hossain added. "We used the principal component approach."

Their model reflects exactly what Markowitz's was trying to do but is much easier to compute and gives a very accurate model of the risk-return situation, a "huge improvement" on Sharpe's work and a boon for the investment community.

"The differences between Sharpe's model and our own sound small, but the benefits to investors will be huge," Troskie notes. "In investment it's very difficult to give a portfolio's risk-return structure. This research work gives a very refined risk-return structure of a portfolio."

Although the improved model has been developed for the South African context, the authors say it can be applied to other stock exchanges, with similar results. **HELEN THÉRON**

**The differences between Sharpe's model and our own sound small, but the benefits to investors will be huge.**

# on-the-spot tests for planes

**Dirk Findeis and Professor Jasson Gryzagoridis have dedicated the past seven years to the development of a portable, non-destructive device to put aircraft materials to the test.**

The new UCT Digital Shearography Prototype 3 developed by Findeis and Gryzagoridis, based in the Non-Destructive Testing Laboratory in the Department of Mechanical Engineering, allows for the inspection and evaluation of an object without physical contact or permanent deformation, damage or any other unwanted effect.

The device, which is based on technology called digital shearography, uses a laser to illuminate the object. The laser light reflected off the object is imaged through a shearing device - which splits the image in two - and collected by a high-resolution digital camera.

“By just looking at the surface, if there is a sub-surface defect, it will reveal itself in the displacement field of the surface,” says Findeis. “Only minimal surface deformation is required in order for the device to pick it up.”

Current aircraft testing methods include the use of dye-penetrants, X-rays and ul-

trasound. However, says Findeis, with the increased use of composite materials, digital shearography is potentially better suited to the job. Dye-penetrants and X-rays cannot detect delaminations in composites, and ultrasound requires a probe to be scanned over the entire area to be tested. The high level of attenuation of the ultrasound signal in composites complicates matters further.

With their device commercially available, the researchers have sold one to the Council for Scientific and Industrial Research (CSIR).

Airbus has also asked them for a quotation. And arrangements are afoot for the system to be taken to the hangars in Toulouse, France, for trials on the under-construction A400M Airbus.

The task at hand now is to spread the word.

Every aircraft comes with a safety and maintenance manual, specifying devices, techniques and procedures that must be followed, says Findeis. “The challenge is to get digital shearography specified in the manuals as a certified testing technique, and the visit to Toulouse may well be the answer to this challenge.”

**DANIELLA POLLOCK**

**High flyers: Dirk Findeis (front) and Prof Jasson Gryzagoridis have designed a new device to test modern-day aircraft materials.**



# hoppy mix

**The product may be easily dispensed and enjoyed, but brewing requires some serious science.**

That was the official word at the October inauguration of a new microbrewery, tucked into the corner of the Department of Chemical Engineering's experiential learning centre.

The microbrewery will afford students a first-hand taste of the brewing processes, as well as more practical technological and engineering insights - like pilot plant development and process design - and basic business principles like costing and product development.

The unit, a gift from brewing giant

South African Breweries in Newlands, teaches students some fundamental chemical processes such as enzyme extraction and yeast propagation.

That's apart from its more recreational attractions, of course. Beer, it seems, is serious business.

"In this country 2.6 billion litres of beer are consumed every year, compared to 300 million litres of wine," said Clifford Raphiri, manufacturing and technical director for South African Breweries.

It was a shame beer didn't enjoy the same mystique and culture as wine, noted Raphiri, a UCT mechanical engineering graduate.

Nonetheless, skilled brewers are in demand, and it's not just a man's work. South African Breweries has 65 brewers across the country, 23 of whom are women.

Professor Sue Harrison said the department had a long-running collaboration with the brewery, which acted as a real-world site for students, providing industrial exposure.

"Brewing is a good mix of art and science," final-year student Bradwin Roper said, tapping a measure for tasting and raising it to the light. "The brew is quite hoppy." **HELEN THÉRON**



Drink to that! (From left) Clifford Raphiri (SAB), Denis da Silva (SAB), Diarmaid de Búrca and Prof Sue Harrison toast the microbrewery.

# intelligent transport systems

## What do you think when you hear “N2 Cape Town” or “Ben Schoeman Highway”?

Congestion? Pollution? Minibus taxis riding the shoulder of the highway? Road rage?

“Anarchy,” says UCT’s Dr Marianne Vanderschuren.

She’s right. The Road Traffic Management Corporation’s figures show that there were 2 968 293 motorised vehicles on Gauteng’s roads and 1 317 586 on the Western Cape’s in January.

There are more on the way, thanks to a booming economy and a mushrooming mobile middle class with easy access to credit.

Why not build more roads? That’s a slow and capital-intensive process. And apartheid city design also flung huge satellite townships into the peripheries, making bus and rail links expensive and inadequate.

“We don’t have the best resources,” Vanderschuren says. “But we can bet-

ter manage what we have.”

A civil engineering lecturer, Vanderschuren’s PhD thesis on Intelligent Transport Systems is timeous. Similar studies in the developed world show that Intelligent Transport Systems improve transport safety, mobility and efficiency, and, more importantly, travel time.

“We shouldn’t have traffic jams at the end of our highways. We need better information on where the cars are and what speed they’re going.”

In Johannesburg, the South African Intelligent Transport Systems reports that R350 million is to be spent on an “extensive transport plan”, with Intelligent Transport Systems at the heart, ahead of the Soccer World Cup in 2010.

Vanderschuren’s amused when told that the topic seems an unlikely one for a Hollander (think flat, straight, with responsible commuters on bicycles). But Vanderschuren has always been preoccupied with cars, roads and sound monitoring practices.

“My father had a driving school.” ▶

**We shouldn’t have  
traffic jams at the  
end of our highways.  
We need better  
information on  
where the cars are  
and what speed  
they’re going.**

**Indeed, South African drivers have bad habits: the distance between cars (we're too close); constant lane swapping (which research shows doesn't get us anywhere faster); overtaking on off-ramps; and pushing in.**

Her thesis models three Intelligent Transport Systems on the N2 and Ben Schoeman Highway, two particularly problematic corridors. The first model investigated the effects of a high-occupancy vehicle lane for taxis, buses and cars with multiple passengers.

The second looked at homogenising traffic speed and flows using variable message signs (changing recommended speeds depending on traffic flow). In developing countries these worked well to reduce congestion.

And the third examined introducing ramp metering, which regulates the stream of cars joining the highway from on-ramps.

The idea is to tweak a set of controls (traffic lights) that ensure a maximum flow of cars from A to B with minimum disruption.

"The aim of Intelligent Transport Systems is to keep the highway flowing, reducing congestion and pollution. Moreover, when you have a lot of different driving behaviour, as is currently the case, the accident rate increases."

Her modelling results yielded some surprises. For example, high-occupancy vehicle lanes didn't reduce the time factor or increase vehicle throughput.

"I found that introducing a high-occupancy lane on the Ben Schoeman Highway and N2 led to congestion in the suburbs as vehicles weren't able to enter the highway."

Vanderschuren also saw that homogenising speed (and thus the flow of cars)

by introducing variable message signs had only a minor influence on throughput, although the safety benefit increased when a fixed 80km/hour speed was introduced.

Ramp metering also provided varying results. On the Ben Schoeman Highway, throughput increased by between 2.2% and 8.5%. And though travel times remained unchanged, the safety risk decreased. But on the N2, traffic throughput decreased by between 5% and 8.8%, with an increase in safety risk.

However, fine-tuning her models proved difficult. When it comes to variables like driver behaviour, South Africans are unique.

"We even find differences between cities," says Vanderschuren, but adds that no hard data are yet available to paint a real picture. Various "side-steps in the literature" have at least yielded some insights into the differences between local drivers and their American and European counterparts.

Indeed, South African drivers have bad habits: the distance between cars (we're too close); constant lane swapping (which research shows doesn't get us anywhere faster); overtaking on off-ramps; and pushing in.

Nonetheless, Vanderschuren's overall results provided sufficient evidence to suggest Intelligent Transport System measures are essential in our transport networks.

"But it will depend on how the meas-



ures are implemented and the types of corridors they are used on.”

There are other complicating factors. Service levels need to be improved before Intelligent Transport System measures can be considered. And our expertise levels need beefing up. South Africa has too few specialists in the field.

Vanderschuren has sent copies of her study (the thesis was printed in book form) to several stakeholders, including the South African Society of Intelligent Transport Systems and the Ministry of Transport.

Hopefully, someone has their reading glasses on. **HELEN THÉRON**

**Road works: Dr Marianne Vanderschuren’s PhD thesis on Intelligent Transport Systems is timeous. But service levels and expertise will need some attention, she says.**

*(Picture: Roger Sedres)*



# the perfect crash would be no crash

Striving to jack up vehicle safety, a leading European car manufacturer once suggested the development of a flawed vehicle frame, made of rectangular tubes, low-carbon steel or aluminium, which would make a crash safer. After crushing

more than 100 steel tubes, UCT's Dr Steeve Chung Kim Yuen says the answer is mini-pyrotechnic devices, like those used to trigger airbags.

Chung Kim Yuen, a postdoctoral fellow in the Blast Impact and Survivability Re-

search Unit (BISRU) in the Department of Mechanical Engineering, has found a way to improve the impact-absorption characteristics of a vehicle's frame, under the supervision of Professor Gerald Nurick. This he believes will reduce the impact experienced by passengers during a crash.

Chung Kim Yuen says that, in application, the impact of a collision would trigger strategically placed little pockets of explosives on a vehicle's frame to create geometric and material imperfections in the frame. This would cause the vehicle to crumple in a way that best preserves the physical safety of its occupants.

"It can be used in any system that needs to absorb large amounts of kinetic energy, which includes most of our transport system, even elevators in an impact event," Chung Kim Yuen said.

It's convenient, too. "You can use the same mechanism that is used for airbags." **DANIELLA POLLOCK**

**Crash:** Dr Steeve Chung Kim Yuen is looking into ways to make car crashes safer.



# uct hosts africa's genetic research

**It is research that could help fight deadly diseases and threatening economic challenges. South Africa, and specifically UCT's Institute of Infectious Disease and Molecular Medicine (IIDMM), is hosting the third component of the International Centre for Genetic Engineering and Biotechnology (ICGEB), having beaten Nigeria and Tanzania in the race.**

The research that will be conducted at the ICGEB laboratory at UCT is expected to help the world's scientists determine the mechanisms related to infections and the resurgence of diseases at a molecular level. It will hopefully also result in new drugs and vaccines in the fight against TB, malaria and HIV/AIDS.

There are existing components in laboratories at Trieste, Italy, and New Delhi, India.

The ICGEB, established in 1987 by the United Nations Industrial Development Organisation, places major emphasis on health-related research as well as on projects towards the sustainable application of biotechnology in agriculture.

The centre will give South Africa access to sophisticated technologies aimed at solutions to both medical and agricultural challenges on the continent. Importantly, it will also enhance efforts towards the development of an African hub of technology. ▶

**Title bid: Vice-Chancellor and Principal, Prof Njabulo S Ndebele (left), accompanied Minister Mosibudi Mangena (middle) on his visit to the IIDMM. Prof Frank Brombacher showed the minister around one of the institute's laboratories.**



**The component, he added, would also boost the country's profile as the preferred destination for global science and technology initiatives and would drive Africa's development in innovation and technology.**

Minister of Science and Technology Mosibudi Mangena said the development was significant on several fronts: "It will enable us to address the disease burden of the developing world, the agricultural challenges of poor harvest yields, and the use of biotechnology to develop our manufacturing and industrial sectors."

His department has allocated R40 million over four years to support the ICGEB's establishment.

Mangena said the decision will lend powerful momentum to the development of the African Science and Technology platform under the auspices of the African Ministers' Council on Science and Technology.

The component, he added, would also boost the country's profile as the preferred destination for global science and technology initiatives and would drive Africa's development in innovation and technology.

The government's goal is to dedicate one percent of gross domestic product to research and development (R&D) by 2008 and indications are that public and private expenditure on that has increased from 0,69% in 1994 to 0,87% in 2004/5.

In its report to the Board of Governors, the ICGEB selection committee expressed satisfaction with the infrastructure and organisation of scientific research conducted at the IIDMM.

According to the report, "the possibility of carrying out good science by the IIDMM is enhanced by the number of research bodies located near UCT, such as the Medical Research Council".

UCT established the IIDMM in 2001 to consolidate and expand existing efforts to combat the most serious threats to health and overall prosperity in the region.

Director Professor Greg Hussey said: "The Institute of Infectious Disease and Molecular Medicine is extremely proud to be hosting the African component of the ICGEB here at UCT. We view this initiative as a positive step by the world community to contribute actively towards the advancement of science on the African continent. The research mandates of the IIDMM and the ICGEB are remarkably similar in context and focus and we look forward to forging closer links with our colleagues in Africa and on the Indian sub-continent." **MYOLISI GOPHE**

# prize-winning research

**Just before he wrapped up his doctoral thesis with the Hatter Institute, UCT's premier cardiovascular research laboratory, Siyanda Makaula got the perfect confidence-booster.**

His presentation on his research earned him first prize and a purse of R5 000 at the AstraZeneca Medical Research Day, hosted by the pharmaceutical company. At the event, researchers from UCT, the Medical Research Council, the University of Stellenbosch and the University of the Western Cape presented their ongoing work.

Makaula's winning talk was around his interest in the high-impact link between diabetes and heart disease. It's estimated that up to two out of three diabetics die of heart disease or stroke.

In his doctoral work, Makaula shed some valuable light on the workings of a metabolic gene known as acetyl-CoA carboxylase beta (ACC<sub>β</sub>).

ACC<sub>β</sub> controls how much fatty acids are taken up by the mitochondria, the organelle that converts fats to energy. Working as an inhibitor, the ACC<sub>β</sub> curbs the mitochondria's capacity to


absorb fatty acids, which means the mitochondria produce less energy.

But what happens when the body needs a huge dollop of energy, say, during strenuous exercise? This is where, Makaula showed, a mechanism known as the nuclear respiratory factor 1 (NRF1) kicks in.

The NRF1 revs up the mitochondria's capacity to produce energy by switching off the ACC<sub>β</sub> gene.

"It inhibits the inhibitor," explains Makaula.

Makaula is now based in the Department of Physiology at the University of the Witwatersrand. **MEGAN MORRIS**

A photograph of Siyanda Makaula, a young Black man with long dreadlocks, wearing a white lab coat. He is standing in a laboratory, looking directly at the camera with a neutral expression. The background is filled with various pieces of laboratory equipment, including pipettes, bottles, and racks, creating a busy scientific environment.

**All heart: Siyanda Makaula has added another piece to the puzzle that links diabetes to heart disease.**

# food allergies on the rise

**Master's student Michelle van der Ventel used to be partial to a piece of fresh snoek.**

These days she's seen too much under the microscope to really enjoy the Cape delicacy. Things like *Anisakis pergreffii*, a nematode or parasitic worm that lives in the intestines of fish.

The David and Elaine Potter fellow's research into food allergens reveals the importance of fish allergy. During her honours research project, Van der Ventel investigated *Anisakis* infection and its influence on the allergic response to common food allergens.

Food allergies are characterised as an adverse or abnormal host response to a particular molecule present in food. This reaction triggers the body's immune system to elicit 'IgE' antibodies that bind to special mast cells. On binding, these mast cells are activated and release chemical mediators that, in turn, cause the symptoms associated with an allergic response.

The primary predisposing factor leading to allergies is sensitisation, Van der

Ventel said. Once sensitised, the individual will continue to mount an allergic immune response to the specific allergen. Key symptoms range from the minor, such as watery eyes, to life-threatening reactions such as respiratory disease and anaphylactic shock.

Basic eatables and drinkables like milk, eggs, peanuts and fish, which constitute an important protein source in Africa, are responsible for about 90% of allergic reactions. It's a growing problem around the world. In South Africa, 6% of children and 4% of adults are allergic to different kinds of food.

"Allergic diseases such as asthma, hay fever, eczema and food allergies are among the most common - and costly - diseases in the world," says Van der Ventel.

These reactions may result from enzyme deficiencies such as lactase deficiency. Other pharmacological food intolerances are caused by food additives histamine and tyramine found in fermented foods such as cheese, alcoholic drinks and canned fish.

Adverse reactions are also attribut-

**Basic eatables and drinkables like milk, eggs, peanuts and fish, which constitute an important protein source in Africa, are responsible for about 90% of allergic reactions. It's a growing problem around the world.**



able to food additives like food colouring, flavouring, preservatives and anti-oxidants.

Not only are consumers at risk but also those employed in processing factories; occupational sensitisation, it's called. For example, it affects those who work with raw fish day in and day out, gradually sensitising the workers to allergens present in fish and their products, causing skin rashes and other symptoms.

Occupational fish and seafood allergy in South Africa has raised important concerns illustrated in a study

conducted in Van der Ventel's research unit. Her research project thus aims to develop a mouse model of fish allergy to dissect the underlying immunological mechanisms involved.

Van der Ventel investigates the major fish allergen, parvalbumin, a fish-muscle calcium-binding protein, and its allergenic properties upon various sensitisation exposure routes in mice.

"Understanding these mechanisms will help us improve current diagnosis and evaluation of allergic people."

**HELEN THÉRON**

**Behind glass: Michelle van der Ventel tackles the results of her mouse model of fish allergy, especially parvalbumin, a fish-muscle calcium-binding protein.**

# sports scientists shake up old theories

**For a long time, everyone has known why athletes cramp during endurance events. Conventional wisdom puts it down to two things - dehydration or an electrolyte imbalance.**

But now a new study by Professor Martin Schwellnus and Dr Malcolm Collins at the MRC/UCT Research Unit for Exercise Science and Sports Medicine (ESSM) suggests that dehydration and electrolyte concentrations have little bearing on who gets cramps or when.

What then causes the cramps?

Fatigue, believes Schwellnus. In a new fatigue hypothesis, the scientists propose that cramping develops when the muscles grow tired, which is when they become more “excitable” and twitchy.

“Which is why cramping always comes at the end of an endurance event,” says Schwellnus.

For the UCT researchers, the findings are leading to even more interesting questions like why would triathletes decide beforehand to push themselves so hard? That’s one they’ll pose to Ironman participants this year.

**CHRIS MCEVOY**



**Nerves of steel: Ironman races are among the most prestigious on the world sporting calendar, but triathletes sometimes take a battering, as Prof Martin Schwellnus and Dr Malcolm Collins (in picture) found again this year.**

# counting the cost of abuse

**She is young and pretty but with a limited future. She cannot do simple counting exercises and her IQ is low. The 10-year-old girl from Hanover Park on the Cape Flats has brain damage because her mother consumed alcohol while she was pregnant.**

A Functional Magnetic Resonance Imaging (fMRI) research study of number processing in children with fetal alcohol syndrome (FAS) shows that affected children may never be able to acquire certain skills.

The girl was one of the subjects in a functional neuro-imaging pilot study conducted at the Faculty of Health Sciences. This study is the first of its kind to be performed with South African children and presents a collaboration between Dr Ernesta Meintjes and Professor Chris Molteno of UCT, Professors Sandra and Joseph Jacobson of Wayne State University, and John Gore of Vanderbilt University.

The incidence of FAS in the col-

oured population of the Western Cape Province has been estimated to be 18 to 141 times greater than that in the United States. This population, composed mainly of descendants of white European, Malaysian, and Khoi African ancestors, has historically comprised the large majority of workers in the wine-producing region of the province. The high prevalence of FAS in this community is a consequence of very heavy maternal drinking during pregnancy, due to poor psychosocial circumstances, say researchers.

In 1998, Molteno and the Jacobsons started recruiting mothers from antenatal clinics in the coloured communities where there is an unusually high incidence of alcohol abuse and dependence in women of child-bearing age, very heavy alcohol consumption during pregnancy, and, consequently, one of the highest incidences of FAS in the world.

Obtaining accurate drinking histories from the mothers is critical for a diagnosis of FAS. Detailed drinking ▶

**The incidence of FAS in the coloured population of the Western Cape Province has been estimated to be 18 to 141 times greater than that in the United States.**



histories during pregnancy were obtained from the mothers using timeline follow-back interviews. The 159 children born to these mothers have been assessed at six months and 13 months, using a battery of narrow-band infant cognitive tests that are potential early indicators of alcohol-related cognitive deficit.

The results show alcohol-related impairment in infant numerosity, visual acuity and attachment. At five years, evidence was found of impairment in magnitude comparison, a component of number processing that appears to be particularly sensitive to prenatal alcohol exposure.

As yet it is unknown which parts of the brain are most sensitive to prenatal alcohol exposure and no biomarkers for FAS have been identified. But Molteno, Meintjes and the Jacobsons were determined to do functional neuroimaging of this cohort when they reached eight years of age.

This pilot study aims to ascertain whether brain regions are activated differently during number processing in alcohol-exposed and control children, and whether these differences could be detected in children between eight and

11 years of age using functional neuroimaging. fMRI is a technique that shows increased signal intensity in brain regions with increased oxygen perfusion, and is based on the different magnetic properties of oxy-haemoglobin compared to deoxy-haemoglobin. Using this technique, researchers are able to identify brain regions that are active during specific tasks.

About 64 right-handed children between the ages of eight and 11 from Hanover Park and Philippi participated in the study, which started in May 2005 and was completed recently.

Alcohol-exposed and control children were recruited from the same communities and were matched for age, gender, and socio-economic status. Two self-paced paradigms were administered in the MRI scanner: exact addition and proximity judgement, in which children were asked to identify which of two numbers are closer to a third.

To facilitate subject comparisons, each subject's data was normalised using a tool known as Talairach space. Although affected children performed significantly poorer on behavioural tests of exact addition and proximity

judgement, the tasks for the scanner were simplified to the extent necessary for both groups to perform equally well in the scanner.

In both tasks control children show greater activation of the right anterior horizontal intraparietal sulcus and bilaterally of the posterior horizontal intraparietal sulcus, spilling over into the posterior superior parietal lobule, Meintjes explained.

Previous research in adults has identified that the horizontal intraparietal sulcus, the left angular gyrus, and the posterior superior parietal lobule play a critical role in number processing. In both tasks children with fetal alcohol spectrum disorder therefore show reduced activation of two parietal areas central to number processing.

The results suggest that children with fetal alcohol spectrum disorder recruit other areas, notably the angular gyrus and anterior cingulate region, to a larger degree.

This is to compensate for impairment in horizontal intraparietal sulcus and posterior superior parietal lobule function to successfully complete the number processing tasks.

**MYOLISI GOPHE**

Losing count: In a new study on fetal alcohol syndrome (FAS) on the Cape Flats, Dr Ernesta Meintjes has found that the condition impairs children's ability to develop some basic skills.



# africa's biggest hiv vaccine trial

**A candidate HIV vaccine goes up for testing in Gugulethu soon, and could give vaccine developers around the world some useful leads**

UCT's Desmond Tutu HIV Centre's HIV Vaccine Clinical Trial site, in the heart of Gugulethu, is one of five research sites for a new HIV vaccine trial, the largest yet in Africa.

Over the next four years, about 3 000 HIV-negative men and women will be followed closely in this, a Phase IIb "test-of-concept" vaccine trial known as Phambili or HTVN 503. The trial will determine how well the vaccine works and, if successful, if it can move on to a larger Phase III trial, which could lead to licensing and production.

The main objective, said Professor Linda-Gail Bekker of the Institute of Infectious Disease and Molecular Medicine's DTHC and local leader of the Phambili trial, is to see how well this vaccine product does in the field. The results from this trial will inform vaccine developers about a number of key factors that have dogged product development around the world.

Bekker explains that the trial seeks to determine if the candidate vaccine can possibly prevent HIV infection, or at least modify the disease progression of those who become infected. It is hoped that, if anyone should become HIV-infected during the course of the trial, after vaccination, their HIV viral loads may be much lower, resulting in slower progression to HIV disease or AIDS.

Participants who reach that point will be placed on anti-retroviral treatment.

"We also want to see how well this HIV Clade B vaccine (the sub-unit is derived from a clade or subtype B HIV) functions in a Clade C environment," says Bekker. Clade C is the most common HIV subtype in South Africa, while Clade B occurs mostly in North America.

The question then is: Will this vaccine show potential to protect against all subtypes of HIV and, indeed, will differences in subtype matter as new vaccines are developed?

The test vaccine, provided by Merck & Co Inc, contains a weakened adenovirus - one of the main culprits in colds - that serves as a vector or carrier for the immunogenic HIV component. Because

**The question then is: Will this vaccine show potential to protect against all subtypes of HIV and, indeed, will differences in subtype matter as new vaccines are developed?**



the vaccine contains only a portion of HIV housed in a weakened adenovirus, study participants cannot contract HIV, but the replication of the non-virulent adenovirus means that the immune system is adequately “exposed” to the HIV component, explains Bekker.

It is hoped that this component would sufficiently prime the immune system to respond efficiently if ever the host is exposed to wild-type HIV in the future.

This provides the second reason for testing this vaccine in South Africa: South Africans tend to have high levels of background immunity to this type of adenovirus.

“This may mean that the immune systems of our participants fight the adenovirus component too strongly, weakening the effect of the vaccine. Only a study such as this will be able to tell us what the impact of background immunity to the vector virus will mean. This is, again, a crucial question for the development of these vaccine products for Third World countries,” says Bekker.

In addition to the DTHC site in Gugulethu, four other sites in Soweto, Klerksdorp, Medunsa and Durban have been selected as clinical trial sites.

**DANIELLA POLLOCK**

**To the point: A candidate HIV vaccine will be trialled with some 3 000 South Africans.**

# cancer warrior out of the blue

**Talk about biodiversity and the first image that springs to mind is likely to be that of a plant. But for her doctoral work on treatments for oesophageal cancer, Dr Catherine Whibley has turned to another unsung treasure of biodiversity - the ocean.**

“Marine biodiversity is far greater than terrestrial biodiversity, so it’s actually quite a good research option,” she says.

With colleagues at the Nelson Mandela Metropolitan University and Rhodes University, Whibley, based in

UCT’s Division of Medical Biochemistry in the health sciences faculty, has identified a number of compounds from Southern African ascidians, which are soft corals and sponges that could be of possible use in the treatment of oesophageal cancer.

Oesophageal cancer, which is cancer of the tube connecting the mouth to the stomach, is now one of the leading causes of cancer-related deaths in black males in South Africa. This cancer is most often caused by a low fibre diet and the use of alcohol and tobacco.

During her research, Whibley further characterised one particular group of compounds that was isolated from a sea slug known as a nudibranch, to see exactly how they kill off cells, and so far the results have been promising. The chain reaction ends in a programmed cell death, a process known as apoptosis. This is preferable to the messier process known as necrosis, where cell debris often causes unforeseen side effects like inflammation.

(Whibley’s supervisors during this research were Dr Denver Hendricks of UCT and Rhodes’ Prof Mike Davies-Coleman.) **MEGAN MORRIS**

**In deep water: Dr Catherine Whibley turned to the ocean in her pursuit of treatments for oesophageal cancer.**



# as the world likes it

**Let there be no mistake – Dr Natasha Distiller is far from ready to jettison William Shakespeare from South African high school and university curricula.**

But, the UCT scholar would propose instead, it's perhaps time to revisit the Bard's hallowed place in the country's education system. And maybe take a more nuanced look at his works.

To most of the world, William Shakespeare is one of the greatest writers - no, the greatest - England and the world has ever produced.

His texts speak for themselves. In the 400-plus years since he first put quill to scratchy paper, his words have won the hearts of critics and theatregoers across countries, cultures and languages. There's something in there for everyone.

"The great quality of Shakespeare, which makes him universal," wrote one *Guardian* reporter, "is his humanity".

Right?

Well, maybe not. A number of scholars – especially those with a postcolonial and cultural materialist bent - have suggested that perhaps Shakespeare's

standing in the literary world has as much to do with culture and history – did he have greatness thrust upon him? - as his way with a soliloquy. And perhaps his work is not as ahistorical as the universalists would have it. ▶

**Why and how: Dr Natasha Distiller raises questions about Shakespeare's place in a post-apartheid education system.**



That makes Shakespeare a tricky proposition, and there can be no straightforward teaching of his work, argues Distiller, based in the Department of English Literature and Language. Not too long ago, his plays and sonnets did good service in aid of, for example, an apartheid education system that wanted to entrench certain values as universal.

But what now for Shakespeare in post-apartheid South Africa?

"If we accept the conclusions of cultural materialist and postcolonial work on the development and institutionalisation of English literature as a discipline, and of the role of Shakespeare within this history," says Distiller, "then there

is no intrinsic reason why Shakespeare's texts should be made to speak to current South African issues outside of the logic of the colonial system that entrenched Shakespeare as the paragon of English literature and thus human expression."

But despite the hardest efforts of university scholars to point to the historical and cultural roots of Shakespeare's canonisation, schools persist in teaching the Bard's "universality".

Two recent series of texts, one by Macmillan Publishers and another by Maskew Miller Longman, did their level best to draw parallels between Shakespearean staples (think Macbeth and his three witches) and South Africa's particular issues.

"The fact remains, the more these editions try to make Shakespeare's language and cultural context 'accessible', the more they point to the gap between the texts and the students' lives," says Distiller.

And what to make of the highly praised set of books in which Walter Saunders modernised Shakespeare's 16th century English?

"If Shakespeare on his own is so abstruse," asks Distiller, "why struggle to come to terms with him at all?"

There are many such questions to be asked of the education system, she suggests.

"I'm not saying we shouldn't study Shakespeare, but that there is lots to be gained from asking why and how we do it." **MEGAN MORRIS**



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# plethora of publications

**This year, several new titles have come from the School of Languages and Literatures' stable.**

Dr Yasin Dutton (Arabic) has produced *Original Islam: Malik and the madhhab of Madina*, part of Routledge's Culture and Civilisation in the Middle East series. The work provides a comprehensive section on the scholarly credentials of the eighth-century Madinan jurist Malik ibn Anas and a detailed examination of a number of theoretical and practical disputed legal issues.

Dr Clive Chandler's *Philodemus on Rhetoric Books 1 and 2: Translation and Exegetical Essays* is part of Routledge's *Studies in the Classics* series and is the result of Chandler's UCT doctorate. The Epicureans were notorious for denigrating most forms of civic participation and for rejecting those cultural activities broadly labelled *paideia*. Philodemus presents an interesting case, for a substantial portion of his surviving work is preoccupied with

investigations into this *paideia* and with demonstrating how an orthodox Epicurean is to approach them. This book selects one of those investigations, the first two books of Philodemus' *On Rhetoric*. The work constitutes a helpful guide to this difficult text.

Following years of research, Wilhelm Snyman (Italian and German) and Giuseppe Stellardi, chair of Italian at Oxford University, have translated a very difficult text, Carlo Michelstaedter's *Persuasion and Rhetoric*, into English for the first time. Michelstaedter committed suicide after completing his "devastating treatise" (his university thesis) on the human condition and the course of Western civilisation.

Professor Dave Wardle's (classics) commentary on Cicero's *On Divination Book I*, published by Oxford University Press, is the first one that is accessible to the reader who knows no Greek or Latin. Cicero's treatise *On Divination* provides the fullest discussion of the

various phenomena of divination in the Greco-Roman world and of the arguments formulated for and against its efficacy. This new translation and extensive commentary (the first in English since 1920) provides a current and comprehensive guide to ancient debates on divination and to the latest scholarly assessments of Cicero's work.

Professor Etienne van Heerden's (Afrikaans) most recent translations are the Dutch translation of *In Stede van die Liefde* and the Russian and Greek translations of *The Long Silence of Mario Salviati*.

Prize-winning poet Professor Joan Hambidge (Afrikaans) has published a new anthology, *Dad* (Genugtig! Uitgewers), poems published about her father after her debut in 1985 (*Hartskrif*) and after his death. "My relationship with my father, Afrikaans versus my father's English world, is assessed in the poems." Hambidge has published 20 volumes of poetry. **HELEN THÉRON**



# life given to cape town's archives

**Mark Fleishman's contemporary dance production, *Cargo*, has pulled in the crowds at some of the country's premier venues, and has earned its fair share of plaudits.**

*Cargo* - the seventh in a series of collaborations between Jazzart Dance Theatre and Fleishman's Magnet Theatre - re-imagines the lives of slaves at the Cape (circa 1652-1836) through performance. With this Fleishman has breathed life into the dusty archive material that he spent a year digging up.

For many centuries cargo was destined for the Cape of Good Hope, explains the show's blurb. Porcelain, silks, spices and slaves came from Mozambique, Madagascar, India and Indonesia. Slaves were an integral part of this lucrative trade. But they also brought with them a culture that is still at the heart of the Cape today.

Slavery's legacy still haunts the city, explain *Cargo's* creators. It is a past that will not pass, and yet so little is remembered. With this work, Fleishman seeks out the human elements,

the desperate attempt of the slaves to retain their humanity. There is no one story line. Rather, Fleishman explains, "Characters are figures in a landscape of various manifestations."

The set, a giant wooden crate sitting on a bed of sand and water, much like cargo when it arrived at the shores of the Cape, later unfolds to reveal a colonial-style house, where slaves' reality, one of violence and attempted resistance to social alienation, plays off.

Much like the archives that underpin *Cargo*, the production is broken into fragments of performance, each bearing a title; an entry in the inventory list.

But how does one bring an archive to life?

"An archive collects documents, usually official documents; what it can't easily do is maintain the body and voice," says Fleishman. "As is, there is very little available in slaves' own voices. Performance puts the body back into the text."

By taking all the bits of voices in the archives, Fleishman set out - with no

**An archive collects documents, usually official documents; what it can't easily do is maintain the body and voice.**



initial script for the cast of 20 – to use the body as a communicator.

Words, Fleishman says, only came where absolutely necessary. Those words have been taken directly from the archives and are spoken by performers as if it were the first time they were reading them. “It’s very difficult to speak for someone else. With dance

the audience is forced to imagine.”

“In *Cargo* we try not to layer the text with emotion; performers simply speak the words as they originally appear in the archives.”

In a press release for *Cargo*’s most recent run, at the Spier Arts Summer Season, the silence, or sparse text, is explained. “It makes one poignantly ▶

**Looking back:** Mark Fleishman’s contemporary dance production, *Cargo*, is the outcome of an ongoing research project into the history of Cape Town.

(Picture: Roger Sedres)

aware of the heartache as it renders one silent in one's own space," it reads.

This is Fleishman's fourth production to find its core in the archives of Cape Town. He wants to give the muted a voice and a platform to speak, he says.

"A fearlessly honest verbal and visual picture of humanity and human error," reads a recent review in *Business Day*. "The dialect is metallic, terse and snappy; the dance fierce and almost feral; but together they create those narrative tensions which define the horrors of human trafficking."

Fleishman, renowned director, play-

wright and published writer, also heads the Department of Drama at UCT. His interest in archival research springs from his upbringing in Cape Town. "From a young age I was provoked to remember," he says. "With a Jewish background I was provoked to remember the Holocaust, an event I had no first-hand knowledge of.

"*Cargo* is the outcome of an ongoing research project into the history of Cape Town," Fleishman says. "But, instead of writing it up as a book, a year's research is captured in dance."

But, as Fleishman adds, the past is

encrusted on the present. "To move forward, we need to deal with the past."

For now, Fleishman has done his bit delving into the Cape's past. His next venture will explore, in a similar fashion, the present, and will aptly be titled *Now*.

He remains diplomatically modest about his take on the present. "The arts don't deal with finite answers; it's about possibilities and different options. It's all about experience.

"I guess what I do is to show performance as a meeting of people."

**DANIELLA POLLOCK**



**Human cargo:** Mark Fleishman's production re-imagines the lives of slaves at the Cape.

# health assets in africa

**Professor Jim Cochrane in the Department of Religious Studies leads the UCT hub of the African Religious Health Assets Programme (ARHAP), which is building a systematic knowledge-base of religious health assets (RHAs) in sub-Saharan Africa.**

The project aims to align and enhance the work of religious health leaders, public policy decision-makers and other health workers facing the challenges of diseases such as HIV/AIDS.

Religion is highly significant for Africans, not just as a matter of personal belief, but as a critical factor in shaping how they perceive health, what choices they make in their response to ill health, and what trust they place in those who offer them solutions.

Religion is a problem for many scientists and policy-makers, a negative factor that is best sidelined, Cochrane explains. But the fact is that many people and groups are already doing a great deal about the health challenges they face on the basis of their religious convictions, worldviews and institutions.

In working with communities, Cochrane advocates a grounded theory approach.

“Theories need to be shaped as much by the way people actually think and work and live on the ground, as they are by prior learning,” he says. ▶



“This can get messy if one is not careful, which makes it hard work to build adequate, persuasive theories this way. But such theories do at least take reality seriously, and when it comes to human beings, they are more likely to be of practical use.”

Cochrane describes the research process in Lesotho and the necessity of translating questionnaires into Sesotho, where there are no equivalents for key English terms. For example the Sesotho word “bophelo” had to be used to encompass everything that is meant by religion, health, and quite a bit more.

“So it’s this translation, cultural trans-

lation that is also a way of looking at the world that is different. Researchers are faced with the challenge of making translations that enable ordinary people to respond in ways that help us to understand those worlds. This captures the essence of ARHAP’s research”.

ARHAP’s approach is to use the assets that people on the ground have - and build on these - rather than working from a deficit model, which is the approach of much standard research.

As Cochrane says, “We are interested in beginning with whatever you have that you work with, no matter how deprived or marginalised your situation.”

The programme is profiling UCT in significant ways as a result of its linkages with agencies such as the World Health Organisation, the Centres for Disease Control and Prevention, the Global Health Council, the Global Fund, the German Medical Mission, the Oslo Centre, the Carter Centre, and the World Council of Churches - and that’s just outside Africa. Significant links have also been developed across Southern and East Africa, with public health agencies, government bodies, other research centres such as the Centre for Health Policy at Wits, the Human Sciences Research Council, and the National Research Foundation, and many faith-based organisations or religious entities. Several doctoral students have registered at UCT because of ARHAP’s work. **CHRIS MCEVOY**



**Researchers are faced with the challenge of making translations that enable ordinary people to respond in ways that help us to understand those worlds. This captures the essence of ARHAP’s research.**

# skull points to common ancestor

**The puzzle of modern human evolution is missing several pieces, but the Hofmeyr skull from the Karoo has provided an intriguing clue about our ancestry.**

A mud-filled human skull found in an erosion channel by a dam construction worker near Hofmeyr, Eastern Cape, in 1954 and only recently dated to be 36 000 years old, corroborates genetic evidence that modern humans probably originated in sub-Saharan Africa and migrated at about this time to colonise the Old World.

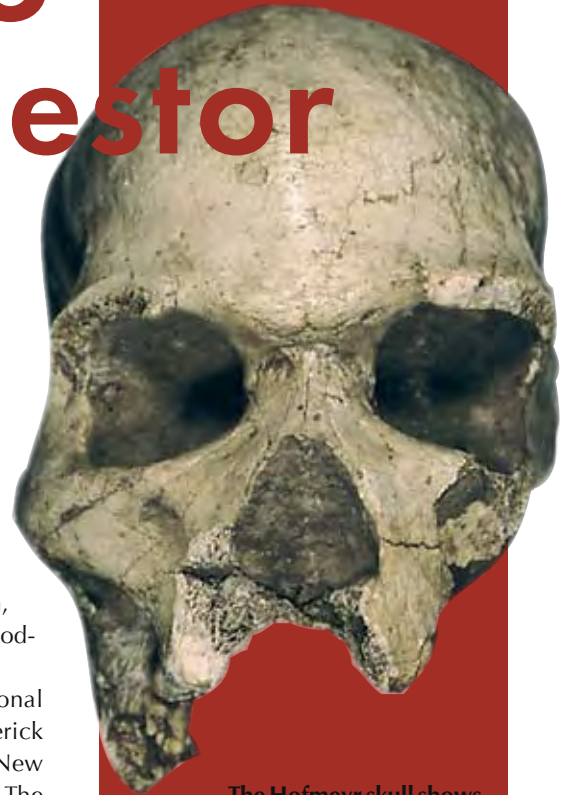
The development has added another piece to an intriguing puzzle about the evolutionary origins of modern people. The skull also shows that Africans and Europeans looked very similar at that time.

Commenting on the skull's significance on the eve of a *Science* paper publication (Late Pleistocene Human Skull from Hofmeyr, South Africa, and

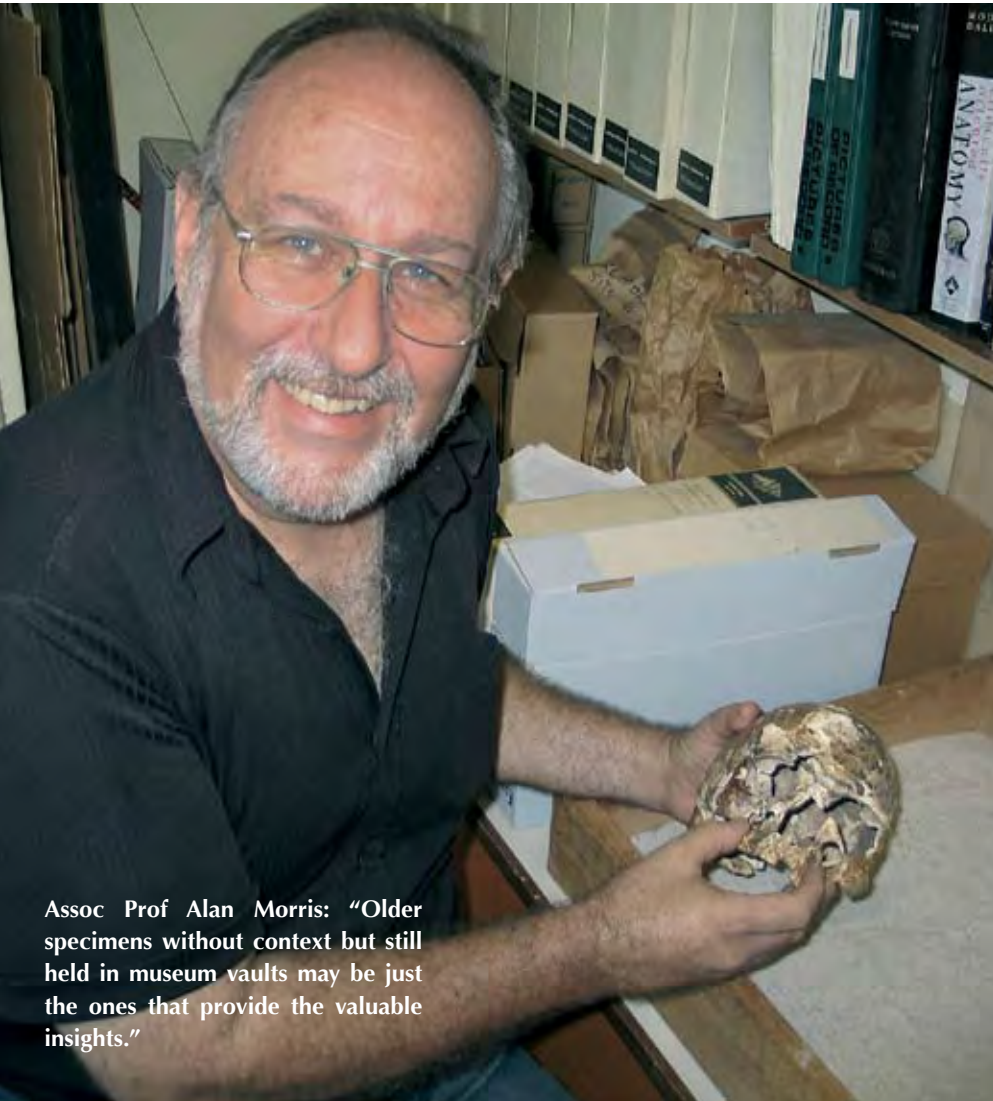
Modern Human Origins, 12 January 2007), UCT's Associate Professor Alan Morris of the Department of Human Biology said: "The Hofmeyr skull gives us the first insights into the morphology of such a sub-Saharan population, at a time when the migrations of modern humans had just left Africa."

Morris was part of an international team of scientists, led by Frederick Grine of Stony Brook University, New York, who conducted the study. The mysteries locked into the skull were made known only after a new dating technique determined its age – over 50 years after its discovery.

Because the carbon-containing organic matter had leached from the skull bone over the millennia, preventing the use of carbon-dating methods, the researchers had to look to a combination of uranium-series and optically stimulated luminescence dating techniques. ▶



**The Hofmeyr skull shows that Africans and Europeans looked very similar around 36 000 years ago. It was discovered near the Karoo town of Hofmeyr, about 70 km northeast of Cradock, but was dated only recently, using new techniques. The fossil also shows characteristics of modern humans: it lacks "beetle brows" and has smaller jaws and teeth than earlier, non-modern human fossils.**



Assoc Prof Alan Morris: "Older specimens without context but still held in museum vaults may be just the ones that provide the valuable insights."

Working with mud from deep within the skull, mud that had not seen the light of day since the death of the Hofmeyr man, Oxford University geomorphologist Dr Richard Bailey was finally able to place the skull in time.

And the skull's age is significant. Despite its generally rich palaeontological heritage, sub-Saharan Africa is devoid of human fossils between 70 000 and 15 000 years ago, leaving a critical gap in human evolutionary history.

"Because the Khoe-San are represented in the recent South African archaeological record and have an ancient genetic heritage in the region, the Hofmeyr skull was expected to closely resemble them," Morris explained.

Instead, this South African fossil has a very close affinity with the European Upper Palaeolithic specimens and is quite distinct from recent sub-Saharan Africans, including the Khoe-San. The team's findings agree with the genetics-based Out of Africa theory, which predicts that humans, like those that inhabited Eurasia in the Upper Palaeolithic, would have been found in sub-Saharan Africa around 36 000 years ago.

Various genetic studies, especially those on the mitochondrial DNA of living people, indicate that modern humans evolved in sub-Saharan Africa and then left between 65 000 and

25 000 years ago to colonise the Old World.

“Until now, lack of human fossils of appropriate antiquity from sub-Saharan Africa has meant that these competing genetic models of human evolution could not be tested by palaeontological evidence.”

The Hofmeyr skull has changed that. Using measurements of the skull that are known to differentiate recent human populations according to their geographic distributions and genetic relationships, team member Katerina Harvati of the Max Planck Institute in Leipzig established the affinities of the Hofmeyr fossil by comparing it with contemporaneous Upper Palaeolithic skulls from Europe and with the skulls of living sub-Saharan Africans, including the Khoe-San.

That the skull survived is miraculous. The cranium was discovered during the construction of anti-erosion weirs in the Hofmeyr area in 1954 or 1955, but was only reported to the late Marge Courtenay-Latimer at the East London Museum in 1956.

“She was the only person to have visited the site before the erosion dams filled in the discovery site,” Morris said. “I arranged for her to come with me to the site in 1992 to point out the exact location. Because the skull seemed impossible to date, it

was only briefly looked at by the anthropologists in the 1960s and 1970s. But its significance was overlooked and it was never published. The skull was relocated in the Port Elizabeth Museum by Francis Thackeray in 1989 and it was he who brought it to my attention.”

Although Grine was the guiding force for the dating and bringing in several co-workers, the original concept for the project was Morris’ and the first morphological studies showing it was not Khoe-San were done by him and postdoctoral student Isabelle Ribot. Ribot, now of the University of Montreal, worked on the skull while she was a postdoctoral student at UCT.

Following the huge public interest in the finding, Morris says the team is gathering morphometric data to extend the comparative sample to South African prehistoric skeletons.

“I’d like to follow up by looking at specimens in collections around the country for date and context. Sometimes you don’t have to do new excavations. We can check the collections we already have. One of the important issues is to show that specimens collected long ago, and thought to be interesting but not important, are both interesting and important.”

**HELEN THÉRON**

**Until now, lack of human fossils of appropriate antiquity from sub-Saharan Africa has meant that these competing genetic models of human evolution could not be tested by palaeontological evidence.**



# courts approve legal scholar's analysis

**One of the ways that a legal scholar may have an impact on society is by changing its law. One of the ways that a legal scholar may change society's law is by getting the courts to accept their views about what it is or ought to be.**

Judged against that criterion, Professor Anton Fagan's recent work on wrongfulness in the South African law of delict certainly has had an impact.

The law of delict is the branch of law that determines when persons who have harmed others must compensate them for it. According to the South African law of delict, the victims of harm-doing cannot demand compensation from the harm-doer unless the harm-doer acted either intentionally or negligently. But that is not enough. The harm-doer must also have acted "wrongfully".

What is it for an intentional or negligent harm-causing act to be wrongful? When is it not wrongful?

For many years, the orthodox view among South Africa's delict scholars, to

be found in most textbooks and taught in most law faculties, has been that harm-causing conduct was wrongful only if it was unreasonable, judged with the wisdom of hindsight. Thus the joy-rider who speeds down a crowded street, but miraculously hits no one, acts negligently but not wrongfully. Thus also the doctor who kills her patient by administering a drug which she reasonably believes has no dangerous side-effects acts wrongfully but not negligently.

In two book chapters and an article published over a five-year period, Fagan challenged this orthodoxy. He argued that, though the courts occasionally paid lip service to the orthodoxy, they did not actually apply it. Instead, he claimed, the courts had two altogether different conceptions of wrongfulness. One, which was applied when harm had been caused negligently, made wrongfulness turn on the reasonableness, not of conduct, but of imposing liability. The other, which was applied when harm had been caused intentionally, did make wrongfulness turn on the reasonableness of con-

**It can take many years before the courts endorse a scholar's views, even if they are sound. Courts only pronounce on scholarly views that have a bearing on the cases before them.**

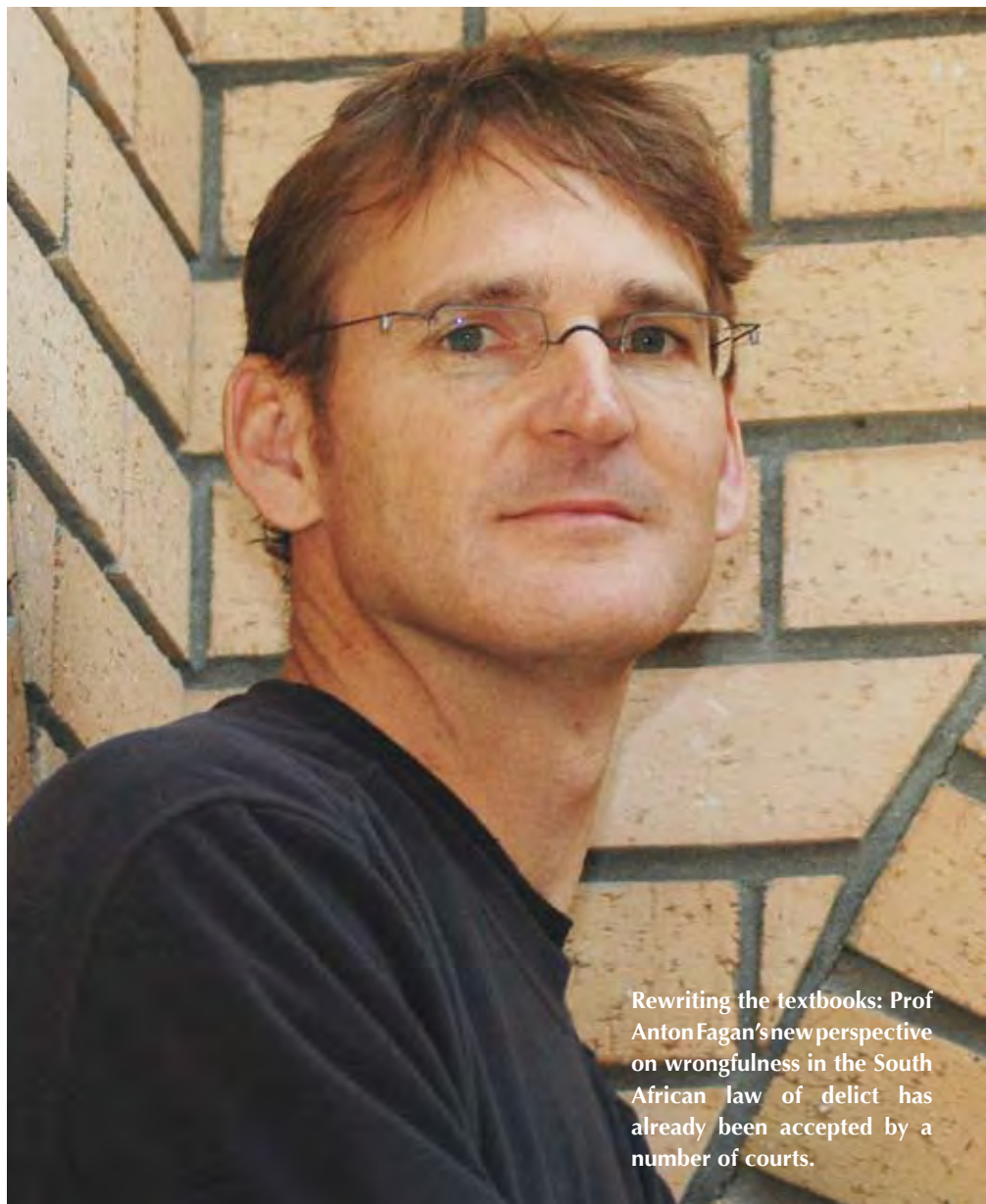
duct, but not judged with hindsight.

It can take many years before the courts endorse a scholar's views, even if they are sound. Courts only pronounce on scholarly views that have a bearing on the cases before them. Fagan has been fortunate in that regard. His most thorough investigation of wrongfulness appeared in an article in the *South African Law Journal* in 2005. Within two years of its publication, the Supreme Court of Appeal has cited it, with approval, in several judgments.

"It is rare that one has the good fortune of having such an immediate impact on the heart of delict and South African law," says Fagan's colleague, Professor Danie Visser.

The battle is not yet over, though. Courts can change their minds.

And in several recent publications the orthodoxy's proponents have hit back, criticising Fagan's views and the Supreme Court of Appeal for adopting them. However, for the moment, Fagan's views appear to be gaining rather than losing acceptance. **IMPACT**



Rewriting the textbooks: Prof Anton Fagan's new perspective on wrongfulness in the South African law of delict has already been accepted by a number of courts.

# dutch civil award for law scholar

**Honorary research associate Professor Margaret Hewett's translation of a weighty Latin text has earned her the Orde van Oranje-Nassau (officier), a civil award for services to the Dutch State.**

The highly prestigious award also honours her long career of translating Latin legal texts that have their ori-

gins in Roman Dutch law.

Hewett won the rare recognition for her two-volume translation of Jacobus Voorda's (1698 – 1768) *Dictata ad Ius Hodiernum* (lectures on the contemporary law).

"Voorda's lectures are the only analysis of the Roman Law of the Digest as applied in each of the seven provinces of the Netherlands," she explained.

"Most writing on the topic concerns only the law of the province of Holland, whereas each of the other provinces had its own special reception of the law."

*Dictata ad Ius Hodiernum* comprises Voorda's Latin lecture notes, given to his students at the University of Utrecht between 1740 and 1760. These notes were in his handwritten manuscript, held in the archives of the former Hof van Friesland and had never been published.

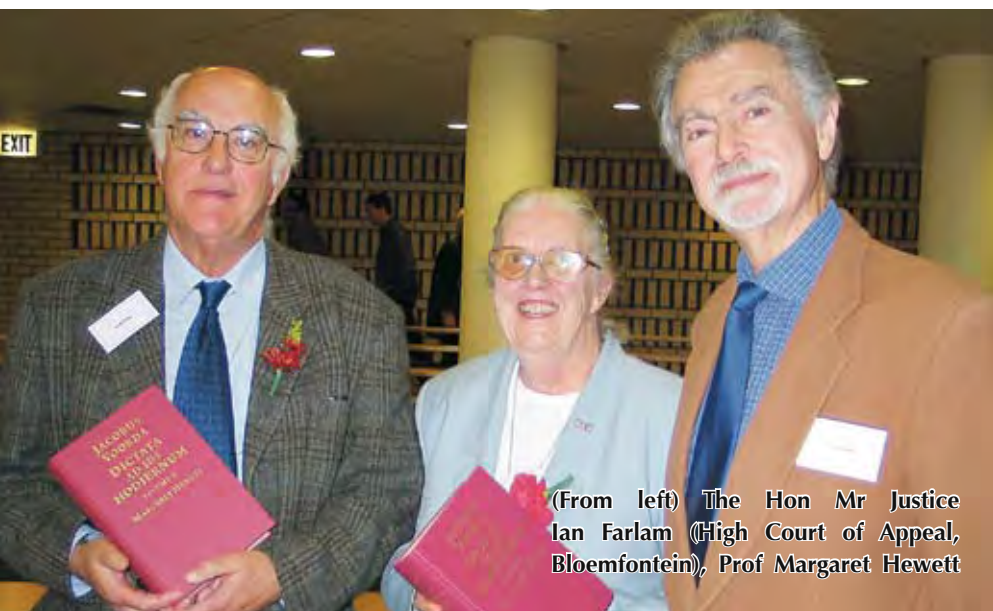
The original manuscript consists of over 1 000 pages of abbreviated Latin notes written by Voorda himself. These Hewett transcribed, translated into English and annotated with indices, bibliography, and so on.

"The demanding part is knowing how to decipher the abbreviated notes," said Hewett.

The mammoth task took eight years, in between lecturing, and a further two years to get to the press.

The work is highly significant to the understanding of Roman Dutch law, and Hewett's translation is an invaluable resource for law scholars and law historians around the world.

**HELEN THÉRON**



(From left) The Hon Mr Justice Ian Farlam (High Court of Appeal, Bloemfontein), Prof Margaret Hewett

# why men kill women

## **They begin as love stories but end in tragedy.**

In South Africa, 1 500 women are killed annually - that's four every day, one every six hours - by their intimate partners: husbands, common-law husbands and boyfriends.

Police dockets label these cases simply as "murder", not distinguishing these "intimate partner homicides" from other murder dockets.

South Africa tops world rankings for these crimes.

"We're in the throes of an epidemic," says forensic psychiatrist Associate Professor Sean Kaliski. He believes the rate of crime between people who know each other, sometimes intimately, beats "stranger" crimes.

"We're underestimating the degree of violence in our own homes and communities."

Often the victims downplay the level of violence.

"There's shame attached to physi-

cal violence," Kaliski adds, "especially in some conservative religious communities."

Is ours a sick society?

"No, we're not a sick society, but we have lost proper controls of behaviour," Kaliski adds. "We have to change our mindset when a woman abused by her husband isn't regarded as a victim of crime."

On that score, Kaliski is part of a multidisciplinary UCT team that has launched a two-part project to assess the men who kill their women and to identify the psychological triggers for their behaviour.

"The idea is that counsellors, medical practitioners and the like would be able to pick up on these high-risk factors through constructive interviewing strategies when these women visit them."

Besides the Department of Forensic Psychiatry and the Gender Health and Justice Research Unit, the multidisciplinary team includes Professor Lorna Martin and Dr Sonata Walraven

of the Division of Forensic Medicine, straddling three separate departments within the Faculty of Health Sciences.

Kaliski has gathered and studied over 60 cases of domestic homicide over the past five years, looking at perpetrators sent to Valkenberg Hospital for the mandatory 30-days' psychiatric observation.

Not much is known about the men who kill their intimate partners.

"But these men are seldom mentally ill," Kaliski says.

Commonly, they are in their 30s, with some history of alcohol abuse and conflictual relationships with their partners.

Historically, the woman has tried to leave him. They've taken out protection orders and the abuser flouts the conditions of these orders, killing her with undue violence or aggression.

"Forty-four stab wounds on a woman's body is an unusually high level of violence. We're puzzled by what underlies this pathological behaviour. What is it we should be looking for?" ▶

Every case that Kaliski assesses is subjected to a battery of interviews and investigations to get to grips with the prevalence of domestic homicide. The project will develop a screening instrument to determine the risk of further violence. Is the perpetrator fit to stand trial? Is he a risk back in society?

A disturbing factor is the number of policemen involved in domestic homicides.

One 33-year-old Mitchell's Plain woman was shot in the back six times by her policeman husband after she had obtained a protection order against him

through the Domestic Violence Act. She had moved out of their home and had begun divorce proceedings.

The first part of the group's project is a retrospective study analysing Kaliski's 60 cases. The second phase is a prospective study in which a new instrument to assess men who kill their intimate partners will be developed and tested.

"Often the accused claim they were not responsible for their actions because they were suffering from non-pathological incapacity or temporary insanity at the time."

Importantly, the study will attempt to reconcile post-mortem findings with accounts given by the accused. Psychiatric assessments and forensic analysis are always conducted separately, but this study will bring together these perspectives of intimate partner homicide and subject them to comprehensive criminological and legal analysis. The development of interdisciplinary theory and practice in relation to intimate-partner violence is the very essence of the research.

Lillian Artz, director of the Gender, Health and Justice Research Unit, believes the initiative is long overdue.

"Domestic homicide is not only an under-researched area in South Africa, but exerts enormous strain on our public health and criminal justice systems, not to mention the impact it has on families and the community."

But there's something else that bothers her. Only one-third of these victims had sought help from the criminal justice system.

That, however, is another area of study, one closely allied to her doctoral work on the attrition of domestic violence cases in the South African criminal justice system.

"Cases of domestic violence are simply falling out at various stages within the system, and an interdisciplinary study of this nature is precisely what is required to establish the reasons for this."

**HELEN THÉRON**



Lashing out: A new study at UCT will explore why rates of domestic violence are so high in South Africa.

# new approaches to kidney stones

**Prof Allen Rodgers will tell you that kidney stones have no single cause, and likely no single cure.**

“It’s multi-factorial,” says Rodgers, head of UCT’s Kidney Stone Research Laboratory in the Department of Chemistry.

Now doctoral candidates Nontobeko Mabizela and Thokozile Lewanika have tackled the condition from different perspectives. They both started from a common point: the well-worn statistic that black South Africans are far less likely to develop kidney stones than their white compatriots, even though they consume more foods high in the salt known as oxalate.

When bound with calcium in the intestines, oxalate forms calcium oxalate, the building blocks of some 75% of kidney stones. Mabizela has shown that bikunin, a protein found in the urine, checks the build-up of calcium oxalate far better in blacks than it does in whites, perhaps because the structure of bikunin

is very different in the two groups.

Lewanika revealed that gut bacteria like *Oxalobacter formigenes* and *Lactobacilli* do a better job of breaking down oxalates in blacks than it does in whites. That means less oxalate in the urine, where kidney stones start. She also showed that a certain species of *Lactobacillus* bacteria appears to be very good at degrading oxalate. That may make it suitable for treating kidney stones.

In time, both Mabizela’s and Lewanika’s studies could well save countless from the agony that’s synonymous with kidney stones.

(Mabizela worked under the supervision of Rodgers and Assoc Prof Ed Sturrock, while Lewanika’s supervisors were Assoc Profs Shez Reid and Val Abratt.)

**CHRIS MCEVOY**

**(Above) Nontobeko Mabizela. (Below) Thokozile Lewanika.**



# genetically modified maize nears trials

**And considering that maize accounts for 50% of calories in local diets, virus-resistant maize would make an important contribution to grain provision on the continent.**

**The rains had been good that season, but KwaZulu-Natal subsistence farmer Esther Ncobo had noticed something that alarmed her. There were minute, pale circular spots on the lowest exposed leaves of her young maize crop, telltale signs of maize streak virus infection. She's seen the worrying signs before. Plants infected at an early age became stunted, producing undersized, misshapen cobs. Sometimes there was no yield at all.**

Endemic to Africa and nearby Indian Ocean islands, the maize streak virus is one of a number of diseases that blight Africa's main cereal crops, and also the most serious viral disease. The carrier - the humble leafhopper (*Cicadulina mbila*) - looks innocuous enough. But it's a pest that carries a deadly virus from plant to plant.

And considering that maize accounts

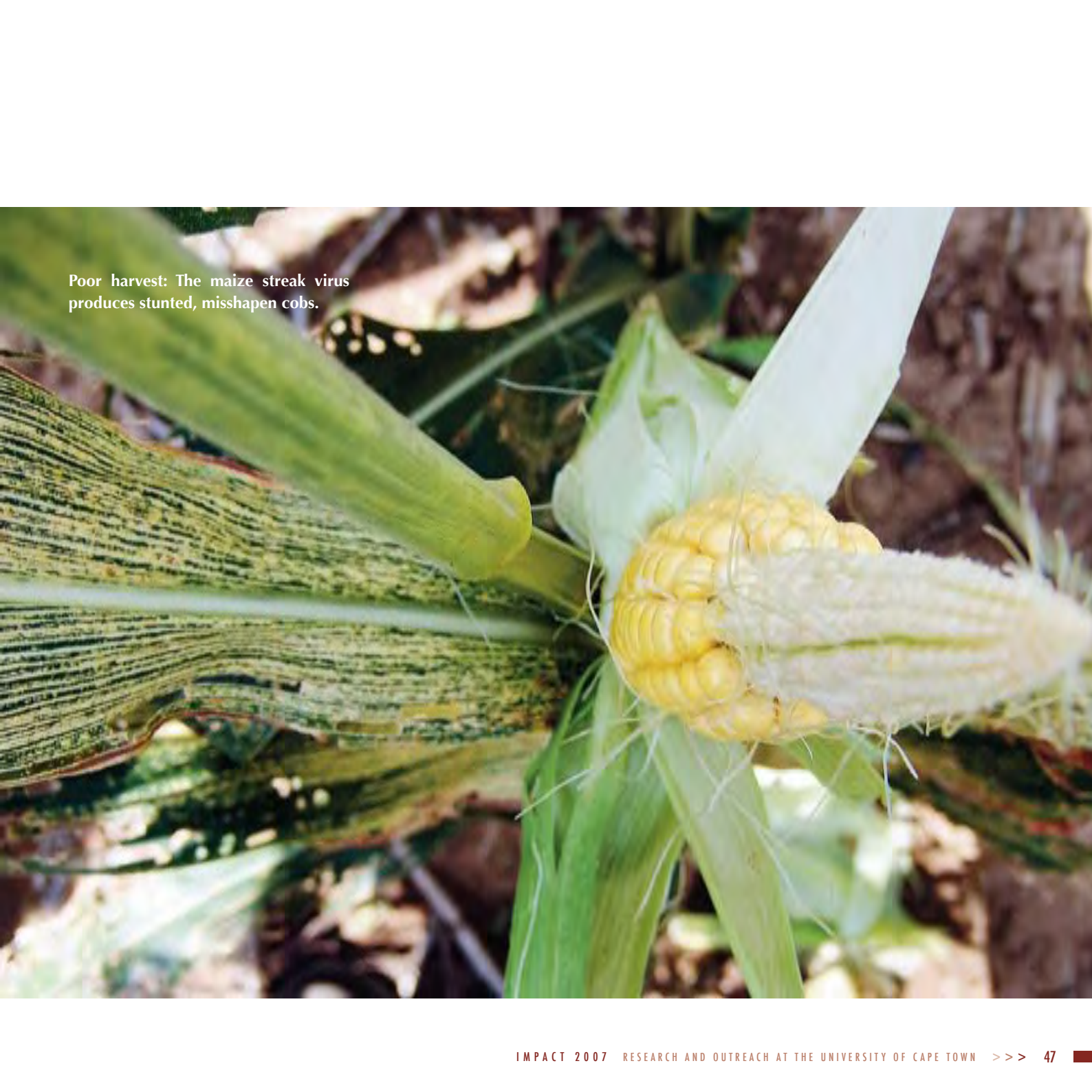
for 50% of calories in local diets, virus-resistant maize would make an important contribution to grain provision on the continent.

For the past 25 years African crop scientists have been trying to produce virus-resistant maize by crossing plants that carry natural resistance, but with limited success: good resistance is a multigene trait, and the development of a single breeding line can take years.

Now there are fresh prospects.

From the 12 January edition of the prestigious *Science* magazine (Vol 315) comes news that Africa is gearing up for its first trial of a genetically modified (GM) crop to withstand the virus, one developed entirely in Africa by Professors Jennifer Thomson and Ed Rybicki and their team in the Department of Molecular and Cell Biology at UCT.

The team's efforts have been fruitful. They have managed to produce ▶



Poor harvest: The maize streak virus produces stunted, misshapen cobs.



maize plants containing a single altered virus-derived gene. This produces a protein that very successfully interferes with virus multiplication, halting disease development in its tracks.

The team has been working with plant pathologist Frederik Kloppers at Pannar Seeds, Greytown, to test the genetically modified plants. These plants had resisted infection consistently over several generations. Kloppers hopes to start field trials later this year.

According to the *Science* article, South Africa is one of the few African countries allowing farmers to grow genetically modified crops.

So far, so good, as attempts to use other genetically modified crops like cassava and sweet potato in Africa have failed.

Postdoctoral scholar Dionne Shepherd, who has worked on the maize project for nine years, says field trials are crucial to test environmental and health risks. The team needs to determine whether the crop affects soil micro-organisms or the insects that feed on it.

If all goes well, though, this will be the country's first genetically modified crop to be field-tested at home.

And with government now developing its own expertise to evaluate envi-

ronmental and human safety, they're keen to use the UCT maize, the most advanced locally produced genetically modified product, as a guinea pig.

The team is well aware of GM's bad reputation. Genetically modified plants don't always work, as was the case with a genetically modified sweet potato in Kenya recently.

Skeptics also believe GM technology is just a way of attracting funding that benefits industrial agriculture, not smaller farmers. As UCT's maize was home-grown without big corporate bucks (Pannar was the only corporate contributor), the UCT scientists hope to shake off some of these criticisms.

Thomson also recently penned a sequel to her well-received *Genes for Africa: Genetically Modified Crops in the Developing World* (University of Cape Town Press), described as "a gem of a book" and one that provides a balanced view of genetically modified organisms, their status and the debate around crop biotechnology.

Importantly, the team is also working on second-generation products that will only express the GM protein after infection, and will not express foreign genes in the seed, removing other concerns about allergens and toxicity.

**HELEN THÉRON**

**Postdoctoral scholar  
Dionne Shepherd,  
who has worked on  
the maize project for  
nine years, says field  
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health risks.**

# mathematician produces botanical gem

**When Dr Peter Bruyns was a child, American botanists Alain C White and Boyd L Sloane's three-volume *The Stapelieae*, published in 1937, was his bible.**

Many years later, Bruyns has completed the first monograph on Stapeliads. Stapeliads are those almost alien-looking, fleshy-stemmed succulents with their striking, star-shaped flowers belonging to the family *Apocynaceae* and quite plentiful in the drier parts of Africa.

A mathematician specialising in the theory of permutation groups, Bruyns took 25 years to finish his two-part work, which deals with all 182 of the region's Stapeliads in great detail, including his own illustrations, line drawings showing the small details of the complex flowers, as well as photos and distribution maps.

In the decades since 1937 there has been plenty of exploration by doughty botanists, leading to the discovery of many new species.

"It also led to the realisation that

many of the species discussed by White and Sloane, who never had the opportunity to see any of these plants in their natural habitat, were not species at all."

Bruyns' work is timely, bringing together many disparate sources, the results of the exploration and research that has taken place over the past 60 years on Southern African Stapeliads, found in Botswana, South Africa, Namibia, Zimbabwe, Mozambique and Madagascar.

"In the Stapeliads, the flowers are specialised exclusively for fly pollination. This is partly a response to the wide variety of flies in the region they grow and also partly because, in these areas, periodic dry periods cause flies to be often the only insects that are plentiful."

Bruyns does most of his fieldwork during sabbaticals, after the rains when the plants are in flower. For this, he's tramped some of the world's remoter places in search of specimens: Eritrea, Ethiopia, Yemen, Nepal, the Canary Isles and Burma. **MYOLISI GOPHE**



**Job done: Dr Peter Bruyns with his monograph on Stapeliads.**

# new current flies in the face of flow

**Prof Gerold Siedler and Dr Mathieu Rouault have mapped a new current in the South Indian Ocean, one that flies in the face of textbooks and atlases.**

Twenty years ago scientists may have raised their eyebrows if you'd told them there was a current in the South Indian Ocean that bucked oncoming traffic - millions of cubic metres of water flowing west - to loop around and flow back east.

Oceanographers of old traced currents by throwing bottles into the sea to detect the general pattern. But few would have guessed at an anomaly like a countercurrent to the east against the predominant flow to the west, halfway between Madagascar and Australia.

The discovery was made by UCT's Dr Mathieu Rouault, a chief research officer in the Department of Oceanography, and Gerold Siedler, emeritus professor of physical oceanography at the Leibniz Institute of Marine Sciences of Kiel University, Germany, who visited UCT as an Alexander von Humboldt Fellow in 2005.

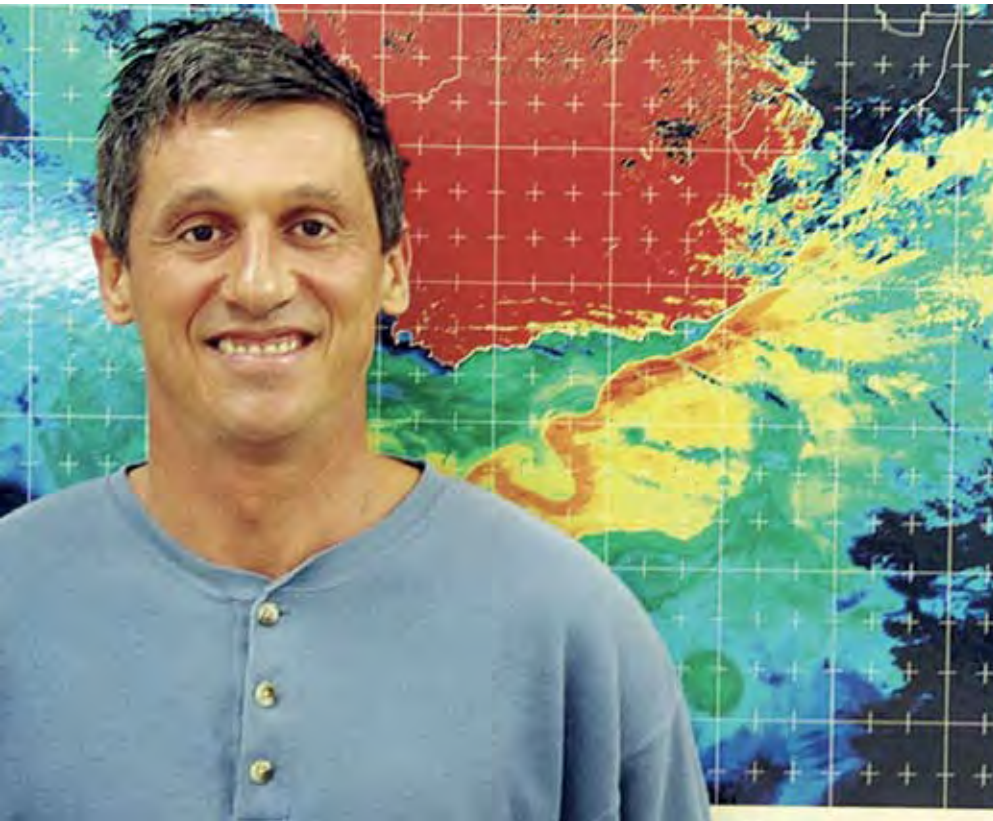
Planning to study subtropical currents in the southern Indian Ocean, they scrutinised masses of satellite data on surface currents. While inspecting wave-like and eddy structures propagating to the west, they noted currents to the east, hidden in these structures. Examining several years of data, they realised they'd found a new and strong current, 50km to 100km wide, off the Madagascar coast at about 25 deg S to the east.

Later analyses of old oceanographic surveys confirmed the countercurrent - and indicated it was quite deep, up to 800m.

"But we need to go there to take measurements to confirm our study," Rouault said. "After all, it's very seldom one discovers a current without going there on a ship. A new, international programme, the Agulhas-Somali Large Marine Ecosystem study, will start soon in the Indian Ocean and I'll try to convince them to survey our current with us."

Recent studies by other groups using such satellite data indicate the existence of similar eastward countercurrents in other oceans.

**Examining several years of data, they realised they'd found a new and strong current, 50km to 100km wide, off the Madagascar coast at about 25 deg S to the east.**



**Against the stream:** Oceanographer Dr Mathieu Rouault, whose work with Kiel University's Emeritus Professor Gerold Siedler, an Alexander von Humboldt Fellow at UCT last year, led to a description of the structure, transport and origin of the new South Indian Ocean Countercurrent, named by Dutch researchers.

"I expect a series of new papers on this topic in the near future," Siedler added.

Currents and oceans also affect the earth's delicate climatic balances. What happens when you have a countercurrent slap bang in the middle of the ocean?

"Since the appearance of the eastward current can only be expected in the narrow core region, which changes location, sometimes within days or weeks,

boats or ships may well feel it from time to time. But captains would have a hard time making use of the current in a predictable way."

It was also usually assumed that the global current patterns in the sub-tropical regions depend mainly on north-south flows.

"The new observations show that a considerable amount of water is transported west-east at these latitudes, and this fact will have to be considered in future models of ocean circulation and climate change," Siedler added.

The Agulhas Current off the South African coast is one of the strongest in the world ocean. The new South Indian Ocean Countercurrent has about one-tenth of its transport - which makes it a strong current.

"However, we still have to better understand how it is generated," Siedler points out. "The large-scale forcing by wind fields or the patterns of ocean-atmosphere water exchange in the southern Indian Ocean will be the key drivers. But it is not yet clear which process dominates. Considerable work remains to be done." **HELEN THÉRON**

# the earth moved 3.8 billion years ago

**A UCT scientist and National Research Foundation A-rated researcher features among an international team that's found evidence of tectonic movement much earlier than previously thought.**

A fragment of ancient seafloor, a serendipitous find by a team of international geologists in remote southwest Greenland, shows evidence that Earth's crustal plates were shifting as far back as 3.8 billion years ago.

The team's observations, printed in *Science* (23 March 2007), indicate that this tectonic activity began before any known structural geological record of Earth, and provides new clues to understanding Earth's geochemical evolution.

Evidence comes in the form of the oldest preserved pieces of the Earth's crust, near Nuuk, where a rare outcrop in the Paleoproterozoic Isua Supracrustal Belt is found to constitute an ophiolite. Ophiolites are pieces of ancient "fossilised" seafloor that formed at oceanic

spreading centres, dated between 3.7 and 3.8 billion years old.

This is more than one billion years earlier than the oldest previously discovered ophiolite in China, says UCT's Professor Maarten de Wit of the Department of Geological Sciences. De Wit was on the team that spent two weeks scouring the area (a helicopter flew them to the remote region), "a Mecca for researchers who study the world's oldest rocks".

"It's a geological paradise," says De Wit.

Researchers had been unable to determine the beginning of plate tectonics, colossal movements of the Earth's outer shell that explain how oceans and continents were formed.

The team's finding is significant, pushing back the date of plate tectonic processes to an era far closer to Earth's conception 4.5 billion years ago.

"Since the plate tectonic paradigm is the framework in which we interpret all modern-day geology, it is important to know how far back in time it operated,"

**The team's finding is significant, pushing back the date of plate tectonic processes to an era far closer to Earth's conception 4.5 billion years ago.**



said co-author, Professor Minik Rosing of the University of Copenhagen, as reported in *BBC News*.

Fortuitously, the normally fractious weather played along, clear conditions helping them find the sheeted dike complex, considered to be the crucial component of ophiolites, in a brooding landscape dominated by black basalt.

Though the rock samples were dated in England using a uranium lead process, UCT will soon be able to do this kind of work, thanks to the R20 million purchase of three state-of-the-art instruments by the African Earth Observatory Network (AEON). This is an international initiative to train African scientists to develop “robust Earth stewardship models”.

In 2004 De Wit co-authored another *Science* paper with team member Pro-

fessor Harald Furnes, documenting how microscopic organisms, smaller than the width of human hair, had eaten their way into similar rock in the 3.5 billion-year-old Barberton Mountain Land of Mpumalanga to form long, worm-like tubes.

The finding proved that the microbial processes we see today also occurred at the earliest stages of the planet’s history, close to the origins of life on Earth.

“The work in Greenland is an attempt to push that date back by another 300 million years,” De Wit notes.

In the aftermath of the latest *Science* paper, he is back in his UCT laboratory, musing on what discoveries lie under the vast Greenland ice sheet, threatened, like Antarctica, by global warming.

**HELEN THÉRON**

**(Above left) No stone unturned: Geologists Maarten de Wit (UCT), left, and Harald Furnes (University of Bergen, Norway) hunt ancient rocks in southwest Greenland.**

**(Above right) Huge strain: An example of an ocelli-bearing pillow lava. The pale ocelli, originally spheres, provide a measure of the deformation that the rocks have suffered.**

# new giant lobster discovered

**Professor Charles Griffiths has described over 100 new species in his career and was part of another important find last year.**

He and Marine and Coastal Management lobster specialist Dr Johan Groeneveld added a new giant species of spiny lobster, *Palinurus barbarae* (Decapoda Palinuridae) from Walters

Shoals on the Madagascar Ridge, to the list.

*Palinurus barbarae* is named in memory of Barbara Groeneveld, Groeneveld's late wife, and is most closely related to the Natal rock lobster *Palinurus delagoae*.

World wide, only three new lobster species have been identified in the past 12 years.

There's an irony to the discovery.

The large size of the lobsters is probably due to the fact that it's an unfished stock, explains Griffiths.

"There's a pristine population of really old animals out there and now they will be a free-for-all. It's very likely they will be exploited."

Does size matter? In this case, maybe. Very large lobsters are not as marketable as their smaller sibling species.

"The market is for plate-sized lobsters," Griffiths commented. "These ones would have to be chopped up!"

Griffiths is still left wondering how the lobsters got to this isolated location and how the population is replenished.

The answer will determine how localised the population is and how it will react to fishing.

"It leads to the sobering thought that isolated species like this one could be fished to extinction even before they become known to science."

Besides assisting with the giant lobster find, the marine biologist was awarded the prestigious Gold Medal of the Zoological Society of Southern Africa (ZSSA) for 2006.

**MYOLISI GOPHE**



Monsters of the deep: Prof Charles Griffiths (left) and Dr Johan Groeneveld aboard a Marine and Coastal Management vessel, show off the giant lobster species, *Palinurus barbarae*.

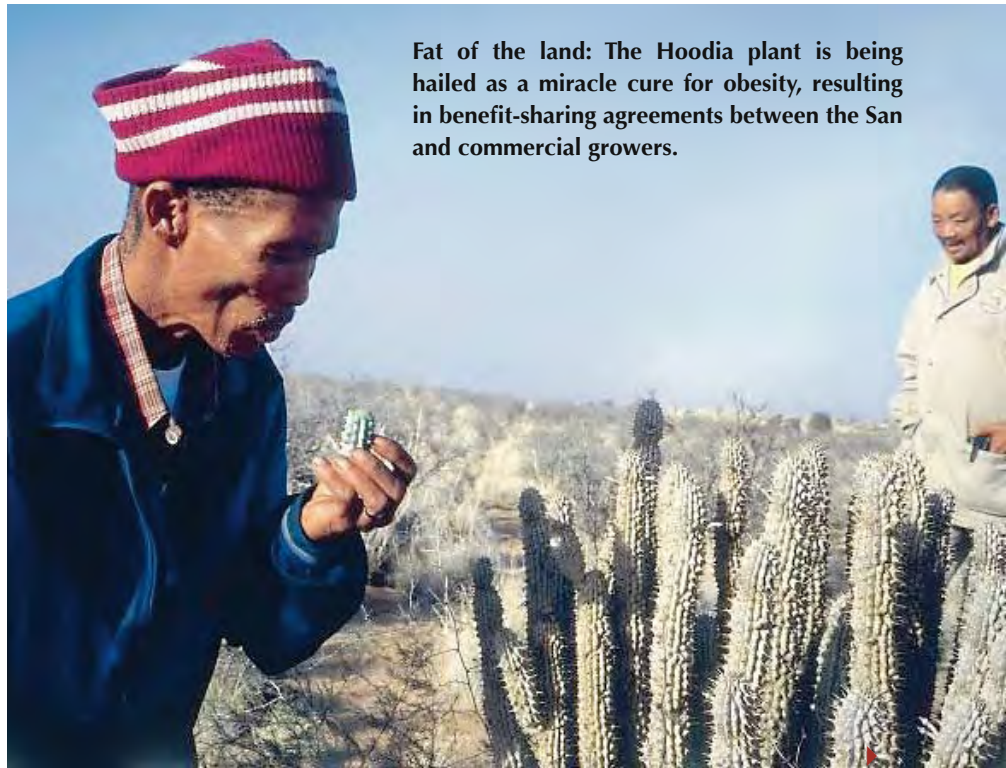
# eeu expertise for touchstone project

**It's a spiky cucumber-like succulent plant that grows in the country's driest region, home to the San people.**

For centuries the San have used Hoodia to stave off hunger and thirst on long hunting trips. Now it's being hailed as a miracle cure for obesity, and stands to make San communities very wealthy once products are on the shelves.

But its success is a double-edged sword. As a geographically scattered group, who decides for the San how the resources should be used? It's a thorny social and ethical issue that will set precedents worldwide. To this end, the Environmental Evaluation Unit's (EEU) expertise has been harnessed in a two-year research project with the Wellcome Trust and the University of Central Lancashire.

Heading the UCT thrust is senior researcher and deputy director of the ▶



**Fat of the land: The Hoodia plant is being hailed as a miracle cure for obesity, resulting in benefit-sharing agreements between the San and commercial growers.**



**Indigenous knowledge and material is protected by the Convention on Biological Diversity, which demands equal sharing of any benefits flowing from the use of traditional knowledge about biodiversity with indigenous communities.**

EEU, Dr Rachel Wynberg. Wynberg is a natural scientist and environmental policy analyst with more than 15 years' experience in the environmental field and a raft of publications. With a doctorate from Strathclyde University, Glasgow, and two master's degrees (marine biology and environmental science) from UCT, she specialises in issues to do with the commercialisation of biodiversity, intellectual property rights and traditional knowledge, and the integration of social justice and ethics into biodiversity. Her doctorate on pro-poor models of biodiversity commercialisation is currently being prepared as a book.

"My recent work looks at the way in which plants like devil's claw, rooibos tea, honeybush tea, Hoodia and marula can be traded in ways that deliver benefits to marginalised communities and that protect the environment and result in social justice," says Wynberg.

Indigenous knowledge and material is protected by the Convention on Biological Diversity, which demands equal sharing of any benefits flowing from the use of traditional knowledge about biodiversity with indigenous communities.

Hoodia's main ingredient is reportedly about 10 000 times as active as glucose.

It hoodwinks the brain and nerves into telling the body it is full. As obesity is a growing global medical problem, the commensurate benefits on the pharmaceutical and dietary supplements side are enormous.

And the 100 000 or so San scattered along the edges of the Kalahari Desert, many displaced, stand to benefit from the royalties they have won with assistance from their lawyer Roger Chennells.

Despite the Hoodia case having been splashed across the world's press, no-one has tackled an in-depth assessment of the decision-making process used by the San and other parties to negotiate the agreement, and the sharing of benefits that will arise from the plant's commercialisation.

"This is the first research attempt to look comprehensively at some of the social and ethical issues it raises," Wynberg said.

To date, few benefit-sharing agreements with indigenous communities have been concluded successfully. One of the most significant of these was concluded in 2003 between the San and the Council for Scientific and Industrial Research (CSIR) (they first conducted

research on the plant as a means of survival for the South African Defence Force back in the 1960s) covering a range of legal and social issues and outlining the establishment of a trust to manage the funds on behalf of the San. The trust was formed in 2004 and the first payments received in 2005. This forms part of a licensing agreement between CSIR and the consumer products giant Unilever plc. Another agreement has also recently been concluded between the San and the commercial growers of Hoodia to give the San a share of benefits from the sale of cultivated material for herbal markets.

Similar cases arise in other developing parts of the world where indigenous plants and knowledge are involved. In this context, many important questions remain unanswered.

National legislation on access to genetic resources and benefit-sharing is in its infancy worldwide. There are many issues around prior informed consent and benefit sharing and the legal implications and sharing mechanisms like trust funds. To this end, the EEU has also been contracted by the Department of Environmental Affairs and Tourism to assist in the develop-

ment of South African regulations on access and benefit-sharing.

“The urgency of the matter and the number of biodiversity-rich countries in need of legislative developments make our project very timely,” Wynberg said.

“To analyse the best-known benefit-sharing cases in detail, and the way in which the prior informed consent of communities has been obtained, will provide a good example of how the issue can be handled by national legislation.”

Wynberg is working with a large international team of researchers, headed by the leading bioethicist Professor Doris Schroeder (UK) and including Chennells, Dr Miltos Ladikas (UK) and Saskia Vermeylen (UK), who is conducting doctoral work on the San. Collaborating partners include the University of the Philippines, the national Ethics Commission (Mexico) and the Indian government. External advisors hail from Australia and Europe. A key outcome of the project will be a book on community consent and benefit sharing, edited by Wynberg and Chennells, to be published by Springer-Verlag in 2008. **CHRIS MCEVOY**



**Go far: Hoodia has been used by the San people for centuries to stave off hunger and thirst on long hunting trips.**

# distinguished award for outstanding work

Over the past decade there has been considerable progress in our understanding of the universe.

## The past year has seen two significant milestones for Peter Dunsby.

Firstly came an ad hominem promotion to full professor in the Department of Mathematics and Applied Mathematic, followed by news that he's won the 2006 S2A3 British Association Medal (Silver), one of the highest awards to young (under 40) scientists for original research in Southern Africa.

The award is made annually to recognise exceptional contribution to the advancement of science. Dunsby is the first recipient of the S2A3 medal since 2002.

He sees the award as an important endorsement.

"You feel you're doing something that's being recognised nationally and internationally."

The launch of the South African Large Telescope in Sutherland last year and the Square Kilometre Array bid re-

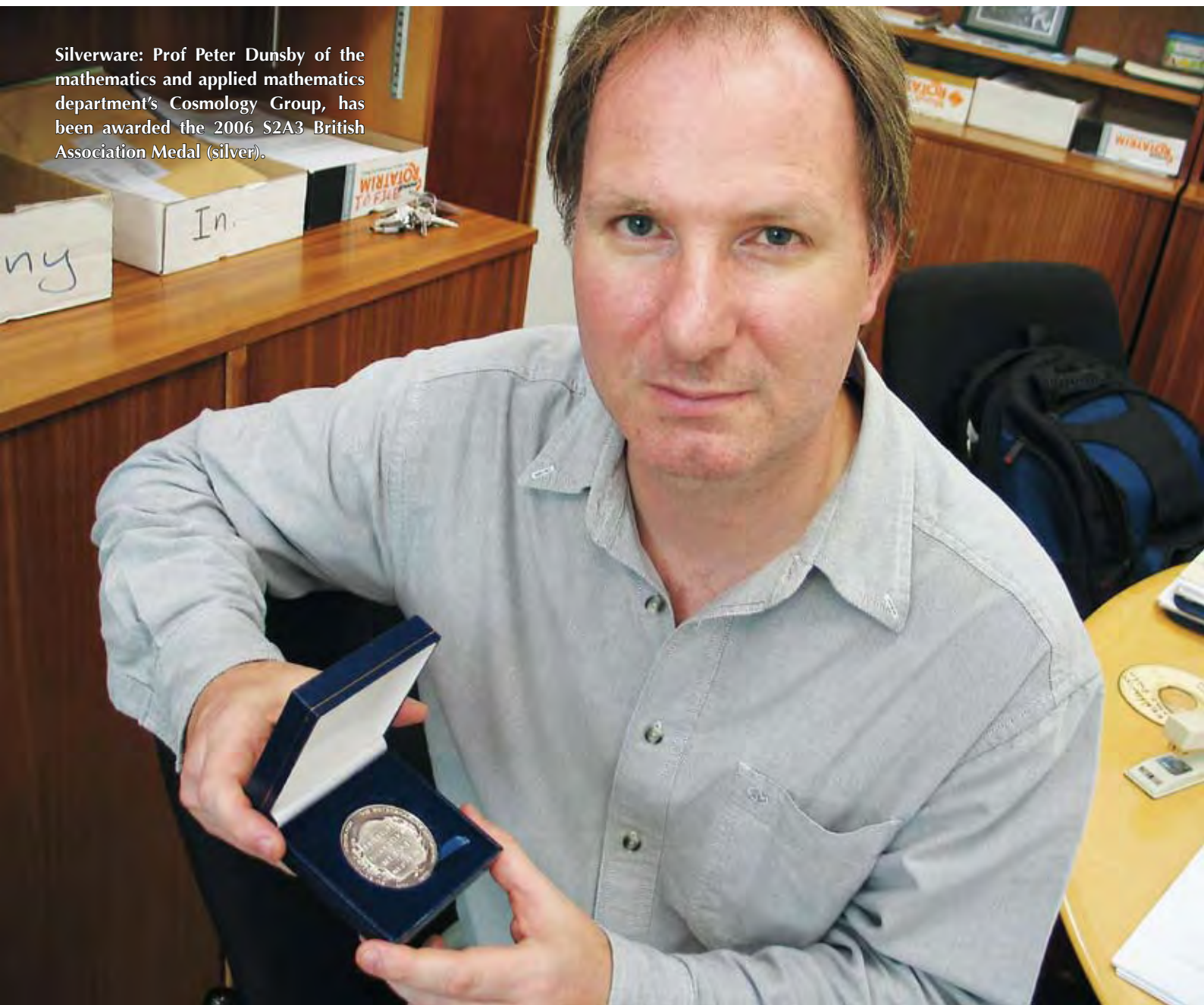
flects a national focus on astrophysics and cosmology. As director of the collaborative National Astrophysics and Space Science Programme (NASSP), hosted at UCT, that's good news for Dunsby and his colleagues.

"Over the past decade there has been considerable progress in our understanding of the universe, largely due to the impact technological advances have had on observational cosmology," he says.

Key developments are the ongoing boom in the production of detailed cosmic microwave background anisotropies data sets, as well as Ia supernova measurements of the Hubble parameter that have allowed scientists to build a concordance model that fits all available data.

Apart from his interests in modern cosmology, Dunsby has also been working on problems that lie at the interface between plasma physics and general relativity. **HELEN THÉRON**

Silverware: Prof Peter Dunsby of the mathematics and applied mathematics department's Cosmology Group, has been awarded the 2006 S2A3 British Association Medal (silver).



# uct big winner at nstf awards

**UCT was done proud at the 2006 National Science and Technology Foundations Awards, which yielded three winners among the 12 categories.**

Professor Tim Noakes of the MRC/UCT Research Unit for Exercise Science

and Sports Medicine took the Over a Lifetime Award. Associate Professor Candy Lang of the Department of Mechanical Engineering walked off with the Research Capacity Development (over the past five to 10 years [female winner] award, and Dr Tania Douglas of the Department of Human Biology

won the Distinguished Young Black Researcher (over the past two to five years) award.

"I am delighted with UCT's overall performance at this year's NSTF awards," Deputy Vice-Chancellor Professor Cheryl de la Rey said. "What is especially pleasing is that our researchers have won awards across a range of categories, from the individual over a lifetime category to the category for distinguished young researcher as well as for a researcher who has made an outstanding contribution to research capacity development.

Noakes was honoured for his contribution to exercise science and sports medicine, one that has revolutionised the scientific approach in this area.

Lang was singled out for her work on the honours programme in materials science, introduced at UCT in 2004 and which now boasts a healthy number of black women among its numbers.

Douglas was honoured for her work on innovative instruments and techniques for the diagnosis of pathologies such as foetal alcohol syndrome (FAS), spinal injuries, adolescent scoliosis, tuberculosis and meningitis. **MEGAN MORRIS**



**Award-winning smiles:**  
Prof Tim Noakes and Dr  
Tania Douglas show off  
their pickings.

# researchers rake in nrf ratings

**The University of Cape Town now boasts 254 National Research Foundation (NRF) rated researchers in total.**

The breakdown of rated researchers is as follows:

- 23 A-rated researchers
- 80 B-rated researchers
- 121 C-rated researchers
- 6 P-rated researchers
- 21 Y-rated researchers
- 3 L-rated researchers

Professor David Schalkwyk of the Department of English Language and Literatures, Professor George Ekama of the Department of Civil Engineering and Professor Hans-Peter Künzi received A-ratings from the NRF in the recent round. An A-rating is given to researchers who are unequivocally recognised by their peers as leading international scholars in their field for the high quality and impact of their recent research outputs.

The NRF evaluates and rates academics according to the quality of their research outputs in the preceding seven years. This evaluation is conducted by local and international peers and results in a rating of A, B, C, P, Y or L, from highest to lowest rating.



Increasingly sought-after is the P-rating, given to young researchers, usually younger than 35 years, who have the potential to become leaders in their field.

The NRF ratings are considered a valuable instrument in research-capacity development and for building a strong basis for future researchers.

“I am very pleased that our researchers put themselves forward for rating,” commented deputy vice-chancellor for research and innovation, Professor Cheryl de la Rey.

“The success of our applicants informs us that our researchers enjoy international recognition for the quality and impact of their research. This contributes to building our international reputation as a research-led university.” **CHRIS MCEVOY**

**A rated: (From left) Prof David Schalkwyk, Prof George Ekama and Prof Hans-Peter Künzi.**

# more chairs for uct

**In 2006, the Department of Science and Technology (DST) announced that UCT had secured seven of the first 21 National System of Innovation research chairs, established within strategic research areas at South African universities.**

This after the first round of the DST's new South African Research Chairs Initiative, a programme that will attempt to reverse the country's decline in research output and renew and extend the country's scientific infrastructure base.

The UCT scholars to hold the seven new chairs are Dr Edwin de Blok, Dr Ernesta Meintjes, Professor Kevin Naidoo, Professor Iqbal Parker, Professor George

Philander, Professor Daya Reddy and Professor Clifford Shearing.

De Blok is spearheading research on the distribution of dark matter, which comprises 95% of the universe's total mass.

Meintjes is a key member of UCT's Brain Behaviour Initiative, one of two research signature themes UCT supports.

Parker heads the Division of Medical Biochemistry. The award will allow him to expand his work on oesophageal cancer.

Philander was the Knox Taylor Professor of Geosciences at Princeton University and director of their Atmospheric and Oceanic Sciences programme. He is a specialist in ocean-atmospheric interactions and climate fluctuations,

including El Niño and La Niña.

Naidoo is acting head of UCT's Centre for High Performance Computing and a member of the American Chemical Society.

The former Dean of Science, Reddy is a National Research Foundation A1 researcher and the only South African scientist to belong to all four of the country's science academies.

Shearing is Professor of Criminology and director of the Institute of Criminology in the Faculty of Law with around 39 years' experience as a criminologist. He was a member of a multinational panel that led an inquiry into curbing violence and intimidation in the 1994 elections.

**CHRIS MCEVOY**



Prof George Philander.



Dr Edwin de Blok.



Prof Kevin Naidoo.



Prof Iqbal Parker.

# research reaping rewards in township

**Professor of obstetrics and gynaecology Lynette Denny's research in preventing cervical cancer scooped the 2006 Distinguished Scientist Award for Contribution to the Improvement of the Quality of Life of Women.**

Denny has been involved in a study on alternative methods to the Pap smear for the prevention of cervical cancer in women in low-resource settings.

Working in collaboration with Columbia University in New York, she set out to identify a test that was less complex to perform, and found the answer in a cheap, readily available product: vinegar.

"We trained about 12 nurses who have a really high ability to screen the cervix using just a bright light, cotton wool and vinegar, which is just as good as a Pap smear in detecting pre-cancerous lesions," says Denny.

To date, about 16 000 women have been screened.

Cervical cancer is the most common cancer among women in developing countries, killing mostly those in the 40-to-50-age group. This has a devastating impact on the community and yet it is largely preventable.



Of the award, Denny says: "At this time in South Africa we are very much in a culture where people are being acknowledged for good work. I'm really grateful for it, especially since it comes with a R50 000 purse, which will go into my research. It is hard work being a clinician and a scientist doing community-based work. I think the concept of recognising people is great as it makes them feel appreciated." **SHUMI CHIMOMBE**

**Tri-alliance: Prof Lyn Denny (left) with guest of honour and supporter of her Cervical Cancer Research Programme, Graham Beck, and guest speaker Dr Mamphela Ramphele.**



# take to the sky

**Astrophysics master's student Renée Hlozek, her supervisor Associate Professor Bruce Bassett and fellow researcher Professor Martin Kunz from the University of Geneva will likely raise a few eyebrows with their paper in *Physical Review D*.**

The paper, titled *Bayesian Estimation Applied to Multiple Species (BEAMS)*, covers the researchers' work on BEAMS, a self-designed, all-purpose estimation method that makes working through a mass of cosmology data, which up till now had to be done by hand, a cinch.

Hlozek, one of only 19 students in the National Astrophysics and Space Science Programme (NASSP) that's hosted by UCT, originally undertook this project as part of her honours degree in astrophysics and space science in 2006. But the scope of her work sparked plenty of interest.

Apart from the paper in *Physical Review D*, Hlozek also did a presentation on BEAMS at a seminar at the Institute of Cosmology and Gravitation at the University of Portsmouth late last year, where her work was well received.

BEAMS is used in astronomy and cosmology to study supernovae, or exploding stars, in the search for answers as to why the universe is accelerating.

The problem to date has not been the collecting of the data, but the weeding



out of information that shrouds the true statistics, says Bassett, based in the Department of Mathematics and Applied Mathematics and a research astronomer at the South African Astronomical Observatory. This is because only certain types of supernovae can give insight into the inner workings of the universe.

BEAMS makes it possible to remove the data from supernovae that taint the information.

Also, as Bassett says, doing this by hand is no longer an option. "In the future we will have so much data that this won't be possible." **DANIELLA POLLOCK**

**Rising star: Renée Hlozek is part of a team of researchers that has used an estimation method to study supernovae. Their paper is soon to appear in *Physical Review D*.**

