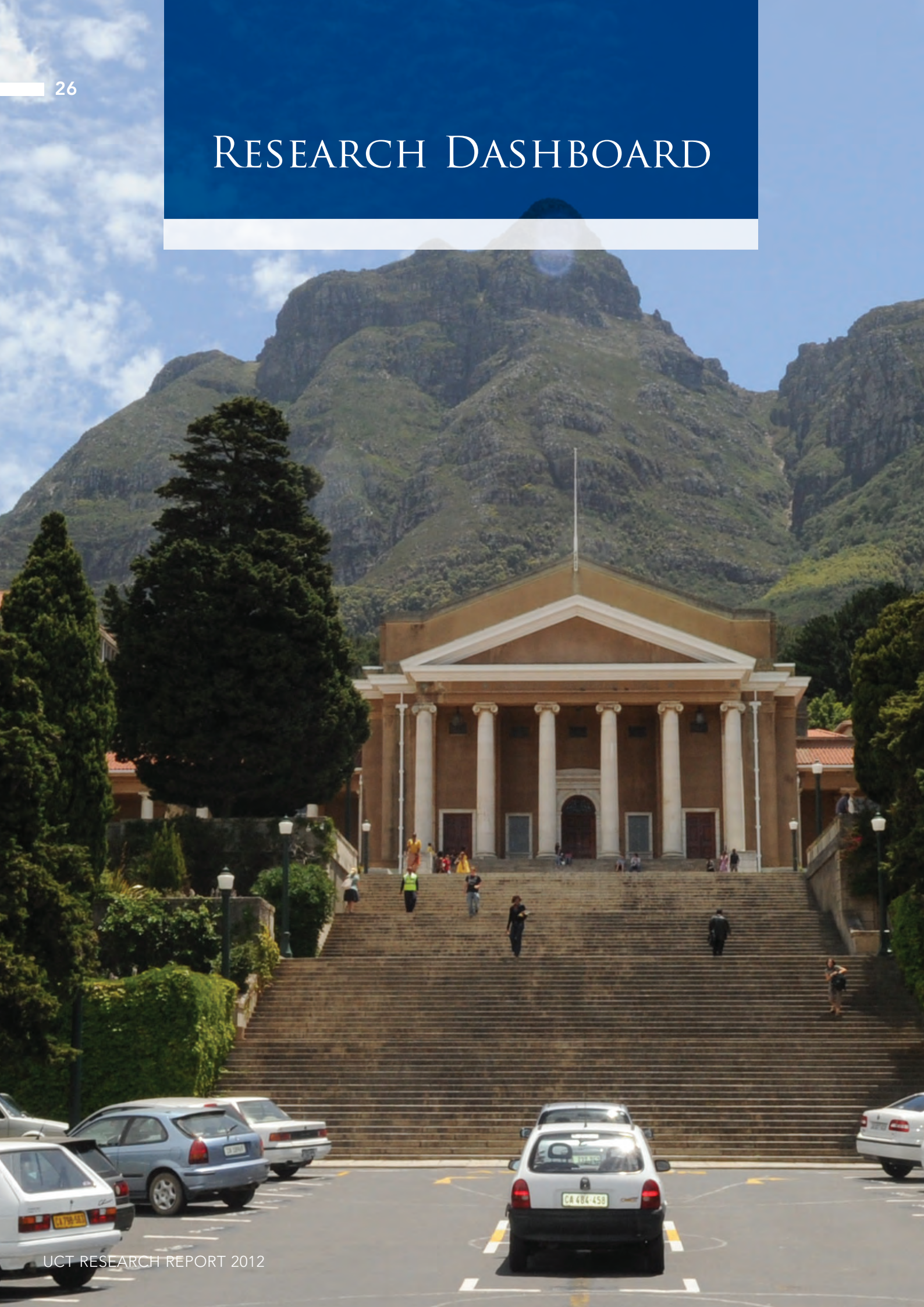
Research Dashboard



Research Funding

UCT's vision for the development of research recognises the importance of focusing our efforts and resources in selected areas, in order to take the quality and impact of our research to the next level. The DST/NRF Centres of Excellence and Competence Centres, the South African Research Chairs Initiative, and UCT's Signature Themes for research and university-accredited research groupings provide frameworks to achieve this goal. Our research is made possible through generous donations, scholarships and fellowships, and through research contracts and grants from national and international funding agencies.

Funding through research contracts

Research contracts to the value of R682 million were processed in 2012. These contracts vary from short-term contracts to multiyear contracts with multi-million-rand budgets, involving both local and international funders. In 2012, 1 218 contracts were signed.

Research contracts to the value of R90.26 million were entered into with South African government departments, public enterprises and statutory bodies in 2012. South African science councils, national research centres and non-profit entities accounted for R48.5 million, of signed contracts, whereas contracts with South African industry were valued at R111.4 million. Major South African industry partners include the Eskom Group, Anglo Group, Old Mutual, Rustenburg Platinum Mines, and the Sasol Group.

At an international level, 572 contracts to the value of R431 million were entered into with entities from 48 countries. The major source of foreign funding is the USA (R211.8 million), followed by the United Kingdom (R82.6 million), Canada (R35.6 million), Belgium (R23.5 million), and the Netherlands (R22.5 million).

The most prominent funder of research in 2012 was the National Institutes of Health, and contracts to the value of R73.3 million were, directly or indirectly (through collaboration with USA universities), entered into. Contributions through the Bill and Melinda Gates Foundation amounted to R40.7 million and the Aeras Global TB Vaccine Foundation contributed R37.4 million.

The Medical Research Council, with contracts to the value of R28.8 million, was the major United Kingdom contributor, followed by the Wellcome Trust (R24.5 million). Contracts to the value of R21.6 million and R19 million were respectively entered into with the European Commission and the European and Developing Countries Clinical Trials Partnership, which operates from the Netherlands. Canada's main contributor was the International Development Research Centre, with contracts to the value of R17.4 million.

National agency funding through research grants

The **National Research Foundation** (NRF) remains a significant funder of research at UCT. In 2012, the total grants awarded from the NRF declined to R208 million, with 766 grants at an average grant size of R271,540, compared to R224 million in 2011, with 848 grants, at an average grant size of R264,150. These amounts include carried forward grant awards from 2011 as well as the actual grant awards for 2012. The decline in 2012 can be attributed to many factors, including budget constraints and policy changes in the NRF's funding landscape and priorities. **Figure 1** shows the percentage of NRF grant awards to UCT in 2011 and 2012 by funding purpose.

Established researchers

The majority (55%) of the NRF funding support to UCT in 2012 was allocated to supporting established researchers across all knowledge areas and disciplines, through the Competitive Programmes for Rated and Unrated researchers (R19.3 million), Incentive Funding for Rated Researchers (R18.9 million), and the South African Research Chairs Initiative (R76.4 million for the DST/NRF Chairs).

National and strategic priorities

Fifteen percent (R30.7 million) of NRF funds awarded to UCT in 2012 was to support research on national and strategic priorities. The bulk of this funding is ring-fenced by the Department of Science and Technology to support their Research and Development Strategy and

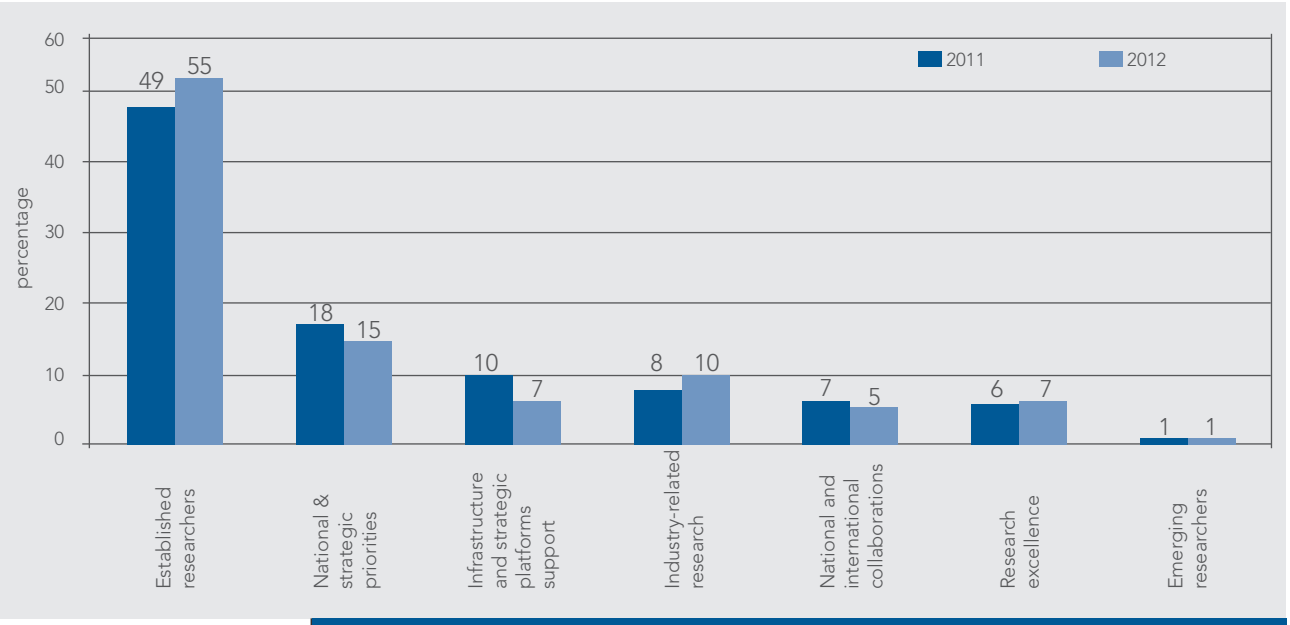


Figure 1: Percentage of NRF grant awards to UCT in 2011 and 2012 by their primary funding purpose

their Ten Year Innovation Plan. Areas of support include space science and astronomy, global change, human and social dynamics, marine research, indigenous knowledge systems, and community engagement. This investment area includes support for the Blue Skies Programme, through which R704 911 was allocated to UCT researchers in 2012.

Infrastructure and strategic platforms support

Seven percent (R14.9 million) of NRF funding in 2012 was allocated to the acquisition of state-of-the-art infrastructure and skills development to support the roll-out of national infrastructural programmes.

Applied research relevant to industry

The Technology and Human Resources for Industry Programme (THRIP) is a programme of the Department of Trade and Industry, managed by the NRF. THRIP promotes partnerships in pre-commercial research between business and publicly funded research institutions. The design of the programme is to leverage collaborative partnerships on a cost-sharing basis for research in science, engineering, and technology in order to provide technology solutions for industry, and in the process produce a flow of targeted, highly skilled, human capital for industry.

Direct funding from THRIP (i.e. excluding the industry portion) increased to R20 286 684 in 2012 (10% of total funding), from R17 827 833 in 2011 (8% of total funding). The average grant size in 2012 was R563 519.

Research excellence

UCT was awarded R13 210 177 in 2012 for the two DST/NRF Centres of Excellence, c*change (*see page 172*) and Birds as Keys to Biodiversity Conservation (*page 108*). UCT also co-hosts a node of the DST/NRF Centre of Excellence for Biomedical TB Research (*page 61*).

National and international collaborations

Five percent of UCT's funding from the NRF in 2012 was allocated to support collaborations mainly through the South African Science and Technology Bilateral Agreements and the Knowledge Interchange Programme. Mainly due to a timing difference, there was a decrease in total funding from R16 617 629 in 2011 to R10 247 305 in 2012 (with an average grant size of R119 698), with many bilateral funding calls being issued late in 2012 and the outcomes communicated in 2013.

Emerging researchers

The Thuthuka Programme aims to develop human capital for research and innovation. In 2011, the NRF launched a new Thuthuka Programme that was implemented for 2012 funding and that consisted of three funding tracks, namely the PhD track, post-PhD track, and the NRF-rating track. The NRF also set support targets for this programme in terms of black and female researchers.

These changes, together with limited NRF funding, resulted in UCT being unable to grow its Thuthuka budget in 2012, this remaining at approximately

R3 million. UCT's Emerging Researcher Programme (*see page 23*) will continue to play a complementary role in supporting this target group.

UCT is also a beneficiary of funding from the South African **Medical Research Council**, which awards research grants for individual projects, research-unit funding, and career-development and training awards. In 2012, awards valued at R15 783 326 were made for new projects and fellowships, in addition to renewal grants, and the funding for scholarships and bursaries reported on page 30.

Postgraduate Students and Funding

Increasing the absolute numbers of both local and international postgraduate students, and improving retention rates, are two of UCT's primary goals. In order to ensure that the professional sector of the country and continent is adequately provided for through the emergence of excellent graduates, broad-based support for these sectors is an imperative.

The creation of the post of Director, Postgraduate Studies, and the mandate to connect and communicate between the different structures and resource mechanisms that support postgraduate students have given new impetus to improving the UCT experience of this sector of the research community.

In 2012, 4 739 awards were administered to 2 464 honours, master's and doctoral students at UCT, to a total value of R159 455 046.

Sources of funding

- **UCT departmental awards** accounted for 32.5% of all funding administered in 2012, and included more than 30 new departmental scholarships and fellowships. These awards are intended to support continuing and new students or doctoral graduates with specific skills and research interests.

- **The National Research Foundation** continues to be a major funder of postgraduate students. In 2012, 904 bursaries and scholarships were awarded to honours, master's and doctoral students, to a total value of R46 395 844.

- **The Medical Research Council** provides support for master's and doctoral students who are studying in areas of the health sciences. In 2012, 12 bursaries and scholarships were awarded to postgraduate students, to a total value of R760 000.

- **The UCT Research Associateships** provide prestigious awards to recognise the research excellence of master's and doctoral students across all disciplines, as well as to acknowledge the work of their supervisor(s). In 2012, 20 master's and doctoral awards were made, valued at R840 000.

- In 2012, 25 master's and 45 doctoral students were awarded **UCT Conference Travel Grants**, valued at R178 397 and R627 221 respectively, which enabled them to present papers locally and internationally. **Table 4** lists the areas of study represented and the travel destinations visited during 2012.

- **UCT Scholarships for International Travel** enable master's and doctoral students to undertake research visits to internationally recognised institutions for a minimum of two and a maximum of 10 months. In 2012, awards were made to 32 master's and doctoral students for international travel, valued at R1 274 515.

- Through the **National Student Financial Aid Scheme** offered by the national Department of Higher Education and Training, 31 honours students and 12 master's students were awarded loans to the value of R1 157 819 and R366 168 respectively.

- In 2012, 12 students received scholarships valued at R1 083 486 through the **UCT/CSIR Scholarship Programme**. The awards are funded equally by UCT and the CSIR and provide high-value scholarships to honours, master's, and doctoral students whose areas of study fall within the CSIR's priorities.

- Four postgraduate students were funded through the **Commonwealth Scholarship Programme** in 2012 in the following areas of study: management science or philosophy (master's), economics for development (master's), intellectual history (master's), and environmental engineering (doctoral).

- The generous **David and Elaine Potter Fellowships** provide full-cost support to excellent master's and doctoral students who intend to contribute to civil society in South Africa by leveraging their educational advantage in any discipline. Since its inception in

2004, more than 75 students have been supported. In 2012, 19 awards were made (including continuing students) valued at R2 010 310. Areas of study ranged across disciplines, from applied mathematics, chemistry and historical studies, to philosophy and social anthropology.

- The **Harry Crossley Research Fellowships** are full-cost and are available to South African students for full-time study in any research-related degree, with the exception of students whose studies are in the areas of politics or religion. The fellowships are granted on the basis of academic merit and financial need to students proceeding to honours, master's and doctoral degrees. In 2012, 27 students received Harry Crossley Research Fellowships (including continuing students), valued at R1 868 000.

The **Harry Crossley Foundation** is one of UCT's most generous and long-standing donors. In addition to the Fellowship Programme, the Foundation provides support to postgraduate students in the form of need-based bursaries, a postdoctoral fellowship, funds for research in health sciences, and an annual grant for the supply and maintenance of equipment in the Postgraduate Centre.

- The **UCT/Woolworths Fellowship Programme** supports master's and doctoral students whose research is in the areas of environmental issues and probiotics. In 2012, four students received awards valued at R320 000.

- The **AW Mellon (cross-faculty) Scholarship Programme** provides support to master's and doctoral students registered in specific areas of study in the humanities, law, and commerce. In 2012, 21 awards were accepted to the value of R2 264 473.

- In 2012, 96 international and 20 refugee students were awarded R2 667 500 and R730 000 respectively through the **UCT Scholarships for International and Refugee Students**. International students received 31% of the total funding provided to postgraduate students at UCT in 2012. The **UCT Refugee Students' Scholarship programme** funded through the **Eric Abrahams Scholarships** was augmented by a donation from the **Sigrid Rausing Trust**, which funded 11 of the 20 refugee students. The programme commenced in 2007 and has funded 56 students to a total value of R3 574 333. This number includes some students who were funded for two degrees, i.e. honours and master's. **Table 3** illustrates the source of funds used for international student support, as well as the breakdown of students from SADC, other countries in Africa (non-SADC), and the rest of the world.

Table 1: Total awards made to postgraduate students in 2012 by source of funds

Degree	Awards	UCT (central)	Departmental funds	Donations	Investments	MRC	NRF	State	External*	Total
Honours	Number	242	93	171	59	3	191	31	79	869
	Value	R2 798 500	R2 432 472	R3 383 046	R626 793	R240 000	R5 443 000	R1 157 819	R2 745 719	R18 827 349
Master's	Number	598	558	185	203	2	407	12	285	2250
	Value	R8 129 897	R23 482 763	R5 232 506	R3 048 141	R100 000	R19 571 567	R366 168	R5 944 024	R65 875 066
Doctoral	Number	464	460	154	117	7	306	0	112	1620
	Value	R8 303 221	R25 989 895	R12 264 552	R4 027 021	R420 000	R21 381 277	0	R2 366 666	R74 752 632
Total	**Number**	**1304**	**1111**	**510**	**379**	**12**	**904**	**43**	**476**	**4739**
	Value	**R19 231 618**	**R51 905 130**	**R20 880 104**	**R7 701 955**	**R760 000**	**R46 395 844**	**R1 523 987**	**R11 056 408**	**R159 455 046**

**External awards reflect external funds for student support, and are received and processed by the Fees Office.*

Table 2: Postgraduate funding awards by degree level and faculty in 2012

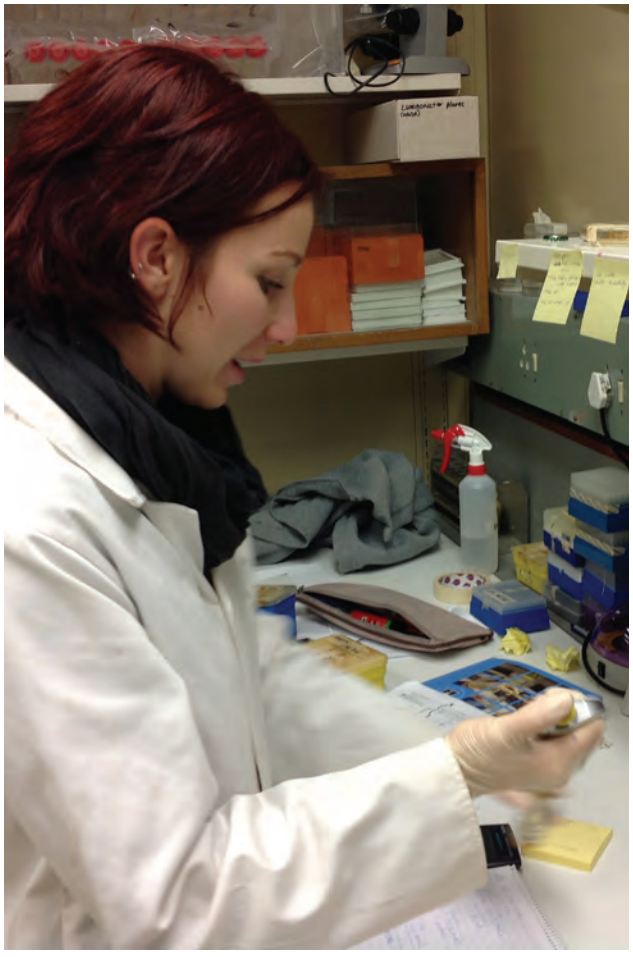
	Honours			Master's			Doctoral			Total		
Faculty	**Number of students receiving awards**	**Number of awards made**	**Value of awards**	**Number of students receiving awards**	**Number of awards made**	**Value of awards**	**Number of students receiving awards**	**Number of awards made**	**Value of awards**	**Number of students receiving awards**	**Number of awards made**	**Value of awards**
Commerce	31	53	R1 148 555	59	92	R2 697 980	75	119	R5 687 817	165	264	R9 534 352
Engineering & the Built Environment	36	49	R920 057	303	479	R17 502 536	111	179	R10 533 240	450	707	R28 955 833
Health Sciences	54	93	R2 010 235	219	337	R10 857 831	171	332	R17 654 208	444	762	R30 522 274
Humanities	229	388	R6 041 960	305	500	R10 679 137	144	271	R10 728 092	678	1159	R27 449 189
Law	0	0	R0	40	63	R1 535 145	28	58	R2 363 690	68	121	R3 898 835
Science	129	207	R5 960 823	268	494	R16 658 413	262	549	R25 418 919	659	1250	R48 038 155
Total	**479**	**790**	**R16 081 630**	**1 194**	**1 965**	**R59 931 042**	**791**	**1 508**	**R72 385 966**	**2 464**	**4 263**	**R148 398 638**

Table 3: Summary of awards made to international and African students by region in 2012

Source of Funds	Awards	Africa (non-SADC)	International	SADC	Total
UCT (central)	Awards made	228	134	83	445
	Value	R 4 362 500	R 2 537 514	R 2 189 362	R 9 089 376
Departmental funds	Awards made	136	97	210	443
	Value	R 7 857 640	R 5 559 503	R 9 841 164	R 23 258 307
Donations	Awards made	39	12	69	120
	Value	R 2 846 500	R 429 260	R 3 393 679	R 6 669 439
Investments	Awards made	15	17	46	78
	Value	R 276 740	R 390 018	R 1 305 383	R 1 972 141
National Research Foundation	Awards made	17	11	53	81
	Value	R 1 113 649	R 696 199	R 2 872 997	R 4 682 845
Total	**Awards made**	**435**	**271**	**461**	**1167**
	Value	**R 16 457 029**	**R 9 612 494**	**R 19 602 585**	**R 45 672 108**

Table 4: Conference travel destinations of postgraduate students in 2012

Faculty	Field of study	Destinations
Commerce	Business Administration, Economics, Information Systems, Statistics	Thailand, USA, South Africa (Pretoria)
Engineering & the Built Environment	Chemical Engineering, Civil Engineering, Electrical Engineering, Geomatics	Malaysia, USA, Uganda, South Africa (Langebaan), Australia, Singapore, Germany
Health Sciences	Anatomy and Cell Biology, Biokinetics, Clinical Science and Immunology, Exercise Science, Human Genetics, Neurosciences, Pharmacology, Physiology, Psychiatry, Public Health, Radiotherapy	Canada, USA, Singapore, South Africa (Port Elizabeth, Durban), Washington, Belgium, Spain, Germany, Canada
Humanities	Fine Art, French Language and Literature, Justice and Transformation, Linguistics, Philosophy, Psychology, Social Anthropology, Sociology, Theatre and Performance	South Africa (Durban, Johannesburg, Pretoria), USA, Senegal, Sweden, France, Berlin
Law	Criminal Justice	Malawi
Science	Applied Maths, Astronomy, Chemistry, Climate Change and Development, Conservation Biology, Molecular and Cell Biology, Physical Oceanography, Physics	Portugal, Scotland, South Africa (Bloemfontein, Skukuza), USA, Brazil, Sweden, Ukraine, England, Singapore, Tanzania



Institutions visited by postgraduate students in 2012 as a result of support from UCT scholarships for international travel

- **USA:** Emory University, International Space University, University of California, Athinoula A Martinos Centre, Charlestown, Harvard University, Boston, University of Connecticut, USA
- **Canada:** Simon Fraser University, Carleton University, University of Western Ontario, University of British Columbia
- **Africa and the Middle East:** University of Malawi, Malawi; Technion Haifa Institute of Technology, Israel
- **Asia:** Amedkar University, New Delhi, India
- **Europe and the United Kingdom:** National Institute for Research in Computer Science and Control, France; Ludwig Institute for Cancer Research, United Kingdom; Cambridge University, United Kingdom; King's College London, United Kingdom; University of Balearic Islands, Spain; University of Brest, France; Forschungszentrum Julich, Germany; Plymouth Marine Laboratory, United Kingdom; Royal Botanic Gardens, United Kingdom; Institute for Neural Signal Transduction, University of Hamburg, Germany; University of Central Lancashire, United Kingdom; University of Pierre and Marie Curie, France; Institut de Biologie Structurale Jean Pierre Ebel, France

Postdoctoral Research Fellows

Postdoctoral research fellows (PDRFs) are much sought after at UCT in view of their potential to strengthen the research enterprise, and relieve the dwindling numbers of academic staff and researchers in South Africa and on the continent of Africa. The number of postdoctoral researchers that register for up to five years at UCT has increased steadily since 2002, and the university hopes to further increase this number in the next five years.

In 2012, 282 registered postdoctoral research fellows received more than R52 million in funding support. As can be seen from **Table 6**, individual academic departments and the NRF remain the strongest supporters of this sector. However, donated funds, such as the sponsorship received from the Claude Leon Foundation, play a vital role in attracting and sustaining PDRFs at UCT.

The majority of PDRF registrations are in the Science and Health Sciences faculties. UCT support increasingly aims to move beyond only financial administration of the sector. To this end, increased attention is being paid to the quality of the postdoctoral experience, as well as advocacy to recognise the critical role they play.

In 2012, 35 PDRFs attended conferences in 21 countries and received mobility grants valued at R535 397. Some PDRFs are registered at UCT but receive external support which is not administered by the PGC&FO. 282 PDRFs are recorded as being registered, but only 267 of these received UCT-administered fellowships.

Table 5: Postdoctoral Research Fellowships per faculty, 2012

Faculty	Number of registered PDRFs	Number of fellowships awarded	Value
Commerce	8	19	R1 787 732
Engineering & the Built Environment	21	41	R3 324 495
Health Sciences	99	168	R20 292 827
Humanities	26	34	R3 662 981
Law	4	7	R919 291
Science	124	187	R22 157 664
Total	**282**	**456**	**R52 144 990**

Table 6: Postdoctoral Research Fellowships by source of funds in 2012

Source of funds	Number of fellowships made	Value
UCT funds	70	R4 940 168
Departmental funds	234	R29 533 179
Donations	16	R2 641 058
Investments	1	R12 000
Medical Research Council	3	R390 000
National Research Foundation	132	R14 628 585
Total	**456**	**R52 144 990**

Table 7: Postdoctoral conference and research travel, 2012

Faculty	Number of travel grants made	Value
Commerce	2	R37 463
Engineering & the Built Environment	5	R64 859
Health Sciences	8	R131 998
Humanities	3	R47 937
Law	1	R16 431
Science	16	R236 709
Total	**35**	**R535 397**

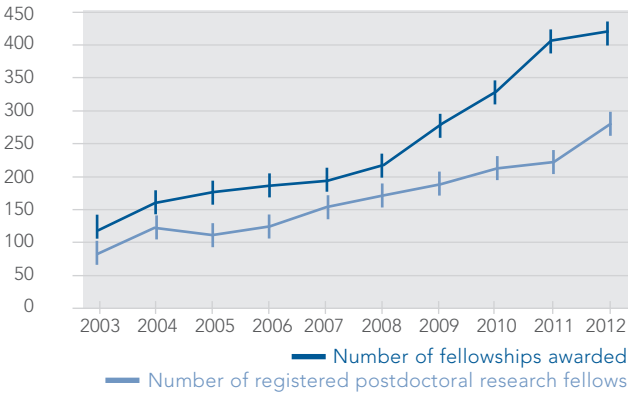


Figure 2: Growth in postdoctoral research fellows at UCT, 2003–2012

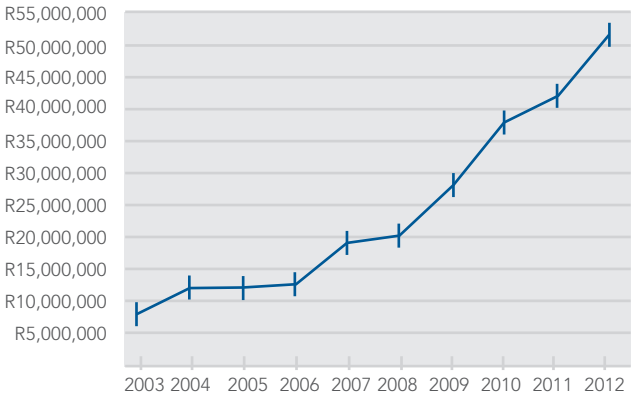


Figure 3: Value of postdoctoral fellowships, 2003–2012

National Research Foundation Evaluation and Rating

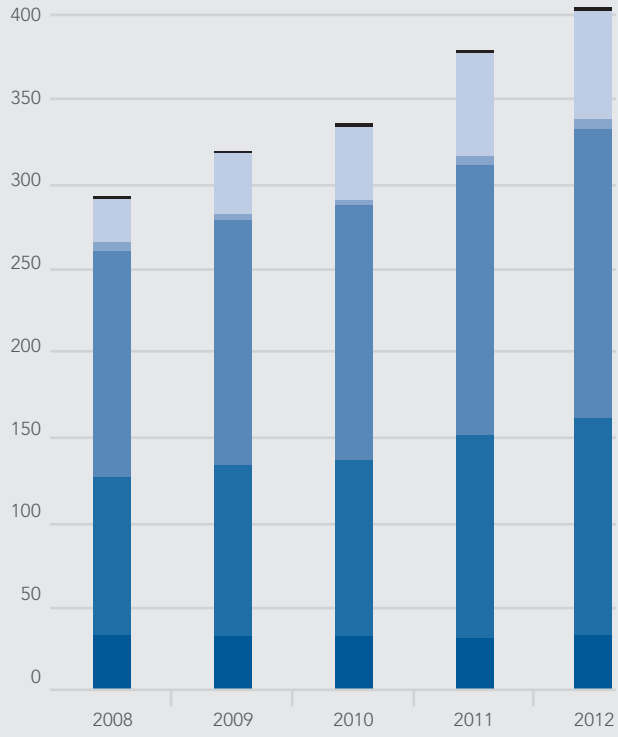
The National Research Foundation's rating system is an international benchmarking tool used to assess the quality of research. The system contributes to the building of a globally competitive science system in South Africa and encourages rated researchers to impart their skills to the next generation of researchers through supervision and collaboration.

World-leading expertise

UCT was awarded four new A ratings in 2012, to professors Harold Kincaid and Don Ross (Commerce) and professors Heribert Weigert (Physics) and Jack van Honk (Health Sciences). The A ratings of professors Igor Barashenkov (Mathematics and Applied Mathematics), Clifford Shearing (Criminal Justice), Lionel Opie (Medicine), Doug Butterworth (Mathematics and Applied Mathematics), John de Gruchy (Religious Studies), Gerd Gäde (Zoology), and Dan Stein (Psychiatry and Mental Health), and Distinguished Professor Philippe-Joseph Salazar (Rhetoric Studies), were renewed on re-evaluation.

Recognising future leaders

The NRF annually awards P ratings to young researchers who demonstrate the potential to become future leaders in their research field. Structural geologist Dr Åke Fagereng and particle physicist Dr Andrew Hamilton were the recipients of new P ratings in 2012.



Description of NRF rating categories

A World leaders renowned for the high quality and impact of their research.

B Researchers with considerable international stature.

C Established researchers who produce research of an international standard.

P Young researchers (within five years from PhD) who are recognised internationally as having the potential to become future leaders in their field.

Y Young researchers (within five years from PhD) who show promise of becoming established researchers within a five-year period after evaluation.

L Late entrants into research (this category is being phased out by the NRF).

Figure 4: Number of NRF-rated researchers at UCT, 2008–2012

NRF Ratings

Dr Andrew Hamilton

Unlocking the secrets of a simply brilliant universe

Despite what he calls the "long and often complicated path" it takes to uncover the laws of physics, Dr Andrew Hamilton, who was awarded an NRF P rating for his continuing insights into understanding the Universe at its most fundamental level, believes they are inherently simple.

Dr Hamilton's academic journey has spanned three continents and has seen him contribute to more than 200 peer-reviewed publications as a member of two large proton collider experiments, ATLAS and the Collider Detector at Fermilab in the USA. He joined UCT's Department of Physics as a lecturer in July 2011, following a five-year stint at the ATLAS experiment, which he joined as a postdoctoral fellow with the University of Geneva. The ATLAS project is one of two general-purpose detectors at the Large Hadron Collider at the European Centre for Nuclear Research (CERN), the decades-long experiment to detect the Higgs boson particle. Here, Dr Hamilton focused on helping to develop the ATLAS trigger system.

"The trigger system is a vital component of the experiment that selects which events to record for further analysis and which to discard," he explains.

His true interest, however, lies in analysing and interpreting the data collected by the trigger, specifically data related to the Higgs boson's decay into two photons, which is what the Higgs boson does in the Standard Model of the Universe.

Dr Hamilton's teaching career began at the University of Alberta as a teaching assistant in 2001, and evolved into the supervision of master's and doctoral students at the University of Geneva. He also co-ordinated the doctoral programme at the Swiss Institute of Particle Physics from 2010 to 2011. At UCT, he has been teaching physics from first-year to honours level, and previously taught nuclear and particle physics and advanced nuclear physics to senior undergraduate students.

What inspires his curiosity about the smallest stuff that makes up our Universe? "The idea of breaking down our understanding of the Universe into its most fundamental pieces attracted me to particle physics," he says. "The ability to observe a physical phenomenon as profound as the Higgs boson has kept me interested."

Dr Hamilton's present research interests revolve around Standard Model direct photon production studies. He plans to continue research at the high-energy frontier of particle physics. Due to the fundamental nature of contemporary particle physics, Dr Hamilton admits that the impact of his and his peers' research on society might not be immediately visible.

"Just as people doing fundamental research in the early 20th century could not have predicted that an understanding of quantum mechanics would lead to the development of the computer, we don't know where our current fundamental research will lead."

Seismic counts for earthquake geologist

At just 30, earthquake geologist and lecturer in structural geology in the Department of Geological Sciences Dr Åke Fagereng was awarded a P rating from the National Research Foundation in 2012. These ratings can be awarded only once, but there is an expectation that the recognition and support will grow not only his body of work, but a new generation of young geologists in his wake.

Dr Fagereng received his PhD in 2010, but already has a sizeable publications list, mostly papers published in the past two years. With funding from the South African

Dr Åke Fagereng

National Antarctic Programme, he is presently conducting a three-year project to study deep crustal processes recorded in the Antarctic rocks. That means looking for ancient, active fault lines that have been exposed to high temperatures and pressures from the Earth's shifting plates.

Studying the microscopic properties and formation of rocks, Dr Fagereng unravels the age-old stories rocks tell about the geophysical processes that occur deep in the Earth's crust. His recent research is broadening the understanding of subduction zone fault processes (where one tectonic plate, or piece of the Earth's crust, is forced under another after colliding), particularly those factors that affect the 'seismic style' of the subduction megathrust interface. The latter occurs when the ocean floor is forced under a continent and slip occurs on this interface. How the interface responds (its 'seismic style') determines whether it produces large earthquakes like those in Japan and Sumatra, or creeps along slowly and silently, as is the case in the Philippines.

Dr Fagereng also studies the physical processes behind the recently discovered seismic phenomena of episodic tremor. These are 'earthquakes' of very low frequency and slow slip, characterised by seismic rumbling, or tremor, and slow slip along the tectonic plates. Usually, these events are imperceptible to humans and are not destructive. Through his project, he is collaborating with researchers in New Zealand on the development of theoretical models for fault behaviour and conditions. They intend to compare geological observations in well-studied exhumed fault zones, regions of rock showing significant displacement along the fractures as a result of movement in the Earth's crust. A large chunk of this work will also be done off-shore, drilling through a fault section between the Pacific and Australian tectonic plates, a major earthquake zone, down through 2km of water and 6km of rock.

Dr Fagereng is renowned among the 'fault community' for his extraordinary integration of geological and geophysical data. His geological maps trace and document fault lines, those places where the rock formations and chemical compositions point to weaknesses in the Earth's crust. The field studies are used to elucidate seismogenic behaviour.

He is currently also working with students on the Naukluft Thrust, in Damaraland, Namibia, and has students working in the Cape Fold Mountains on a project to monitor intraplate seismicity at a microseismic scale.

Dr Fagereng was also recognised for the impact of his work through a UCT College of Fellows Young Researcher Award in 2012, as well as a Claude Leon Merit Award for Young Lecturers.

Professor Don Ross

A-rating milestone for Commerce dean

Professor Don Ross, economics professor and chair of the executive board of the International Network for Economic Methodology, became the first dean of a South African commerce faculty to be awarded an A rating by the National Research Foundation.

Professor Ross's research unites economic methodology, experimental economics and econometrics, cognitive science, and the philosophy of science. Among his recent achievements has been the launch of the Research Unit in Behavioural Economics and Neuroeconomics.

Professor Ross believes methodological work should be directly integrated with empirical research. Since 2008 he has led an international research team of experimental economists and psychologists in applying his 'anti-behaviouralist' approach. This emphasises modelling differences among people at the population level, rather than trying to model special features of individuals and then aggregating them. Professor Ross and his colleagues have specifically applied this method to the study of addiction and other forms of impulsive consumption. This produces results of direct relevance to policy at the population scale, rather than clinical advice. Thus the method is characterised as 'structuralist' and 'anti-individualist' empirical microeconomics.

This methodology is explored in his 2005 book *Economic Theory and Cognitive Science: Microexplanation*, also published in Chinese in 2010. He has published various papers that empirically apply the methods, as well as a book of which he is first author, *Midbrain Mutiny: The Picoeconomics and Neuroeconomics of Disordered Gambling* (2008). He co-edited, with collaborator Professor Harold Kincaid, the *Oxford Handbook of Philosophy of Economics* (2009).

In 2007, together with Professor James Ladyman, he co-published a broadened exploration of his general structuralist and anti-individualist metaphysical perspective across the whole of the sciences, particularly quantum physics. This book, *Every Thing Must Go: Metaphysics*

NRF Ratings

Naturalized (2009), received highly favourable reviews. It has been taught in graduate seminars around the world and has been the subject of book symposia at four international conferences. A follow-up collection of essays titled *Scientific Metaphysics*, which he co-edits with professors Ladyman and Kincaid, is expected for publication in 2013.

Professor Ross has produced 13 major policy reports for clients such as the National Department of Trade and Industry. Between 2006 and 2010, he was director of research for the National Responsible Gambling Programme. He has taught and applied game theory throughout his career, and it informs the majority of his work. He is the author of the game-theory article in the *Stanford Encyclopaedia of Philosophy*.

Professor Harold Kincaid

Dynamic leadership in global research

UCT's School of Economics' Professor Harold Kincaid was recognised as an international leader in his field by the National Research Foundation in 2012. Professor Kincaid joined UCT from the University of Alabama at Birmingham, USA, where he had been professor of philosophy, sociology, and epidemiology.

Broadly, his research has focused on the methodologies of social science and he has published on a host of related topics, including causal modelling, the philosophy of social science, the role of explanation as a concept in social sciences, and the medical models of addiction.

"My main focus has been on trying to sort good science from bad science."More recently, his interest has turned to how social scientists infer causes and correlations.

That last category reflects some of Professor Kincaid's recent work at UCT. He has contributed to a few projects with the Research Unit in Behavioural Economics and Neuroeconomics (RUBEN), an interdisciplinary group of researchers in the School of Economics that uses economic experiments to examine the role that social, cognitive, and emotional factors play in economic decision-making.

At RUBEN, Professor Kincaid has been involved in studies looking at the prevalence of gambling in South Africa, and at problem gamblers and at-risk gamblers.

There are particular dynamics to local gambling, he explains. In South Africa, it is by and large the poor who have serious gambling problems. Rather than frequenting casinos, they stake their money on informal and illegal enterprises, such as dice and card games, and the lotto-like numbers game called iFafi.

Professor Kincaid's current research includes a project funded by the NRF, that looks at the risk behaviour of fruit farmers, as well as a study among the poor in Cape Town and Atlanta (USA), which draws on behavioural economics to consider risk and time attitudes, as well as the social and economic factors involved in transitions in and out of extreme poverty.

New frontiers: Chemistry, the brain and behaviour

A world leader and pioneer in the multidisciplinary field of hormones, the brain, and human social-emotional behaviour, Professor Jack van Honk received an A rating from the National Research Foundation in 2012.

Almost 15 years ago he became the world's first researcher to use both hormonal manipulation and brain-stimulation techniques to gain direct insight into the psychobiological mechanisms underlying human social-emotional behaviour.

Professor Jack van Honk

An honorary professor in the Department of Psychiatry and Mental Health since 2010, Professor Van Honk first came to work at UCT in 2008, and now spends 10 months of each year at UCT and two months teaching at his alma mater, Utrecht University, in social and affective neuroscience.

Professor Van Honk leads several UCT research projects, funded by entities in South Africa, the Netherlands and the USA. His core field of research is social neuroscience and his fields of specialisation are psychoneuroendocrinology, affective neuroscience, and neuropsychology, on which he has published prolifically, with 75 research and theoretical papers in peer-reviewed journals in the past eight years alone.

His research underpins the development of innovative treatment strategies, such as hormone manipulation and transcranial magnetic stimulation, to treat fear and aggression disorders like psychopathy, impulsive aggression, psychological trauma, and human phobia.

"Social neuroscience," according to Professor Van Honk, "provides an excellent foundation for the creation of a so-called common body of knowledge, as it combines techniques and insights gained from psychology, sociology, neuroscience, biology, and economics. My personal interest in this fascinating realm is not only to gain fundamental understandings of the psychology of human social behaviour, but also to understand and seek innovative treatments for the psychopathologies of fear and aggression."

Within the Department of Psychiatry, Professor Van Honk is building capacity in psychobiological research among psychiatric populations. He also supervises research in social phobia and psychological trauma. Another project he leads, together with colleague, Dr Barak Morgan (Department of Human Biology), is a new line of research on Urbach-Wiethe disease (UWD), an extremely rare genetic-developmental disorder, characterised by bilateral focal calcifications of the amygdala in the brain. Research has shown that the amygdala play an important role in the 'social brain', processing memory and emotional reactions, such as social threat processing, empathy, and fear conditioning. The Northern Cape is home to almost 20% of the estimated 200 people worldwide to suffer from UWD.

Shedding light on the Universe's deepest secrets

Looking back into the deepest recesses of time, into a Universe immeasurably different from the one we know today, has earned UCT's Professor Heribert Weigert an A rating from the National Research Foundation.

Professor Heribert Weigert

Professor Weigert's research centres on matter as it occurred in the early Universe, very shortly after the Big Bang, when the Universe was immensely hot – more than 100 000 times hotter than the centre of the sun. "This state of matter, the quark gluon plasma, is recreated today at the most powerful particle accelerators we have – the Large Hadron Collider at CERN in Switzerland, and the Relativistic Heavy Ion Collider at Brookhaven National Laboratory (BNL) on Long Island near New York," says Professor Weigert.

He describes himself as a theoretical physicist and was one of the driving forces in the formulation of what is known today as the Colour Glass Condensate, another extreme state of matter that sets the initial conditions in the accelerator experiments at CERN and BNL. One of his reasons for moving to UCT was to join a growing group of both theorists and experimentalists directly involved in this massive international effort to uncover the deepest secrets of the Universe.

He has considerable international experience, having conducted research in Germany, the USA, the UK, and Denmark, and obtained his Habilitation at the University of Regensburg. In addition, he spent a semester as a visiting full professor in Bielefeld, Germany, and served as a research associate professor at the University of Oulu, Finland, for three years. Since April 2011, he has been an associate professor in the Department of Physics at UCT, and in 2011 he became director of the university's Centre of Theoretical and Mathematical Physics. One of his goals is to focus on nurturing and expanding the research group and linking it to the national and international scientific particle physics community.

In the meantime, Professor Weigert plans to continue navigating the labyrinthine ways of the early Universe, in his quest to shed new light on its origins and, hopefully, take a calculated step towards answering the greatest question of them all: why are we here, and how did it all begin?

NRF-rated researchers at UCT

Newly rated researchers are listed in bold text.

Abiodun, B
Abratt, RPA
Abratt, VR
Ackermann, RR
Adhikari, M
Alexander, MG
Altwegg, R
Amar, A
Ansorge, IJ
Archer, A
Archibald, M
Ardington, CS
Armitage, NP
Badri, M
Baets, W
Bagraim, J
Barashenkov, IV
Barnard-Naude, J
Barnes, K
Barr, GDI
Bassett, B
Bateman, E
Baum, R
Becker, M
Beighton, PH
Benjamin, P
Bennett, TW
Beushausen, H
Bezuidenhout, D
Bhorat, HI
Bickford-Smith, JV
Biekpe, N
Blackburn, JM
Blake, EH
Blom, D
Blumenthal, M
Bolton, JJ
Bond, WJ
Boonzaier, F
Bordy, E
Bosch, AN
Bosch, T
Bourne, SA
Bowen, PA
Branch, GM
Brattka, V
Braun, D
Breier, M
Britton, DT
Brombacher, FH
Bronner, GN
Brown, ITJ
Brundrit, J
Bruyns, PV
Buffler, A
Burch, V
Burchell, J
Burgers, W
Butler, A
Butterworth, DS
Caira, MR
Cameron, R
Carignan, C
Case, J
Chan, A
Chege, G
Chibale, K
Chidester, DS
Chigona, WMG
Chimphango, S
Chinsamy-Turan, A
Chirikure, S
Chirwa, D
Chung Kim Yuen, S
Claeys, MC
Clarkson, C
Clarkson, CP
Cleymans, JWA
Cochrane, JR
Cohen, B
Collins, M
Colvin, CJ
Combrinck, MI
Compton, JS
Comrie, CM
Cooper, BL
Coovadia, IC
Corder, HM
Corin, K
Cornille, JL
Coyne, VE
Cramer, MD
Crankshaw, O
Crawford, RJM
Cumming, G
Dalvie, MA
Dandara, C
Darch, C
Davidowitz, B
Davids, L
De Blok, E
De Gruchy, JW
De Jager, G
De Jager, K
De Vos, P
De Vries, P
Deglon, DA
Denny, LA
Deumert, A
Dheda, K
Distiller, N
Dominguez, CA
Douglas, TS
Draper, C
Driver, KA
Dunne, P
Dunsby, PKS
Dutton, Y
Dyer, R
Ebobisse, F
Eckardt, F
Egan, TJ
Ekama, GA
Ellis, GFR
Everson, V
Fagan, A
Fagereng, Å
Falowo, O
Farrant, JM
Fearick, RW
Feast, M
February, EC
Feris, L
Folly, K
Franzidis, J
Fraser, DM
Gäde, G
Gain, J
Gammon, DW
Gaunt, CT
Gillson, L
Gilson, L
Glazewski, JI
Glenn, I
Godby, M
Goedecke, JH
Gray, C
Greenberg, LJHL
Griffiths, CL
Guo, R
Haerting, M
Haines, LM
Hamann, R
Hamilton, A
Hamilton, C
Hapgood, J
Hardman, JC
Harris, C
Harrison, STL
Hart, M
Hattingh, A
Haupt, A
Hedderson, TAJ
Hellaby, CW
Herman, R
Hewett, ML
Hewitson, BC
Himonga, C
Hoadley, U
Hoffman, MT
Horowitz, WA
Horsnell, WGC
Howells, FM
Hunter, R
Ianovsky, A
Illing, N
Inggs, SC
Ingle, R
Isafiade, A
Jackson, GE
Jacobs, DS
Jacobs, M
Janelidze, G
Jawitz, J
Jeebhay, M
Jelsma, J
Kalula, ER
Kaminer, D
Kaplan, D
Kelly-Laubscher, R
Kew, MC
Khan, A
Khumalo, N
Kidson, S
Kincaid, H
Klak, C
Klatzow, PJL
Klopper, S
Klump, HH
Knutsen, RD
Koelble, TA
Kohn, T
Kolbe-Alexander, T
Kraan-Korteweg, RC
Krige, JEJ
Kritzinger, PS
Kruger, T
Kunzi, H-P A
Kuttel, M
Kyobe, ME
Lambert, EV
Lambert, MI
Lamberts, RP
Lang, CI
Lang, DM
Langdon, G
Langerman, FS
Le Roex, AP
Le Roux, P
Leaner, V
Lecour, S
Leibbrandt, M
Levitt, N
Lewis, AE
Little, F
London, L
Louw, J
Low, I
Lubbe, S
Lucas, M
Luckett, K
Luiz, J
Lund, C
Maartens, G
Mager, A
Mall, AS
Marais, P
Marco, H
Marsden, G
Martin, D
Martin, R
Mattes, RB
Mayosi, BN
McBride, V
McIntyre, D
McKinney, C
Meadows, ME
Meintjes, EM
Meintjes, G
Meissner, P
Mendelsohn, R
Mesthrie, R
Meyers, PR
Micklesfield, L
Midgley, JJ

New NRF ratings: Dr Megan Becker (left) *and Dr Kirsten Corin* (right) *of the Department of Chemical Engineering.*

Millar, R
Mishra, AK
Mizrahi, V
Mlambo, C
Moller, KP
Moloney, CL
Morrell, R
Morris, AG
Morrow, B
Mostert, H
Moultrie, T
Mowla, S
Moyo, P
Muasya, M
Mulder, N
Muller, JP
Murugan, J
Naidoo, KJ
Nassimbeni, LR
Nassimbeni, MC
Naudé, T
New, M
Ng'ambi, D
Ngwenyama, O
Noakes, TD
Novitzky, N
Nurick, GN
Nyamnjoh, F
Oelgeschläger, T
Ojuka, E
Oldfield, SE
Opie, LH
O'Riain, MJ
O'Ryan, C
Parker, MI
Parkington, JE
Parnell, SM
Pascoe, M
Penn, N
Perez, SM
Peshier, A
Petersen, J
Picker, MD
Pillay, D
Pillay, P
Piraino, P
Pirie, G
Posthumus, M
Pototsky, A
Potter, P
Prince, S
Prinsloo, MH
Raju, J
Ramon, G
Ramutsindela, MF
Ratzkin, J
Rawatlal, R
Rayner, BL
Reason, C
Reddy, BD
Reid, S
Reid, SJ
Richardson, SH
Rodgers, AL
Ross, DA
Ross, F
Rossi, M
Roth, R
Rouault, M
Russell, VA
Ryan, PG
Rybicki, EP
Salazar, PhJ
Sales, K
Sandmeier, R
Saunders, CC
Schurch, MPE
Schwikkard, PJ
Scott, H
Scriba, T
Sealy, JC
Segal, H
Sewchurran, K
Sewell, BT
Seymour, L
Shaikh, S
Shain, M
Shannon, L
Shay, S
Shearing, C
Shepherd, D
Shillington, FA
Simmons, RE
Sliwa-Hahnle, K
Smith, G
Solms, ML
Soudien, C
Spakowski, H
Spottiswoode, B
Stein, D
Stewart, TJ
Sturrock, E
Suleman, H
Swart, S
Tapson, JC
Tayob, AI
Thiart, C
Tredoux, CG
Tupper, G
Turok, I
Uliana, EO
Underhill, LG
Van As, AB
Van Belle, J-P
Van der Heyden, K
Van der Lingen, C
Van der Merwe, CN
Van der Merwe, NJ
Van der Schijff, J
Van der Spuy, ZM
Van Honk, J
Van Sittert, L
Van Steen, EWJ
Van Walbeek, C
Van Zyl, K
Van Zyl-Smit, R
Varsani, A
Vaughan, CL
Venter, G
Verboom, GA
Vivian, L
Von Blottnitz, H
Vougalter, V
Waldron, HN
Ward, C
Wardle, D
Warner, B
Warner, D
Watson, VJ
Weigert, H
Weltman, A
West, A
Wheaton, S
Whitelock, PA
Williamson, A-L
Williamson, C
Winkler, H
Wiysonge, C
Wolff, H
Wood, EAS
Wood, R
Woolard, ID
Worden, NA
Woudt, PA
Wynberg, R
Younge, JGF
Zar, HJ
Ziervogel, G
Zilla, P
Zingoni, A

South African Research Chairs Initiative

The Department of Science and Technology's South African Research Chairs Initiative (SARChI) was designed to strengthen the ability of the country's universities to produce high-quality research and innovation output and, through this, increase the quality of the training of postgraduate students, thereby contributing more directly to growing the knowledge economy in South Africa. The SARChI Programme is managed by the National Research Foundation.

The Chairs are expected to contribute significantly towards helping universities realise their strategic research plans, and the initiative is intended to provide a base on which to consolidate and extend excellence in research. Although the programme aims to attract South African and other international research expertise from abroad, internal candidates are also considered for these Research Chairs.

UCT is now home to 33 SARChI Research Chairs after a further four awards were made in 2011/12 in the following strategic areas:

- Stable Isotopes in Archaeology and Palaeoenvironmental Studies
- Environmental and Social Dimensions of the Bio-economy
- Reaction Engineering
- Industrial Computational Fluid Dynamics

DST/NRF SARChI CHAIRS AT UCT

- Animal Evolution and Systematics – Professor David Jacobs
- Functional Proteomics – Professor Jonathan Blackburn
- Archive and Public Culture – Professor Carolyn Hamilton
- Astrophysics and Space Science – Professor Thomas Jarrett
- Bioprocess Engineering – Professor Susan Harrison
- Brain Imaging – Associate Professor Ernesta Meintjes
- Cancer Biology (vacant in 2012)
- Catalysis (vacant in 2012)
- Climate Change – Professor Bruce Hewitson
- Clinical Neurosciences Research – Associate Professor Marc Combrinck
- Computational Mechanics – Professor Daya Reddy
- Customary Law – Professor Chuma Himonga
- Drug Discovery – Professor Kelly Chibale
- Social Science Chair in Economic Growth – Professor Haroon Bhorat
- Environmental and Social Dimensions of the Bio-Economy – Associate Professor Rachel Wynberg
- Health and Wealth in South Africa – Professor Diane McIntyre
- Industrial Computational Fluid Dynamics (vacant in 2012)
- Immunology of Infectious Diseases in Africa – Professor Frank Brombacher
- Infection and Immunity of Poverty-related Diseases – Professor Keertan Dheda
- Islam, African Publics, and Religious Values – Professor Abdulkader Tayob
- Land Reform and Democracy in South Africa: State and Civil Society Dynamics – Professor Lungisile Ntsebeza
- Marine Ecology and Fisheries – Professor Astrid Jarre
- Migration, Language, and Social Change – Professor Rajend Mesthrie
- Minerals Beneficiation – Professor J-P Franzidis
- Modelling of the Coupled Ocean-land-atmosphere Phenomena Related to Climate (vacant in 2012)
- Extragalactic Multi-wavelength Astronomy – Professor Claude Carignan
- Poverty and Inequality Research – Professor Murray Leibbrandt
- Reaction Engineering (vacant in 2012)
- Scientific Computing – Professor Kevin J. Naidoo
- Security and Justice – Professor Clifford Shearing
- Stable Isotopes in Archaeology and Palaeoenvironmental Studies – Professor Judith Sealy
- Urban Policy – Professor Edgar Pieterse
- Vaccinology – Professor Anna-Lise Williamson

Professor Judith Sealy

Stable Isotopes in Archaeology and Palaeoenvironmental Studies

Judith Sealy, the newly-appointed South African Research Chair in Stable Isotopes, Archaeology and Palaeoenvironmental Science, is Professor of Archaeology and the former Head of the Department of Archaeology at UCT. She also heads UCT's Stable Light Isotope Laboratory, a major facility housing analytical equipment.

Professor Sealy obtained her PhD from UCT in 1989, for a thesis centred on stable isotope techniques of dietary reconstruction in ancient human skeletons. Her work has included laboratory and field studies, investigating archaeological questions ranging from the emergence of modern humans approximately 200 000 years ago, to the origins of slaves brought to the Cape in the colonial era. Her main focus has been on coastal hunter-gatherers of the past 10 000 years, using isotope approaches to explore variations over time and space in the diets people consumed, and using these patterns to elucidate larger-scale processes of economic and social change. Her work has also contributed to the development and improvement of stable isotope methods and techniques.

Professor Sealy has published more than 75 peer-reviewed journal articles and book chapters, including articles in *Nature and Science*. She is currently an Associate Editor of the *Journal of Archaeological Science* and a member of the editorial boards of *Azania and Southern African Humanities*; she was formerly editor of the *South African Archaeological Bulletin*. She is a Fellow of the Royal Society of South Africa and of the University of Cape Town, and holds a B1 rating from the NRF. (*Also see page 106*).

Associate Professor Rachel Wynberg

Environmental and Social Dimensions of the Bio-economy

Associate Professor Rachel Wynberg holds the South African Research Chair in the Environmental and Social Dimensions of the Bio-economy, and is the deputy director of the Environmental Evaluation Unit at UCT. She holds two cum laude master's degrees from the University of Cape Town, one in Marine Biology, and the other in Environmental Science, and a PhD from the University of Strathclyde, Glasgow.

She is well recognised as a leading scholar on the bio-economy, reflected in her B2 NRF rating. Her work is focused on bio-politics, the commercialisation and trade of biodiversity, access and benefit sharing, and the social and environmental implications of new biotechnologies. She has consulted and published widely on these topics, including more than 140 scientific papers, book chapters and technical reports, and four recent co-edited books. She is currently serving on the board of three non-profit organisations and is also a member of the Expert Committee for the UK Government's Darwin Initiative, one of the largest and most significant global funders of biodiversity projects.

Associate Professor Wynberg's scholarship is characterised by an unusual breadth of experience as a researcher, policy advisor, and activist, demonstrating her strong commitment to social justice and transformation in the sphere of biodiversity conservation and use. Because of the complexity of her research topic, and the importance of developing a holistic and integrated understanding in this field, she has consciously developed a research strategy crossing many disciplines and engaging a body of literature and colleagues across the humanities, arts, and sciences. (*Also see page 162*).

UCT Signature Themes for Research

What research challenge could faculties propose to tackle, that would not only be embedded in our location in Africa but would also be of global importance?

This was one of the questions that led to the formation of signature themes at UCT, which encourage collaborative, interdisciplinary research that crosses disciplinary and faculty boundaries. Through a rigorous 'bottom up' process, faculties responded to a call to come up with problem-based collaborative research themes that would capture the imagination of students and lead to exciting discoveries. Over and above the strong research groups operating across the university, the signature theme framework intends to stimulate cross-faculty collaboration that would result in more than 'business as usual'.

Through a competitive process and with limited seed funding, five themes were established between 2006 and 2007: African Cities, Brain and Behaviour, Drug Discovery, Marine Research, and Minerals to Metals. More recently, through a strategic process led by the Vice-Chancellor, the African Climate and Development Initiative emerged as the sixth signature theme in 2011. Strong academic leadership and a vibrant research team are part and parcel of the signature theme concept. To date, the themes have been able to demonstrate the leveraging ability and impact of their world-class research, not only on their immediate environment but also more broadly on the global south. As hubs that attract increasing numbers of postgraduate students and postdoctoral fellows, the themes excel but remain under pressure to maintain a leading edge.

National Centres of Excellence and Competence Centres

Funded by the South African Department of Science and Technology, the national centres of excellence and competence centres act as hubs for high-quality research and development in areas of national priority. The centres and nodes often involve significant interdisciplinary collaboration with other universities, publicly-funded research organisations, governments, and industry. They serve as important research training sites for postgraduate students.

UCT hosts two national Centres of Excellence, Birds as Keys to Biodiversity Conservation, and c*change, and co-hosts a node of the Centre of Excellence for Biomedical TB Research. UCT also co-hosts the Hydrogen Catalysis Competence Centre with Mintek.

The Centres of Excellence are managed by the National Research Foundation.

Research Groupings

A significant part of the exciting and diverse research carried out at UCT occurs within formal research groups, which incorporate members and students from across departments and faculties. Both through discipline-specific and cross-disciplinary approaches, their research is making a significant contribution towards understanding and alleviating some of society's major challenges.

At the end of 2012, there were 71 formally constituted research groupings at UCT. These included five newly-accredited groupings in 2012: African Collaboration for Quantitative Finance and Risk Research (Commerce), the Policy Research in International Services and Manufacturing (Commerce), the UCT Tourism and Events Research Unit (Commerce), Centre for Transport Studies (Engineering & the Built Environment), and the Lung Infection and Immunity Unit (Health Sciences).

UCT Knowledge Co-op

The UCT Knowledge Co-op builds on UCT's tradition of social responsiveness, aiming to make it easier for community partners to access UCT's skills, resources, and professional expertise. In the second year of its pilot phase, the focus was on expanding the number of collaborative projects with civic society and the public sector while also enhancing its visibility within UCT and in the wider community.

During 2012, 40 new topics for collaborative research or practical support were submitted to the facility, bringing the total number to 108. Fourteen of these arose from partnerships going back to previous years, indicating a deepening of UCT–community partnerships. The topics came from organisations ranging from provincial government departments to grassroots community groups, and local and international NGOs, as well as some programmes run by UCT students.

Ten new projects were initiated during the year, and another four were carried over from 2011. These include studies into experiences of breast-cancer patients and alternative energy sources for pumping water, as well as more hands-on ones involving computer training in organisations or the design for a school hall. Forty-five students and 15 academics partnered with community groups in these projects, of which eight were completed in 2012, bringing the total completed to 15.

Alongside this a *Code of Good Practice for Engaged Scholarship with External (non-academic) Constituencies* has been produced for academics, with a student version in process. This document aims to build the capacity of academics to take on supervision of collaborative research, and to prepare students for their involvement.

Internationally, the UCT Knowledge Co-op is part of the Living Knowledge network. During May, the project manager of the Co-op participated in a Science Shop Summer School and the LK5 conference on Re-imagining Research Relationships – Co-creating Knowledge in a Democratic Society in Bonn, Germany. This was a first opportunity to share insights through a conference paper drawing on a three-year, NRF-funded study to evaluate the model of the Co-op.

The website – http://www.knowledgeco-op.uct.ac.za – has contributed to increasing the visibility of the Co-op both within UCT and beyond.

Safety and Violence Initiative

The Safety and Violence Initiative (SaVI) was established at UCT in 2010 with support from the Vice-Chancellor's Strategic Fund and facilitates debate, research and interventions across the university on understanding, and responding to violence, as well as promoting safety.

SaVI brings together scholars from various faculties across UCT, including Commerce, Health Sciences, Humanities, Law, and Engineering & the Built Environment. Its mission is to establish sustained research collaborations that will contribute to promoting safety, reducing violence, and raising awareness about these issues within South Africa (and in due course in other African countries). A key feature of SaVI's role is to develop theory and to translate this into practice. A director for SaVI (Guy Lamb) was appointed in October 2012.

UCT researchers under the auspices of SaVI undertook five distinct research projects in 2012, namely:

- Violence interrupters: establishing a specialised cohort of domestic-violence social workers through an evidence-based violence-intervention approach;
- Violence and substance abuse at a Cape Town trauma centre;
- Violence and substance abuse in South Africa;
- The development of a brief intervention for substance users attending trauma clinics in the Western Cape;
- Use of new information and communications technology to consolidate post-conflict reintegration of former combatants and peace-building in Africa.

SaVI hosted two seminars in 2012 that directly related to informing discussion and decision-making in relation to communities affected by high levels of violence in Cape Town. In response to the rapid increase in violence in Khayelitsha over the past few years, the first seminar was held to consider the conditions and developments in Khayelitsha in relation to other areas in Cape Town, as well as to initiate a public conversation about how UCT can play a constructive role in promoting safety in violence-affected areas in the Western Cape. A second seminar was held in Hanover Park – widely considered to be one of the communities in Cape Town most affected by gang violence – which discussed youth programmes and lower-risk lifestyle support programmes that could reduce and prevent gang violence in this area.

2012 NRF Special Recognition Awards

From left: ***Bertha Chibale (representing her husband Professor Kelly Chibale), Professor Anusuya Chinsamy-Turan, Dr Gansen Pillay, Minister Naledi Pandor, Deputy Minister Derek Hanekom, Professor Timothy Noakes, and Dr Albert van Jaarsveld.***

Three UCT researchers were recognised for their outstanding work in 2012, through the National Research Foundation's special recognition awards.

Professor Timothy Noakes was honoured with the NRF Lifetime Achievement award for his pioneering work in sports science research, Professor Anusuya Chinsamy-Turan received the Transformation of the Science Cohort Award for her achievements as a palaeobiologist, and Professor Kelly Chibale was named the NRF's Champion of Research and Capacity Development at Higher Education Institutions in South Africa.

Vice-Chancellor Dr Max Price said of the accolades: "These awards celebrate three remarkable academics whose work has helped position UCT as an African hub of intellectual activity and research: exploring the continent's prehistory, the science behind excellence in sports, and the potential of different chemical compounds to cure Africa's diseases. They are part of UCT's platform for nurturing the next generation of academics for many other universities in the country and on the continent."

Professor Timothy Noakes

Lifetime Achievement Award

Professor Timothy Noakes has steadily built an international reputation in the area of sports science, biokinetics, and sports medicine. His research has not only challenged established dogma in the area of exercise and sports training, but also broken new ground in our understanding of human physiology and endurance.

The work of Professor Noakes and his research group has influenced a number of areas of endurance sport. For example, his recommendations have led to changes in practice regarding fluid ingestion. This and his other work led to the awarding of the Lifetime Achievement in Marathon Sports Medicine Research Award by the International Marathon Medical Directors Association in 2009, and resulted in the publication of his book *Waterlogged: The Serious Problem of Over-Hydration on Endurance Sports*, the culmination of 30 years of research that controversially exposes the false science advocated by the sports-drink industry in the USA in the marketing of their products, and examines the serious medical condition known as exercise-associated hyponatraemia, a condition first described and causation determined by Professor Noakes.

A noteworthy focus of his work has been on the Central Governor Theory of Fatigue during Exercise, which posits that the brain regulates exercise, controlling physical activity so that its intensity cannot threaten the body's homeostasis (internal stability) by causing ischaemic damage to the heart or other organs. This work led to a series of articles in the *British Journal of Sports Medicine* in 2005. His most recent article on this topic has attracted close to 7 000 Internet views, one of the highest for any article published in *Frontiers of Physiology*.

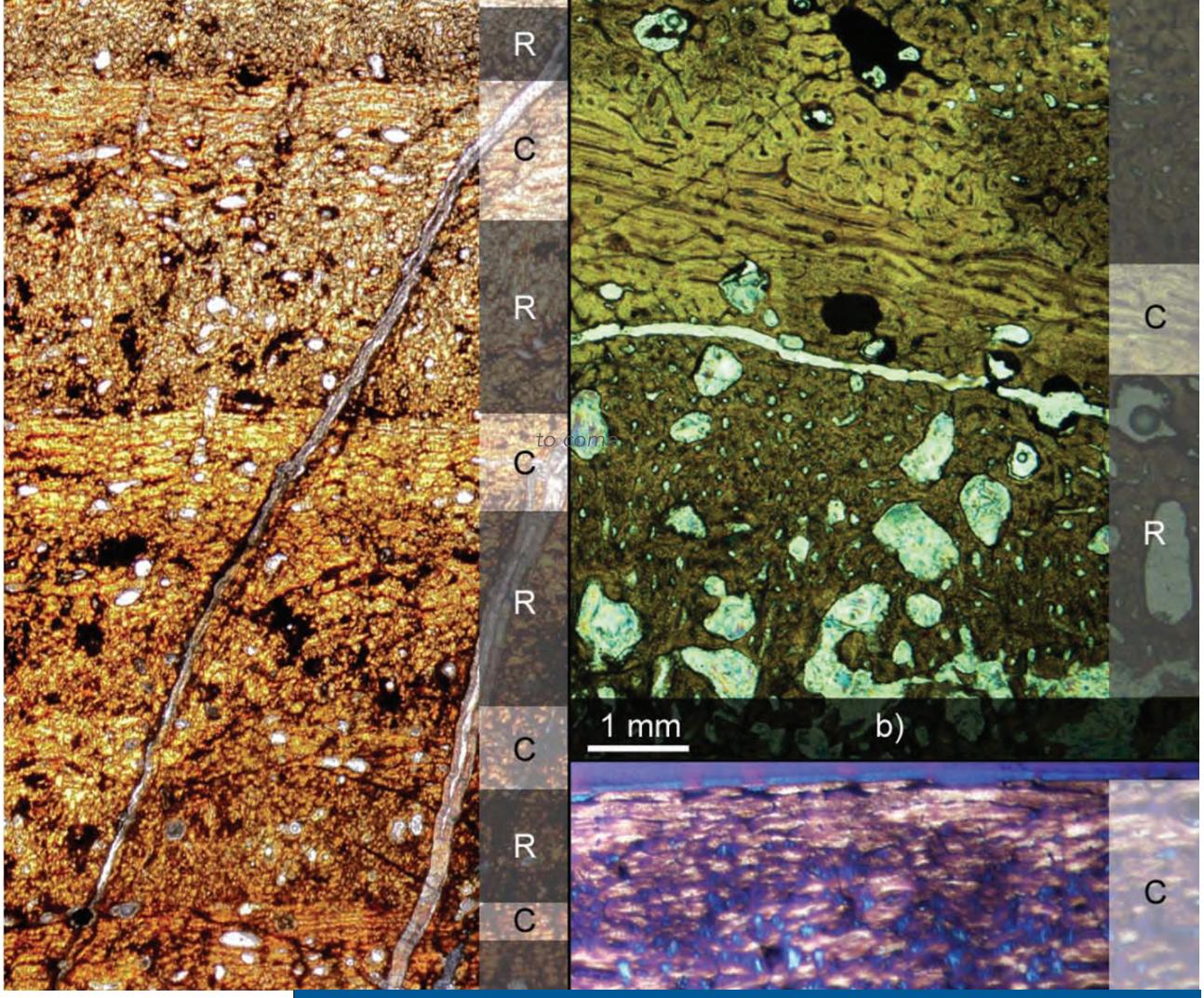
Professor Noakes began teaching of the sports sciences at UCT in 1981 and has supervised or co-supervised 77 MSc, MPhil, MD, and PhD graduates at UCT in areas such as sports medicine, exercise science, and physiology. He also founded the UCT/MRC Research Unit for Exercise and Sports Medicine, one of the longest-standing research units of the Medical Research Council. He also co-founded the Sports Science Institute of South Africa.

Professor Noakes has been a National Research Foundation A1-rated scientist since 2004. He maintains an H-index of 59 and his work has attracted well over 12 000 citations. He has authored/co-authored more than 80 book chapters, as well as over 425 internationally peer-reviewed articles in journals such as the *New England Journal of Medicine*, the *International Journal of Sports Medicine*, and the *SA Medical Journal*. He also currently serves on the editorial boards of 16 international journals.

He received the Citation Award from the American College of Sports Medicine in 1996, was elected founder member of the International Olympic Committee Science Academy in 1999, received the International Cannes Grand Prix Award for Research in Medicine and Water in 2001, and was awarded an Honorary Fellowship by the Faculty of Sport and Exercise Medicine in the UK in 2008. In 2011, he received an honorary doctorate from the Vrije University in Amsterdam. He is a Visiting Professor in Neuroscience and Biomedical Systems at the University of Glasgow, and in Sports Medicine at Sri Ramachandra University in India. In 2008, in recognition of his 'excellent contribution to the field of sport and the science of physical exercise', he was awarded the Order of Mapungubwe (Silver) by President Thabo Mbeki.

He is currently director of the UCT/MRC Research Unit for Exercise Science and Sports Medicine and Discovery Health Chair of Exercise and Sports Science at UCT.

A veteran of more than 70 marathons and ultra-marathons, Professor Noakes authored the book *Lore of Running* (1985), which is now in its fourth edition. The book, which is regarded as a runner's 'bible', draws on his research to explore the physiology of training, temperature regulation, ergogenic aids, injury prevention and treatment, and challenges much of the commonly held assumptions about running. His recently released autobiography, *Challenging Beliefs: Memoirs of a Career*, describes the significant themes and achievements in his scientific career.



Display of the alternating types of bone tissue present in the bones of the polar dinosaurs.

Professor Anusuya Chinsamy-Turan

Transformation of the Science Cohort Award

Professor Anusuya Chinsamy-Turan is a global expert on the microscopic structure of the bones of extinct and extant vertebrates. She is also head of the newly established Department of Biological Sciences at UCT (combining the former departments of botany and zoology).

The NRF award adds to several other highly acclaimed awards that recognise the value and impact of her work.

Early in her career, she received an NRF President's Award and was awarded the Royal Society Meiring Naudé Gold Medal. In 2003 she was awarded the National Science and Technology Forum Award for Outstanding Contribution to Science, Engineering, and Technology. This was followed by the 2005 South African Woman of the Year Award, which acknowledged her contribution to science in terms of both research and science communication to the wider public. In the same year she received the Distinguished Woman Scientist Award from the South African Department of Science and Technology.

She is former president of the Association of South African Women in Science and Engineering (SAWISE), former deputy president of the Academy of Science of South Africa, and has also served as director of Iziko Museums' Natural History Collections (which includes the South African Museum). Professor Chinsamy-Turan previously served as the chair of the Advisory Board of Scifest Africa, the biggest science festival in Africa, and currently serves as a board member for the US-based Jurassic Foundation. She is a Fellow of the University of Cape Town, the Royal Society of South Africa, and the World Academy of Science.

Professor Chinsamy-Turan has published extensively – both in international scientific journals (including four publications in *Nature,* and a recent publication in *Nature Communications*) and in the popular press. Her academic book *Microstructure of Dinosaur Bone – Deciphering Biology Through Fine Scale Techniques* was published by Johns Hopkins University Press, USA, in 2005 and her popular-level book for children titled *Famous Dinosaurs of Africa* was published by Struik, SA, in 2008. Her latest academic book is titled *Forerunners of Mammals: Radiation. Histology. Biology* (2012, Indiana University Press, USA), and she has another in the pipeline with Cambridge University Press.

Champion of Research and Capacity Development at Higher Education Institutions in South Africa

Professor Kelly Chibale holds the South African Research Chair in Drug Discovery at UCT, and is the director of the MRC/UCT Drug Discovery and Development Research Unit. He is a former co-director of the UCT Drug Discovery Signature Theme and established the Drug Discovery and Development Centre (H3-D) in 2010.

Professor Chibale joined the University of Cape Town in 1996 and has since built up an outstanding and impressive record of attracting and successfully supervising students and postdoctoral researchers, particularly those from designated groups. He has supervised to graduation 26 PhD and 21 MSc students. His research focuses on the discovery of potential drugs that fight malaria, tuberculosis, and helminth (parasitic worm), as well as cardiovascular and fibrosis diseases. His research group currently comprises 44 researchers, including 17 postdoctoral fellows, 19 PhD students, and 8 MSc students.

Professor Chibale has identified the need for South African scientists to enhance the drug-discovery capability of the country to address its health needs in particular, but also those of the rest of the African continent. Thus research into the discovery of potential medicines against the major diseases in South Africa and Africa is critical, along with the training of a new generation of South African and African scientists with the key modern pharmaceutical-industry skills required to discover modern medicines. In response to this need, Professor Chibale has developed a number of partnerships with major global organisations,

Professor Kelly Chibale

including pharmaceutical companies and not-for-profit organisations, which have been critical in building the much-needed research capacity and infrastructure at both UCT and other higher-education institutions in South Africa.

In a major breakthrough in 2012, Professor Chibale led the UCT drug-discovery team that discovered a compound that he and international research collaborator Medicines for Malaria Venture (MMV) hope will lead to the development of a single-dose treatment for malaria. The compound, named MMV390048, is the first compound researched on African soil to enter preclinical development in partnership with MMV. This project was voted and awarded the 2012 MMV Project of the Year award. In addition, the news of a possible single-dose cure for all strains of malaria not only dominated headlines around the world following its release in August 2012, but Elsevier's *Malaria Nexus* review voted it their most popular story of 2012. (*Also see page 20*).

Professor Chibale has published more than 130 articles in peer-reviewed journals, including a number of publications in leading journals in the field of drug discovery, such as the *Journal of Medicinal Chemistry* and *Drug Discovery Today*.

His recent awards have included the 2010/11 NSTF–BHP Billiton Awards in the category TW Kambule NRF Senior Black Researcher. This award gave recognition to Professor Chibale's role in the establishment of H3-D, Africa's first integrated modern drug-discovery centre, and the setting up of various modern technology platforms for the discovery of potential medicines. In 2009, he was elected Life Fellow of UCT and Fellow of the Royal Society of South Africa. He was also awarded the Alan Pifer Research Award for 2011. This is the UCT Vice-Chancellor's award made annually "to a single researcher at UCT in recognition of outstanding research that demonstrates relevance to the advancement and welfare of South Africa's disadvantaged people".

Naledi Pandor, South African Minister of Science and Technology and Dr Sindiso Mnisi Weeks.

2012 DST Women in Science Awards

Eleven UCT scholars featured among the winners of the 2012 South African Women in Science Awards, presented by the national Department of Science and Technology.

Leading the procession of UCT women was Professor Alison Lewis, who was named Distinguished Woman Scientist in the Physical and Engineering Sciences, and Dr Sindiso Mnisi Weeks who received the Emerging Researcher Award in a special category that recognised the use of science and technology to develop rural women and end poverty. This theme, which was in line with the 2012 United Nations theme for women, namely 'Empower rural women and end hunger and poverty', also took cognisance of Parliament's theme for 2012, 'Knowledge Economy and Development Opportunities'.

Professor Hanri Mostert (profiled on page 192) was runner-up in the category 'Distinguished Young Women Scientists: Social Sciences and Humanities'. DST fellowships for doctoral students were awarded to Joyce Mwangama, Gladwell Nganga, and Toni-Lee Sterley, and fellowships for master's students went to Matsopiane Maserumule, Lombe Mutale, siblings Narjis and Sumaiyya Thawer, and Akhona Vava.

Professor Alison Lewis

Distinguished Woman Scientist in Physical and Engineering Sciences

Professor Alison Lewis graduated with a BSc (Chemical Engineering), MSc (Chemical Engineering), and PhD, all from the University of Cape Town. She is a registered professional engineer and a professor in the Department of Chemical Engineering at UCT. She is also the UCT Orator.

Her interest in chemical engineering grew after she was inspired by the realisation that the practical application of mathematics and chemistry was fundamental to the field. She started a new group specialising in crystallisation and precipitation research, and the group has since become an accredited research unit at UCT. The research unit is funded by a range of national and international companies and consists of five staff members, one postdoctoral researcher, and 15 postgraduate students. Since the research unit's inception, 24 master's and PhD students have graduated and between them, they have published more than 100 international peer-reviewed publications, a patent, eight book contributions, and 85 conference presentations.

Both her MSc and PhD degrees focused on applied mathematical models for water treatment, and her research interests revolved around water treatment and, more recently, water refining.

Professor Lewis's research highlights crystallisation as a tool to purify metals such as platinum, palladium, and rhodium, as well as its potential to treat contaminated water such as acid mine drainage. She believes that it is essential to design water-treatment processes that are sustainable; they must not only produce pure water, but also recover the contaminants as useful products. This is one of her main research focus areas.

Professor Lewis has received a number of awards and honours, including the 2010 NRF President's Award for Research Capacity Development and a number of best conference paper and poster awards. She is also a member of the Academy of Science of South Africa and a fellow of the South African Academy of Engineering.

Award for the Development of Rural Women – Emerging Researcher

Dr Sindiso Mnisi Weeks completed her DPhil in Law in 2009 at the University of Oxford, where she was a Rhodes Scholar. She is a graduate of the University of Cape Town, from which she obtained a BA and LLB, both with distinction. Dr Mnisi Weeks is currently a senior researcher in the Centre for Law and Society (formerly the Law, Race and Gender Research Unit) at UCT, working on the rural women's action research programme, which combines research and policy work on women, authority, and property in terms of customary law. During 2011 and 2012, she was also a senior lecturer in UCT's Department of Private Law, where she co-taught African Customary Law.

Her publication work spans customary law, women's rights, traditional institutions, and the Constitution. Dr Mnisi Weeks has successfully supervised 17 student interns, fieldworkers, and research assistants. Her publication record includes eight peer-reviewed journal articles, three book chapters, and several legislative submissions.

Her main focus has been with rural women's exclusion from law-making and decision-making practices in traditional communities, as well as their participation in national legislative processes. Using methods that include rural women's participation, she has publicly challenged these forms of exclusion and the implications they have for rural women's ability to attain social and economic security.

Dr Mnisi Weeks's current research focuses on vernacular dispute-resolution forums in South Africa, and she has been actively involved in the co-ordination and representation of the multisector resistance to the passing of the Traditional Courts Bill. Her experience includes policy work, public education, and media publicity. As an emerging researcher, her recognition at an international level is steadily growing. She has been invited to contribute to publications alongside senior academics abroad and to deliver one of the keynote addresses at an international conference due to be held in Brazil in 2013.

Dr Mnisi Weeks is a former clerk of the Deputy Chief Justice of the Constitutional Court of South Africa, Dikgang Moseneke. She has won the Ismail Mahomed South African Law Reform Commission Essay Competition, among other awards. She was named one of the 200 Young South Africans (in the business and law category) by the *Mail & Guardian* in 2011, and she was part of the Law, Race and Gender research team that was awarded the Social Responsiveness Award by UCT in 2011.

2012/13

NSTF-BHP Billiton Awards

Seven UCT scholars were finalists in the prestigious 2012/13 National Science and Technology Forum–BHP Billiton awards, the 15th such event that recognises, acknowledges, and promotes excellence in the South African research and development community. The annual event is the flagship project of the largest and most prominent multi-stakeholder representative forum for science, engineering, technology, and innovation (SETI) organisations in South Africa.

Professor Graeme Cumming of the Faculty of Science received the TW Kambule NRF-NSTF Award to an Individual for an Outstanding Contribution to SETI through Research and its Outputs over the last 5 to 10 years. Professor Cumming is the Pola Pasvolsky Chair of Conservation Biology in the Department of Zoology (now Biological Sciences).

The ARTIST (Adaptive Real-Time Internet Streaming Technology) team (a collaborative effort between the Council for Scientific and Industrial Research, UCT, and East Coast Access) won the category for 'an Individual or a Team for an Outstanding Contribution to SETI through Research leading to Innovation: in a Corporate organisation or Institution'. From the UCT side, intellectual property (IP) was developed by a team of researchers in the Department of Electrical Engineering, headed by Associate Professor Mqhele Dlodlo, Professor Gerhard de Jager, and Dr Guy-Alain Lusilao Zodi. This IP has been licensed by the Consortium to start up Tuluntulu, which is currently commercialising it.

Professor Robert Millar, director of the Mammal Research Unit at the University of Pretoria and Senior Research Scholar in UCT's Faculty of Health Sciences, received the NSTF award made to an individual for an outstanding contribution to SETI over a lifetime.

Other finalists from UCT were Professor Dan Stein, head of the Department of Psychiatry and Mental Health and director of the MRC Unit on Anxiety Disorders at the University of Stellenbosch, Professor Karen Sliwa-Hahnle, director of the Hatter Institute for Cardiovascular Research in Africa (Department of Medicine, UCT), and director of the Soweto Cardiovascular Research Unit at the University of the Witwatersrand, and Associate Professor Kobus van Zyl, who was part of the Aqualibrium Civil Engineering Team.

T W Kambule NRF-NSTF Award to an Individual for an Outstanding Contribution to SETI through Research and its Outputs over the last 5 to 10 years

Professor Graeme Cumming, Pola Pasvolsky Chair of Conservation Biology in the Department of Zoology (now Biological Sciences), received the 2012/13 T W Kambule NRF-NSTF Award, for his research into the theory and application of complexity theory in ecological and social-ecological systems.

Professor Cumming studied Zoology and Entomology at Rhodes University and then attended Oxford University, UK, on a Rhodes Scholarship. While at New College, Oxford, he completed his doctorate on 'The Evolutionary Ecology of African Ticks'. From Oxford he moved to the University of Wisconsin-Madison, where he was funded by a D H Smith Postdoctoral Fellowship from The Nature Conservancy (TNC). In Madison, he worked with TNC and Professor Steve Carpenter at the Center for Limnology on applying species-based models to management and conservation-related problems in freshwater systems. After two years as a postdoctoral research fellow, he was hired as an Assistant Professor in the Department of Wildlife Ecology and Conservation at the University of Florida (UF). He left UF at the end of 2005 to take up the Pola Pasvolsky Chair in Conservation Biology at the University of Cape Town's Percy FitzPatrick Institute.

Professor Cumming has a wide range of interests, which centre on understanding spatial aspects of ecology and the relevance of broad-scale pattern-process dynamics for ecosystem (and social-ecological system) function and resilience. He is also interested in the applications of landscape ecology and complexity theory to conservation and the sustainable management of natural resources.

Research currently being undertaken by Professor Cumming and his students falls into two main programmes.

Professor Graeme Cumming, pictured with Minister in the Presidency, Trevor Manuel, and Dr Thandi Mgwebi of the National Research Foundation.

The first focuses on water birds and their parasites, pathogens, and movement ecology. This programme is currently addressing the complex movement patterns of waterfowl around Southern Africa and their role in the spread of pathogens (particularly avian influenza and avian malaria), plant seeds, and aquatic invertebrates. Waterfowl movements have important implications for waterfowl and wetland conservation, human health, and poultry production. The second programme focuses on the topic of spatial resilience and is using protected areas as a case study for understanding the relevance of location, spatial context, connectivity, and network membership for social-ecological sustainability.

Professor Cumming has published more than 100 peer-reviewed journal articles and book chapters, including two books. He has successfully supervised more than 30 postgraduate students and is a past recipient of the Meiring Naudé Medal of the Royal Society of South Africa, which is awarded for 'scientific achievement by a scientist under the age of 35 years'. His current research is funded by the National Research Foundation and a complexity scholar award from the James S McDonnell Foundation.