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UNIVERSITY OF CAPE TOWN
FACULTY OF SCIENCE
NEWSLETTER – MARCH 2012

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MESSAGE FROM THE DEAN

Highlights of 2011 include the recognition of new A-rated and P-rated researchers in the Science Faculty, the establishment of the H3-D Centre for Drug Discovery, the UNESCO L'Oreal Award for Women in Science and the adoption of a suite of new strategic goals aimed at strengthening the status of the Faculty.

The year 2011 was an eventful and productive year. Professor Kathy Driver, Dean of Science from 2006 through 2010, decided to take a well-earned break and not renew her deanship for a second term. Instead, she chose to re-invigorate her research in mathematics by taking a twelve month sabbatical. The Faculty grew from strength to strength under Professor Driver's deanship, and we remain deeply grateful to her for her leadership during her tenure as Dean.

An important development during 2011 was the adoption of a set of strategic goals aimed at strengthening all-round performance of the Faculty and specifically to: address the poor undergraduate throughput; provide support for and improve productivity of young researchers in the Faculty; ensure that academic staff remain competitive in the international research arena, and ensure that our Faculty remains the destination of choice for African science scholars and postgraduate students.

Research in the Faculty continues to flourish, with new initiatives being developed and new successes celebrated. Amongst the former, were the establishment of the H3-D Centre for Drug Discovery and Development, the new UCT Samsung Mobile Innovation Laboratory and amongst the latter were the centenary celebrations of the Bolus Herbarium. The number of staff with high-ranking international research profiles (NRF A & B ratings) increased to 66, reflecting on-going striving for excellence in research. Of particular note was the recognition by the National Research Foundation of one new A-rated, three new B-rated and two new P-rated staff.

The Faculty remains proud of the number of registered postgraduate students, which continues to grow annually, with some 320 registered PhD students and 400 Masters students. Furthermore, our Faculty now has an all-time record number of 120 postdoctoral fellows, nearly half of the total number at UCT, and it is our aim to continue to grow in this area.

Anton le Roex
Professor of Geochemistry
Dean, Faculty of Science



Three new UCT Fellows honoured

Vice-chancellor Dr Max Price recognised four new UCT Fellows on 18 October 2011. Of these, three were from our Faculty: Professors George Janelidze and Hans-Peter Kunzi from the Department of Mathematics and Applied Mathematics and Professor Ed Rybicki from the Department of Molecular and Cell Biology were welcomed as new Fellows.

Professor George Janelidze obtained his PhD in Mathematics from the Tbilisi State University in Georgia in 1978, and his DSc from the St Petersburg State University in Russia in 1992. His was, in fact, the first DSc in category theory in the former USSR. During the years thereafter, he was a visiting professor at a number of institutions in Europe, North America, and Australia, where he collaborated with several distinguished mathematicians. He was appointed as Professor at UCT in 2004, and became an honorary member of the A Razmadze Mathematical Institute of the Georgian Academy of Science, where he had previously held a permanent position as leading research scientist. Janelidze has about 80 publications in international mathematical journals, and he is the editor of four such journals. He has been a National Research Foundation (NRF) A-rated researcher since 2005. Janelidze's current research is devoted to various topics of categorical algebra, including abstract Galois theory, with applications in classical algebra, geometry and topology

Professor Hans-Peter Kunzi received his Master's, PhD and habilitation degrees from the University of Berne in Switzerland. After postdoctoral years at Virginia Tech, US, and UCT, he worked for several years as a lecturer and researcher in Switzerland, at the Universities of Berne and Fribourg. In July 2000 he was appointed full professor at UCT. He has held an NRF A-rating since 2006. The research of his Topology Research Group at UCT lies mainly in the field of analytic and categorical topology, focusing on frame theory and asymmetric topology. For the past 30 years Kunzi has travelled a great deal for scientific purposes, leading to numerous collaborations and publications with colleagues all over the world.

Professor Ed Rybicki has been at UCT, as a student and staff member, continuously since 1974. He became a senior lecturer in 1987, an associate professor in 1992, and was promoted to Professor in Microbiology in 2002. He started out as a classical plant virologist, but retrained in molecular biology techniques in 1985 during an academic leave in Belgium. His research interests are in the area of 'biopharming', or the use of plants and cell cultures to make pharmaceutically-important proteins and other molecules, and in elucidating the virus-host interactions of grass- and cereal-infecting geminiviruses with a view to engineering resistance against them. He is a fellow of the Royal Society of South Africa and a member of the Academy of Science of South Africa.

Young Researcher Awards

The UCT College of Fellows named two of our Faculty staff: Dr Rob Ingle and Dr Deena Pillay as recipients of its 2011 Young Researcher Awards, which recognises outstanding scholarly work by young academics...



Dr Rob Ingle of the Department of Molecular and Cell Biology (MCB) graduated with a first-class BA honours in biological sciences and a PhD from the University of Oxford. He then moved to South Africa, and was a Claude Leon Postdoctoral Fellow in MCB from 2004 to 2006. He now holds a Y1 rating from the NRF. Ingle is interested in the interactions between plants and their environment, particularly in the molecular mechanisms that help them cope with stresses imposed either by other organisms or by chemical/physical factors.



Dr Deena Pillay is a marine ecologist who joined the Department of Zoology in March 2008 after completing his PhD at the University of KwaZulu-Natal in 2006. He has broad research interests in intertidal and estuarine ecology, with a strong focus on understanding the role of biological interactions in structuring marine ecosystems. This area offers great opportunities to explore theoretical concepts in ecology while still contributing significantly to applied areas. He is interested in understanding the effects of human pressure and changing environments on the biological interactions that ripple through marine ecosystems and their consequences.





Jill Farrant wins major global award for her contribution to life sciences

Professor Jill Farrant of the Department of Molecular and Cell Biology at UCT has become the third UCT woman scientist- and the fourth from South Africa - to win a L'Oréal-UNESCO Women in Science Award in Life Sciences.

Plant physiologist Professor Jill Farrant from the Department of Molecular and Cell Biology at UCT has added another feather to her cap: the L'Oréal-UNESCO Women in Science Award in Life Sciences. On 8 November, she was named one of five women from around the world to win a 2012 L'Oréal-UNESCO Women in Science Award in Life Sciences.

It's the latest in a string of accolades for the National Research Foundation (NRF) A-rated researcher. Farrant's list of achievements include among others: the Harry Oppenheimer Memorial Trust Fellowship Award, the first woman in the life sciences at UCT to receive the NRF A-rating, recipient of the South African Distinguished Women in Science Award from the Department of Science & Technology, and she featured in the Mail & Guardian's Book of South African Women.

An international network of nearly 1 000 scientists nominates the candidates for each year's awards, which form part of the L'Oréal-UNESCO Women in Science Programme. The five Laureates are then selected by an independent, international jury presided over by Professor Günter Blobel, winner of the Nobel Prize in Medicine in 1999. "The work of the 2012 Award Laureates yielded remarkable insights into human health issues," Blobel said in a statement. "Their research is truly original, and each is among the best in five distinct regions of the world."

One winner is named for each of five regions. In Africa and the Arab States it was our Professor Farrant; in Asia/Pacific, Professor Ingrid Scheffer of the University of Melbourne, Australia; in Europe, Professor Frances Ashcroft of Oxford University, UK; in Latin America, Professor Susana López of the National University of Mexico; and in North America, Professor Bonnie Bassler of Princeton University in the US. These top level scientists are at the forefront of their research encompassing diverse areas in the Life Sciences (plants, epilepsy, diabetes, rotaviruses and bacteria).

The women are singled out for the major impact their research can have on society.

Professor Farrant, is renowned for her multi-dimensional research on resurrection or desiccation-tolerant plants, which are able to withstand prolonged drought or water loss - a looming climate change issue - but will spring to life once water arrives. Over the past years she has explored the roles that antioxidants and sucrose play in this Lazarus-like act, and is now trying to unpack the signalling pathways triggered by a group of lipids known as volatile organic compounds - and, in a recently published work, is attempting to get to grips with the genetic make-up of such plants.

It's work that could have a profound impact on the world, and as put by Professor Farrant, "I believe in the potential outcomes of my work - i.e. the ultimate production of drought-tolerant crops, with the aim of addressing food security needs in Africa; which will become more important as climate change (increasing drought) continues to impact on agriculture."

Professor Farrant is quick to acknowledge the collaboration of students and attributes her success to team effort: "I have worked with amazing students and collaborators who have helped put me on this map," she says. "I might have initiated the research, and had many of the ideas that have been tested and published, but I alone did not do the work that has enabled me to receive such an award."

Previous UCT L'Oréal-UNESCO Women in Science Award laureates are Professor Valerie Mizrahi, now director of the Institute of Infectious Disease and Molecular Medicine, in 2000; and Professor Jennifer Thomson, who also hails from Farrant's quarters in the Department of Molecular and Cell Biology, in 2004.

"Professor Jill Farrant is a truly deserving laureate," said Professor Danie Visser, deputy vice-chancellor for research. "This is yet another reminder of the telling impact that women have at UCT, and as the award demonstrates, on the world."

Farrant will receive her award and prize money, US\$100 000, at a ceremony at the UNESCO headquarters in Paris in March 2012.





New academy welcomes bright young scientists

Three UCT scientists, two of whom are from our Faculty, all in their early to mid-30s, have been named among the 20 founder members of the new South African Young Academy of Science (SAYAS).

Dr Shadreck Chirikure of the Department of Archaeology and Dr Jeff Murugan of the Department of Mathematics and Applied Mathematics were inaugurated into SAYAS at a function hosted by the deputy minister for science and technology, Derek Hanekom, in Pretoria in September. "The group," said SAYAS in a statement, "was selected from among the best scientific minds in South Africa and represents a diverse range of talent in terms of race, gender and scientific discipline."

SAYAS is designed to bridge the gap between the more senior and well-established Academy of Science of South Africa, and the up-and-coming young scientists who may well be future leaders in their fields. It will also give a voice to young scientists on national and international issues, and creates a platform for them to have their say in policy decisions.

"For so long, young researchers have been excluded in charting the country's destiny," says Chirikure (33). "SAYAS is an opportunity to put this behind us, by showing the world that young South African researchers can distil solutions that can move the country forward in topical issues such as climate change, employment creation and sound governance."

"I guess there's a great sense of responsibility," says Murugan (35). "And that there were only 20 founding members selected from nearly 150 nominations from across the country means that this is something of a vote of confidence."

Bolus Herbarium celebrates centenary

The Bolus Herbarium and its associated library celebrated 100 years of being in the custodianship of UCT. This invaluable collection of plant material and botanical literature was bequeathed to the university in 1911 by stockbroker, philanthropist and botanist Harry Bolus. To mark this milestone in the history of the university, a series of lectures by world renowned botanists, two exhibitions and a commemorative collecting trip were arranged. The lectures covered diverse topics ranging from the function of herbaria at universities in support of studies in plant systematics, to Harry Bolus himself and the fascinating world of plants on our green planet Earth

The exhibition, held in the herbarium and curated by Mary van Blommestein from the Irma Stern Museum, covered the historical aspects of Harry Bolus's botanical career and another, more contemporary exhibition curated by Nadja Daehnke, was held at the Michaelis School of Fine Art. The events were well attended and well received by the UCT community and the general public alike.

The purpose of the commemorative field trip was to focus on an under-collected area in terms of representation in the herbarium and invited botanists to collect plants from their group of specialization. A four day trip in early September to the Voedpadsberg area just north-east of Touws River, had ten botanists delighting in camping and collecting on Mr Robert



Brown's farm, Pienaarskloof. The specimens collected were then named, processed and are currently being incorporated into the herbarium's collections, adding considerable value to the existing 350,000 specimens in the collection. These new specimens are to be identified by a special label that would indicate their significance and value in the next 100 years to come.

HARRY BOLUS COMMEMORATIVE TRIP (left to right): Ross Turner, Timothy Moore, Prof. Peter Linder, Terry Trinder-Smith, Prof. Terry Hedderson, Prof. Charles Stirton, Matthew Britton, Nicholas Wilding, Nicholas Helme, Dr. Muthama Muasya.



Launch of UCT H3-D

Drug discovery and development centre a first for Africa

H3-D (Holistic Drug Discovery and Development) – South Africa's first drug discovery centre was launched in April 2011. The centre, which aims to address the health challenges and target diseases specific to South Africa, Africa and the world at large, has a rich database and natural laboratory for clinical research in Africa.

The new centre ties in well with UCT's strategy for innovation which strives for new inventions with tangible effects, including social innovation. Professor Danie Visser described at the launch how UCT wants to be a model for the developing world, combining excellent research with a commitment to do research that will unlock the potential of people in the country.

Professor Kelly Chibale, from the Department of Chemistry, at the helm of the centre, has established international links at the highest levels and is a real pioneer in his field. At the launch, Kelly's gave a talk entitled "H3-D: How we got here", in which he focused on the drivers that gave impetus to setting up the centre. He spoke about the lack of a modern drug discovery culture in Africa and the need to make a contribution to society's problems and needs; the pharmaceutical industry's expressed interest to engage with, learn from and partner with pharma; the need to make African traditional medicines safer. He described how a large majority of our continent rely on traditional medicines and how diet has changed over the years, having pertinent health implications, thereby raising the question of how science can make a contribution to the safety of these products. Kelly highlighted how we train people in skills overseas and that there is a 'brain drain' but asked what we have for these people to come back to? Kelly explained how the H3-D initiative aims to provide a home for people to come back to and to apply their skills and experience.

Professor Chibale explained that when faced with a challenge as large as this, one asks, "Where do you start?" because drug discovery is very complex, time consuming and expensive. He described how the Medicines for Malaria Venture (MMV) has provided a valuable level of academic support through mentorship and support from highly experienced personnel from the pharmaceutical industry. MMV also provide starting points in the form of promising potential molecules active against the malaria parasite and funding for research to further develop these molecules. This effectively removed at least 3 years from the discovery phase and allowed H3-D to start from year 4 instead of at the very beginning. Professor Chibale described the process of drug discovery as being that of needing to kiss many frogs before one meets the prince – that the journey takes time, costs a great deal and is a long process. Professor Chibale said that the goal of the centre is value addition – not only focusing on developing the product, but also training the next generation of scientists.

Other speakers at the event were: **Dr Mamphela Ramphele**, Chair of the Technology Innovation Agency (TIA) and former UCT Vice Chancellor, who spoke about the need to stimulate, develop and exploit technological innovations to improve the quality of life of all South Africans and the need for collaboration and partnership between public and private organizations, not only for financial support but also for mentorship and transfer of skills; **Dr Timothy Wells**, Chief Scientific Officer of Medicines for Malaria Venture, and a partner in the new Centre who argued that UCT has the discovery capability, understanding of the disease and the people to put it together to the benefit of the whole of Africa, and **Dr Anthony Wood**, Senior Vice President and Head of Worldwide Medicinal Chemistry, Pfizer Pharma Therapeutics, who in his capacity as Chair of the H3-D Scientific Advisory Board encouraged H3-D to take advantage of the opportunity to be close to clinical medicine and the challenges faced, bringing the bench and bedside close together. He encouraged a shared goal of delivering new medicines to meet the unique needs of patients and said that Pfizer would help Kelly and his team navigate, avoid pitfalls and create a contribution in drug discovery and development that will not only provide a tangible product, but also attract intellectual capacity to UCT.

The TEAM: The H3-D Centre comprises Professor Chibale as Director, 8 academic staff as collaborating researchers, 14 (with 3 more expected to arrive!) Post Doctoral students; 18 PhD students and 4 Masters students.



International year of Chemistry

2011 was the International Year of Chemistry and to celebrate this, the Department of Chemistry hosted a wide range of events to engage young and old and to give them insight into what Chemistry is all about and how it impacts on and affects many different aspects of our everyday lives. The programme aimed to highlight how academic knowledge aids in enhancing daily life, how an understanding of chemistry can help professionals and laypeople make intelligent decisions about health, food products, beauty/ grooming products, etc.

The events took the format of mini lectures, with topics ranging from molecules, malaria, mineral water, kidney stones and traditional medicine to cosmetics, crystals, computers and the chemistry of vaccines. The department hosted "Chemistry in Action" - a series of workshops where experiments were demonstrated and explained; Tour de Chemistry where participants got behind the scenes glimpses of chemical research at UCT. A fun demonstration for young children, entitled "Chemistry, Cupcakes and Cookies" entailed creating slime, explosions and other hands-on chemical wonders. An Intervarsity/ Interschool Chemistry Quiz in Jameson Hall saw teams of varsity students, academics and school learners and teachers pit their chemistry brains against one another. The keynote lecture by Associate Professor David Gammon looked at "Chemistry between ourselves: Insights into human behaviour", highlighted how chemistry can increase our understanding of how our emotions work.

Professor Allen Rodgers, the force behind the event said, "One of the drives of the programme was to highlight how African-based knowledge and expertise can contribute to the world's body of knowledge and hopefully encourage and increase South Africa's skills base with qualified chemists who can work in health, food, engineering, IT, pharmaceutical and industrial sectors".



PUBLIC LECTURES

Professor Len Barbour on the secret life of crystals

Each year a distinguished alumnus of our Faculty is celebrated and honoured by being asked to deliver a lecture on their current research or area of work as part of our Distinguished Alumni Lecture Series. On 22 September 2011 we were privileged to hear Professor Leonard Barbour, talk about "The Secret Life of Crystals". NRF A-rated Professor Barbour graduated with his PhD from our Faculty in 1994 and is currently Professor in the Department of Chemistry and Polymer Science at the University of Stellenbosch, where he holds a SARChI research chair.

Professor Barbour's talk highlighted the historical development of crystal structure and analysis and showcased how insights at the molecular level have led to the design of functional materials. He explained that two decades after the 1895 discovery of X-rays, scientists used radiation to "see" atoms and molecules in crystals and how this astounding innovation revealed molecular geometries that revolutionised the chemical, physical and biological sciences. After almost a century of intensive research, scientists have unravelled many of the secrets of crystals.

Professor Barbour gave an intriguing account of the development of crystallography, citing as far back as ancient Romans who believed that quartz was ice, permanently frozen over great lengths of time, to the discovery of the hexagonal symmetry of snowflake crystals in the 17th century which had regular packing of the spherical water particles and the discovery that every face of crystals could be described by simple stacking patterns of blocks of the same shape and size. He gave an fascinating overview of the ground-breaking research of various Nobel prize-winning crystallographers and their discoveries which changed the face of history and medical science.

Although Professor Barbour's talk addressed a topic as complex as crystallography, he held the audience spellbound with his eloquent, enthusiastic delivery in which he related crystal structure to functional materials such as digital watches, Islamic art, quartz crystals for timing and the piezoelectric effect utilised to generate signals for sonar in submarines.

In his talk, Professor Barbour related a fascinating story of how RW James, a former UCT professor of physics (after whom the Physics building on University Avenue at UCT is named) and a pioneer X-ray crystallography, had responded to an advert that Ernest Shackleton, the famed Antarctic explorer, had placed calling for men to take part in a "hazardous journey, small wages, bitter cold, long months of complete darkness, constant danger, safe return doubtful, honour and recognition in case of success."





INAUGURAL LECTURE

Gene expression – key to morphological diversity

by Professor Nicola Illing

In October 2011, Professor Nicola Illing of the Department of Molecular and Cell Biology delivered her inaugural lecture entitled, “Evo-Devo: Clues to morphological and functional diversity in bats and resurrection plants”. Professor Illing explained that the term Evo-Devo or “Evolutionary-Development” links the evolution of morphology in living organisms with developmental genetics. Focusing on the membranous wings of bats that are supported by elongated digits of the hand, Professor Illing showed how these are a good example of morphological variation, as highlighted by Darwin 150 years ago when pondering the question of the evolution of limb diversity in vertebrates. Interestingly, during human embryonic development, the hand has webbing between the digits, but as development progresses, the webbing regresses freeing each digit. Bats, on the other hand, retain the inter-digital webbing between the digits, and the digits themselves continue growing for longer.

Prof. Illing and her research team have shown that expression of Sonic hedgehog, a gene known to be important for patterning hands and feet of all vertebrates, is uniquely reactivated for a second time during bat wing development. In the 1970s, she said, the accepted model was that gene duplication was a prerequisite for a change in gene function, but more recent research has shown that changes in regulatory elements that turn the genes on or off during development may also play an important role in generating functional diversity.

Turning to plants, Professor Illing noted that the important Evo-Devo question was whether the desiccation tolerance in the leaves and roots of a specialist group of plants known as resurrection plants evolved from the activation of seed desiccation genes. Desiccation tolerance refers to the ability of an organism to withstand or endure extreme dryness, or drought-like conditions. In plants, it could mean species that revive after seeming to be dead. After studying *Xerophyta humilis*, a plant whose family members are widespread in southern Africa, Illing and her research group have highlighted the importance of the central regulators of the germinating seed in the desiccation response of leaves of resurrection plants. “What we have seen is the reaction of existing genes’ regulatory pathways, which play an important role in generating diversity” said Illing.

Professor Illing explained how much of their current insight into gene regulation during development has been obtained from researchers working on human diseases. Illing highlighted how the study of the genetic basis of morphological diversity in bats and plants provides alternative, invaluable insights on how this occurs. “Our lessons on the genetic basis of diversity of morphology have taught us about development in the limb and the importance of Sonic hedgehog in stimulating bone growth and preventing regression of inter-digital membranes by cell death. This is important, because cancer arises when the processes of growth and cell death go wrong.

SCIENCE OUTREACH



Science Ambassadors

The Faculty has a dynamic group of Science Ambassadors (second, third and fourth year science students) who promote the faculty at schools in their home town and areas when they go home for varsity vacations. The idea behind this initiative is to promote our Science Faculty in areas UCT doesn’t usually reach through the usual marketing trips. The ambassadors are trained by the faculty and are provided with a presentation that they can deliver to school learners. The schools and learners have responded positively to this initiative, saying that in some cases it is the first time anyone from UCT has been to their schools. The ambassadors’ enthusiasm and passion for science is contagious and they have excelled at being really good ambassadors for science and for UCT.

Continues on next page...



MORE SCIENCE OUTREACH...



Science Day – Kensington High

Annually for the past five years, our Science Faculty is hosted by the local school in a community where we hold a Science Day. At this event all of our departments set up interactive exhibitions and engage with high school learners from that school, as well as from other surrounding schools in the area. In 2011 our Science Day was held at Kensington High School, where one of our graduates, Marvin Bester is a Science teacher. Caitlynne Francis, an alumnus of Kensington High, and a current Masters student in Botany at UCT, delivered an inspiring motivational talk to the learners.

Open Day at UCT

The Science Faculty, with its thirteen departments, has become such a draw-card at UCT Open Day that we have taken over Jameson Hall to host school learners and their parents and family at our interactive, engaging displays. Jameson Hall was abuzz with plants, sea creatures, rocks, skulls, chemicals, machinery and enthusiastic volunteers manning the stands and engaging with learners. The talks given on options in the Faculty were so well attended additional talks had to be added to accommodate interested parties.



Snapshot of the exciting world of Science – Posters for National Science Week

As a contribution to National Science Week, academics from the Science Faculty once again produced four engaging, scientifically up-to-date posters which were distributed to primary schools across the Western Cape. The 2011 topics were: The Wonders of Gravity; Carbohydrates and the Sweet Life; Metal Guzzling Plants and Teeth: Buried Treasure. The faculty has now produced 18 posters in total and these are used as a resource by teachers, learners and educators. To view or download these for free, go to: www.science.uct.ac.za/students/resources/posters/

Jack Elsworth Christmas Lecture: Under the Sea

The postgraduate students in the Department of Chemistry produced yet another entertaining science show for the annual Christmas Jack Elsworth lecture. This year's production was entitled "Under the Sea" and the mermaids, King Neptune, octopi, pirates and divers provided a huge amount of action and hilarity, as well as demonstrations on chemical interactions!



IN MEMORIAM

The Science Faculty is sad to report the deaths of two of its longest-serving and highly respected scientists, **Professor Johann Lutjeharms (Oceanography) and Associate Professor Wolf Brandt (Molecular and Cell Biology).**



Professor Johann Lutjeharms

Professor Johann Lutjeharms, of UCT's Department of Oceanography and one of Southern Africa's leading marine scientists and the foremost authority on the Agulhas Current, died on 8 June after a 10-year battle with cancer. He was 67 years old. Tributes to Lutjeharms poured in from across the world. He will be remembered and honoured for his academic passion, his prodigious contributions to peer-reviewed scientific literature, and the scores of international awards and other honours he received, as well as for his modesty and the support he provided to young researchers and students.

He served as a visiting academic at many universities around the world, thus building the international reputation of African marine science and knowledge of the oceans around this continent. He had been an A-rated researcher since 1998, identifying him as an international leader in his field.

Among the many accolades he received was the Order of Mapungubwe (Silver), the country's highest national honour, presented to him by President Jacob Zuma in 2010 for his outstanding contributions to and achievements in

oceanographic science. Lutjeharms was also a winner of the 2008 Individual Over a Lifetime Award from the National Science and Technology Forum.

Lutjeharms completed his undergraduate studies in Physics. In 1971 he received his MSc (cum laude) in Oceanography from UCT. He was awarded the Harry Crossley Bursary, the Fisheries Development Corporation postgraduate overseas bursary and the CSIR overseas bursary to study for a PhD at the University of Washington, where he graduated in 1977. In 1993 he became the founding director of UCT's Centre for Marine Studies.



Associate Professor Frederich Brandt

Associate Professor Frederich 'Wolf' Brandt, of the Department of Molecular and Cell Biology, died on 15 June, two days after his 66th birthday.

Brandt was born in Anderbeck, East Germany, in 1945, and was raised in Namibia. He obtained his BSc and BSc honours degrees in chemistry from UCT, the latter in 1968. He obtained his PhD degree in biochemistry at UCT in 1973, under the supervision of the late Professor Claus von Holt, on the amino acid sequence of chicken histone F3.

Brandt joined the academic staff of the former Department of Biochemistry in 1974 as a lecturer, and progressed through the ranks to Associate Professor in 1981.

His histone sequencing work led to important insights into structure/function relationships, such as the multidomain structure of histones, with highly-conserved central sequences and more variable N- and C-terminal domains.

In more recent years he studied the biochemistry of polyphenols and their role in plant and yeast desiccation tolerance. He published 73 papers in peer-reviewed journals during his career, and his histone work in particular has been very well cited.



Jumping cockroach leaps into world's top ten species



A small jumping cockroach from Table Mountain National Park has topped the 2011 list of the World's 10 top species. This list is produced annually by the International Institute for Species Exploration at Arizona State University, who with a special committee of international scientists announced their selection on 23 May 2011 (<http://species.asu.edu/Top10>). Also included on this year's list were an underwater mushroom, a single-toothed leech, a new species of duiker, and a two metre fruit-eating lizard. The list highlights some of the more amazing species that have only been recently-discovered, and by doing so strengthens the case for habitat conservation. Many of these species have popular appeal, and thus act as flagship species for conservation of the areas where they occur. Fortunately, the jumping cockroach occurs in a protected area that is mostly free of alien vegetation and other threats. Currently it is only known from a very small area, but further work is required to establish its accurate distribution. The Cape Peninsula is renowned for its exceptional plant and faunal endemism, with at least 130 animals occurring only on the Peninsula and nowhere else.

The world's first and only known jumping cockroach was recently discovered by UCT Zoologist Associate Professor Mike Picker and Dr Jonathan Colville (SANBI). The species was described in 2010, and named *Saltoblattella montistabularis* (literally "Small jumping cockroach from Table Mountain"). Leaproach, as it is commonly known, bears little superficial resemblance to a typical cockroach, instead resembling a small grasshopper. It is a small (1 cm long), brightly-coloured insect that is very active during the day, where it lives with grasshoppers amongst restios and grasses. Its body has converged with that of grasshoppers in terms of the adaptations required for jumping. Leaproach has enormous hind legs which propel its jumps. In addition, the eyes are huge and bulging, to provide improved vision which enable it to land accurately on distant grass perches. It feeds on the droppings of the grasshoppers which share its habitat in the Silvermine area of the Table Mountain National Park. In addition, the antennae are strengthened in a very unusual manner to prevent damage to them that would be caused by the large forces generated during take-off. They have a unique double articulation at their base with the head, allowing them to be folded flat along the body after experiencing the initial whiplash force experienced at the onset of the jump. This prevents breaking of these delicate and long sensory structures. The underside of the foot is also unusually roughened to enable firm purchase to the substrate in take-off, and possibly landing. It also lacks wings, which have now been reduced to small scales.

Apart from these very unusual adaptations for jumping, Leaproach is for all intents and purposes, a conventional cockroach, and is quite closely related to the common household German cockroach. The primary function of its spectacular jumping abilities, appear to be locomotion, as jumping is its main form of movement. What is more puzzling is why just a single cockroach, amongst the 4 000-odd known species, should have evolved jumping? Fossil proto-cockroaches with enlarged hindlegs are known, but it is uncertain if they could jump, and in addition, they are quite unrelated to modern cockroaches. Associate Professor Mike Picker and co-authors Malcolm Burrows (Cambridge) and Jonathan Colville (SANBI) have recently published a paper on the jump mechanics of Leaproach in the journal *Biology Letters*. According to Mike Picker, *Saltoblattella* is an accomplished jumper: "It outperforms locusts in terms of its jumping abilities, being able to leap forward nearly fifty times its body length, compared to locust's twenty times its body length mumps. This amazing feat being accomplished by a 1cm long cockroach that remained undiscovered until 2011! Unusual deposits of the elastic protein resilin in the knee of Leaproach likely return the knee to its original shape after being deformed by the forces experienced during jumping.

It is possible that additional species of jumping cockroach, related to *Saltoblattella*, will be discovered in the fynbos biome, illustrating just how poorly-surveyed the insect life of this biome is compared to its plants. Another unusual discovery by Mike Picker and Jonathan Colville in the winter rainfall biomes of South Africa was that of a new insect order, the Heelwalkers (*Mantophasmatodea*) in 2002. The entire order is restricted to Southern Africa. The little Leaproach is a great addition to the impressive biological wealth of the Table Mountain National Park.



New study says ancient hominid males stayed home while females roamed



The males of the two bipedal hominid species that roamed the South African savannah more than a million years ago were stay-at-home kind of guys when compared to the gadabout gals, says a new high-tech study led by the University of Colorado Boulder. Dr Petrus le Roux from the Department of Geological Sciences at UCT, was part of a team which studied teeth from a group of extinct *Australopithecus africanus* and *Paranthropus robustus* individuals from two adjacent cave systems in the Sterkfontein-Swartkrans area in South Africa.

The research team used high-tech laser ablation mass spectrometry to measure isotope ratios of strontium in the hominid tooth enamel in order to identify specific areas of landscape use. A naturally occurring element, strontium, is found in rocks and soils and is absorbed by plants and animals and becomes incorporated in the enamel of their teeth during development. Since unique strontium signals are tied to specific geological substrates – like granite, basalt, quartzite, sandstone and others, they can be used to reveal landscape conditions where ancient hominids grew up. Sandi Copeland, UC Boulder Adjunct Professor and lead study author explains, “The strontium isotope ratios are a direct reflection of the foods these hominids ate, which in turn are a reflection of the local geology”. The researchers found that the strontium isotope signals in half of the female teeth indicated that they were derived from outside the local area, which contrasted with that of the males. In the latter only about ten percent suggested that they were from elsewhere, implying that the males probably grew up and died in the same area.

Sandi Copeland said, “One of our goals was to try and find something out about early hominid landscape use. Here we have the first direct glimpse of the geographic movements of early hominids, and it appears the females preferentially moved away from their residential groups.” She said that the new study results were somewhat surprising as they had assumed that more of the hominids would be from non-local areas, as it is generally thought that the evolution of bipedalism was due in part to allow individuals to range longer distances. “Such small home ranges could imply that bipedalism evolved for other reasons”, Copeland said.

Professor Matt Sponheimer, UC-Boulder anthropologist and a co-author of the article, says, “It is difficult enough to work out relations between the sexes today, so the challenges in investigating the ways that male and female hominids used the landscape and formed social groups over a million years ago, are considerable. Disembodied skulls and teeth are notoriously poor communicators, so the real difficulty with a study like this is finding new ways to make these old bones speak”. The female dispersal pattern seen in the two hominid groups is similar to that of many modern humans, chimpanzees and bonobos, but unlike most other primates, including gorillas, where one or two males dominate a group of females, explained Copeland. “This study gets us closer to understanding the social structures of ancient hominids, since we now have a better idea about the dispersal patterns”, she said.